Mathematics

Teacher's Manual

Grade 3

Papua New Guinea
Department of Education

JICA

Issued free to schools by the Department of Education

First Edition

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The Mathematics curriculum officers, textbook writers, pilot teachers from NCD and Central Provinces and the Subject Curriculum Group (SCG) are acknowledged for their contribution in writing, piloting and validating this teacher's manual.

The Curriculum Panel members, members of the Subject Advisory Committee (SAC) and the Basic Education Board of Studies (BEBOS) are also acknowledged for their advice, recommendation and endorsement of this teacher's manual.

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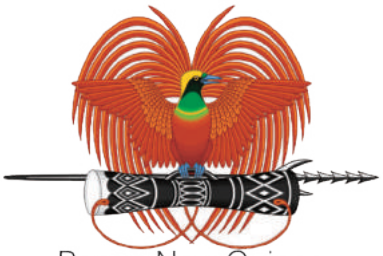
Mathematics Teacher's Manual

Grade 3



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Secretary's Message

Dear Teacher,

The Mathematics Teacher's Manual is produced for Grade 3 teachers to help and guide them to plan and teach the Mathematics lessons in line with the National Mathematics Textbook for Grade 3 students. The Textbook and Teacher's Manual were developed for quality teaching and learning by our Curriculum Officers, Textbook Writers and Pilot Teachers, who have worked together with Japanese Subject Specialists for 3 years.

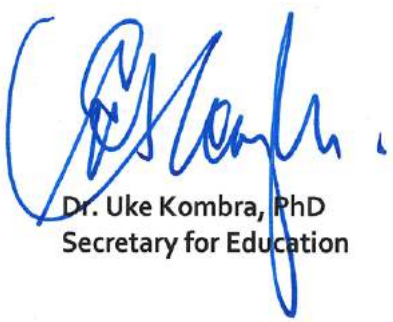
The Teacher's Manual is designed to achieve the implemented curriculum of the content standards outlined in the syllabus. It provides suitable teaching and learning content and concepts for the primary school teachers to promote and maintain standard lessons for daily, termly and yearly teaching and learning activities Nationwide.

The Teacher's Manual guides critical thinking and problem-solving approach in which you can easily visualise the concept in the lesson flow that is expanded from the textbook. It addresses necessary areas of what to teach, how to teach and what to measure (assess). The manual is user friendly and reflects PNG contexts in daily situations to help students acquire knowledge, skills, attitudes and values set through the lesson objectives.

We understand that some teachers are confident in teaching mathematics and some are not. This Teacher's Manual introduces many new approaches for lessons with more mathematics teaching aids, full utilisation of the blackboard using students' ideas and prior knowledge. It will help you to teach mathematics processes step by step with necessary information to a standard or higher level. Therefore, you can demonstrate and improve your lessons with new teaching approaches through careful reading and preparation of each lesson using this Teacher's Manual.

You are encouraged to use the Teacher's Manual and Textbook with other relevant resources to deliver the mathematics contents with enjoyment and for your students to have fun and love mathematics.

I commend this Teacher's Manual for Grade 3 Mathematics to be used with the National Textbook as an official resource for teaching in all primary schools throughout Papua New Guinea.



Dr. Uke Kombra, PhD
Secretary for Education

Introduction

The Teacher's Manual has been developed for teachers to teach learning contents to their students more effectively with the National Textbook. The features of this Teacher's Manual and its contents correspond to the National Mathematics Textbook according to Grades 3-5 Mathematics Syllabus. The standards outlined in the syllabus are reflected in this Teacher's Manual to help teachers plan and conduct lessons.

The Prelimenary pages of the Teacher's Manual consists of the following 7 sections:
How to Use Teacher's Manual, Lesson Presentation using TB and TM, How to use Blackboard plan, Assessment, Attachments, Yearly Overview and Mental Mathematics Skills.

It is important for you to take time to read and understand how to use the Textbook and the Manual.

1. How to use the Teacher's Manual

In order to use the Teacher's Manual effectively, it is important to understand the composition of the National Textbook.

1.1 Composition of National Textbook

The composition of the National Textbook consists of the following features.

1. Heading colours of the Textbook

Heading colour for each term changes to assist teacher to recognise teaching periods.

2. Titles and Numbers

Each chapter consists of Chapter and Sub-chapter titles with numbers. All problems in the textbook have Task and activities using numbers to indicate. We call 1 as task 1 and 1 as activity 1.

3. Students' ideas

Textbook uses students' ideas for students to think and reason mathematically. Basically, students learn using prior ideas to higher order thinking.

4. Activity Symbol

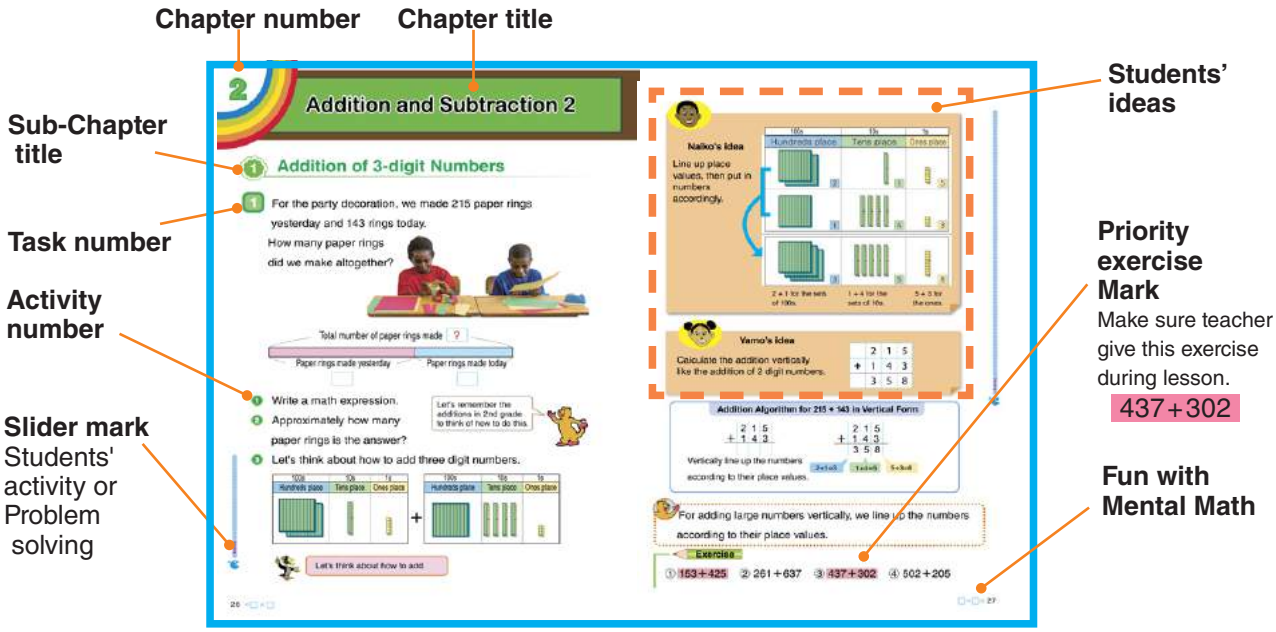
Some chapters have Ice breaking activity as the lead up activity for chapter.

5. Fun with Mental Math!

26 = □ × □

The students can enjoy by filling in the boxes with numbers where the answer equate to the page numbers.

Sample Textbook page



"Necessary Competencies acquired through the use of textbook"

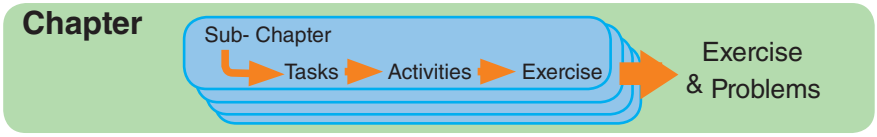
Experimental mathematical activities such as "measure", "compare", "divide", "order", "touch", "pile up" and "throw" are contained in all grades. It is intended to develop the ability and skills to be able to solve various problems logically in daily life by considering many ways.

Mathematical Literacy

Activities for improving reading, expression and comprehension abilities and skills are contained in relating formulas, letters and graphs. In addition, textbooks are designed in order to use acquired abilities and skills for future learning content and daily life situations.

Structure of a Chapter in the Textbook

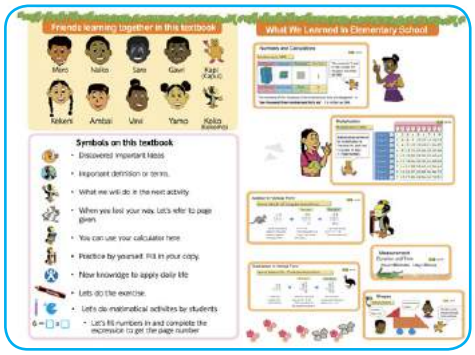
The structure in the Chapter consists of several Sub-Chapters, Tasks, Activities, Exercises and ends with a set of Exercise and Problems.

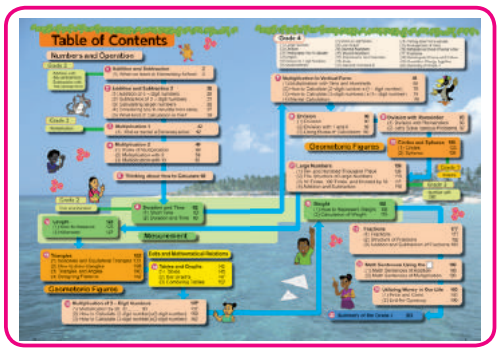


Parts of the Textbook

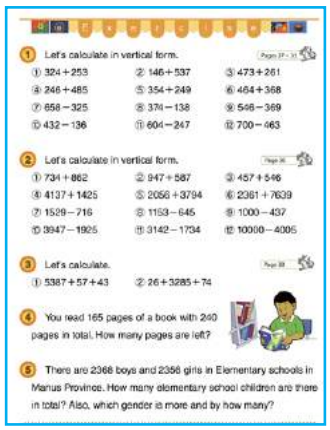
Textbook Introduction Page

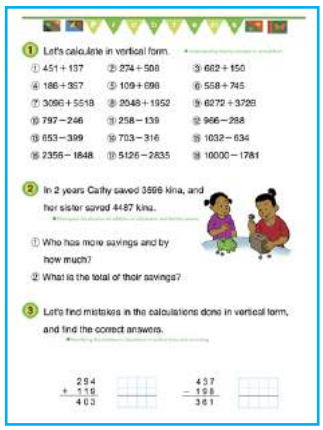
The introduction page consist of two pages which introduces very important information and icons allowing students and teachers to be familiar with what is expected to be encounted in the textbook. It also has chapters learned from previous grade outlined carefully and a table of contents. It promotes sequences of learning to help teachers to plan and program effectively.





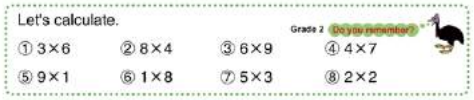
Exercise & Problems





At the end of each chapter, Exercises are set for students to consolidate what has been learnt in a particular chapter. Page numbers indicating specific content found for each exercise is tagged beside each exercise. The Problems are placed after each exercise in each chapter. The problems are more advanced in order to enhance students higher order thinking skills for each chapter. It also guides students to apply what they have learnt.

Revison "Do you remember?"



This section of the textbook is purposely for revision. Before moving into the next chapter, these set of exercises will enable students to reflect to the contents covered in the past and relate to the new chapter. This also promotes solidifying of previous content.

Additional Information

Additional information is placed in some units to relate the content covered to cultural and social aspects of life. It helps the students to think mathematically in solving daily life situations.

1.2 Main content of the Teacher's Manual

The layout of the Teacher's Manual has 9 components, Basic lesson information, Objectives, Prior Knowledge, Assessment, Preparation, Lesson flow, Teacher's note, Sample Blackboard Plan and reduced textbook page. The information given in each component will help in preparing and conducting lessons. Therefore, it is strongly recommended that the manual is read and understood before planning each lesson.
Teachers should use Chapters and Sub-Chapters in the textbook and Units and Sub-units in the Teachers' Manuals.

Lesson information

Basic information consists of unit title, sub-unit or topic and lesson number for each sub-unit. The textbook page and actual lesson number is indicated for easier reference.

Sub-unit objective

Each Unit consists of one or more sub-units and is indicated only at the beginning of each sub-unit. The Sub-unit objectives explain specific Attitudes,Skills, Knowledge and Mathematical Thinking (ASK-MT) which should be achieved in this sub unit.

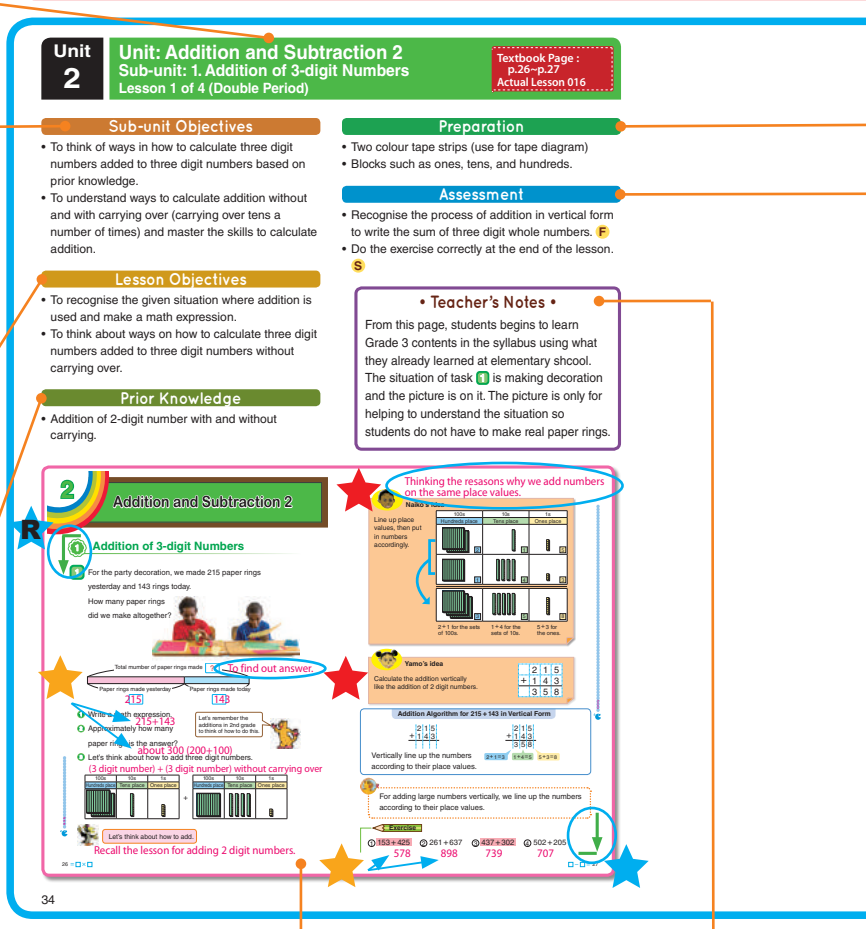
Lesson objective

Objectives capture the ASK-MT of every lesson that should be achieved.

Prior Knowledge

Prior knowledge describes contents that students should have acquired before the new lesson. In the case where students are not ready to learn new concepts, the teacher can identify which contents to review and refer back to while teaching.

Teacher's Manual page sample



Reduced Textbook page of the lesson

Corresponding textbook page is shown at the bottom of the left page.
The following are written in the page.

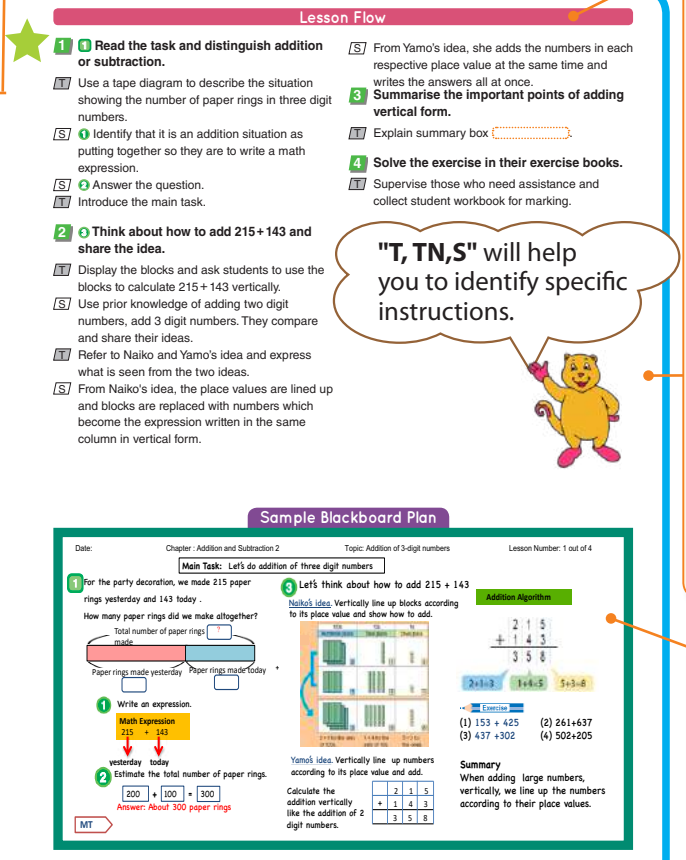
- **Lesson span** :Where the lesson begins and ends is indicated.
- Answers and solutions of the Tasks, Activities, Problems and Exercises.
- Teaching points such as; Purpose of the Tasks, Exercises and Problem types and characteristics of the problem, calculation and concepts.

Assessment

There are two types of assessment in this textbook, 'Formative F' and 'Summative S'. The details are shown on page XI.

Preparation

The preparation specifies the materials or resources which are recommended for use in the lesson. Some materials may not be available or accessible in the local community. In such cases, teachers are encouraged to improvise or replace them with other relevant and available materials.



Lesson Flow

1 ① **Read the task and distinguish addition or subtraction.**

T Use a tape diagram to describe the situation showing the number of paper rings in three digit numbers.

S ① Identify that it is an addition situation as putting together so they are to write a math expression.

S ② Answer the question.

T Introduce the main task.

2 ③ **Think about how to add 215+143 and share the idea.**

T Display the blocks and ask students to use the blocks to calculate 215+143 vertically.

S Use prior knowledge of adding two digit numbers, add 3 digit numbers. They compare and share their ideas.

T Refer to Naiko and Yamo's idea and express what is seen from the two ideas.

S From Naiko's idea, the place values are lined up and blocks are replaced with numbers which become the expression written in the same column in vertical form.

S From Yamo's idea, she adds the numbers in each respective place value at the same time and writes the answers all at once.

3 **Summarise the important points of adding vertical form.**

T Explain summary box .

4 **Solve the exercise in their exercise books.**

T Supervise those who need assistance and collect student workbook for marking.

"T, TN,S" will help you to identify specific instructions.

Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Topic: Addition of 3-digit numbers Lesson Number: 1 out of 4

Main Task: Let's do addition of three digit numbers

1 For the party decoration, we made 215 paper rings yesterday and 143 today .

How many paper rings did we make altogether?

Total number of paper rings made

Paper rings made yesterday + Paper rings made today

1 Write an expression.

Math Expression 215 + 143

yesterday today

2 Estimate the total number of paper rings.

200 + 100 + 300

Answer: About 300 paper rings

MT

3 Let's think about how to add 215 + 143

Naiko's idea. Vertically line up blocks according to its place value and show how to add.

Yamo's idea. Vertically line up numbers according to its place value and add.

Calculate the addition vertically like the addition of 2 digit numbers.

Addition Algorithm

2 1 5
+ 1 4 3
3 5 8

2+1=3 1+4=5 5+3=8

Exercise

(1) 153 + 425 (2) 261+637
(3) 437 +302 (4) 502+205

Summary

When adding large numbers, vertically, we line up the numbers according to their place values.

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Teacher's Notes

Contains supplementary information that is useful to teachers and enhance their content background knowledge.

Lesson flow

A lesson flow consists of several teaching points that will help in the understanding and visualization of the lesson sequence. It is important to read this part in preparation for the lesson.

T : What the teacher should do and say during the lesson.

TN : Supplementary information or key ideas and points that should be considered when conducting the lesson.

S : Students' expected responses and what they are expected to do during the lesson.

1 The number in the square corresponds to the "Task" in the textbook.

1 The number in the circle corresponds to the Activity in the Textbook content of the lesson. Important point to be emphasised during the lesson as below boxes.

Blackboard Plan

Shows a plan of how the blackboard can be arranged and should be utilized as a guide. (Refer to page X)

It is very important to read these information before conducting the lesson to understand the objective of the lesson.

1.3 Other Contents: Chapter Introduction Page

The Chapter Introduction page is found at the beginning of every Unit and consists of the Unit Objectives with specific numerical representations of the Content Standards and Performance Standards in the Syllabus, Teaching Overviews and Related Learning Contents.

1. Unit Objective

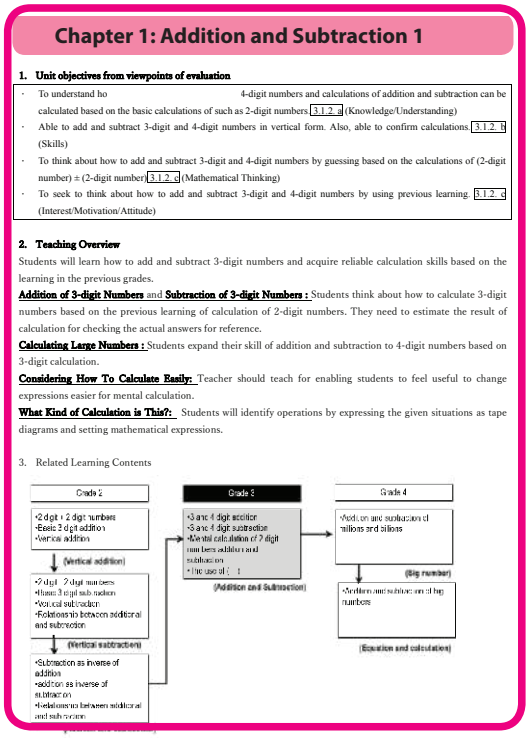
Outlines the key ASK-MT that students are expected to learn or acquire at the end of each unit. There may be one or more unit objectives for each unit depending on the unit capacity and content.

2. Teaching Overview

Outlines the main content areas to be covered in each unit with sub units briefly described to rationalize an overview of the unit. This section can also assist the teachers to be aware of the type of content expected in each unit and prepare in advance.

3. Related Learning Content

Shows the content map of what the students have learned already, in-line with the current unit to be taught. The previous content covered will serve as the foundation for students to learn new concepts and contents. Furthermore, the current unit to be learned is also linked to the next learning area and grade level.



Chapter 1: Addition and Subtraction 1

1. Unit objectives from viewpoints of evaluation

- To understand ho 4-digit numbers and calculations of addition and subtraction can be calculated based on the basic calculations of such as 2-digit numbers. 3.1.2. a (Knowledge/Understanding)
- Able to add and subtract 3-digit and 4-digit numbers in vertical form. Also, able to confirm calculations. 3.1.2. b (Skills)
- To think about how to add and subtract 3-digit and 4-digit numbers by guessing based on the calculations of (2-digit number) ÷ (2-digit number) 3.1.2. c (Mathematical Thinking)
- To seek to think about how to add and subtract 3-digit and 4-digit numbers by using previous learning. 3.1.2. d (Interest/Motivation/Attitude)

2. Teaching Overview

Students will learn how to add and subtract 3-digit numbers and acquire reliable calculation skills based on the learning in the previous grades.

Addition of 3-digit Numbers and **Subtraction of 3-digit Numbers :** Students think about how to calculate 3-digit numbers based on the previous learning of calculation of 2-digit numbers. They need to estimate the result of calculation for checking the actual answers for reference.

Calculating Large Numbers : Students expand their skill of addition and subtraction to 4-digit numbers based on 3-digit calculation.

Considering How To Calculate Easily: Teacher should teach for enabling students to feel useful to change expressions easier for mental calculation.

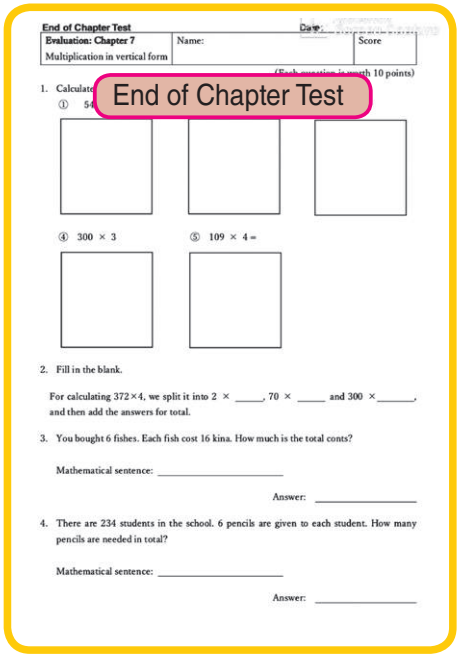
What Kind of Calculation is This?: Students will identify operations by expressing the given situations as tape diagrams and setting mathematical expressions.

3. Related Learning Contents

Grade 2 · Grade 3 · Grade 4

1.4 Other Contents: End of Chapter Test

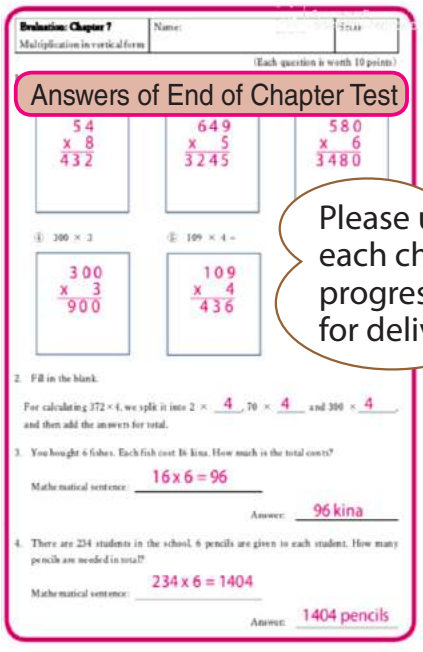
At the end of each unit in the Teacher's Manual, there is an attached End of Chapter Test.
The test is purposely used to measure how much content and mathematical concepts the students have understood and acquired for each Chapter. This will also help teachers and students to understand better and observe vital areas to be improved in both teaching and learning.



End of Chapter Test

Evaluation: Chapter 7 — Multiplication in vertical form — Name: — Score — Date:

1. Calculate
   ① 54 × 8 = ② 649 × 5 = ③ 580 × 6 =
   ④ 300 × 3 ⑤ 109 × 4 =
2. Fill in the blank.
   For calculating 372×4, we split it into 2 × ____, 70 × ____ and 300 × ____, and then add the answers for total.
3. You bought 6 fishes. Each fish cost 16 kina. How much is the total costs?
   Mathematical sentence: _____
   Answer: _____
4. There are 234 students in the school. 6 pencils are given to each student. How many pencils are needed in total?
   Mathematical sentence: _____
   Answer: _____



Answers of End of Chapter Test

Evaluation: Chapter 7 — Multiplication in vertical form — Name:

(Each question is worth 10 points)

① 54 × 8 = 432 ② 649 × 5 = 3245 ③ 580 × 6 = 3480

④ 300 × 3 = 900 ⑤ 109 × 4 = 436

2. Fill in the blank.
   For calculating 372×4, we split it into 2 × 4, 70 × 4 and 300 × 4, and then add the answers for total.
3. You bought 6 fishes. Each fish cost 16 kina. How much is the total costs?
   Mathematical sentence: 16×6=96
   Answer: 96 kina
4. There are 234 students in the school. 6 pencils are given to each student. How many pencils are needed in total?
   Mathematical sentence: 234×6=1404
   Answer: 1404 pencils

Answers of the end chapter test is located before a page of End of chapter Test as sample on left.

Please use the evaluation test in each chapter to confirm students' progress and challenge each step for delivering the best lessons!!

2. Lesson presentation using TB and TM

In every lesson preparation, teachers should always consider what to do before, during and after the lesson. Both the TM and TB must be used to conduct a successful lesson.

2.1 Lesson Preparation

When preparing a mathematics lesson the following requirements should be considered;

1. Ensure to have both TB and TM and read and understand the lesson content.
2. Review previous lesson and understand the next day's lesson before delivering the current lesson.
3. Work out the answers to the activities and exercises in advance.
4. Study the Sequence of the lesson, relate to the blackboard plan and visualise how to use it.
5. Prepare teaching materials prior to the lesson.
6. Plan and prepare according to the recommended time.

2.2 Lesson Presentation

When you have prepared your lesson, you should now be ready to present your lesson. Consider the following points during the lesson.

1. Have only the TM during the presentation of the lesson.
2. Review students prior knowledge.
3. Present the task or problem situation from the textbook.
4. Encourage problem solving approach and facilitate group or general discussions.
5. Analyse and consider students' opinions or findings and always direct misconceptions back to the main concept.(Formative Assessment)
6. Encourage students to do homework for consolidation of skills. (Formative and Summative Assessment)
7. Assist students to master the skills in the lesson content through the exercises and problems. (Formative and Summative Assessment)
8. Evaluate and summarise important points, concepts or ideas learnt and predict what is expected to be learned in the next lesson.

Dos

1. Strictly follow Teachers Manual with reference to the Textbook.
2. Conduct experimental activities when necessary.
3. Expansion of student ideas in the textbook.

4 Involve students in outdoor exercises when required to.

5. Encourage students to use mathematical tools or instruments appropriately for its purpose.
6. Encourage more student interactions.
7. Every lesson is important as concepts are linked from one lesson to the next lesson.

2.3 Lesson Evaluation

After the lesson, teachers should reflect on the lesson taught and evaluate students achievements and do self reflection.

These can be done through;

1. Marking of exercises or tasks done.
2. Observation checklists.
3. Review of board plan.
4. Student responses during summary of the lesson.
5. Making adjustments based on the evaluation to improve teaching strategists lessons may require re-teaching.

3. How to use blackboard plan

The Blackboard is an important tool for teachers to use daily. This TM introduces the strategy for enhancing the effective use of the blackboard to Improve Student Learning. The whole blackboard should be utilised fully from left to right corresponding to the lesson flow.

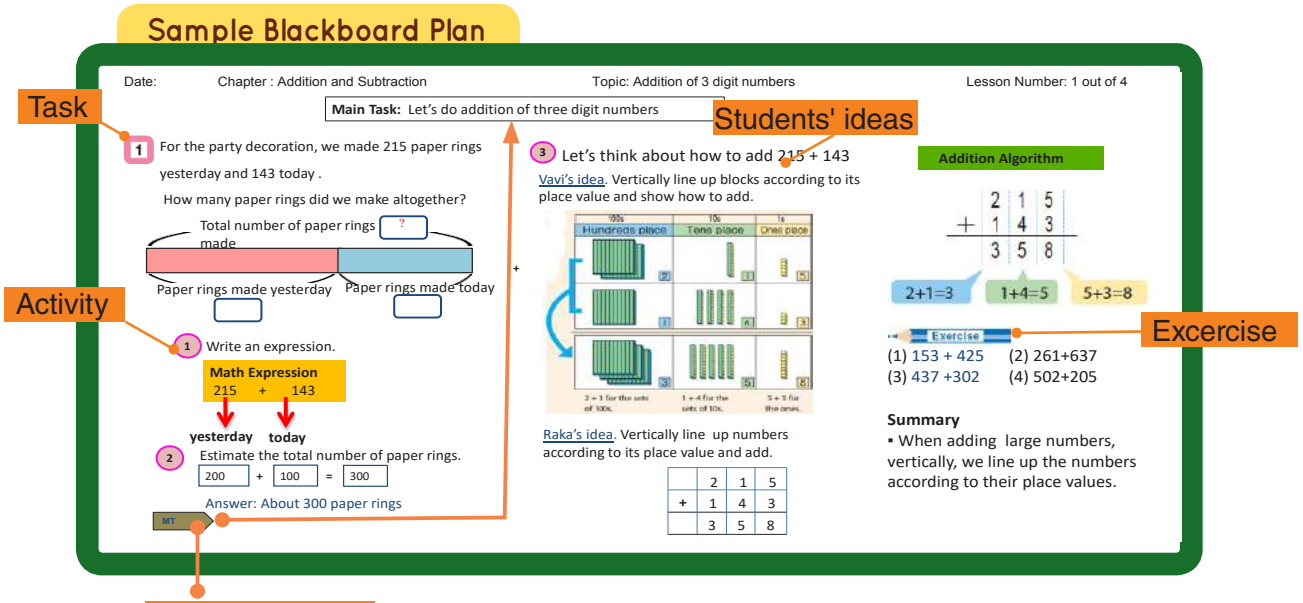
Use the blackboard according to the following steps.

1. Ensure that the whole blackboard is clean.
2. Write Date, Chapter, Topic and lesson number from the top left hand corner to the right.
3. Follow the sequence of the lesson working from left to right according to the blackboard plan including:
   a) Main Task Heading (MT)*
   b) Review(Where necessary)
   c) Student Ideas and textbook ideas
   d) Important points
   e) Tasks and activities (practices)
   f) Summary (All of the components will depend and correspond with the flow of the lesson.)

Points to consider.

1. Write in a very organised manner so the students can see connections and is visible from all parts of the room.
2. Check what you write as you write if we intend students to copy it down in their exercise books to learn.
3. Encourage students to display their ideas on the blackboard by writing and explaining what they have and promote student centred learning.
4. Allow students sufficient time to copy what you wrote.
   (Students should copy only the important points, not necessary to copy all.)

At end of lesson, it is time for summary of the lesson. Teachers should summarise using whole black board to point out important points.



*MT: Main task mark

The Main Task is introduced as indicated on the Blackboard plan according to the lesson flow. In this sample blackboard plan, the teacher proceeds with 1 (Task 1) 1 and 2 (activities 1 and 2), then writes and explains the Main task.

4. How to conduct Assessment

Assessment is a fundamental aspect of students mathematical learning and performance. Results of assessment will benefit the students in setting goals, take high responsibility for their own learning and become more independent learners.
There are two main types of assessment used in this book which is in line with the syllabus assessment to assess the students.
They are:
1. Formative Assessment (Assessment Of or As)
2. Summative Assessment (Assessment For)
This should guide teachers to prepare assessment tasks and methods.
You will find summative F and formative S assessment indicated in every lesson so it is important for you to plan how you want to assess students' learning and performance.

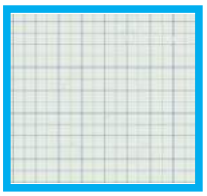
Formative assessment (F)
Formative assessment examples in the TM are:
1. Observation checklists
2. Correction of exercises
3. Analysis of discussions
4. Students' participation.

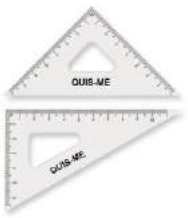
Summative assessment (S)
Summative assessment examples include:
1. Exercise and Problems
2. End of Chapter Test
3. Projects
4. Homework and Assignments.

5. Attachments

The Teacher's Manual has four attached pages that the teacher can use when teaching lessons. The pages consists of a 5 mm^2 grid, a 1 cm^2 grid, a 1 cm^2 dotted grid and triangle rulers and a protractor.

1. **5 mm^2 grid**
   The 5 mm^2 grid can be used for drawing graphs, sketching nets or solids and drawing various figures with 5 mm scale.
2. **1 cm^2 grid**
   The 1 cm^2 grid can be used for drawing graphs, sketching nets or solids and drawing with 1 cm scale.
3. **1 cm^2 dotted grid**
   The 1 cm^2 dotted grid can be used for drawing various lines, shapes or figures.
4. **Triangle rulers and protractor**
   The triangle rulers and protractor can be used to draw shapes and figures, measure and confirm lengths and angles.





6. Yearly Overview

Yearly overview is an essential and systematic plan of the grade content. It is helpful in the preparation of the yearly program to effectively plan for teaching strategies. The strand is outlined and identifies each unit and topic into different strand groups. The units are in sequential order from the first to the last unit.

Strand	Unit #	Unit & Topic	Lesson #	Single / Double	Page No.
Number & Operation (Recalling of Grade 1 and 2)	1	**Addition and Subtraction 1**			
		What We Learned in Elementary School			
		1.Addition and subtraction	1	S	2
			2	D	3
			3	S	4,5
			4	S	6
			5	D	7,8
			6	S	9
			7	S	10,11
			8	S	12,13
			9	S	14,15
			10	S	16,17
			11	S	18
			12	S	19,20
			13	S	21,22
			14	S	23,24
			15	S	25
Number & Operation	2	**Addition and Subtraction 2**			
		1. Addition of 3-digit Numbers	16	D	26,27
			17	D	28
			18	S	29
			19	S	30
		2. Subtraction of 3-digit Numbers	20	D	31,32
			21	D	32,33
			22	S	33
			23	S	34
			24	S	35
		3. Calculating Larger Numbers	25	D	36
		4. Considering How to Calculate More Easily	26	D	37,38
		5. What kind of Calculation is This ?	27	S	39
		6. Exercise and Evaluation	28	S	40,41
Recalling of Grade 1 and 2	3	**Multiplication1**			
		1. What We Learned in Elementary school			
		Meaning of Multiplication1	29	S	42,43
		Rules of Multiplication	30	S	44
		Multiplication table	31	S	45,46
		Let's memorise multiplication table 1	32	S	47
		Let's memorise multiplication table 2	33	S	48
Number & Operation	4	**Multiplication2**			
		1. Rules of Multiplication	34	D	49,50
			35	D	50,51
			36	D	52
			37	S	53
		2. Multiplication with 0	38	D	54,55
			39	D	56
		3. Multiplication with 10	40	S	57
		Exercise and Evaluation	41	D	58,59
	5	**Thinking about How to Calculate**	42	D	60,61
Measurement	6	**Duration and Time**			
		1. Short Duration	43	D	62,63
			44	S	64
		2. Duration and Time	45	S	65,66
			46	S	66
		Exercise and Evaluation	47	D	67,68
Number & Operation	7	**Multiplication in Vertical Form**			
		1. Multiplication with Tens and Hundreds	48	D	69
		2. How to Calculate (2-digit numbers)x (1-digit number)	49	S	70.71
			50	D	72,73
		3. How to Calculate (3-digit numbers) x (1-digit number)	51	D	74
			52	S	75
		4. Mental Calculation	53	S	76
		Exercise and Evaluation	54	D	77,78,79
Number & Operation	8	**Division**			
		1. Division	55	D	80,81,82,83
			56	S	84,85
			57	S	85
			58	D	86
			59	D	87
			60	D	88
		2. Division with 1 and 0	61	S	89
		3. Using Rules of Calculation	62	D	90
		Exercise and Evaluation	63	D	91,92

Under each unit in the Overview, the topics for each lesson are also indicated. For all topics, the actual lesson numbers are given according to the student textbook. Each lesson is recognised as either single (S) 30 minutes period or double (D) 60 minutes period. Finally, page numbers are attached to each lesson to easily identify the lesson topics for planning.
Note that in the Yearly overview, the term 'units' is used while the term 'chapter' is used in the textbook.

Strand	Unit #	Unit & Topic	Lesson #	Single / Double	Page No.
Number & Operation	9	**Division with Remainders**			
		1. Division with Remainders	64	S	93,94
			65	S	95
		2. Let's Solve Various Problems	66	S	96
		Exercise and Evaluation	67	D	97,98
Geometrical Figures	10	**Circles and Spheres**			
		1. Circles	68	D	99,100
			69	D	100,101
			70	D	101,102
			71	D	103,104
		2. Spheres	72	D	105,106
		Exercise and Evaluation	73	D	107,108
Number & Operation	11	**Large Numbers**			
		1. Ten and Hundred Thousand Place	74	D	109, 110
			75	S	111,112
		2. The Structure of Large Numbers	76	S	113,114
			77	D	114,115,116
		3. 10 Times, 100 Times and Divided by 10	78	S	117
			79	S	118
		4. Addition and Subtraction	80	S	119
			81	S	120
		Exercise and Evaluation	82	D	121,122
Measurement	12	**Length**			
		1. How to Measure	83	D	123,124,125
			84	S	126
		2. Kilometre	85	D	127,128
			86	D	129
			87	S	130
		Exercise and Evaluation	88	D	131.132
Geometrical Figures	13	**Triangles**			
		1. Isosceles and Equilateral Triangles	89	D	133
			90	D	134
			91	D	135
			92	D	136
			93	D	137
		2. How to Draw Triangles	94	D	138
			95	D	139
		3. Triangles and Angles	96	D	140
			97	S	141
		4. Designing Patterns	98	D	142
		Exercise and Evaluation	99	D	143, 144
Data & **Mathematical Relations**	14	**Tables and Graphs**			
		1. Tables	100	D	145, 146
		2. Bar Graphs	101	D	147, 148
			102	S	149
			103	D	150,151
		3. Combining Tables	104	D	152,153,154
		Exercise and Evaluation	105	D	155,156
Number & Operation	15	**Multiplication of 2-digit Numbers**			
		1. Multiplication by 20, 30, ...90	106	D	157,158
		2. How to Calculate (2-digit numbers) x (2-digit numbers)	107	D	159
			108	S	159,160
			109	D	161
		3. How to Calculate (3-digit numbers) x (2-digit numbers)	110	D	162
			111	S	163
		Exercise and Evaluation	112	D	164,165
		Making Tapes	113	D	166
			114	D	167
Measurement	16	**Weight**			
		1. How to Represent Weight	115	D	168,169
			116	D	169
			117	S	170
			118	D	171
			119	D	172
			120	D	173
			121	D	174
		2. Calculation of Weight	122	D	175
		Exercise and Evaluation	123	D	176
Number & Operation	17	**Fractions**			
		1. Fractions	124	D	177, 178
			125	S	179,180
			126	S	180,181
		2. Structure of Fractions	127	D	182
		3. Addition and Subtraction of Fractions	128	S	183
		Exercise and Evaluation	129	D	184,185
Number & Operation	18	**Math Sentences Using the ☐**			
		1. Math Sentences of Addition	130	D	186,187
			131	D	188,189
		2. Math Sentences of Multiplication	132	D	190,191
		Exercise and Evaluation	133	D	192
Money	19	**Using Money in Our Life**			
		1. Price and Coins	134	D	193,194,195
			135	D	196,197,198
		2. Unit for Currency	136	S	199, 200
			137	S	201,202
Summary	20	**Summary of 3rd Grade**			
			138	S	203,204
			139	S	205,206
			140	S	207
			141	S	208,209

7. Let's have fun for improving Math skills

Some interesting games are introduced in the textbooks for improving students mathematics thinking skills. Teachers are encouraged to facilitate these games during lesson time, recess, lunch and after lessons.
Below is an example of addition, subtraction and multiplication in a number card game to improve students' mental calculation skills.

Let's Play "Number Card Game"

Objective: Students will be able to do mental calculations of addition (up to 9+9), subtraction(up to 18−9) and the multiplication(up to 9×9).

When to play

It is very effective if you play the game 5 minuets at the beginning of every lesson.

How to play

1. Addition

Teacher gives the students a number to be added. Teacher shows different number cards and the students do mental calculation to add the number mentioned to the number shown as quickly as possible.
Example:
Teacher: "Please add 5 to the shown number card".
Show a number card (3).
Students: "8"
Teacher: Show a number card (6).
Students: "11"

2. Subtraction

Teacher gives the students a number to be subtracted from. Teacher shows different number cards and the students do mental calculation to subtract the number mentioned to the number shown as quickly as possible.
Example:
Teacher: "Please subtract the number shown on the card from 15".
Teacher: Show a number card (8).
Students: "7"
Teacher: Show a number card (6).
Students: "9"

3. Multiplication

Teacher gives the students a number to be multiplied. Teacher shows different number cards and the students do mental calculation to multiply the number given by the teacher with the number in the card and answer as quickly as possible.
Example:
Teacher: "Please multiply 3 to the shown number card".
Teacher: Show a number card (8).
Students: "24"
Teacher: Show a number card (5).
Students: "15"

Chapter 1 Addition and Subtraction 1

1. Unit Objectives

- To understand how to add and subtract 3-digit and 4-digit numbers and calculations of addition and subtraction can be calculated based on the basic calculations of such as 2-digit numbers. (3.1.2a)
- To add and subtract 3-digit and 4-digit numbers in vertical form. Also, able to confirm calculations. (3.1.2b)
- To think about how to add and subtract 3-digit and 4-digit numbers by guessing based on the calculations of (2-digit number) ± (2-digit number). (3.1.2c)
- To seek to think about how to add and subtract 3-digit and 4-digit numbers by using previous learning. (3.1.2c)

2. Teaching Overview

Unit 1 is revision of previous grades. In Unit 2, students will learn how to add and subtract 3-digit numbers and acquire reliable calculation skills based on the learning in the previous grades.

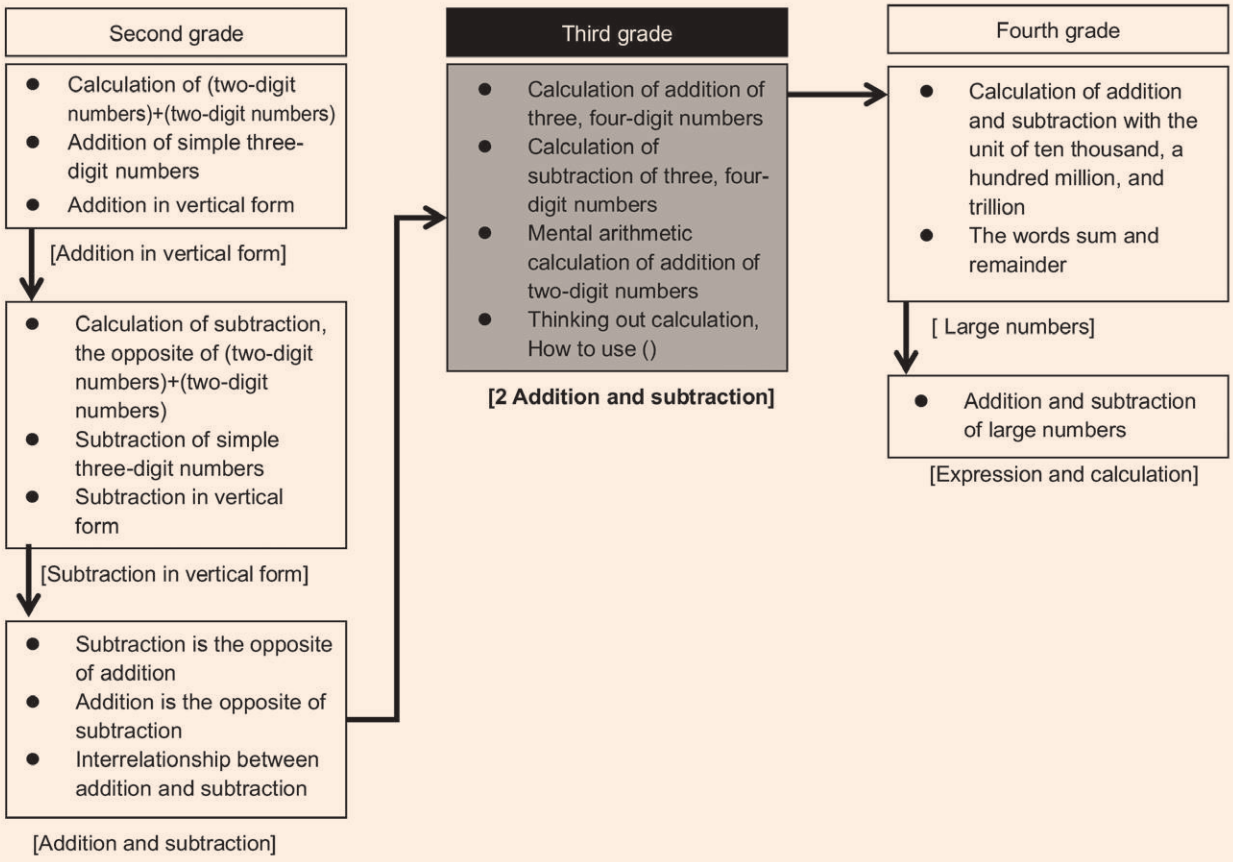
Addition of 3-digit Numbers and Subtraction of 3-digit Numbers : Students think about how to calculate 3-digit numbers based on the previous learning of calculation of 2-digit numbers. They need to estimate the result of calculation for checking the actual answers for reference.

Calculating Large Numbers : Students expand their skill of addition and subtraction to 4-digit numbers based on 3-digit calculation.

Considering How To Calculate Easily: Teacher should teach for enabling students to feel useful to change expressions easier for mental calculation by utilising commutative and associative laws.

What Kind of Calculation is This?: Students will identify operations by expressing the given and ungiven information as tape diagrams and setting mathematical expressions by considering the sizes of numbers.

3. Related Learning Contents



Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 1 of 15 lessons (Single Period)

Textbook Page :
p.2
Actual Lesson 001

Sub-unit Objectives

- To understand the meaning of addition and subtraction.

Lesson Objectives

- To appreciate posing various questions for addition to others.
- To explain different types of addition situations with the terms such as more, increase, altogether.
- To get answers of addition without counting by fingers.

Prior Knowledge

- Numbers 1 to 10 (Grade1)
- Composing and decomposing numbers (Grade1)

Assessment

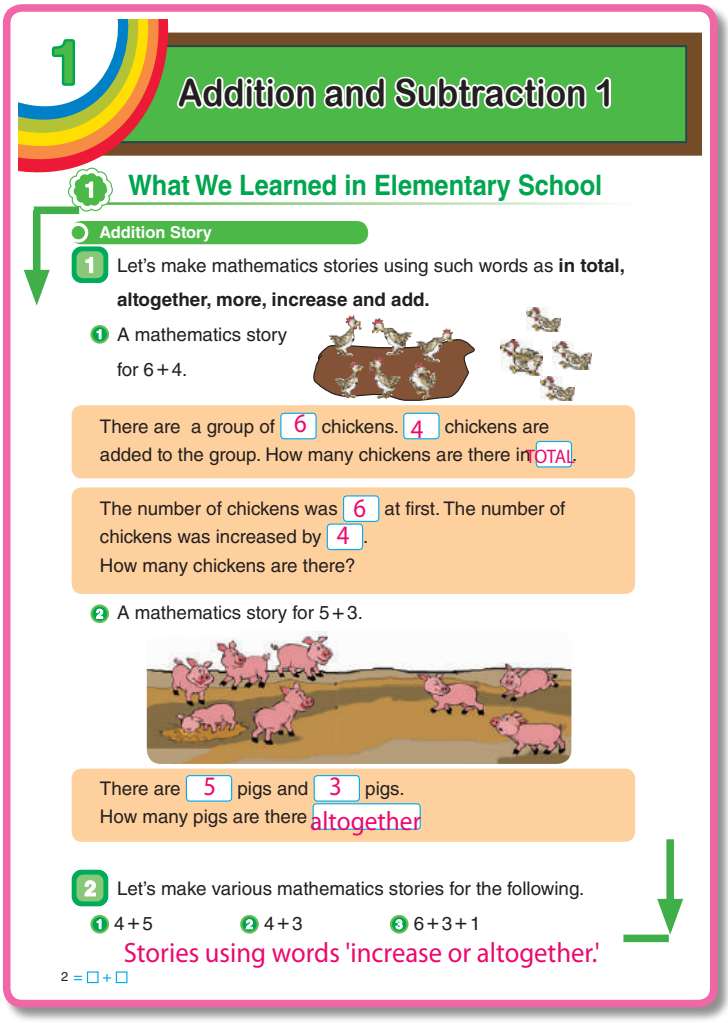
- Appreciate the addition stories for each other with the questions such as which questions are enjoyable for you and why. F
- Make math stories for addition. F S

• Teacher's Notes •

The content of this page is relearning of the contents at the Elementary School. If students do not learn well, the teacher needs to set the additional activities or home work necessary for students to enable them to learn third grade mathematics.

Key words: total, altogether, sum

Students should be encouraged to recall knowledge of writing mathematical sentences from mathematical stories and differenciate between total and altogether.
Action on the sentence add 4 to 6 means 6+4.



1 Addition and Subtraction 1

1 What We Learned in Elementary School

Addition Story

1 Let's make mathematics stories using such words as **in total, altogether, more, increase and add.**

1 A mathematics story for 6+4.

There are a group of 6 chickens. 4 chickens are added to the group. How many chickens are there in TOTAL.

The number of chickens was 6 at first. The number of chickens was increased by 4.
How many chickens are there?

2 A mathematics story for 5+3.

There are 5 pigs and 3 pigs.
How many pigs are there altogether

2 Let's make various mathematics stories for the following.

1 4+5 2 4+3 3 6+3+1

Stories using words 'increase or altogether.'

2 = □ + □

Lesson Flow

1 ① Make their own stories for 6 + 4.

T Ask students to make stories for 6 + 4.
Gives some time to students to think and write their ideas in their exercise books.
T Explain the use of the key words, total, altogether, added, increase in different math stories.
S Those who cannot make stories, draw pictures for the situation of 6 + 4.
T Introduce the main task.

2 Display the stories and drawing on the blackboard.

T What kind of words are used in those sentences?
S Increase, altogether, add, total…
T How many sentences are used for those stories?
S 2 or 3.

3 Compare student's stories and the stories of ① and ② shown in the textbook.

T Open the textbook. Let's compare your stories to story ①. Are they the same or different? How is it different from yours?
S My story used the word 'altogether' and story ② also use 'altogether'.
My story is finding altogether the number of the animals which are in the same place but story 1 is increasing.

4 ② Make various stories.

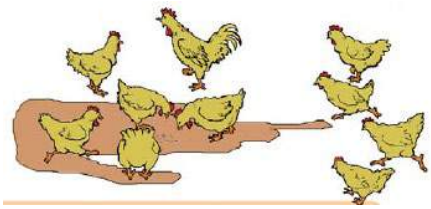
S Make stories focusing on the word of total, altogether, more, increase or others, and differentiating the story of increase or altogether.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Making addition stories Lesson: 1 of 15

Task: Let's think about making Addition Stories

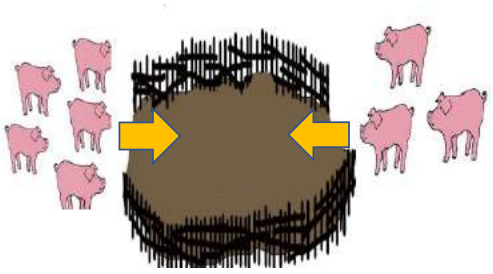
1 Make a math story for 6 + 4



There are [6] chickens [4] more chickens come in.
How many chickens are there in [total] ?

MT

Make a math story for 5 + 3



There are [5] pigs and [3] pigs to be fenced.
How many pigs are there [altogether] ?

Key words: total, altogether, sum

2 Make various math stories for the following.
1) 4+5
2) 4+3
3) 6+3+1

Summary

Summarise the lesson based on what the students have learnt.

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 2 of 15 (Double Period)

Textbook Page : p.3
Actual Lesson 002

Lesson Objectives

- To enjoy calculation of addition with addition cards
- To master calculation of addition with the use of the addition cards.
- To recognise patterns of how numbers change through lining up the addition cards.
- To get answers of addition without counting by fingers.

Prior Knowledge

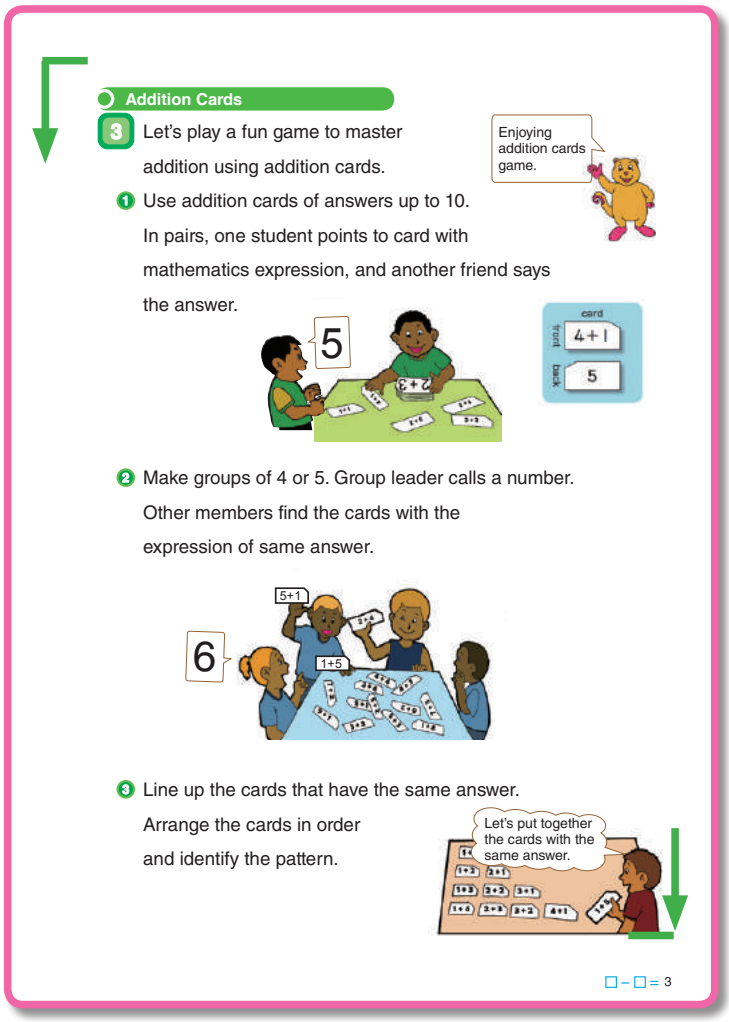
- Making various questions for addition. (Previous lesson)
- Different types of addition situations with the terms such as more, increase, altogether. (Previous lesson)

Preparation

- Make copies of Additon cards for the number of groups (attached Teacher's Manual page).
- Write answer at the back of each card.
- Scissors

Assessment

- Enjoy the game and find the answer without using fingers. F
- Find any pattern of the numbers through the activity. F
- Master the addition of less than 10. S



• Teacher's Notes •

Enjoy and learn mental addition

When students need to use their fingers for addition, it implies that they did not have appropriate opportunities to learn the mental calculation of addition which is written as the necessary learning contents in the elementary school syllabus. Teachers are recommended to give addition cards for this lesson.

- When teaching this lesson, please focus on enjoying the game to enable students to feel the necessity to calculate mentally to win. Practice for mental caluculation needs more time.
- Encourage students to arrange their cards in order in such a way that all horizontal rows should have the same answer and all vertical columns should have cards with the same augend.

Lesson Flow

1 (3) (1) Use the Addition cards, students practice in pairs guessing and telling the answers for each math expression.

T Explain how to use addition cards to the students.
S Get into pairs. One student shows a card with expression and the other give the answer.
S Change roles and continue the game.
T Introduce the main task.

2 (2) Play a card game of finding the cards with the same answer.

T Make groups of 4 to 5 and play a card game.
S One of the group members call a number and everybody in the group looks for all the math expression cards whose answer is the same number as mentioned. The person who wins the most cards wins the game.

3 (3) Line up the addition cards and identify a pattern of how numbers change.

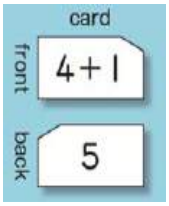
S Put the cards together with same answer.
T Why did you arrange your cards like this? Is there another way to arrange?
S Talk about what you notice by looking at the cards you lined up.
TN It is good if students notice various patterns and changes in the cards that they line up. For example, as for a vertical pattern, one number changes with some patterns, and as for a horizontal pattern, a number also changes with some patterns.

Sample Blackboard Plan

Date: **Chapter: Addition and Subtraction 1** **Topic: What we learned at Elementary** **Lesson: 2 of 15**

3 **Main Task: Let's think about using addition cards to master additions up to 10.**

1 Pair up.
1.Peer show an addition card
2.The other says the answer.



Remember!!
6 + 2, we call that 6 is Augends and 2 is Addends

2 Get into groups of 4 or 5.
1.Leader says a number.
2.Members find addition cards with the same answer.

5 + 1
2 + 4
1 + 5

Emphasis the use of words like total and altogether.

3 Line up the cards that have the same answer

Why did you arrange your cards like this? Is there another way to arrange? Explain

1+1	Row of answer 2							
1+2	2+1	Row of answer 3						
1+3	2+2	3+1	Row of answer 4					
1+4	2+3	3+2	4+1	Row of answer 5				
1+5	2+4	3+3	4+2	5+1	Row of answer 6			
1+6	2+5	3+4	4+3	5+2	6+1	Row of answer 7		
1+7	2+6	3+5	4+4	5+3	6+2	7+1	Row of answer 8	
1+8	2+7	3+6	4+5	5+4	6+3	7+2	8+1	Row of answer 9
1+9	2+8	3+7	4+6	5+5	6+4	7+3	8+2	9+1 Row of answer 10

MT

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 3 of 15 (Single Period)

Textbook Page : p.4~p.5
Actual Lesson 003

Lesson Objectives

- To identify the compositions of a number “10” .

Prior Knowledge

- Numbers 1 to 10 (Grade1)
- Composing and decomposing numbers (Grade1)

Preparation

- Blocks

Assessment

- Find the pattern of the number about composition of 10. F
- Find the number of composition 10 without counting or using fingers. F S

• Teacher’s Notes •

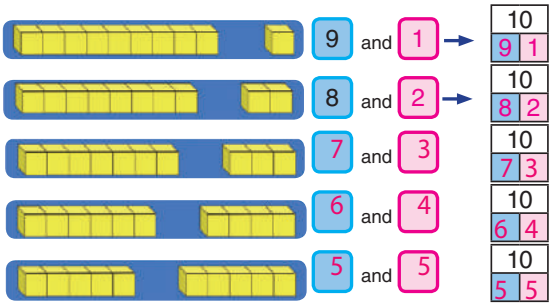
- T-Math
- T-Math is Table Mathematics. It is a total to assist student to do their calculation. Teacher read it holizontaly then vertically. Students can enjoy and find pattern of answers.
- In 6+2, 6 is the Augend and 2 is the Addend.
- Introduce the flash card game where teacher flashes number cards and students give answers using addition, subtraction and multiplication.

4 Let’s play making 10 by adding two numbers.

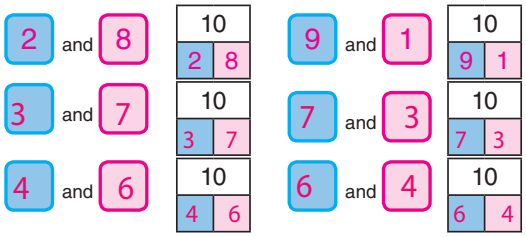
Teacher shows a number.

1 Look at teacher’s flash card from 1 to 9 and add a number to make 10

2 Look at the blocks and fill numbers in ☐ and ☐ to make 10.



3 Let’s find other cases to make 10. How do you find all cases?



4 Let’s add and find the same answers.

① 3+6 9 ② 6+4 10 ③ 6+0 6
④ 2+8 10 ⑤ 7+3 10 ⑥ 4+6 10

4 = ☐ + ☐

Teacher explains about augend and addend.

Let’s try T-Math calculation!! T-Math is a Table-Mathematics. You can find pattern of answers. It is so amazing! All the best! Have a fun!

Remember!! 6+2, we call that 6 is **Augends** and 2 is **Addends**

1 Let’s fill in the answer for addition, (augend) + (addend), in the following T-Math.

T-Math Addition		Addends									
		1	2	3	4	5	6	7	8	9	10
Augends	1	2	3	4	5	6	7	8	9	10	11
	2	3	4	5	6	7	8	9	10	11	12
	3	4	5	6	7	8	9	10	11	12	13
	4	5	6	7	8	9	10	11	12	13	14
	5	6	7	8	9	10	11	12	13	14	15
	6	7	8	9	10	11	12	13	14	15	16
	7	8	9	10	11	12	13	14	15	16	17
	8	9	10	11	12	13	14	15	16	17	18
	9	10	11	12	13	14	15	16	17	18	19
	10	11	12	13	14	15	16	17	18	19	20

2 Let’s fill in anwers for additional in the following T-Math.

T-Math Addition		Addends									
		1	2	3	9	10	5	6	7	8	4
Augends	7	8	9	10	16	17	12	13	14	15	11
	4	5	6	7	13	14	9	10	11	12	8
	3	4	5	6	12	13	8	9	10	11	7
	9	10	11	12	18	19	14	15	16	17	13
	10	11	12	13	19	20	15	16	17	18	14
	5	6	7	8	14	15	10	11	12	13	9
	6	7	8	9	16	16	11	12	13	14	10
	2	3	4	5	11	12	7	8	9	10	6
	8	9	10	11	17	18	13	14	15	16	12
	1	2	3	4	10	11	6	7	8	9	5

3 Let’s compare the tables 1 and 2 and explain how to tell the difference.

☐ − ☐ = 5

Lesson Flow

1 4 1 Play make 10 game with flash cards.

T Introduce the main task.

2 2 Fill in the boxes ☐ in the textbook..

T Guide students to realise that when they move a block from right to left (or vice versa), the numbers of blocks in each side will change.

T Should try to help students link the movement of block in the hands-on activity with how the numbers of blocks actually change.

TN The pattern “5 and 5” is the middle of all the combination patterns.

T When students use an expression such as “middle,” Teacher should ask the students to give some more explanations about their own idea and what they mean by “middle.”

3 3 Identify what two numbers make 10 and fill in the box.

S Think individually to find the answers and share the answer with friends.

TN All the answers should be given by students.

4 4 Solve the problems of addition.

• Teacher’s Notes •

Password game : Just like in a telling password game where student A says “mountain” and student B says “river,” or sugar-salt and red-white, this is a game of telling complements of 10 by reflex, i.e. 3-7 and 4-6. Teacher can incorporate this game at the beginning or the end of lessons so that the learning can be reinforced. It is recommended especially for early graders to continuously learn such number concepts in various different opportunities. It is more effective than trying to teach everything intensively in certain periods.

Sample Blackboard Plan

Date: **Chapter: Addition and Subtraction** **Topic: Making 10**

Task: Let’s pair up numbers to make 10

4 Make 10 by adding two numbers.

2 Fill in numbers to make 10

9	and	1	→	10 (9 1)
8	and	2	→	10 (8 2)
7	and	3	→	10 (7 3)
6	and	4	→	10 (6 4)
5	and	5	→	10 (5 5)

3 Find other pair of numbers that make 10

10 (4 6)	10 (2 8)	10 (0 10)
10 (3 7)	10 (1 9)	

“Middle”

10	10	10	10	10	10	10	10	10	10	10
10 0	9 1	8 2	7 3	6 4	5 5	4 6	3 7	2 8	1 9	0 10

The pattern “5 and 5” is the middle of the combination patterns

4 Add numbers and group additions that give the same answer.

10’s	9’s	6’s	3’s
2) 6+4	1) 3+6	3) 6+0	10) 0+3
4) 2+8			
5) 7+3			
6) 4+6			
7) 8+2			
8) 3+7			
9) 9+1			
11) 1+9			
12) 5+5			

Summary

Summarise the lesson based on what the students have learnt.

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 4 of 15 (Single Period)

Textbook Page : p.6
Actual Lesson 004

Lesson Objectives

- To appreciate posing various questions for subtraction to others.
- To explain different types of subtraction situations with the terms such as remain, left, more.
- To get answers of subtraction without counting by fingers.

Prior Knowledge

- Numbers 1 to 20 (Grade1)
- Composing and decomposing numbers (Grade1)

Preparation

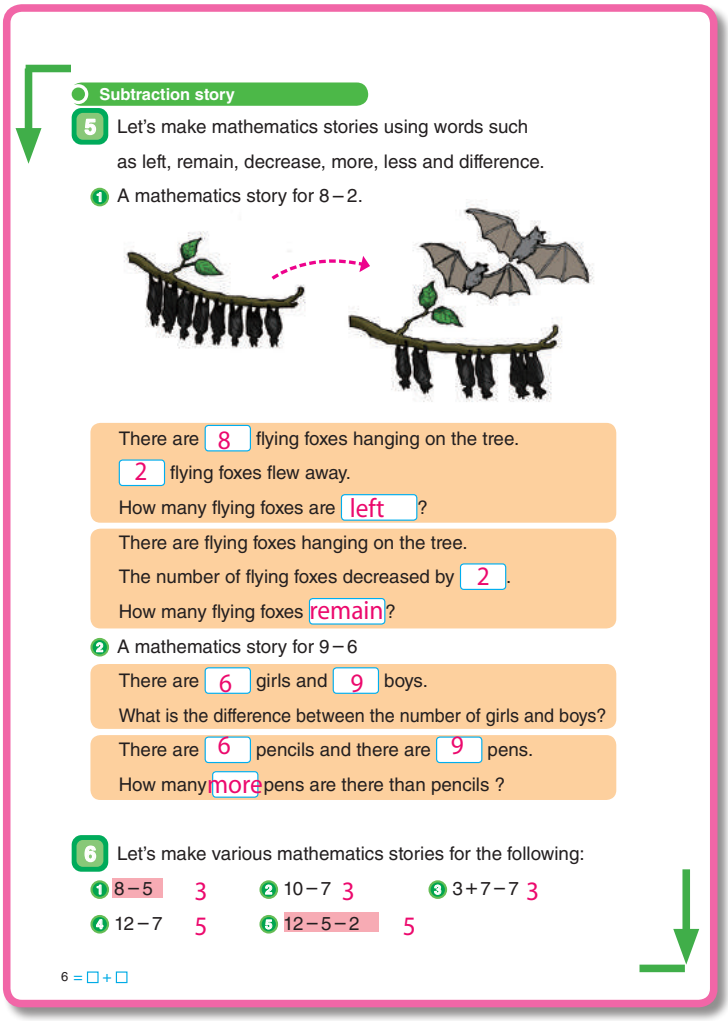
- Refer to the blackboard plan.

Assessment

- Appreciate the subtraction stories for each other with the questions such as which questions are enjoyable for you and why. F
- Make math stories for subtraction. F S

• Teacher's Notes •

Key words: Left, remain, difference and more



Subtraction story

5 Let's make mathematics stories using words such as left, remain, decrease, more, less and difference.

1 A mathematics story for 8 − 2.

There are 8 flying foxes hanging on the tree.
2 flying foxes flew away.
How many flying foxes are left ?

There are flying foxes hanging on the tree.
The number of flying foxes decreased by 2 .
How many flying foxes remain ?

2 A mathematics story for 9 − 6

There are 6 girls and 9 boys.
What is the difference between the number of girls and boys?

There are 6 pencils and there are 9 pens.
How many more pens are there than pencils ?

6 Let's make various mathematics stories for the following:

1 8 − 5 3 2 10 − 7 3 3 3 + 7 − 7 3
4 12 − 7 5 5 12 − 5 − 2 5

6 = □ + □

Lesson Flow

1 5 Make their own stories for 8 - 2.

T Introduce the main task.
T Let's make stories for 8 - 2.
Gives some time to students to think and write their ideas in their exercise book.
T Those who cannot make stories, draw pictures for the situation of 8 - 2.
TN For those who cannot make a story, ask them to draw pictures for the situation of 8 - 2.
TN In the case where most students cannot make a math story nor even draw, let them open the textbook and use the stories shown in the textbook to give the following lesson.

2 Display the stories and drawing on the blackboard.

T What kind of words are used in those sentences?
S left, remain, difference, more …
T Is the order of numbers appearing in the sentence same as the expression?
How many sentences are used for those stories?
S 2 or 3.
T Which stories are more interesting? Why?
S Story A is most interesting for me because the situation happens in my house too.

3 Compare student's stories and the stories 1 and 2 shown in the textbook.

T Open the textbook. Let's compare your stories to story 1.
Are they the same or different? How is it different from yours?
S My story used the word 'remain' but story 1 used 'left'.
S My story is finding the difference of the number of the children, but story 1 is finding the number after some birds left.(Compare to story 2 as well)

4 6 Make various stories.

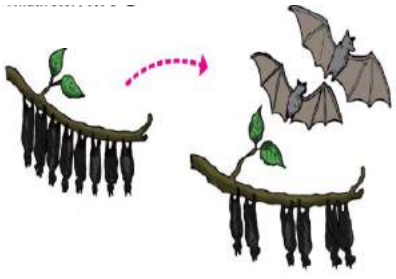
S Make stories focusing on the word, number of the sentence and the meaning of 'left' or 'difference'.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Making Subtraction Stories Lesson: 4 of 15

Task: Let's make subtraction stories.

5 Make a math story for 8 – 2



There are [8] flying foxes hanging on a branch of a tree.
[2] flying foxes flew away.
How many flying foxes are [left]?

5 Make a math story for 9–6

There are [9] boys and [6] girls.

What is the [difference] ?

6 Make various math stories for the

1) 8 – 5
2) 10 –7
3) 3 +7–7
4) 12–7
5) 12–7–2

Summary

Summarise the lesson based on what the students have learnt.

MT

Key words: left, remain, difference, more

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 5 of 15 (Double Period)

Textbook Page : p.7~p.8
Actual Lesson 005

Lesson Objectives

- To enjoy calculation of subtraction with numbers.
- To master calculation of subtractions with the use of the subtraction cards.
- To recognise patterns of how numbers change through lining up the subtraction cards.
- To get answers of subtraction without counting by fingers.

Prior Knowledge

- Numbers 1 to 10 (Grade1)
- Composing and decomposing numbers (Grade1)

Preparation

- Make copies of Subtraction on cards for the number of groups (attached Teacher's Manual page).
- Write answer at the back of each card.
- Scissors

Assessment

- Enjoy the game and find the answer without using fingers. F
- Find any pattern of the numbers through the activity. F
- Master the subtraction less than 10. S

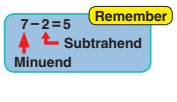
• Teacher's Notes •

Encourage students to arrange their cards in an orderly way that all horizontal rows should have the same answer and all vertical columns should have cards with the same minuend.

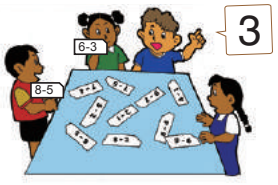
Subtraction Cards

7 Let's play a fun game to master subtraction using subtraction cards.

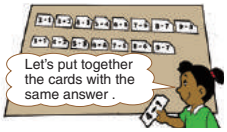
1 Use subtraction cards of which minuends are up to 10. In pairs, one student show card and other friend says the answer.



2 Make groups of 4 or 5. Group leader calls a number. Members find the cards with the same answer.

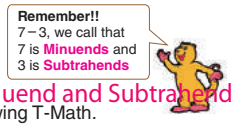


3 Line up the cards that have the same answer. Let's explain your arrangement of cards which have the same answer.



□ − □ = □

Homework



1 Let's fill in the answers for subtraction, (minuend) − (subtrahend), in the following T-Math.

Teacher explains about Minuend and Subtrahend.

T-Math Subtraction		Subtrahends									
		1	2	3	4	5	6	7	8	9	10
Minuends	1	0	-	-	-	-	-	-	-	-	-
	2	1	0	-	-	-	-	-	-	-	-
	3	2	1	0	-	-	-	-	-	-	-
	4	3	2	1	0	-	-	-	-	-	-
	5	4	3	2	1	0	-	-	-	-	-
	6	5	4	3	2	1	0	-	-	-	-
	7	6	5	4	3	2	1	0	-	-	-
	8	7	6	5	4	3	2	1	0	-	-
	9	8	7	6	5	4	3	2	1	0	-
	10	9	8	7	6	5	4	3	2	1	0

2 Let's fill in the answers for subtraction in the following T-Math.

T-Math Subtraction		Subtrahends									
		1	2	3	9	5	6	7	10	8	4
Minuends	7	6	5	4	-	2	1	0	-	-	3
	4	3	2	1	-	-	-	-	-	-	0
	3	2	1	0	-	-	-	-	-	-	-
	9	8	7	6	0	4	3	2	-	1	5
	5	4	3	2	-	0	-	-	-	-	1
	6	5	4	3	-	1	0	-	-	-	2
	2	1	0	-	-	-	-	-	-	-	-
	8	7	6	5	-	3	2	1	-	0	4
	10	9	8	7	1	5	4	3	0	2	6
	1	0	-	-	-	-	-	-	-	-	-

3 Let's compare the tables 1 and 2 and explain how to develop T-Math table for subtraction.

8 = □ + □

Lesson Flow

1 7 1 Using the Subtraction cards, students practice in pairs guessing and telling the answers for each math expression.

T Explain how to use subtractions cards to the students.
S Get into pairs. One student shows a card with an expression and the other give the answer and change roles.
T Introduce the main task.

2 2 Play a card game of finding the cards with the same answer.

T Make groups of 4 to 5 and play a card game.
S One of the group members calls a number and everybody else in the group looks for all the math expression cards whose answer is the same number as mentioned. The person who won the most cards wins the game.

3 3 Line up the subtraction cards and identify a pattern of how numbers change.

S Put together the cards with the same answer.
T Why did you arrange like this? Is there another way to arrange?
TN It is good if students notice various patterns and changes in the cards that they line up. For example, as for a vertical pattern, a minuend changes with some patterns and as for a horizontal pattern, both subtrahend and minuend change with some patterns.

• Teacher's Notes •

Enjoy and learn mental subtraction.When students need to use their fingers for subtraction, it implies that they did not have appropriate opportunities to learn the mental calculation of subtraction which is written as the necessary learning contents in the elementary school syllabus. You are recommended to give children cards for this lesson. When teaching this lesson, please focus on enoying the game to enable students to feel the necessity to calculate mentally for winning. Practice for mental calculation needs more time.

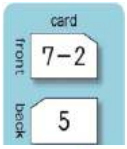
Sample Blackboard Plan

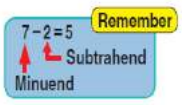
Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson: 5 of 15**

Main Task: Let's think about using subtraction cards to master subtraction.

7

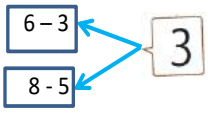
1 Pair up.
1.Peer show a subtraction card
2.The other says the answer.





MT

2 Get into groups of 4 or 5.
1.Leader says a number.
2.Members find subtraction cards with the same answer.



3 Line up the cards that have the same number

2−1	3−2	4−3	5−4	6−5	7−6	8−7	9−8	10−9	Row of answer 1
3−1	4−2	5−3	6−4	7−5	8−6	9−7	10−8		Row of answer 2
4−1	5−2	6−3	7−4	8−5	9−6	10−7			Row of answer 3
5−1	6−2	7−3	8−4	9−5	10−6				Row of answer 4
6−1	7−2	8−3	9−4	10−5					Row of answer 5
7−1	8−2	9−3	10−4						Row of answer 6
8−1	9−2	10−3							Row of answer 7
9−1	10−2								Row of answer 8
10−1									Row of answer 9
Row of answer 10									

Why did you arrange your cards like this? Is there another way to arrange? Explain

Unit 1

Unit: Addition and Subtraction 1

Sub-unit: 1. What We Learned in Elementary School

Lesson 6 of 15 (Single Period)

Textbook Page : p.9
Actual Lesson 006

Lesson Objectives

- To understand sets of 10.
- To understand base ten place value system.

Prior Knowledge

- Numbers 1 to 20 (Grade1)

Preparation

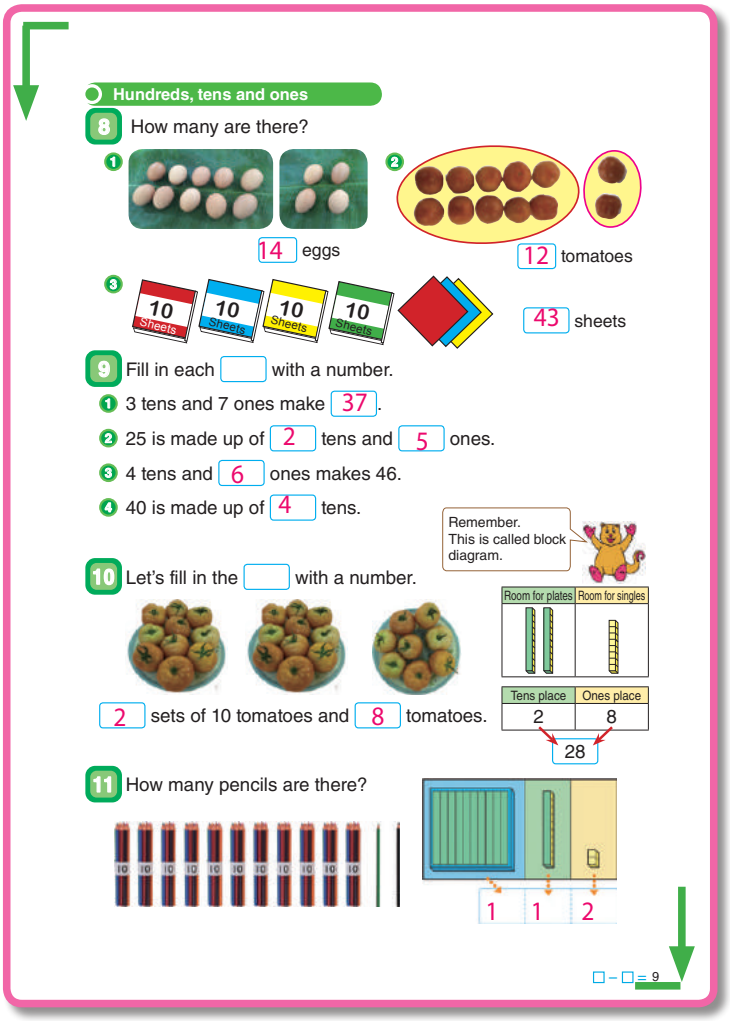
- Prepare according to board plan.

Assessment

- Do the exercise considering sets of 10 and base ten system. F
- Do the exercises correctly. S
- Explain base ten system. S

• Teacher's Notes •

Base-10 place value system
Our everyday number system is a Base-10 place value system. The Base-10 number system is known as the decimal system and has 10 digits to show all numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 using the place value.
Base-10 system is used for expressing all the numbers even it becomes large or small. Therefore, it is very important that students describe the values of the numbers with which they are working.



Lesson Flow

1 Solve tasks from 8 to 11 concerning the following teaching points.

8

T Let students realise the usefulness of making a set of ten and singles in counting.

T Introduce the main task.

9

T Ask students to express numbers using sets of ten and singles in word.

10

TN How to write the number “Twenty eight ” using blocks.

Sets of 10	Ones
2	8

Sets of 10 → Write on the left.

Ones → Write on the right.

11

S Ten sets of ten become 100.

TN Allow students to explain using blocks.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Hundreds, Tens and ones Lesson: 6 of 15

Task: Let’s use sets of 10 to understand the relationship of numbers.

8 How many are there?

①

1 group of 10 eggs

4 eggs

14 eggs

②

4 bundles of 10 sheets

3 single sheets

43 sheets

MT

9 Fill in the missing number.

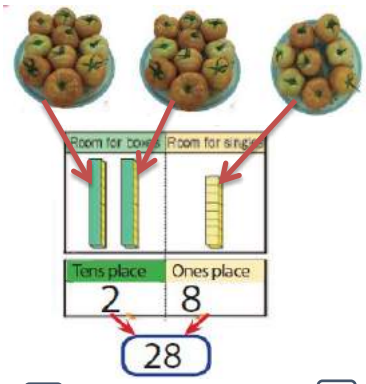
(1) 3 tens and 7 ones make 37

(2) 25 is 2 tens and 5 ones.

(3). 4 tens and 6 ones makes 46

(4). 40 is 4 tens

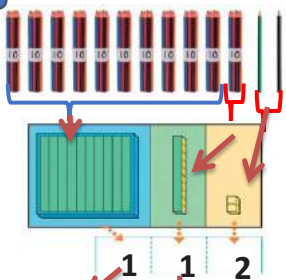
10 How many 10s and 1s are there?



2 sets of 10 tomatoes and 8 tomatoes

is 28 tomatoes

11 How many pencils are there?



1 1 2

10 sets of 10 pencils is 100

2 pencils

1 set of 10 pencils is 10

There are 112 pencils altogether

Summary

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 7 of 15 (Single Period)

Textbook Page : p.10~p.11
Actual Lesson 007

Lesson Objectives

- To appreciate various ways of making 10 for addition more than 10.
- To appreciate using the properties of addition.

Prior Knowledge

- Numbers 1 to 20 (Grade1)
- Composing and decomposing numbers (Grade1)

Preparation

- Addition cards

Assessment

- Think about how to calculate (1-digit) + (1-digit) making 10. F
- Enjoy finding the number pattern by filling in the cards. F
- Explain the idea for finding 10. S
- Get the answers without counting by fingers. S

• Teacher's Notes •

The content of this page is relearning of the contents at the Elementary School. If students do not learn well, teacher needs to set the additional class or home work with students for enabling them to learn the third grade.
In order for students to calculate mentally, it is easier to make 10 first by decomposing the (i) Augend, (ii) Addend or (iii) Both augend and addend, then adding with 10.

Mental Addition

This is very interesting and important skills for daily life. Let's master mental calculation.

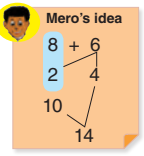
12 Think about how to calculate 8 + 6 in your mind.

I made 10 from 8, so removed 2 from 6. Finally I added the left 4.

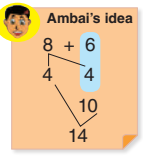
I made 10 from 6, so I removed 4 from 8.

I made 10 by removing 5 each from 8 and 6.

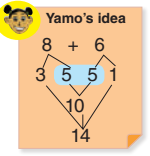
Mero's idea



Ambai's idea



Yamo's idea



13 Let's calculate using the ideas above.

Don't use your fingers. Calculate in your mind quickly by making 10

① 7+6 13 ② 8+9 17 ③ 9+6 15

14 Find the answers mentally and explain.

① 9+4 13 ② 8+3 11 ③ 7+5 12 ④ 6+5 11
⑤ 3+9 12 ⑥ 5+6 11 ⑦ 4+7 11 ⑧ 5+8 13

15 Let's fill in the addition cards.

9+9	8+9	7+9	6+9	5+9	4+9	3+9	2+9
9+8	8+8	7+8	6+8	5+8	4+8	3+8	
9+7	8+7	7+7	6+7	5+7	4+7		
9+6	8+6	7+6	6+6	5+6			
9+5	8+5	7+5	6+5				
9+4	8+4	7+4					
9+3	8+3						
9+2							

Give the answers for addition cards.
Let's fill in the blank cards.
Which place do you fill in first?
Explain the ways of the arrangements.

10 = □ + □

Homework

① Let's fill in the addition expression in the following T-Math and say the answer.

T–Math Addition		Addends									
		1	2	3	4	5	6	7	8	9	10
Augends	1	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
	2	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
	3	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
	4	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
	5	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
	6	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	7+10
	7	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
	8	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
	9	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
	10	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

② After filling in the expressions in the following T-Math ①, let's colour yellow when the answers of expressions are 10 and colour green when the answers of expressions are 14.

T–Math Addition		Addends												
		1	2	3	4	5	6	7	8	9	10			
Augends	1	1+1	1+2							1+9				
	2	2+1							2+8					
	3							3+7						
	4						4+6				4+10			
	5					5+5				5+9				
	6				6+4				6+8					
	7			7+3				7+7						
	8		8+2				8+6							
	9	9+1				9+5								
	10				10+4									

□ – □ = 11

Lesson Flow

1 12 Explain various ways to calculate 8+6.

T Introduce the main task.
T How to calculate 8+6 easily without counting by fingers?
S To make 10 from 8, need 2 more. So separate 6 into 2 and 4.
S To make 10 from 6, need 4 more. So separate 8 into 4 and 4.
T We made 10 in two ways. Do you have any other ways of making 10?
T Let students present the similarities and differences in the students ideas and let them notice that they are all making 10 but in different ways.

2 13 14 Do the exescise.

T Let students calculate addition with three methods instead of restricting to one of the three methods.
T Ask students not to only tell the answer but also explaining how to calculate using 3 ideas.

3 15 Fill in addition cards.

T Ask students to put together the cards with the same answer.
T Ask students to talk about what they notice by looking at the cards they lined up.
S 1) When we change the order of adding numbers from augend to addend and from addend to augend, their answers are the same.
2) When we increase the augend by 1, the addend decreases by 1, answers do not change.
TN It is good if students notice various patterns and changes in the cards that they lined up. For example, as for a vertical pattern, a minuend changes with some patterns, and as for a horizontal pattern, both addend and augend change with some patterns.

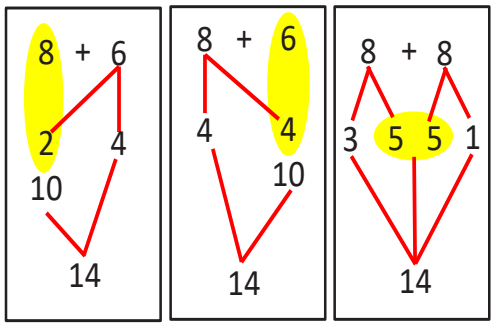
4 Give homework.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Addition without Counting Lesson: 7 of 15

Task: Let's think about adding without counting.

12 Let's make 10



Decompose the augend or addend to make 10 and then adding makes calculation easier.

MT

13 Calculate using the idea of making 10
1) 7 + 6 = 13
2) 8 + 9 = 17
3) 9 + 6 = 15

14 Find answers mentally and explain
1) 7 + 6 = 13
6) 5 + 6 = 11
7) 4 + 7 = 11

1. Do not use fingers.
2. Calculate in your mind quickly

15 Fill in the addition cards

9+9	8+9	7+9	6+9	5+9	4+9	3+9	2+9
9+8	8+8	7+8	6+8	5+8	4+8	3+8	
9+7	8+7	7+7	6+7	5+7	4+7		
9+6	8+6	7+6	6+6	5+6			
9+5	8+5	7+5	6+5				
9+4	8+4	7+4					
9+3	8+3						
9+2							

Patterns

1.Horizontally, the augend decreases by 1 and the addend remains.
2.Vertically, the augend remains while the addend decreases by 1.
3.The cards along the diagonal have the same answer.

Summary

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 8 of 15 (Single Period)

Textbook Page : p.12~p.13
Actual Lesson 008

Lesson Objectives

- To appreciate various ways of making 10 for subtraction more than 10.
- To appreciate using the properties of subtracting.

Prior Knowledge

- Numbers 1 to 20
- Composing and decomposing numbers

Preparation

- Subtraction cards

Assessment

- Think about how to calculate (2-digit) + (1-digit) making 10. F
- Enjoy finding the number pattern by filling in the cards. F
- Explain the idea for finding 10. S
- Get the answers without counting by hands. S

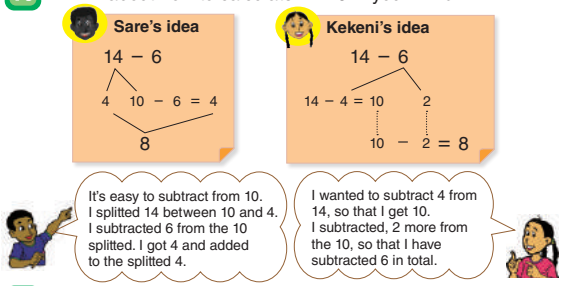
• Teacher's Notes •

The content of this page is relearning of the contents at the Elementary Prep. If students do not learn well, set an additional class or home work with necessary students to enable them to learn third grade mathematics.

In 14 - 6, 14 is the Minuend and 6 is the Subtrahend.

Mental Subtraction

16 Think about how to calculate 14 – 6 in your mind.



17 Let's calculate using the ideas above.

① 11 – 4 7 ② 13 – 9 4 ③ 17 – 8 9

18 Find the answer and explain how to calculate.

① 17 – 9 8 ② 15 – 7 8 ③ 13 – 6 7 ④ 12 – 7 5
⑤ 11 – 5 6 ⑥ 11 – 8 3 ⑦ 12 – 8 4 ⑧ 16 – 8 8

19 Let's fill in the subtraction cards.

11 – 2	12 – 2	13 – 4	14 – 5	15 – 6	16 – 7	17 – 8	18-9
11 – 3	11-4	13 – 5	14 – 6	15 – 7	16 – 8	17 – 9	
11 – 4	12 – 5	13 – 6	14 – 7	15 – 8	16 – 9		
11 – 5	12 – 6	13 – 7	14-8	15 – 9			
11 – 6	12 – 7	13-8	14 – 9				
11-7	12 – 8	13 – 9					
11 – 8	12 – 9						
11 – 9							

Give the answers for subtraction cards.
Let's fill in the blank cards.
Which place do you fill in first?
Explain the ways of the arrangements.

12 = □ + □

Homework

① Let's fill in the expression for subtraction (minuend) – (subtrahend), in the following table.

T - Math Subtraction		Subtrahend									
		1	2	3	4	5	6	7	8	9	10
Minuend	10	10–1	10–2	10-3	10-4	10-5	10-6	10-7	10-8	10-9	10-10
	11	11–1	11-2	11-3	11-4	11-5	11-6	11-7	11-8	11-9	11-10
	12	12-1	12-2	12-3	12-4	12-5	12-6	12-7	12-8	12-9	12-10
	13	13-1	13-2	13-3	13-4	13-5	13-6	13-7	13-8	13-9	13-10
	14	14-1	14-2	14-3	14-4	14-5	14-6	14-7	14-8	14-9	14-10
	15	15-1	15-2	15-3	15-4	15-5	15-6	15-7	15-8	15-9	15-10
	16	16-1	16-2	16-3	16-4	16-5	16-6	16-7	16-8	16-9	16-10
	17	17-1	17-2	17-3	17-4	17-5	17-6	17-7	17-8	17-9	17-10
	18	18-1	18-2	18-3	18-4	18-5	18-6	18-7	18-8	18-9	18-10
	19	19-1	19-2	19-3	19-4	19-5	19-6	19-7	19-8	19-9	19-10
	20	20-1	20-2	20-3	20-4	20-5	20-6	20-7	20-8	20-9	20-10

② Let's fill in answers for the subtractions in the following table.

T - Math Subtraction		Subtrahend									
		1	2	3	4	5	6	7	8	9	10
Minuend	10	9	8	7	6	5	4	3	2	1	0
	11	10	9	8	7	6	5	4	3	2	1
	12	11	10	9	8	7	6	5	4	3	2
	13	12	11	10	9	8	7	6	5	4	3
	14	13	12	11	10	9	8	7	6	5	4
	15	14	13	12	11	10	9	8	7	6	5
	16	15	14	13	12	11	10	9	8	7	6
	17	16	15	14	13	12	11	10	9	8	7
	18	17	16	15	14	13	12	11	10	9	8
	19	18	17	16	15	14	13	12	11	10	9
	20	19	18	17	16	15	14	13	12	11	10

③ Let's develop the T-Math for subtraction and ask your friends to fill in each space.

□ – □ = 13

Lesson Flow

1 16 Explain various ways to calculate14 - 6.

T Introduce the main task.

T Explain how to calculate 14 - 6 easily without counting by hand.

S Split 14 into 10 and 4. Subtracting 6 from 10 makes 4. Adding 4 to it (4) makes 8
(The subtraction by addition method).

S Split 6 into 4 and 2. Subtracting 4 from 14 makes 10. Subtracting 2 from 10 makes 8.
(The subtraction by regrouping method).

TN It is difficult to understand two methods above for those who get used to calculate by counting. In that case, explain the method step by step using the figure shown in the textbook.

2 17 18 Do the exercise.

T We made 10 in two ways. Do you have any other ways of making 10?

S Calculate subtraction with two methods instead of restricting to one of the two methods.

T Ask students not to only tell the answer but also explaining how to calculate.

3 19 Fill in subtraction cards

S Fill in the subtraction cards considering the number pattern.

T What kind of pattern did you notice?

S The number to subtract and the number to be subtracted increase one by one.

S It will be the same answer when the number to subtract and the number to be subtracted increase by same number.

S The number to subtract (subtrahend) is the same when we look diagonally from the lower left.

S There are more cards whose answer is 9.

S Cards are lined up like stair steps.

S There may be a diagonal pattern for the cards which have the same answer.

4 Summary

1) When we change the order of subtracting numbers from minuend to subtrahend and from addend to augend, their answers are the same.
2) When we decrease the minuend by 1 and the subtrahend decrease by 1, answers do not change.

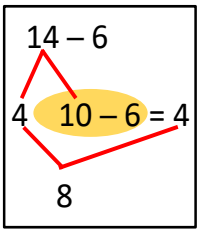
5 Give homework.

Sample Blackboard Plan

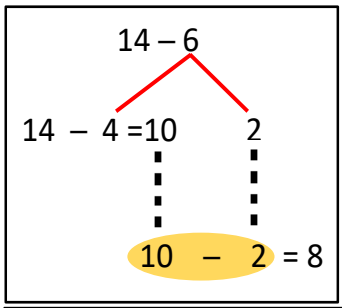
Date: **Chapter: Addition and Subtraction** **Topic: Subtracting without counting**

Task: Let's think about subtracting 14 – 6 without counting.

16 Let's make 10



Decompose the minuend to make 10.
Subtract the subtrahend from 10.
Add the answer with the remainder of the decomposed minuend.



Decompose the subtrahend to make 10 by subtracting from the minuend.
Subtract the subtrahend from 10.
Add the answer with the remainder of the decomposed minuend.

17 Calculate using the idea of making 10
1. 11 – 4
2. 13 – 9
3. 17 – 6

18 Find answers mentally and explain
2. 15 – 7
5. 11 – 5
8. 16 – 8

1. Do not use fingers.
2. Calculate in your mind quickly

19 Fill in the subtraction cards

11-2	12-3	13-4	14-5	15-6	16-7	17-8	18-9
11-3	12-4	13-5	14-6	15-7	16-8	17-9	
11-4	12-5	13-6	14-7	15-8	16-9		
11-5	12-6	13-7	14-8	15-9			
11-6	12-7	13-8	14-9				
11-7	12-8	13-9					
11-8	12-9						
11-9							

Patterns

1.Horizontally, the minuend increases by 1 and the subtrahend increases by 1 and have the same answer.
2.Vertically, the minuend remains and the subtrahend increases by 1 and answers decrease by 1
3.The cards with the same answer are in the same row.

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 9 of 15 (Single Period)

Textbook Page : p.14~p.15
Actual Lesson 009

Lesson Objectives

- To understand the structure of numbers up to 1000.
- To read and write the numbers up to 1000.

Prior Knowledge

- Numbers up to 100
- Structure of place value table

Preparation

- Blocks and place value table

Assessment

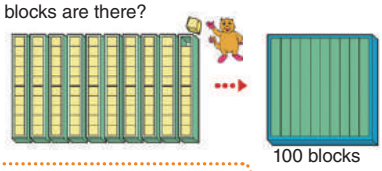
- Think about how to express numbers up to 1000. F
- Read and write numbers correctly up to 1000. S

• Teacher's Notes •

Place value is one of the key concepts in mathematics. It is essential that students understand the meaning of a number. For example, in the number 635, the 6 represents 600. Without this understanding, students often struggle with when to regroup ones and tens or "borrow," and algorithms for adding and subtracting multi-digit numbers make little sense. Place value encompasses not only position and value of digits but also decomposition of numbers and a number's relationship to others in the number system.

Number up to 1000

20 How many blocks are there?

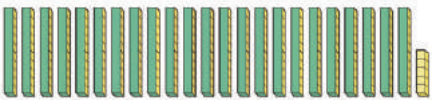


100 blocks

10 sets of 10 is a hundred ➡ 100

10 of 10 kina is a 100 kina.

1. How many more does 96 need to become 100? 4
2. What number is 10 less than 120? 110
3. Look at the picture below and fill in the ☐.



There are 23 boxes of 10 and 5 ones blocks.
10 sets of 10 boxes make 100.
Then, there are 2 sets of 100.

2 sets of 100 is two hundred.
Two hundred, thirty and five is called **two hundred and thirty five** and it is written as **235**.

100s	10s	1s
Hundreds place	Tens place	Ones place
two hundred	thirty	five
2	3	5

21 How many ☐ are there altogether?

1

100s	10s	1s
Hundreds place	Tens place	Ones place

100s	10s	1s
Hund-reds	Tens	Ones
2	3	0

The number when two hundred and thirty are added together.

2

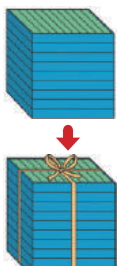
100s	10s	1s
Hundreds place	Tens place	Ones place

100s	10s	1s
Hund-reds	Tens	Ones
1	0	5

The number when one hundred and five are added together.

22 Each box contains 100 ☐ each.

1. How many ☐ are there altogether in 9 boxes of 100. 900
2. When one more box of 100 is added, there will be 10 boxes. How many ☐ are there altogether? 1000



The sum of 10 sets of 100 is called a **thousand** and is written as **1000**. 1 0 0 0

How much larger is 1000 than 999?

14 = ☐ + ☐

☐ − ☐ = 15

Lesson Flow

1 20 Think about the relationship of 10's and 100's.

T Get the students to understand the representation of 100 by 10's.
T "How many blocks are there?"
S Explain that ten sets of tens is equal to 100.
T Introduce the main task.

2 1 2 Complete activities.

T Ask the students to answer the questions.
S Complete activities by answering the questions.
S 3 Complete the activity by filling in the missing numbers in the spaces provided to find out the number of hundreds.
S Take note that 2 sets of 100 is two hundreds.

3 21 Identify the numbers on the block diagram.

T Ask the students to refer to the block diagram and write the numbers represented under each place value.

4 22 Make numbers up to 1000.

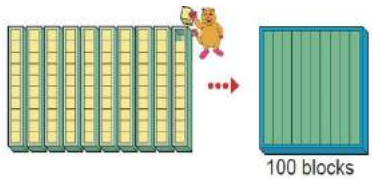
S Identify the number of blocks(100) in each box to determine the number of hundreds.
S 1 The number of blocks in 9 boxes of 100 is 900.
S 2 Make the number 1000 by adding another box of 100 so that there are 10 boxes of 100.
S Summarise by confirming that 10 sets of 100 is 1000.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Numbers up to 1000 Lesson: 9 of 15

Task: Let's read and represent numbers up to 1000.

20 How many blocks are there?



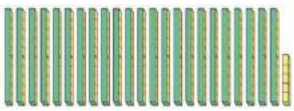
10 sets of 10 is a hundred → 100

MT

1 How many more for 96 to become 100?

2 What number is 10 less than 120?

3 Look at the picture



There are ☐ boxes of 10 and ☐ ones blocks 10 sets of 10 boxes make 100. Then, there are ☐ sets of 100.

21 How many ☐ are there altogether?

1

100s	10s	1s
Hundreds place	Tens place	Ones place

The number when two hundred and thirty are added together.

2 The number when one hundred and five are added together.

100s	10s	1s
Hundreds place	Tens place	Ones place

22 Each box contains 100 ☐.

9 boxes 100 → 900

10 boxes 100 → 1000

The sum of 10 sets of 100 is called a thousand and written as 1000.

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 10 of 15 (Single Period)

Textbook Page : p.16~p.17
Actual Lesson 010

Lesson Objectives

- To compare the numbers using the symbols of comparing quantities.
- To understand the relationships among numbers.

Prior Knowledge

- Numbers up to 1000

Preparation

- Blocks and place value table

Assessment

- Compare the numbers considering the size of each place value. F
- Order the numbers correctly considering relationship among numbers. F
- Do the exercises correctly at the end of the lesson. S

• Teacher's Notes •

Inequality signs

The symbols for larger than ">" and smaller than "<" are the two inequality signs that the students will be introduced to in this lesson and they will also use the signs in other lessons.

23 Let's compare the sizes of the numbers.

① 4 > 2 ② 3 = 3 ③ 2 < 4

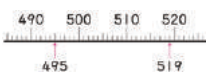
4 is larger than 2. 3 is the equal size as 3. 2 is smaller than 4.

> and < are signs to represent larger than and smaller than for comparing sizes. When the size is the same, = is used.

24 Which number is larger? Please represent it by using either > or <.

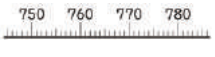
Which place values should we look at?

① 495 < 519



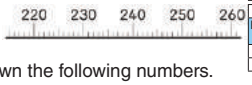
100s (Hundreds)	10s (Tens)	1s (Ones)
4	9	5
5	1	9

② 769 > 764



100s (Hundreds)	10s (Tens)	1s (Ones)

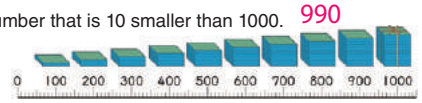
③ 238 < 253



100s (Hundreds)	10s (Tens)	1s (Ones)

25 Let's write down the following numbers.

① The number that is 300 larger than 500. 800
② The number that is 200 smaller than 700. 500
③ The number that is 10 larger than 900. 910
④ The number that is 10 smaller than 1000. 990



16 = □ + □

Exercise

1 Let's read the following numbers.

① 826 ② 160 ③ 408 ④ 505 ⑤ 900

2 Let's write the following numbers.

① seven hundred and forty ② eight hundred and sixty
③ one hundred and twenty 740 ④ five hundred and eight 860
⑤ one hundred and one 120 ⑥ six hundred 508
101 600

3 Let's fill in each □ with a number.

① 1000 is the sum of 100 sets of 10.
② 1000 is the sum of 10 sets of 100.
③ The number when two hundred, fifty and four added together is □. 254
④ The number when 3 sets of 100, 8 sets of 1 added together is □.

4 Which number is larger? Use > or <.

① 312 < 321 ② 602 > 598 ③ 880 > 808

5 Let's fill in each □ with a number.

213 – 214 – 215 – 216 – 217 – 218 – 219 – 220

470 – 480 – 490 – 500 – 510 – 520 – 530 – 540

6 Let's look at 480 and fill each □ with a number.

① 4 in the hundreds place means that 4 is the value of 400.
② 480 is the sum of 48 sets of 10.
③ The number that is 20 more than 480 is 500.

□ – □ = 17

Lesson Flow

1 23 Compare the size of numbers.

T Get the students to compare the size of numbers up to 10.
S Complete activity 1 - 3 and familiarise with the symbols used when comparing quantities.
T Remind students of the meaning of symbols used such as (>larger), <(smaller) and=(equal to) and how to write them correctly.
T Introduce the main task.

2 24 Compare numbers up to 1000.

T Ask the students to answer the questions by comparing the size of numbers up to 1000.
S Complete activity 1 - 3 by using the symbols(> <) to compare pairs of numbers.

3 25 Solve the simple arithmetic problems and write down the numbers.

T Get the students to read the statements, and write the numbers.
S Think about and solve 1 - 4 and write the correct numbers according to the statements.

4 Complete the Exercises.

S Complete the exercises 1 to 6 then conclude the lesson.
T Assist students where necessary and collect books for marking.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Size Numbers Lesson: 10 of 15

Task: Let's compare the size of numbers.

23 Compare the size of numbers.

1 4 > 2 — 4 is ☐ than 2.
2 3 = 3 — 3 is the ☐ size as 3.
3 2 < 4 — 2 is ☐ than 4.

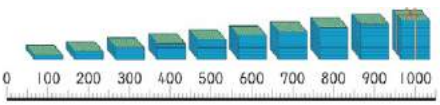
> and < are signs to represent larger and smaller for comparing sizes. When the size is the same, = is used.

MT

24 Which number is larger ? Use either > or < .

1 490 500 510 520 — 495 < 519
2 750 760 770 780 — 769 > 764
3 220 230 240 250 260 — 238 < 253

25 Write down the following numbers.



1 300 larger than 500 is **500+300=800**
2 200 smaller than 700 is **700 – 200=500**
3 10 larger than 900 is **900 – 10=910**
4 10 smaller than 1000 is **1000–10=990**

Summary

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 11 of 15 (Single Period)

Textbook Page : p.18
Actual Lesson 011

Lesson Objectives

- To appreciate using diagram for explaining the situation as addition or subtraction.
- To use tape diagrams for addition and subtraction.

Prior Knowledge

- Numbers up to 100 (Grade 1)
- Meaning of addition and subtraction.

Preparation

- Tape diagram

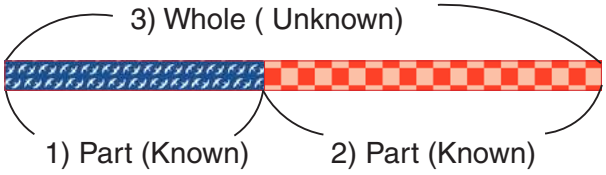
Assessment

- Think about the situation by using tape diagram. F
- Use tape diagram for explaining addition or subtraction using the terms such as part, whole, remaining, difference, more and less. S

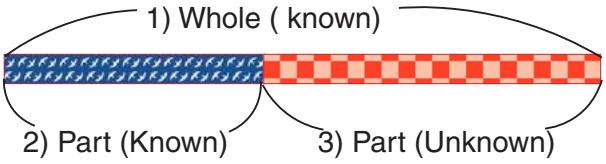
• Teacher's Notes •

Tape Diagrams

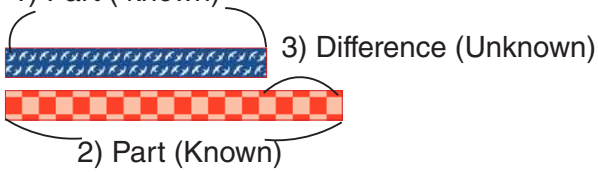
A) Part, Part and then Whole Diagram



B) Whole, Part and then Part Diagram



C) Difference between Part 1) and Part 2)

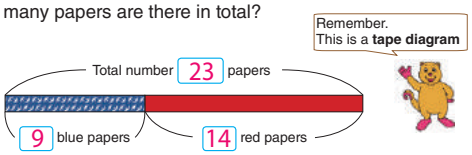


Addition or Subtraction

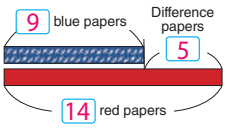
26 Write a mathematical expression and solve it based on each tape diagram. There are 9 blue papers and 14 red papers.

1. How many papers are there in total?

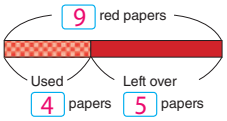
Remember. This is a **tape diagram**



2. Which colour is more and by how many?



3. 4 red papers are used. How many red papers are left?



Homework

1. Which type of tape diagram can tell the story well? Choose a diagram above 1, 2 and 3.

① There are 12 red marbles and 14 blue marbles. How many marbles are there in total? 12 + 14 = 26 26 marbles

② Jane picked 18 beautiful stones. Teacher picked up 4 more than Jane. How many stones did the teacher have? 18 + 4 = 22 22 stones.

③ Hilda had 21 stickers. She gave some to her friend and she is left with 16 for herself. How many stickers did she give to her friend? 21 - 16 = 22 22 stickers.

18 = □ + □

Lesson Flow

1 26 Think how to solve problem 1 2 3.

T Let's describe the problem into simple chart. We will write a long bar and indicate the number of students. We call it 'tape diagram'.

TN Draw tape diagram on the blackboard and explain using the terms such as part and whole.

S Copy the tape diagram in the exercise book.

TN As students at this stage are not used to drawing tape diagram, it is important for the teacher to show them the meaning clearly.

T Introduce the main task.

T Write the mathematical expression and explain.

S The problem includes the word "in total," so I thought it is addition.

S I looked at the tape diagram and noticed that 9 blue papers and 14 red papers. So, I thought we add 9 to 14 to get the total number of papers.

S The answer is 9 + 14 = 23

TN Confirm the math expression and answer using tape diagram on the blackboard focusing on the part(known) and whole(Unknown).

TN Do 2 and 3 applying same sequence of 1. Ask students to explain the meaning of tape diagram in each problem.

2 Give homework.

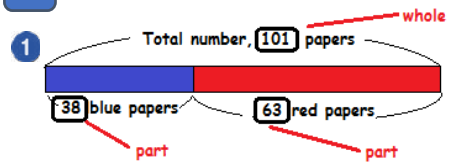
Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Tapes Diagrams Lesson: 11 of 15

Task: Let's solve problems using tape diagrams.

26 How many papers are there in total?

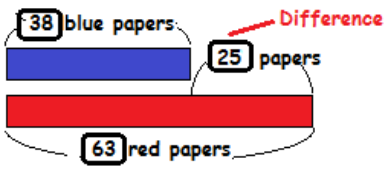
1



Math Expression
38 + 63
Math Sentence
38 + 63 = 101

		3	8
+		6	3
1	0	1	

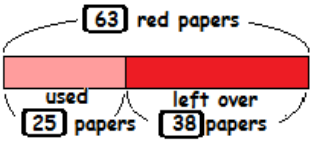
2 Which colour is more and by how many?



Math Expression
63 − 38
Math Sentence
63 − 38 = 25

		6	3
−		3	8
		2	5

3 25 red papers are used. How many red papers are left?



Math Expression
63 − 25
Math Sentence
63 − 25 = 38

		6	3
−		2	5
		3	8

Summary

MT

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 12 of 15 (Single Period)

Textbook Page : p.19~p.20
Actual Lesson 012

Lesson Objectives

- To use vertical form for addition of two-digit numbers.
- To appreciate block diagram for explaining addition in vertical form.
- To understand the relationship between block diagram and addition in vertical form.
- To recall when to carry over and not to carry over.

Prior Knowledge

- Addition of (1-digit) + (1-digit)
- Numbers up to 100

Assessment

- Explain addition in vertical form with carrying or without carrying by using diagram. F
- Do the exercises of addition with carrying and without carrying correctly. S

Preparation

- Blocks

• Teacher's Notes •

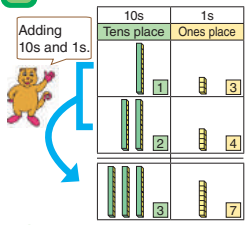
Addition algorithm in vertical form

It is still difficult for some students to understand the algorithm of vertical addition. It is good for students to explain the mechanism by numbers and blocks simultaneously.

When writting the operation in vertical form, it is very important to write exactly align with the position of place value. Even a litlle bit not aligned to the position, students get confused.

Addition in Vertical Form 1

27 Find the answers '13 + 24' using vertical form.



How to Add 13 + 24 using Vertical Form

$$\begin{array}{r} 13 \\ +\,24 \\ \hline \end{array}$$

Line up numbers according to their place value.

$$\begin{array}{r} 13 \\ +\,24 \\ \hline 37 \end{array}$$

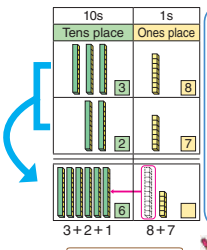
1 + 2 = 3 3 + 4 = 7

Add numbers in the ones place, then numbers in the tens place.

① Find the answers using vertical form.

① 31 + 57 88 ② 18 + 40 58 ③ 50 + 36 86 ④ 20 + 70 90

28 Find the answers '38 + 27' using vertical form.



How to Add 38 + 27 using Vertical Form

Ones place Tens plaece

$$\begin{array}{r} 38 \\ +\,27 \\ \hline \end{array} \rightarrow \begin{array}{r} 38 \\ +\,27 \\ \hline 5 \end{array} \rightarrow \begin{array}{r} 38 \\ +\,27 \\ \hline 65 \end{array}$$

Line up numbers according to their place value. Add the ones place first.

8 + 7 = 15
The ones place is ☐. Carry 1 ten to the tens place.

1 ten was carried so 3 + 2 + 1 = 6. The tens place is ☐.

① Find the answers using vertical form.

① 14 + 29 43 ② 28 + 16 43 ③ 59 + 36 95
④ 72 + 18 90 ⑤ 56 + 4 60 ⑥ 8 + 44 52

29 Find the mistake and explain the reason.

① $\begin{array}{r} 27 \\ +\,65 \\ \hline 82 \end{array}$ → $\begin{array}{r} 27 \\ +\,65 \\ \hline 2 \\ \hline 92 \end{array}$ (8)

② $\begin{array}{r} 56 \\ +\,3 \\ \hline 8 \end{array}$ → $\begin{array}{r} 56 \\ +\,3 \\ \hline 59 \end{array}$

Forget carrying over, Line up same place value

☐ − ☐ = 19 20 = ☐ + ☐

Homework

① Let's add in vertical form. Before addition, please see the numbers if the addition has carrying over or not.

① 26 + 43 = 69	② 47 + 27 = 74	③ 7 + 82 = 89	④ 15 + 56 = 71	⑤ 43 + 38 = 81
⑥ 91 + 43 = 134	⑦ 77 + 9 = 86	⑧ 82 + 7 = 89	⑨ 15 + 5 = 20	⑩ 35 + 45 = 80
⑪ 31 + 60 = 91	⑫ 28 + 63 = 91	⑬ 20 + 17 = 37	⑭ 19 + 18 = 37	⑮ 18 + 19 = 37

② Mary has 27 flowers. James gave 65 flowers to Mary. How many flowers does Mary have?
27 + 65 = 92 A. 92 flowers

③ Let's make an addition story for 56 + 3.

④ Before adding in vertical form, please predict which answer will be larger? Confirm your prediction if it is appropriate or not by using vertical form.

① 18 + 19, 21 + 9 37 30 ② 39 + 27, 40 + 30 66 70 ③ 25 + 48, 30 + 40 73 70

Let's develop T-Math for addition of two-digit numbers as follows.

T-Math Addition		Addends												
		34	35	36	37	38	39	54	55	56	57	58	59	66
Augends	43	77	78	79	80	81	82	97	98	99	100	101	102	109
	44	78	79	80	81	82	83	98	99	100	101	102	103	110
	45	79	80	81	82	83	84	99	100	101	102	103	104	111
	46	80	81	82	83	84	85	100	101	102	103	104	105	112

⑤ Let's work together with friends and fill in each space.

Lesson Flow

1 27 Think about how to solve '13 + 24'.

T By referring to and making correspondence with the mathematics block chart, Teacher demonstrates how to write the expression in vertical forms.
T Where should we write 1?
S Tens place.
T Where should we write 3?
S Ones place. (Continue one by one)
T Introduce the main task.

2 Summarise the important points in using vertical forms.

T Teacher goes over the important points with students such as;
(1) Write numbers in the same places in the same columns vertically.
(2) Add the numbers in the ones place together and add those in the tens place together.
S Students learn the new word, "vertical form."
S 1 Practice using vertical forms to solve the problems in Exercise.
T Make sure students are using vertical forms correctly.

3 28 Think about how to solve the problem 38 + 27.

T Tell students to compare how 38 + 27 is different from 13 + 24, and have them realise that in calculating 38 + 27, the number in the ones place becomes larger than 10. Teacher explains that in such a case, we can make a group/set of 10 out of the numbers in the ones place, and carry 1 ten up to the tens place by increasing the number there by 1, telling them it is called "carrying" or "regrouping."
S Confirm the rule that when we have 10 pieces of single blocks, we should group them as 1 set of 10 (1 ten) and carry 1 ten to the tens place.
S 1 Practice using vertical forms to solve the problems in Exercise.
T Make sure students are using vertical forms correctly.

4 29 Find and explain the mistakes.

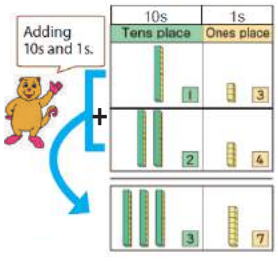
S Find and explain the mistakes of calculation.

Sample Blackboard Plan

Date: Chapter: Addition and Subtraction Sub-chapter/Topic: Addition in Vertical Form Lesson: 12 of 15

Task: Let's think about adding vertically.

27



How to add 13 +24

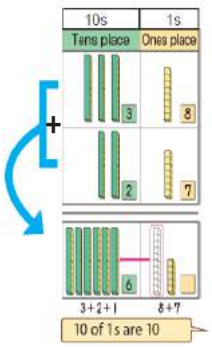
	1	3
+	2	4
	3	7

1 + 2 = 3 + 4 =

- Line up numbers according to their place values.
- Add numbers in ones place then the tens place.

1 Find the answers using the vertical form
(a) 31+57
(b) (b) 18+40
(c) (c) 20+70

28 Find the answers in vertical form



- Line up numbers according to their place values and add ones.
- 8+7=15, The ones place is 15. Carry 1 ten to tens place.
- 1 ten was carried so 3 + 2 + 1 = 6. The tens place is 6.

1 Find the answers using the vertical form
1) 14+29 2) 28+16 3) 59+36 4) 72+18 5) 56+4
6) 8+44

29 Find the mistakes and explain.

	2	7
+	6	5
	8	2

	5	6
+	3	
	8	

MT

Summary

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 13 of 15 (Single Period)

Textbook Page : p.21~p.22
Actual Lesson 013

Lesson Objectives

- To use vertical form for addition of three-digit numbers plus two-digit numbers.
- To appreciate block diagram for explaining addition in vertical form.

Prior Knowledge

- Addition with carrying from ones place to tens place in vertical form.
- Numbers up to 1000

Preparation

- Blocks

Assessment

- Explain addition in vertical form with carrying or without carrying by using diagram. F
- Do the exercises correctly. S

• Teacher's Notes •

On 74+65, if we calculate

$70+4+60+5 = 70+60+4+5$
$= 130+9$
$= 139$

We can use vertical form instead of addition algorithm using base 10 place value system.

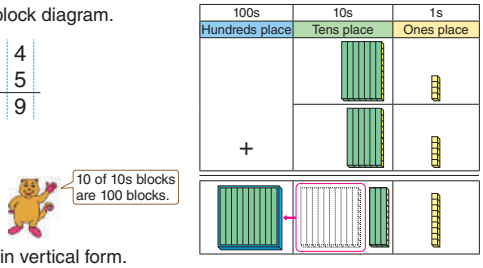
$$\begin{array}{r} 74 \\ +65 \\ \hline 9 \leftarrow 4+5 \\ 13 \leftarrow 7+6 \\ \hline 139 \end{array}$$

It looks like addition algorithm because it explains the procedure 7+6 instead of 70 +60 by using place value system.

Addition in Vertical Form 2

30 Explain the way of calculating this vertical addition using the block diagram.

$$\begin{array}{r} 74 \\ +65 \\ \hline 139 \end{array}$$

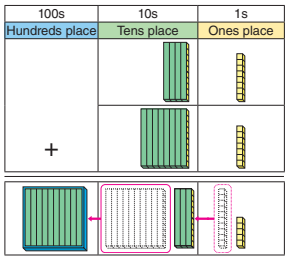


31 Add in vertical form.

1. 93+86 = 179
2. 63+71 = 134
3. 67+80 = 147
4. 20+90 = 110

32 Explain each vertical form using block diagram.

$$\begin{array}{r} 48 \\ +87 \\ \hline 135 \end{array} \qquad \begin{array}{r} 48 \\ +87 \\ \hline 15 \\ 12 \\ \hline 135 \end{array}$$



33 Let's add in vertical form.

1. 35+96 = 131
2. 58+62 = 120
3. 27+78 = 105
4. 15+85 = 100
5. 6+97 = 103
6. 100+400 = 500
7. 100+900 = 1000
8. 345+7 = 352
9. 463+29 = 492
10. 616+66 = 682
11. 748+43 = 791

Homework

1. Let's add in vertical form. Before addition, please think how many times carrying over will happen in the process of addition.

① 88 +44 = 132	② 36 +89 = 125	③ 32 +69 = 101	④ 200 +600 = 800	⑤ 600 +400 = 1000
⑥ 286 + 4 = 290	⑦ 121 + 9 = 131	⑧ 36 +32 = 68	⑨ 500 +500 = 1000	⑩ 325 + 35 = 360

2. Let's find easier ways of calculation.
   ① 56+22+8 ② 54+32+26
3. Let's add in vertical form and confirm the answer using calculator.

① 23 35 +41 = 58	② 27 33 +20 = 60	③ 30 20 10 + 7 = 67

4. When do you prefer to use calculator for adding and when not?
5. Let's develop T-Math for addition of two-digit numbers as follows.

T-Math Addition		Addends												
		34	35	36	37	38	39	54	55	56	57	58	59	66
Augends	63	97	98	99	100	101	102	117	118	119	120	121	122	129
	64	98	99	100	101	102	103	118	119	120	121	122	123	130
	65	99	100	101	102	103	104	119	120	121	122	123	124	131
	66	100	101	102	103	104	105	120	121	122	123	124	125	132

6. Let's work together with friends and fill in each space.

□ − □ = 21 22 = □ + □

Lesson Flow

1 30 Think about how to solve '74 + 65'.

S Work on their own, and write their ideas and math expressions they came up with in their exercise books.
T Advise students to use what they already know from the previous lessons in solving the problem.
S Recognise that in the tens place there are 13 sets of 10 blocks, out of which they have to carry 10 tens to the hundreds place as 1 hundred.
T Introduce the main task.

2 31 Practice using vertical forms to solve the problems.

T Make sure students are using vertical form correctly.
S Answer in vertical form.

3 32 Think about how to solve the problem 48 + 87.

T Let's think about how to solve the problem.
S Explain the strategy step by step using block diagram.
TN Make sure to actualise students' individual learning. Teacher tells students to use the mathematics blocks and place the blocks in such a way that they can visualize the expression 48 + 87.
T Present to students the expression written in vertical form and have them recognise how the numbers are carried to the tens and hundreds places by showing them the manipulation of blocks according to the given expression.

4 33 Practice addition in vertical form.

T Make sure students are using vertical form correctly.
TN If students cannot finish all during the lesson, you can give them as a homework.

Sample Blackboard Plan

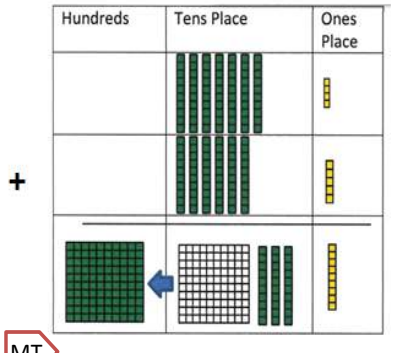
Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson: 13 of 15**

Main Task: Let's add in vertical form for carrying over.

30 Let's explain the algorithm.

	7	4
+	6	5
1	3	9

Algorithm is a method used to an answer using certain number of steps.

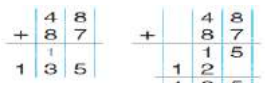


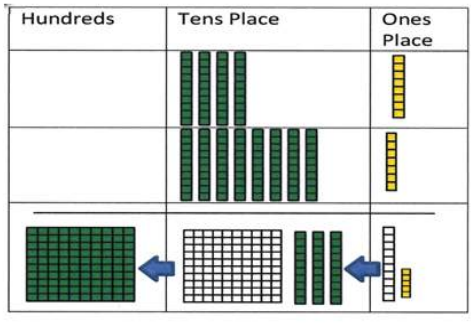
MT

31 Let's add in vertical form.

1) 93 + 86 2) 63 + 71 3) 67 + 80 4) 20+ 90

32





33 Let's add in vertical form.

1) 35 + 96 2) 58 + 6
3) 27 + 78 4)15 + 8
5) 6 + 97 6) 100 + 400
7) 100+900 8) 345 + 7
9) 463 + 29 10) 616 + 66
11) 748 + 43

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 14 of 15 (Single Period)

Textbook Page : p.23~p.24
Actual Lesson 014

Lesson Objectives

- To use vertical form for subtraction of two-digit numbers.
- To appreciate block diagram for explaining subtraction in vertical form.
- To recall when to borrow and not to borrow.

Prior Knowledge

- Subtraction until (18-9)
- Subtraction of 2-digits without borrowing
- Numbers up to 100

Preparation

- Blocks

Assessment

- Explain subtraction in vertical form with borrowing or without borrowing by using diagram. F
- Do the exercises of subtraction with borrowing and without borrowing correctly. S

• Teacher's Notes •

The content of this pages is relearning of the content at the Elementary Grade 2. If students cannot do well, the teacher needs to set an additional class or homework with those students to enable them to learn third grade mathematics.

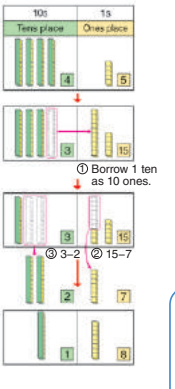
Subtraction in Vertical Form 1

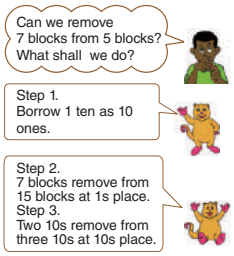
34 Let's find the answers in vertical form.

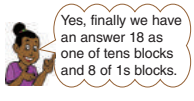
① 76 – 32 44 ② 56 – 40 16 ③ 58 – 5 53
④ 98 – 18 80 ⑤ 43 – 42 1 ⑥ 30 – 20 10

35 Let's explain subtraction in vertical form using block diagram.

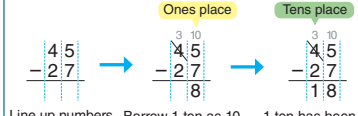
	4	5
–	2	7







How to Subtract 45 – 27 Using Vertical Form



36 Let's find the answers in vertical form.

① 41 – 19 22 ② 70 – 56 14 ③ 26 – 18 8
④ 90 – 88 2 ⑤ 92 – 8 84 ⑥ 40 – 7 33

□ – □ = 25

Homework

① Let's subtract in vertical form. Before subtraction, please check the necessity of borrowing.

① 59 – 45 = 14	② 70 – 23 = 47	③ 53 – 26 = 27	④ 45 – 5 = 40	⑤ 72 – 33 = 39
⑥ 81 – 16 = 65	⑦ 66 – 28 = 38	⑧ 40 – 24 = 16	⑨ 50 – 33 = 17	⑩ 58 – 32 = 26
⑪ 51 – 9 = 42	⑫ 54 – 45 = 9	⑬ 40 – 24 = 16	⑭ 39 – 23 = 16	⑮ 38 – 22 = 16

② There are 32 children in Michelle's class.
3 of them are absent today. How many are present?
32 - 3 = 29 Answer 29 children

③ Let's make subtraction stories for 42 – 39.
Before subtracting in vertical form, please predict which answer will be larger? Confirm your prediction if it is correct or not by using vertical form.
① 74 – 31, 40 – 30 ② 30 – 17, 33 – 14 ③ 87 – 59, 90 – 60

④ Let's develop T-Math for subtraction of two-digit numbers.

T-Math Subtraction		Subtrahends												
		34	35	36	37	38	39	54	55	56	57	58	59	62
Minuends	63	29	28	27	26	25	24	9	8	7	6	5	4	1
	64	30	29	28	27	26	25	10	9	8	7	6	5	2
	65	31	30	29	28	27	26	11	10	9	8	7	6	3
	66	32	31	30	29	28	27	12	11	10	9	10	11	4

⑤ Let's work together with friends and fill in each space.

24 = □ + □

Lesson Flow

1 34 Practice using vertical forms to solve the problems in Exercise.

T Make sure students are using vertical form and find the answer correctly.

2 35 Think how to calculate 45−27 and solve the problem.

T Confirm with students that they cannot do 5−7 in the ones place.
S Try to think how to subtract the ones place to find the answer.
T Advise students to manipulate the blocks based on the calculation process.
S When borrowing 1 ten from the tens place, students should recognise that a set of 10 blocks, when it is moved to the ones place, has to be broken into singles.
T Explain that the operation of moving 1 from the tens place as 10 ones is called “borrowing.”
S Calculate numbers in the ones place.
T Assist with students that the tens place borrowed 1 ten to the ones place already; therefore 4 has become 3.
S Calculate numbers in the tens place and find the answer of the operation 45−27=18.
T Introduce the main task.

3 36 Practice subtraction with borrowing to solve the problems.

T Make sure students are borrowing using vertical form correctly.

4 Give homework.

TN It is important to master the skill of the basic calculation. Students need to solve certain exercises to master the skill. So give some time to solve exercises everyday.

Sample Blackboard Plan

Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson: of 15**

Let’s think about subtracting vertically.

MT

34 Find answers in vertical form.

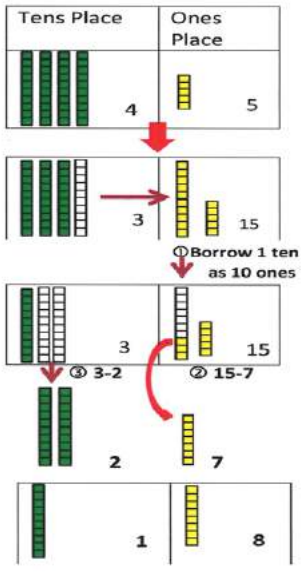
1) 76 – 32 2) 56 – 40 3) 58 – 5
4) 98 – 18 5) 43 – 42 6) 30 – 20

35 Explain subtraction in vertical form.

How to Subtract 45−27 Using Vertical Form

Ones place Tens place

45 −27	3 10 4 5 −2 7 8	3 10 4 5 −2 7 1 8
Line up numbers in each column.	Borrow 1 ten as 10 ones, so 15−7=8 The ones place of the answer becomes ☐.	1 ten has been borrowed by the ones place. So 3−2=☐.



36 Find answers in vertical form.

1) 41 – 19 2) 70 – 56
1) 3) 26 –18 4) 90 – 88
2) 5) 92 – 8 6) 40 – 7

Homework

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 15 of 15 (Single Period)

Textbook Page : p.25
Actual Lesson 15

Lesson Objectives

- To solve subtraction of 3-digit numbers by using vertical form.

Prior Knowledge

- Subtraction of 2-digits with borrowing or without borrowing.
- Numbers up to 1000

Preparation

- Prepare according to board plan

Assessment

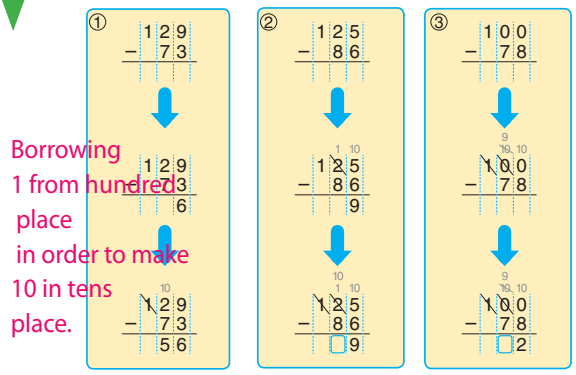
- Explain subtraction in vertical form with borrowing or without borrowing by using diagram. F
- Do the exercise of subtraction with borrowing and without borrowing correctly. S

• Teacher's Notes •

The content of this pages is relearning of the content at the Elementary Grade 1. If students do not do well, the teacher needs to set an additional class or homework with necessary students for enable them to learn third grade mathematics.

Subtraction in Vertical Form 2

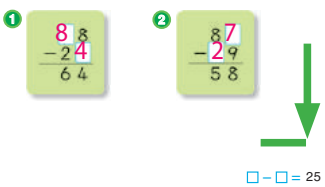
37 Explain subtraction in vertical form with borrowing.



38 Find the answers in vertical form.

① 132 − 41 91	② 109 − 53 56	③ 146 − 60 86
④ 132 − 47 85	⑤ 120 − 61 59	⑥ 106 − 59 47
⑦ 105 − 58 47	⑧ 100 − 39 61	⑨ 102 − 17 85
⑩ 102 − 7 95	⑪ 900 − 500 400	⑫ 1000 − 200 800
⑬ 536 − 5 531		

39 Find the appropriate number in each box.



What we learned in Elementary School. (Addition and Subtraction)	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 38 + 11 = 49 (38 + 11 = 49)

② 89 + 27 = 116 (89 + 27 = 116)

③ 532 + 458 = 990 (532 + 458 = 990)

④ 36 − 23

⑤ 54 − 29

⑥ 367 − 189

2. In a building, there are 342 stair steps from the ground floor to the top floor. He climbed up 113 stair steps. How many steps left to reach the top floor.

② Mathematical sentence: 342-113 = 229

③ Answer: 229 steps

3. Hilda collected 133 stones. Nick collected 109 stones. How many stones did they collect in total?

④ Mathematical sentence: 133 + 109 = 242

⑤ Answer: 242 steps

Lesson Flow

1 37 Think of how to calculate subtraction of 3-digit number.

(1) 129 – 73

T Let students realise that in the tens place they cannot subtract 7 from 2 as it is so you have to borrow 1 from hundreds place.

(2) 125 – 86

S Think about how this problem is different from the subtraction they calculated in the previous one.

T Let students recognise that this problem involves borrowing twice; first from the hundreds place and next from the tens place.

(3) 105 – 78

T Explain to students about the rule that when borrowing values, they have to borrow first from the larger place value; for example borrowing first from the hundreds place to the tens place, and then from the tens to the ones.

T Remind students to use the blocks when they try to understand the above-mentioned rule for borrowing as well as how to borrow from the tens place which is an empty place in the original problem.

T Introduce the main task.

2 38 Practice subtraction with borrowing to solve the problems.

T Make sure students do the exercises correctly.

3 39 Fill in the blanks to complete the subtraction in vertical form.

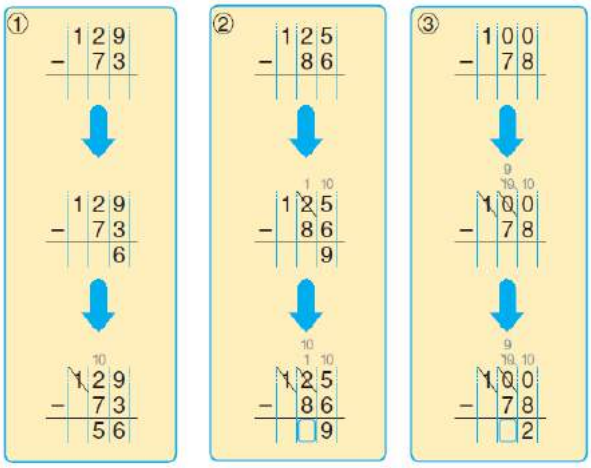
TN Let students think about the missing number from the minuend, subtrahend and answer. For example, first calculation, minuend is 8 and answer is 4, so the missing number (subtrahend) is 4.

Sample Blackboard Plan

Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson:**

Let's subtracting vertically with borrowing/regrouping.

37 Let's explain subtraction in vertical form.



MT

38 Find answers in vertical form.

1) 132 – 41 2) 109 – 5

3) 146 – 60 4)132 – 47

5) 120 – 61 6) 106 – 59

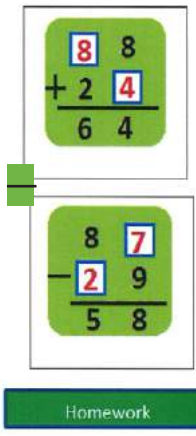
7) 105 – 58 8) 100 – 39

9) 102 – 17 10) 102 – 7

11) 900 – 500 12) 1000 –200

13) 536 –5

39 Find answers in vertical form.



Homework

End of Chapter Test: Chapter 1 **Date:**

What we learned in Elementary School. (Addition and Subtraction)	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 38 + 11

② 89 + 27

③ 532 + 458

④ 36 − 23

⑤ 54 − 29

⑥ 367 − 189

2. In a building, there are 342 stair steps from the ground floor to the top floor. He climbed up 113 stair steps. How many steps left to reach the top floor.

② Mathematical sentence: _____

③ Answer: _____

3. Hilda collected 133 stones. Nick collected 109 stones. How many stones did they collect in total?

④ Mathematical sentence: _____

⑤ Answer: _____

Chapter 2 Addition and Subtraction 2

1. Unit Objectives

- To understand how to add and subtract 3-digit and 4-digit numbers and calculations of addition and subtraction can be calculated based on the basic calculations of 2-digit numbers. (3.1.2a)
- To add and subtract 3-digit and 4-digit numbers in vertical form. Also, able to confirm calculations. (3.1.2b)
- To think about how to add and subtract 3-digit and 4-digit numbers by guessing based on the calculations of (2-digit numbers) ± (2-digit numbers). (3.1.2c)
- To seek to think about how to add and subtract 3-digit and 4-digit numbers by using previous learning. (3.1.2c)

2. Teaching Overview

Unit 1 is revision of previous grades. In Unit 2, students will learn how to add and subtract 3-digit numbers and acquire reliable calculation skills based on the learning in the previous grades.

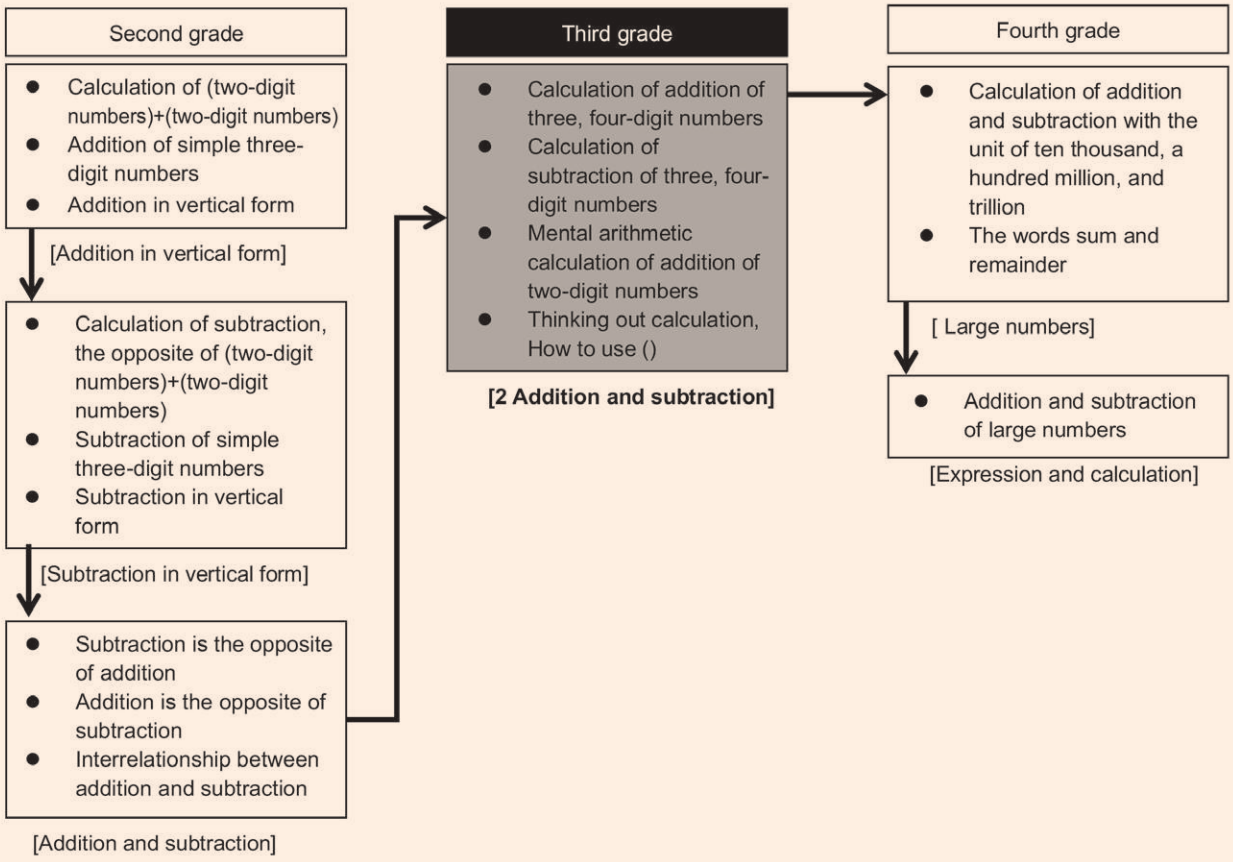
Addition of 3-digit Numbers and Subtraction of 3-digit Numbers : Students think about how to calculate 3-digit numbers based on the previous learning of calculation of 2-digit numbers. They need to estimate the result of calculation for checking the actual answers for reference.

Calculating Large Numbers : Students expand their skill of addition and subtraction to 4-digit numbers based on 3-digit calculation.

Considering How To Calculate Easily: Teacher should teach for enabling students to feel useful to change expressions easier for mental calculation by utilising commutative and associative laws.

What Kind of Calculation is This?: Students will identify operations by expressing the given and ungiven information as tape diagrams and setting mathematical expressions by considering the sizes of numbers.

3. Related Learning Contents



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 1. Addition of 3-digit Numbers
Lesson 1 of 4 (Double Period)

Textbook Page : p.26~p.27
Actual Lesson 016

Sub-unit Objectives

- To think of ways in how to calculate three-digit numbers added to three-digit numbers based on prior knowledge.
- To understand ways to calculate addition without and with carrying over (carrying over tens a number of times) and master the skills to calculate addition.

Lesson Objectives

- To recognise the given situation where addition is used and make a math expression.
- To think about ways on how to calculate three-digit numbers added to three-digit numbers without carrying over.

Prior Knowledge

- Addition of 2-digit numbers with and without carrying.

Preparation

- Two colour tape strips (use for tape diagram)
- Blocks such as ones, tens and hundreds.

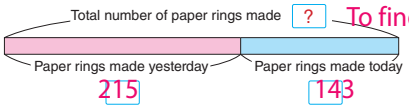
Assessment

- Recognise the process of addition in vertical form to write the sum of three-digit whole numbers. F
- Enjoy recognising situations of addition problems and represent the given situations with tape diagram and others. F
- Do the exercises correctly at the end of the lesson. S

2 Addition and Subtraction 2

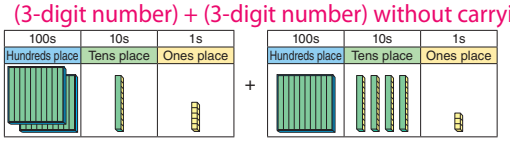
1 Addition of 3-digit Numbers

1 For the party decoration, we made 215 paper rings yesterday and 143 rings today.
How many paper rings did we make altogether?



To find out answer.

1 Write a mathematical expression.
215+143
2 Approximately how many paper rings is the answer?
about 300 (200+100)
3 Let's think about how to add three-digit numbers.
(3-digit number) + (3-digit number) without carrying over



Let's remember the additions in 2nd grade to think of how to do this.

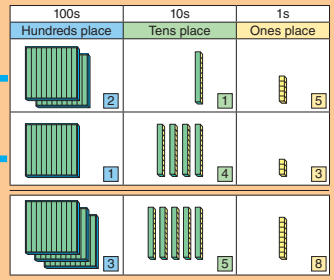
Let's think about how to add.

Recall the lesson for adding 2-digit numbers.

Thinking the reasons why we add numbers on the same place values.

Naiko's idea

Line up place values, then put in numbers accordingly.



2+1 for the sets of 100s. 1+4 for the sets of 10s. 5+3 for the ones.

Yamo's idea

Calculate the addition vertically like the addition of 2-digit numbers.

$$\begin{array}{r} 215 \\ +\ 143 \\ \hline 358 \end{array}$$

Addition Algorithm for 215+143 in Vertical Form

$$\begin{array}{r} 215 \\ +\ 143 \\ \hline \end{array} \qquad \begin{array}{r} 215 \\ +\ 143 \\ \hline 358 \end{array}$$

2+1=3 1+4=5 5+3=8

Vertically line up the numbers according to their place values.

For adding large numbers vertically, we line up the numbers according to their place values.

Exercise

① 153+425 578 ② 261+637 898 ③ 437+302 739 ④ 502+205 707

26 = □ + □ □ − □ = 27

Lesson Flow

1 ① Read the task and distinguish addition or subtraction.

T Use a tape diagram to describe the situation showing the number of paper rings in three-digit numbers.

S ① Identify that it is an addition situation as putting together so they are to write a math expression.

S ② Answer the question.

T Introduce the main task.

2 ③ Think about how to add 215 + 143 and share their ideas.

T Display the blocks and ask students to use the blocks to calculate 215 + 143 vertically.

S Use prior knowledge of adding two-digit numbers and add 3-digit numbers. They compare and share their ideas.

T Refer to Naiko and Yamo's idea and express what is seen from the two ideas.

S From Naiko's idea, the place values are lined up and blocks are replaced with numbers which become the expression written in the same column in vertical form.

S From Yamo's idea, she adds the numbers in each respective place value at the same time and writes the answers all at once.

3 Summarise the important points of adding in vertical form.

T Explain the summary box .

4 Solve the exercise in their exercise books.

T Supervise those who need assistance and collect student workbook for marking.

• Teacher's Notes •

From this page, students begins to learn Grade 3 contents in the syllabus using what they already learned at elementary shcool.

The situation of task ① is making decoration with the picture about it. The picture is only for helping to understand the situation so students do not have to make real paper rings.

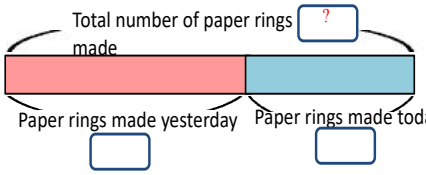
Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Topic: Addition of 3-digit numbers Lesson Number: 1 out of 4

Main Task: Let's do addition of three digit numbers

1 For the party decoration, we made 215 paper rings yesterday and 143 today .

How many paper rings did we make altogether?



① Write an expression.

Math Expression
215 + 143

yesterday today

② Estimate the total number of paper rings.

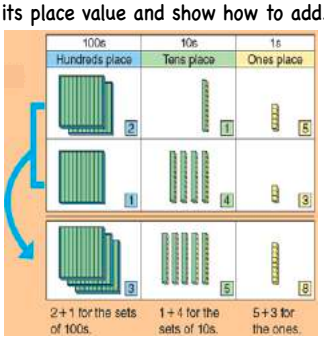
200 + 100 = 300

Answer: About 300 paper rings

MT

3 Let's think about how to add 215 + 143

Naiko's idea. Vertically line up blocks according to its place value and show how to add.



Yamo's idea. Vertically line up numbers according to its place value and add.

Calculate the addition vertically like the addition of 2 digit numbers.

	2	1	5
+	1	4	3
	3	5	8

Addition Algorithm

	2	1	5
+	1	4	3
	3	5	8

2+1=3 1+4=5 5+3=8

Exercise

(1) 153 + 425 (2) 261+637
(3) 437 +302 (4) 502+205

Summary

When adding large numbers, vertically, we line up the numbers according to their place values.

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 1. Addition of 3-digit Numbers
Lesson 2 of 4 (Double Period)

Textbook Page : p.28
Actual Lesson 017

Lesson Objectives

- To make various problems of three-digit numbers added to three-digit numbers.
- To sort out the problems depending on the number and types of carrying over.

Prior Knowledge

- Addition of two-digit numbers added to two-digit numbers with carrying.

Preparation

- Blocks such as ones, tens and hundreds

Assessment

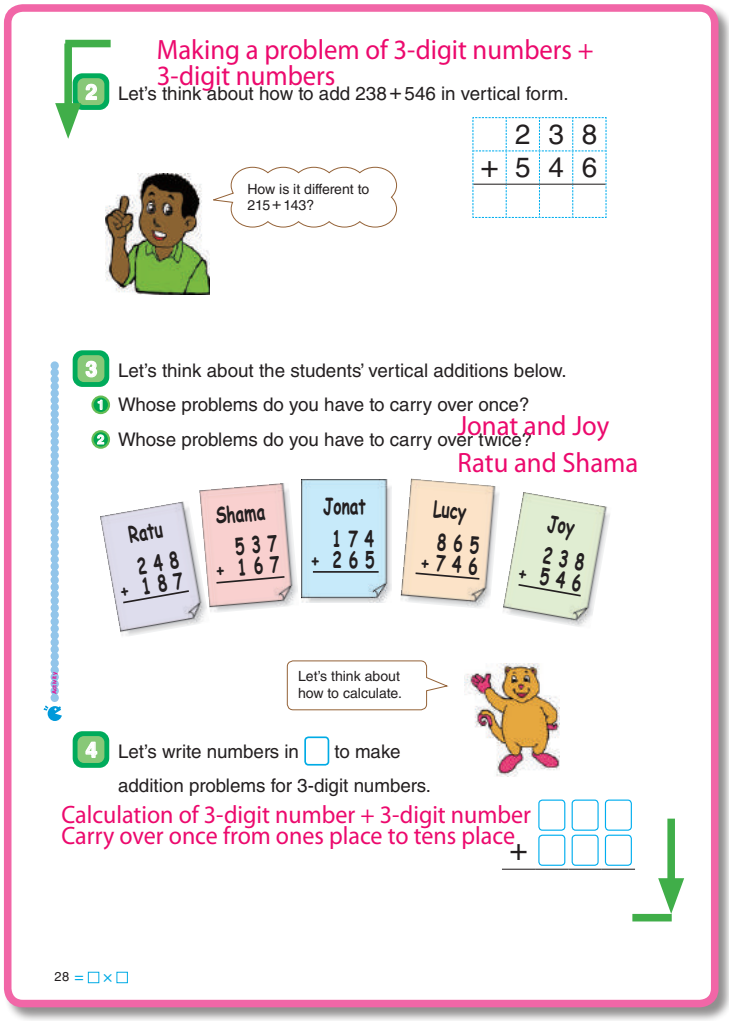
- Make various problems of 3-digit numbers added to 3-digit numbers. F
- Sort out the problems depending on the number and types of carrying over. F S

• Teacher's Notes •

Task 3 provide the view for further learning in relation to making 10 and carrying over to next place value.

On task 4, it is not necessary to calculate the answers because students have not yet learned the contents. What its asking is, categorisation of the problems according to the number of carrying over.

Based on the addition of 2-digit numbers, and simple cases of 3-digit numbers, help students think about how to add 3-digit numbers by carrying over.



Lesson Flow

1 2 Think about how to calculate 238 + 546.

T Confirm the ways on how to calculate through discussions with the students.
S Write how to calculate three-digit numbers in their exercise book.
T Introduce the main task.

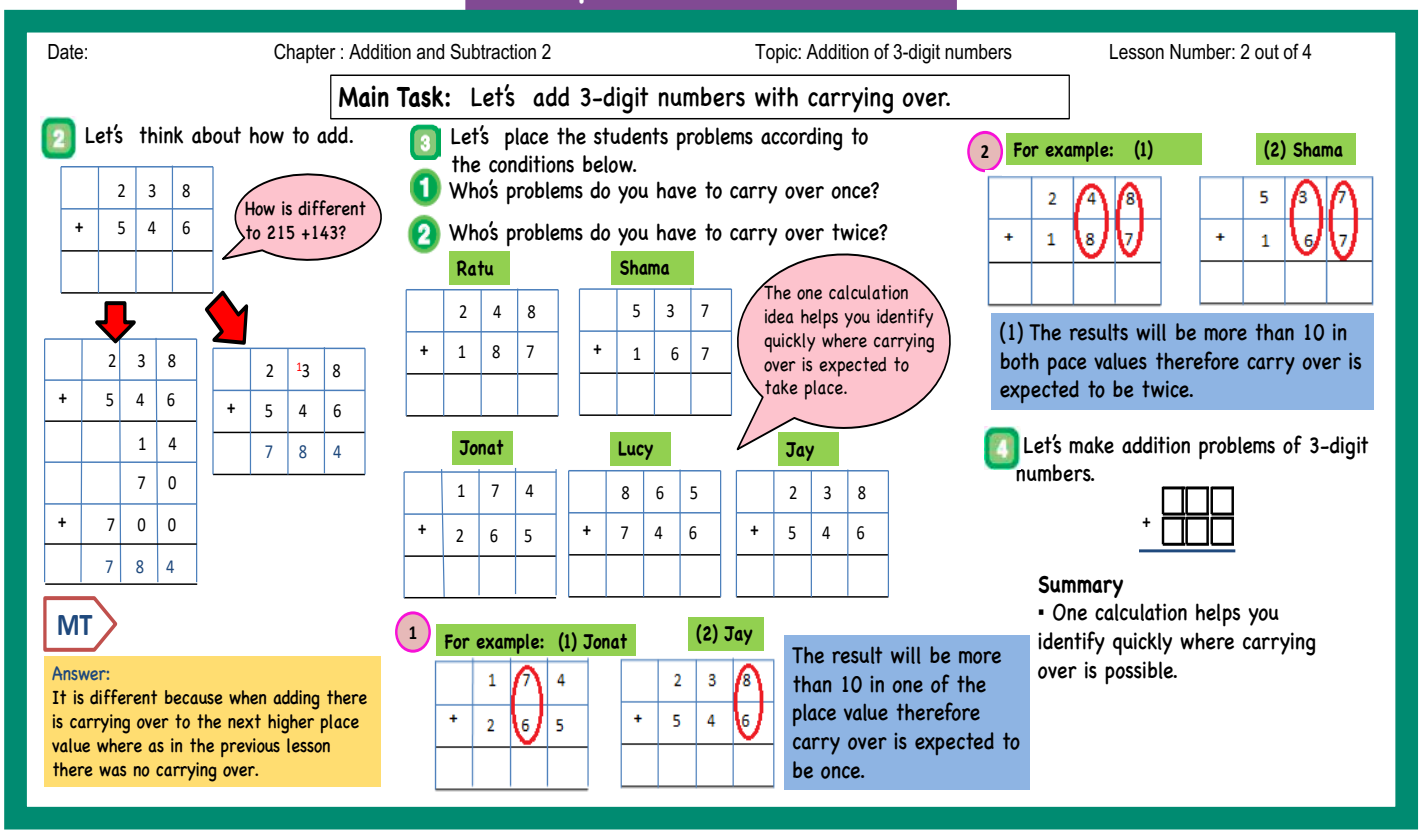
2 3 Make questions of three-digit numbers added to three-digit numbers and focus on carrying over.

S Make questions of three-digit numbers added to three-digit numbers.
T Ask students to display their work on the blackboard.
T Classify the students' work based on the following criteria;
1. Without carrying over.
2. With carrying over from ones place to tens place.
3. With carrying over from tens place to hundreds place.
4. With carrying over from ones place to tens place and tens place to hundreds place.
T Let the students to think of ways on how to solve the problem and focus on carrying over.

3 4 Make addition problem of 3-digit numbers + 3-digit numbers.

S Make own addition problems and analyse according to the criteria of task 3.
S Show the problem to friends and analyse each others work.

Sample Blackboard Plan



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 1. Addition of 3-digit Numbers
Lesson 3 of 4 (Single Period)

Textbook Page : p.29
Actual Lesson 018

Lesson Objectives

- To think of ways in how to calculate three-digit numbers added to three-digit numbers with carrying over once from tens place to hundred place.

Prior Knowledge

- Addition of two-digit numbers added to two-digit numbers with carrying.

Preparation

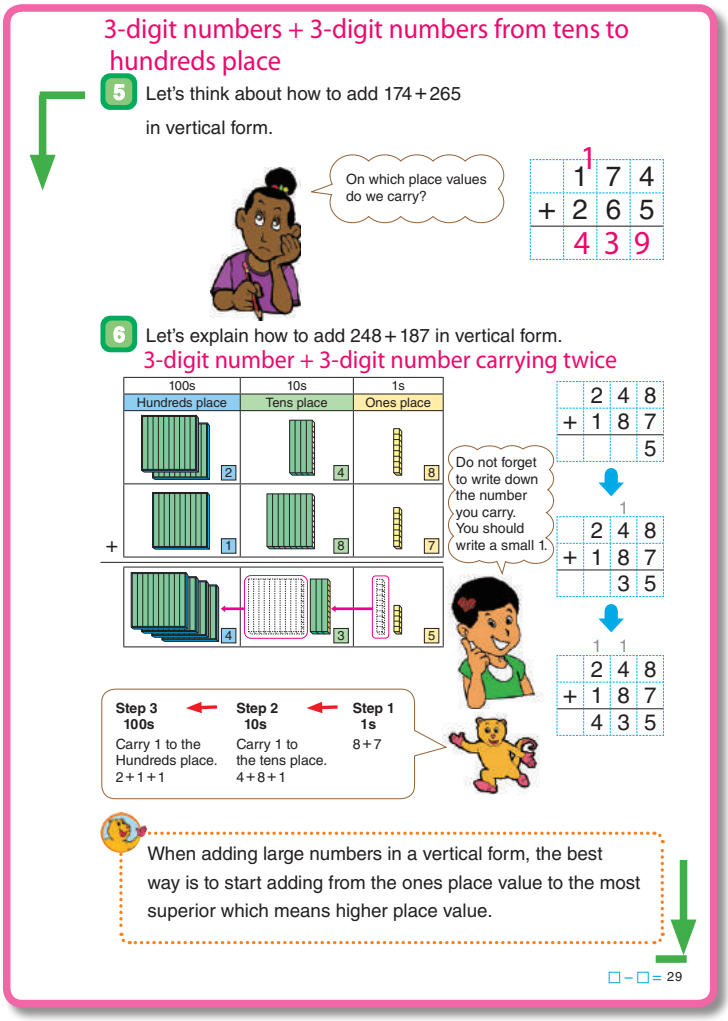
- Blocks such as ones, tens, and hundreds.

Assessment

- Think about how to calculate 3-digit numbers added to 3-digit numbers with carrying over. F
- Explain the process of addition of 3-digit numbers added to 3-digit numbers with carrying over. S

• Teacher's Notes •

Remind students that carrying over may start or occur in different place values so be careful to place the carrying over number to the respective place.
When thinking about how to calculate 154 + 172, help students to find the method of calculation for themselves by making use of prior knowledge of 54 + 72 = 126



Lesson Flow

1 5 Think about how to add 174 + 265 in vertical form.

T Let students recognise that this problem involves carrying over once; from tens place to the hundreds place.

TN The addition with carrying over in this problem can be done in the same way as they did with two-digit numbers.

S Identify that by calculating in the tens column, 7 + 6 = 13, 10 of tens of which is 1 hundred should be carried over to the hundreds place.

T Introduce the main task.

2 6 Explain how to add 248 + 187 in vertical form.

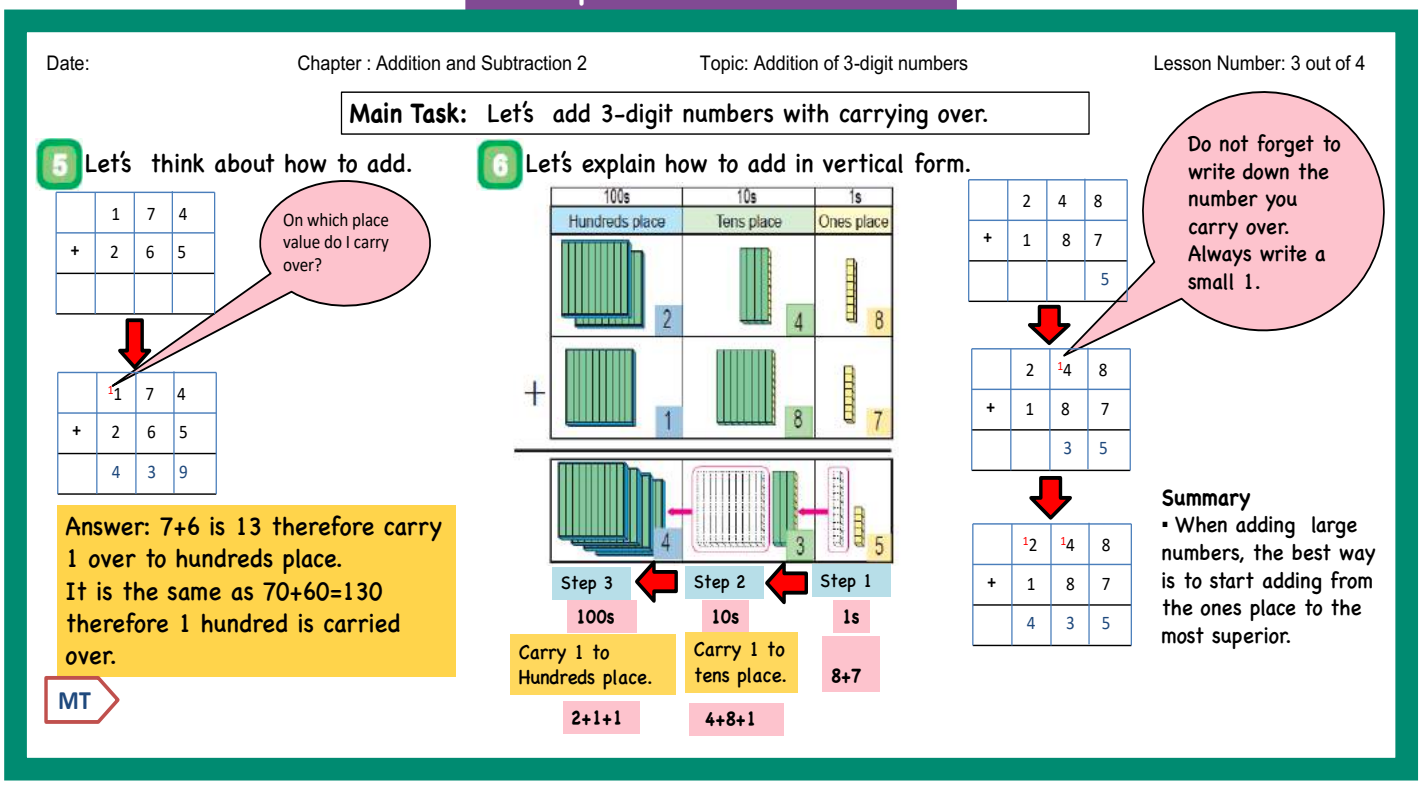
S This time students recognise that this problem involves carrying over twice; from ones to tens and tens to hundreds.

S Identify that by calculating in the ones column, 8 + 7 is more then 10; therefore 1 ten of which is 10 ones should be carried over tens place.

S Identify that by calculating in the tens column, 1 + 4 + 8, the result is again more than ten, 10 of tens of which is 1 hundred should be carried over to the hundreds. Hundreds becomes 1 + 2 + 1.

T Explain the important point in the box .

Sample Blackboard Plan



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 1. Addition of 3-digit Numbers
Lesson 4 of 4 (Single Period)

Textbook Page : p.30
Actual Lesson 019

Lesson Objectives

- To think of ways on how to calculate three-digit numbers added to three-digit numbers with carrying over to tens place of which becomes an empty place or zero.
- To identify that the sum will be the same even if the order of augend and addend are switched.
- To make addition problems of three-digit numbers of which answer is already known by following condition: Carrying over once and Carrying over twice.

Prior Knowledge

- Addition of three-digit numbers added to three-digit numbers with carrying. (Previous lesson)

Preparation

- Prepare according to the blackboard plan.

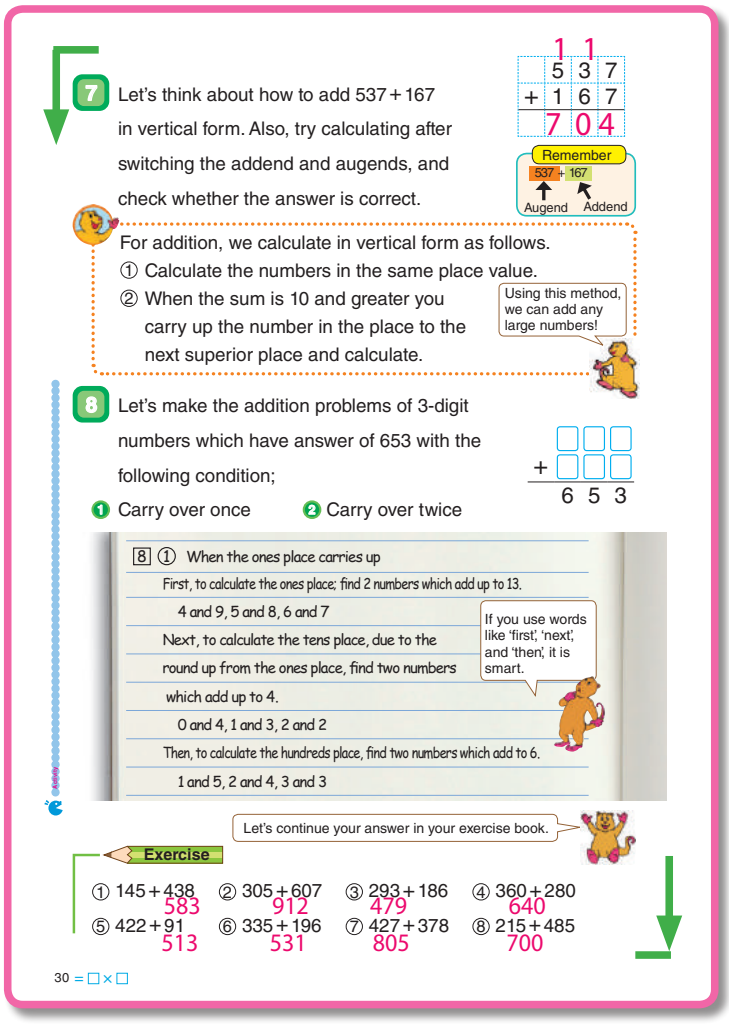
Assessment

- Explain how to calculate addition problems of 3-digit numbers added to 3-digit numbers. F
- Enjoy making addition problems of 3-digit numbers added to 3-digit numbers. F
- Do the exercises correctly at the end of the lesson. S

• Teacher's Notes •

It is necessary to teach students how to add 3-digit numbers based on algorithms for the addition of 2-digit numbers which involves carrying over to tens place and applying to carrying over to hundreds place.

Teach the importance of aligning numbers under their place values.



Lesson Flow

1 7 Think about how to add 537 + 167 in vertical form.

T Introduce the main task.

S Think about how to calculate 537 + 167 in vertical form and explain what their answer is after switching the addend and augends.

S Identify that the sum will be the same even if the order of augend and addend are switched.

T Explain the important point in the box .

2 8 1 Make addition problems of 3-digit numbers of which the answer is 653 with carrying over once.

S Think and explain how they can select pair of numbers for each place value that can add up to get the answer 653, for example;

(1) When the ones place carry over, first, to calculate the tens place, find two (2) numbers which add up to give 13, for example 4 and 9, 5 and 8, 6 and 7.

(2) Next, to calculate the tens place, due to carry over number from the ones place, find two numbers which adds up to 4 such as, 0 + 4, 1 + 3, 2 + 2.

(3) Then, to calculate the hundreds place, find two (2) numbers which adds up to 6 like: 1 + 5, 2 + 4, 3 + 3.

3 2 Make addition problems of 3-digit numbers of which the answer is 653 with carrying over twice.

S Think and explain how they can select pair of numbers for each place value that can add up to get the answer 653, for example;

(1) When the ones place carry over, first, to calculate the tens place, find two(2) numbers which add up to give 13, for example 4 and 9, 5 and 8, 6 and 7.

(2) Next, to calculate the tens place, due to carry over number from the ones place, find two numbers which adds up to 15 such as, 9 + 5, 8 + 6, 7 + 7.

(3) Then, to calculate the hundreds place, find two (2) numbers which adds up to 6 like: 1 + 4, 2 + 3, 3 + 2.

4 Solve the exercise.

Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Topic: Addition of 3-digit numbers Lesson Number: 4 out of 4

Main Task: Let's make addition problems of 3-digit numbers.

7 Let's add in vertical form.

	5	3	7
+	1	6	7

Remember: 537 + 167 — Addend, Augend

	5	$^{1}3$	7
+	1	6	7
	7	0	4

	1	$^{1}6$	7
+	5	3	7
	7	0	4

When augend and addend are switched, the result is the same.

MT

Important Point

For addition, we calculate in vertical form as follows.
1.Calculate the numbers on the same place value.
2.When the sum is 10 and greater, you carry over the number to next superior place and calculate.

8 Make addition problems of 3-digit numbers resulting 653.

1 Carry over once

	1	$^{1}1$	4
+	5	3	9
	6	5	3

Ones place
1.Find 2 numbers that add up to 13
Tens place
2. Find 2 numbers that add up to 4 add the number carried over.
Hundreds place
3. Find 2 numbers that add up to 6

2 Carry over twice

	$^{1}2$	$^{1}5$	6
+	3	9	7
	6	5	3

Ones place
1.Find 2 numbers that add up to 13
Tens place
2. Find 2 numbers that add up to 14 and add the number carried over.
Hundreds place
3. Find 2 numbers that add up to 5 and add the number carried over.

Exercise

(1) 145 + 438 (2) 316 + 457
(3) 305 + 607 (4) 608+207

Summary

- When making addition problems with carrying over, use the idea of one digit calculation in vertical form.
- Find two numbers that add up to give 10 or more to carry over.

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 2. Subtraction of 3-digit Numbers
Lesson 1 of 5 (Double Period)

Textbook Page : p.31~p.32
Actual Lesson 020

Sub-unit Objectives

- To think of ways in how to calculate three-digit numbers subtracted from three-digit numbers as the opposite operation of addition based on prior knowledge.
- To understand various ways to calculate subtraction without and with borrowing (borrowing ten a number of times) and master the skills to calculate subtraction.

Lesson Objectives

- Recognise the given situation where subtraction is used and make a math expression.
- Think of ways in how to calculate three-digit numbers subtracted from three-digit numbers without borrowing.

Prior Knowledge

- Subtraction of one-digit number from two-digit numbers and two-digit numbers from two-digit numbers without or with borrowing in vertical form.

Preparation

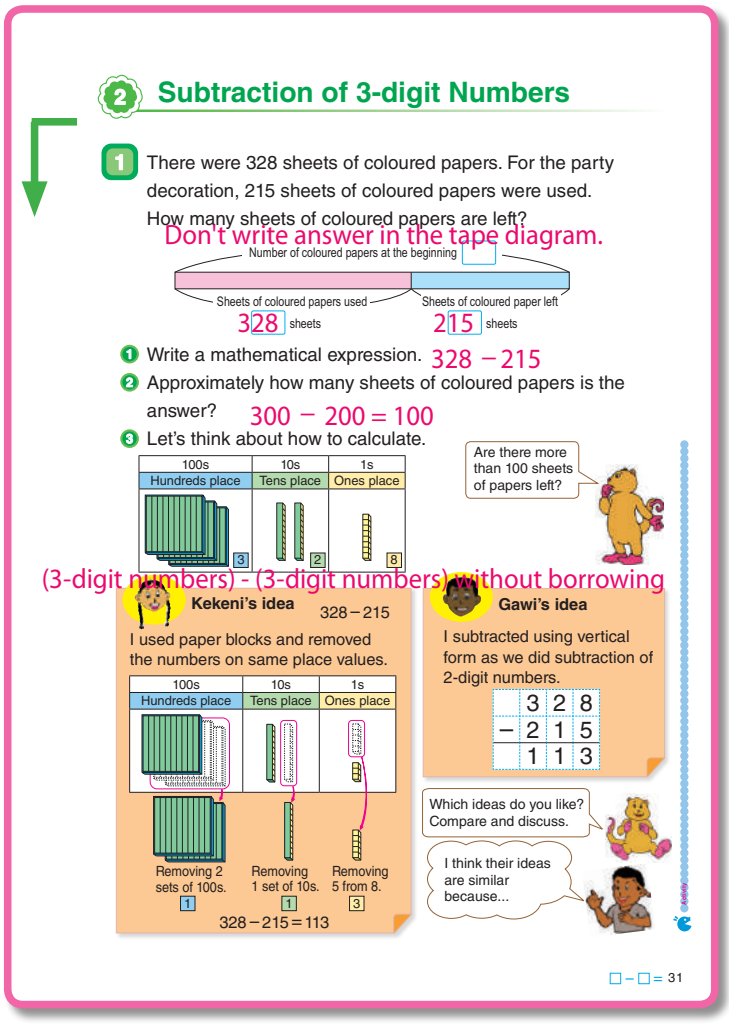
- Block diagram, Paper blocks (1s, 10s & 100s)

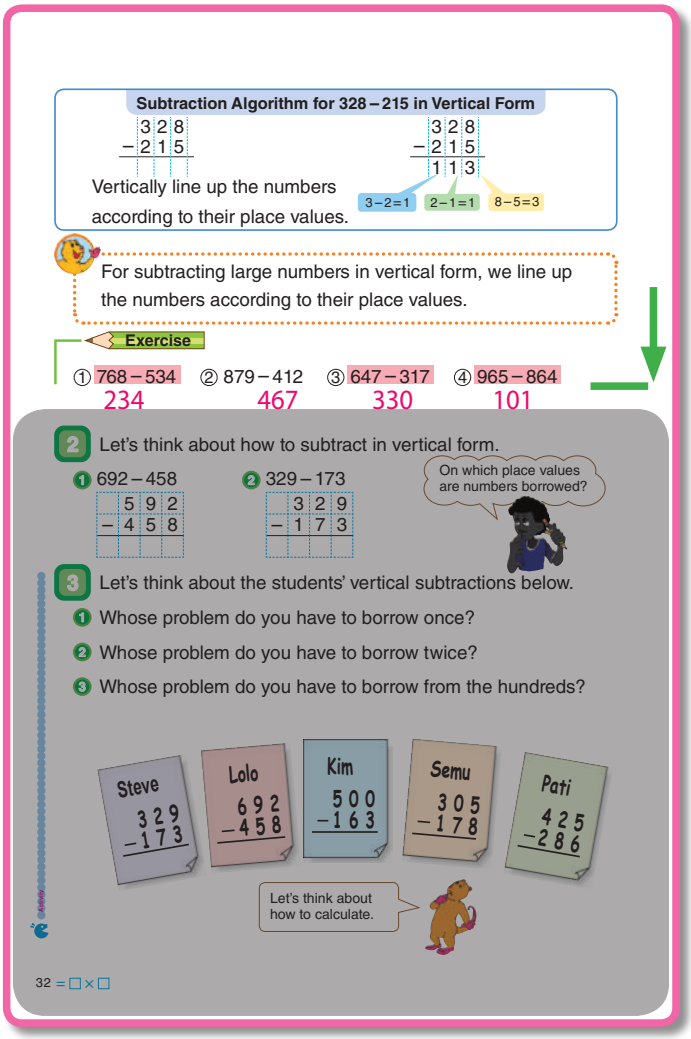
Assessment

- Think of the process of subtraction of three-digit numbers in vertical form. F
- Do the exercises correctly. S

• Teacher's Notes •

For Task 1
Do not write answer into the boxes □ directly.
Discuss the lesson following the lesson flow.





Lesson Flow

1 ① Read the task and distinguish addition or subtraction.

T Use a tape diagram to describe the situation showing the number of coloured papers in 3-digit numbers.
S ① Identify that it is a subtraction situation as taking away from what's given and write a math expression.
S ② Calculate the answer approximately.
T Introduce the main task.

2 ③ Let the students think about how to subtract 328 – 215 and share their ideas.

T Display the blocks and ask students to use the blocks to calculate 328 – 215 vertically.
S Use prior knowledge of subtracting two-digit numbers from 3-digit numbers. They compare and share their ideas.
S Refer to Kekeni and Gawi's idea and express what is seen from the two ideas.
TN From Kekeni's idea, the place values are lined up and blocks are replaced with numbers which become the expression written in the same column in vertical form.
TN From Gawi's idea, he subtracts the numbers in each respective place value at the same time and writes the answers all at once.

3 Summarise the important points of subtracting in vertical form.

T Get the students to understand that: When subtracting large numbers, in vertical form, we line up the numbers according to their place values and add.

4 Do the exercise.

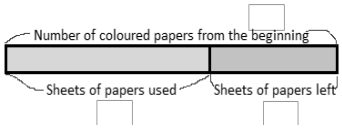
T Supervise those who need assistance and collect student exercise books for marking.

Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Topic: Subtraction of 3-digit numbers Lesson Number: 1 of 5

Main Task: Let's subtract 3-digit numbers vertically.

① There were 328 sheets of coloured papers. 215 papers were used for party decorations.
How many sheets of papers were left?



① Write a math expression.
328 – 215
Papers from the beginning
Papers used

② 300 – 200 = 100

Answer: About 100 papers will remain.

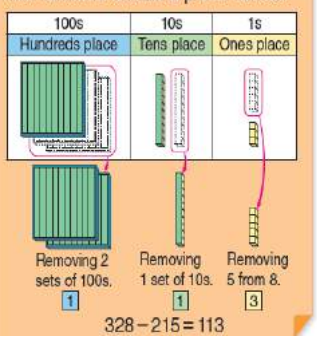
MT

③ Let's think about how to subtract 328 – 215.

Students Ideas
Working out with answers

Kekeni's Idea
Using Block Diagram

I used paper blocks and removed the numbers on same place values.



Gawi's idea
Line up numbers

I subtracted using vertical form as we did subtraction of 2-digit numbers.

	3	2	8
–	2	1	5
	1	1	3

Answer: 113

Summary

When subtracting large numbers in vertical form, we line up numbers according to their place values.

Exercise

(1) 768 – 534
(2) 879 – 412
(3) 647 – 317
(4) 965 – 864

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 2. Subtraction of 3-digit Numbers
Lesson 2 of 5 (Double Period)

Textbook Page : p.32~p.33
Actual Lesson 021

Lesson Objectives

- To make any subtraction problems using three-digit numbers subtracted from three-digit numbers with borrowing in vertical form.
- To analyse the subtraction focusing on borrowing.

Prior Knowledge

- Subtraction of 3-digit numbers without borrowing(Previous lesson).
- Subtraction of 2-digit numbers with borrowing.

Preparation

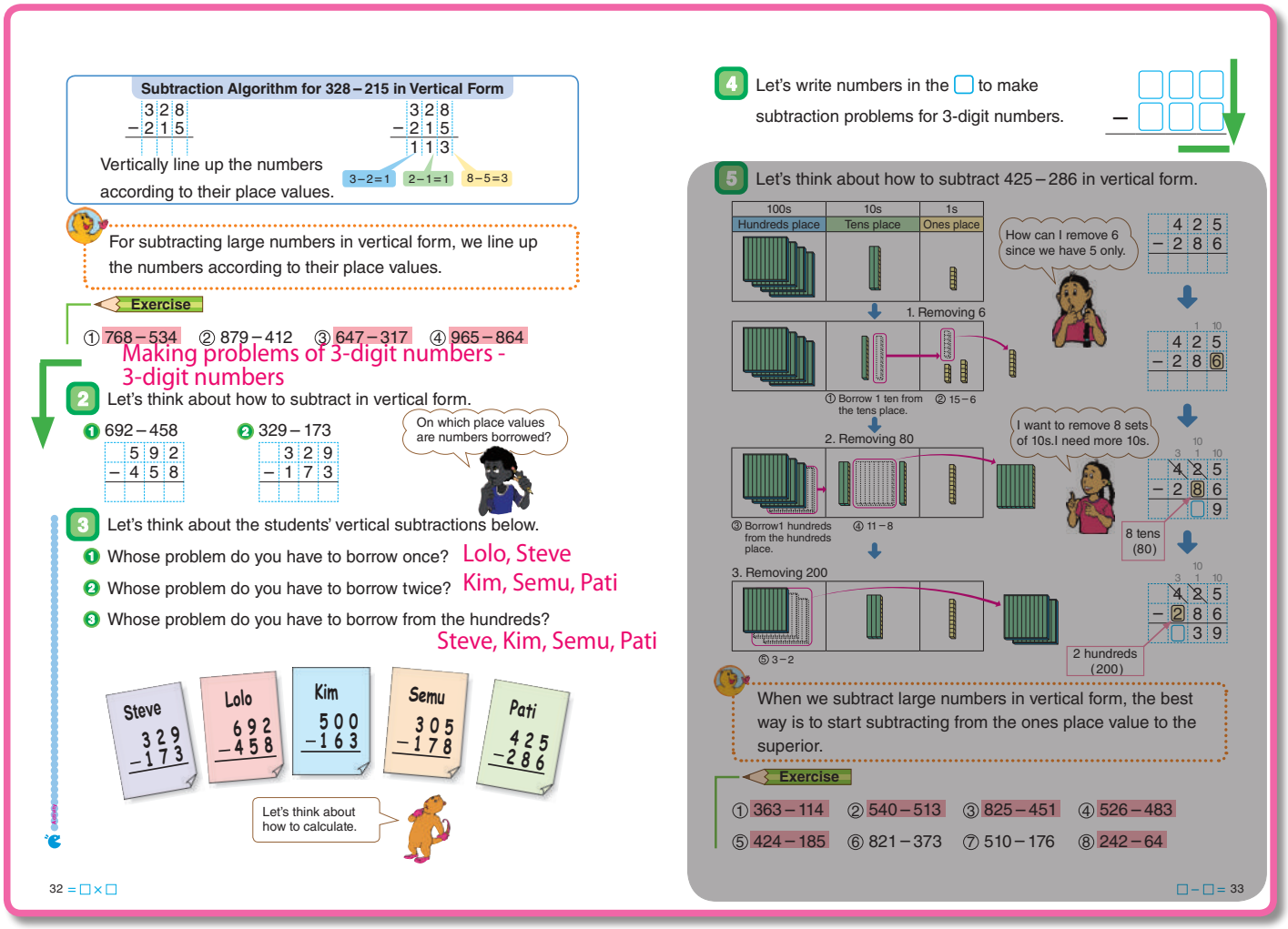
- Block diagram, Paper blocks (1s, 10s & 100s)

Assessment

- Enjoy making any subtraction problems using three-digit numbers subtracted from three-digit numbers. F
- Analyse and categorise the subtraction focusing on borrowing. F S

• Teacher's Notes •

This lesson will be the introduction for the next lesson which is how to calculate 3-digit numbers with borrowing. Therefore, let students analyse the operation focusing on borrowing or without borrowing of each place value.



Lesson Flow

1 ② Think about how to subtract ① and ② in vertical form.

S Recognise that ① involves borrowing once from tens place to ones place and the ② is borrowing once from hundreds place to tens place.

TN Students have learned the subtraction with borrowing with two-digit numbers in Grade 2.

S In activity ① students identify that by calculating 2 – 8 is impossible; therefore 1 ten of which is 10 ones should be borrowed from the tens and given to ones place to make it 12.

S In activity ②, students identify that by calculating 2 – 7 or 20 – 70 in the tens place is impossible, therefore 1 hundred of which is 10 tens, should be borrowed from the hundreds and given to tens place to make it 12-7 or 120 – 70.

T Introduce the main task.

2 ③ Analyse the operation focusing on the borrowing.

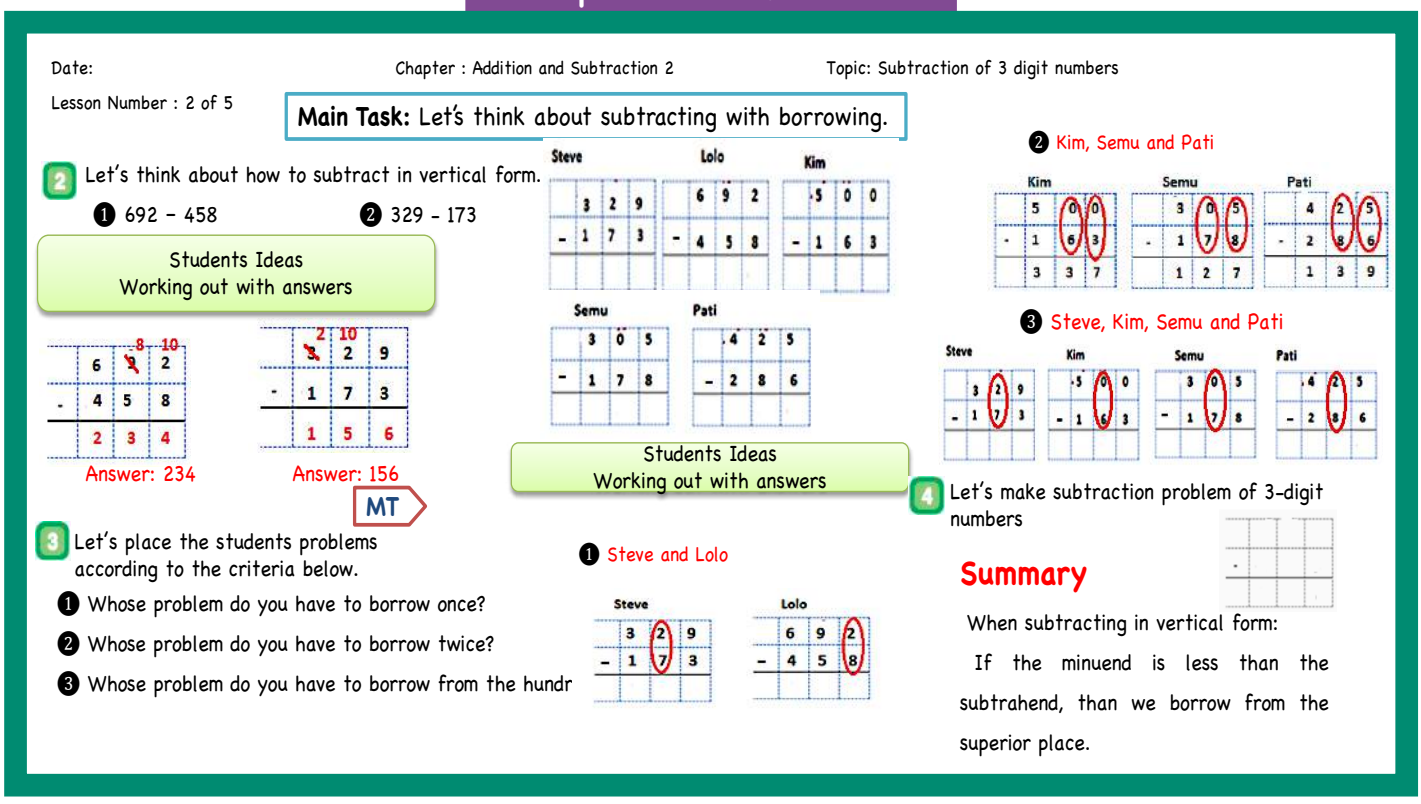
S Categorise 5 operations based on the criteria of ①, ② and ③.

3 ④ Make subtraction problems of 3-digit numbers.

S Make any subtraction problem of 3-digit numbers.

S Share with friends and analyse the operation with each other focusing on borrowing.

Sample Blackboard Plan



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 2. Subtraction of 3-digit Numbers
Lesson 3 of 5 (Single Period)

Textbook Page : p.33
Actual Lesson 022

Lesson Objectives

- To think of ways in how to calculate three-digit numbers subtracted from three-digit numbers by borrowing twice from tens place to ones place and from hundreds place to tens place.

Prior Knowledge

- Subtraction of 2-digit numbers with borrowing.

Preparation

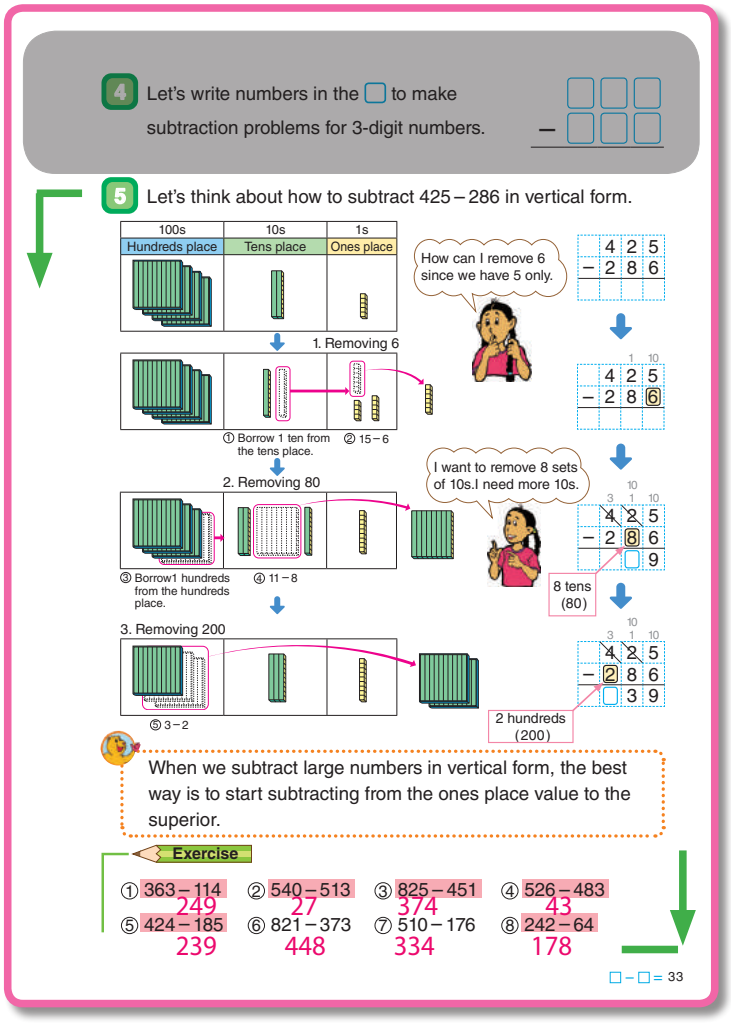
- Block diagram

Assessment

- Think about and understand the process of borrowing twice in subtraction of three-digit numbers and recognising place values where numbers are borrowed. F
- Do the exercises correctly. S

• Teacher's Notes •

It is important for students to understand the argorithm of subtraction with borrowing so the you should explain it using blocks step by step.



Lesson Flow

1 5 Think about how to subtract 425 – 286 in vertical form.

T Let students recognise that this problem involves borrowing twice; from tens to ones place and the later from hundreds to tens place.

TN The subtraction with borrowing in this problem can be done in the same way as they did with two-digit numbers.

S Identify that by calculating 5 – 6 is impossible; therefore 1 ten of which is 10 ones should be borrowed from the tens and given to ones to make it become 10 + 5 – 6 or 15 – 6

S Next, they also identify that tens place becomes 1 – 8 or 10 – 80 and by calculating it is impossible, therefore 1 hundred of which is 10 tens, should be borrowed from the hundreds and given to tens place. Tens place becomes 10 + 1 – 8 or 11 – 8 or 110 – 80 and finally the hundreds place becomes 3 – 2 or 300 – 200.

T Introduce the main task.

2 Summarise the important points of subtracting vertical form.

T Get the students to understand that: When subtracting large numbers in vertical form, the best way is to start subtracting from the ones to the superior place value.

3 Do the exercise.

T Supervise those who need assistance and collect student exercise books for marking.

Sample Blackboard Plan

Date:

Number: 3 of 5

Review

Subtract in vertical form

329 - 173

	2	10	
	3	2	9
-	1	7	3
	1	5	6

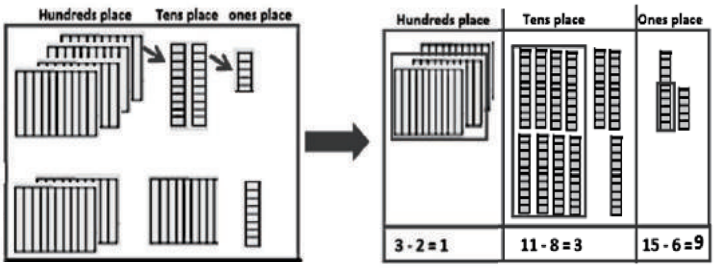
5 425 - 286

Students Ideas
Working out with answers

Chapter : Addition and Subtraction 2 Topic: Subtraction of 3-digit numbers Lesson

Main Task: Let's think about how to subtract 3-digit numbers by borrowing.

Textbook Idea



In the ones place 5 can not subtract 6 so we borrow 1 from the 10s place. (10 + 5 = 15)

Remove 6 (15 - 6 = 9)

In the tens place 10 can not subtract 80 so we borrow 1 from 100s place. (100 + 10 = 110)

Remove 80 (11 - 8 = 3)

Remove 200 (3 - 2 = 1). Answer: 139

MT

Summary

When we subtract large numbers in vertical form, the best way is to start subtracting form the ones place to the superior.

Exercise

Complete ① - ⑤

Home work ⑥ - ⑧

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 2. Subtraction of 3-digit Numbers
Lesson 4 of 5 (Single Period)

Textbook Page : p.34
Actual Lesson 023

Lesson Objectives

- To think about ways how to calculate three-digits numbers subtracted from three-digit numbers where tens place of subtrahend is 0 and with borrowing in vertical form.

Prior Knowledge

- Subtraction of 3-digit numbers with borrowing (Previous lesson).

Preparation

- Paper blocks

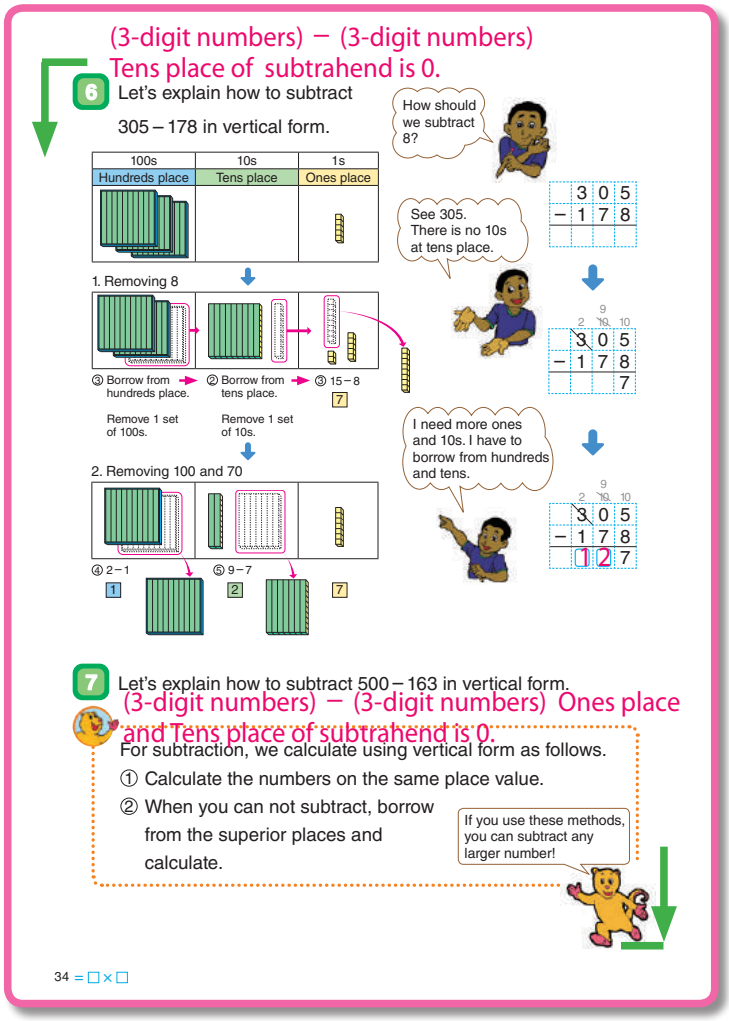
Assessment

- Think and understand the process of borrowing from hundred in the subtraction of three-digit numbers. F
- Explain the process of calculation 500 - 163. S

• Teacher's Notes •

Help students to be confident in borrowing straight from the hundreds place when the subtrahend of the tens and ones place is 0.

Remember that when we borrow from a superior place, we borrow 10 units to the next place value.



49
500
− 163
337

Lesson Flow

1 **6** **Think about how to subtract 305 – 178 in vertical form.**

T Introduce the main task.

TN This time students recognise that this problem involves borrowing straight from the hundreds place because of an empty place and then giving to tens and ones place together.

S Identify that by calculating 5 – 8 it is impossible; therefore we have to borrow, however we cannot borrow from an empty set or 0 in the tens place.
So we borrow 1 hundred as 10 of tens and give to the empty place and then same time give ones place 1 of ten from the 10 of tens or 1 hundred of which is 10 ones.

2 **7** **Explain how to subtract 500 – 163 in vertical form where ones and tens place of subtrahend is 0.**

S Identify that by calculating 0 – 3 is impossible because it is an empty place or 0; however again we cannot borrow from another empty place or 0 in the tens place.
So we borrow straight from 1 hundred as 10 of tens and give to the empty place and same time give ones place 1 ten from the 10 of tens or 1 hundred of which 10 ones.

T Give students various opportunity to explain the process of calculation until all the students understand clearly the process of calculation.

T Summarise the important point in the box .

Sample Blackboard Plan

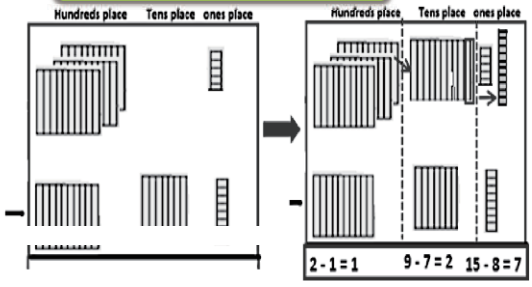
Date: Chapter : Addition and Subtraction 2 Topic: Subtraction of 3-digit number Lesson Number : 4 of 5

Main Task: Let's explain how to subtract by borrowing.

MT

6 Let's explain how to subtract 305 - 178 in vertical form.

Students Ideas
Working out with answers

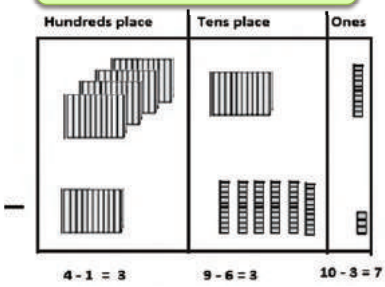


	2	10 9	10 5
-	1	7	8
	1	2	7

Align numbers to explain subtraction.
In ones 15 - 8 = 7
In tens 10 - 1 = 9 then 9 - 7 = 2
In hundreds 2 - 1 = 1
Answer: 127

7 Let's explain how to subtract 500 - 163 in vertical form.

Students Ideas
Working out with answers.



Align numbers to explain subtraction.
In ones 10 - 3 = 7
In tens 9 - 6 = 3
In hundreds 4 - 1 = 3
Answer: 337

Summary
For subtraction, we calculate using vertical form as follows:
1. Calculate the numbers on the same place.
2. When you can not subtract, borrow from the superior place and subtract.

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 2. Subtraction of 3-digit Numbers
Lesson 5 of 5 (Single Period)

Textbook Page : p.35
Actual Lesson 024

Lesson Objectives

- To make subtraction problems of 3-digit numbers subtracted from 3-digit numbers to find the difference of 356.
- To explain the process of subtraction.

Prior Knowledge

- Subtraction of 3-digit numbers with borrowing.

Preparation

- Prepare according to the board plan.

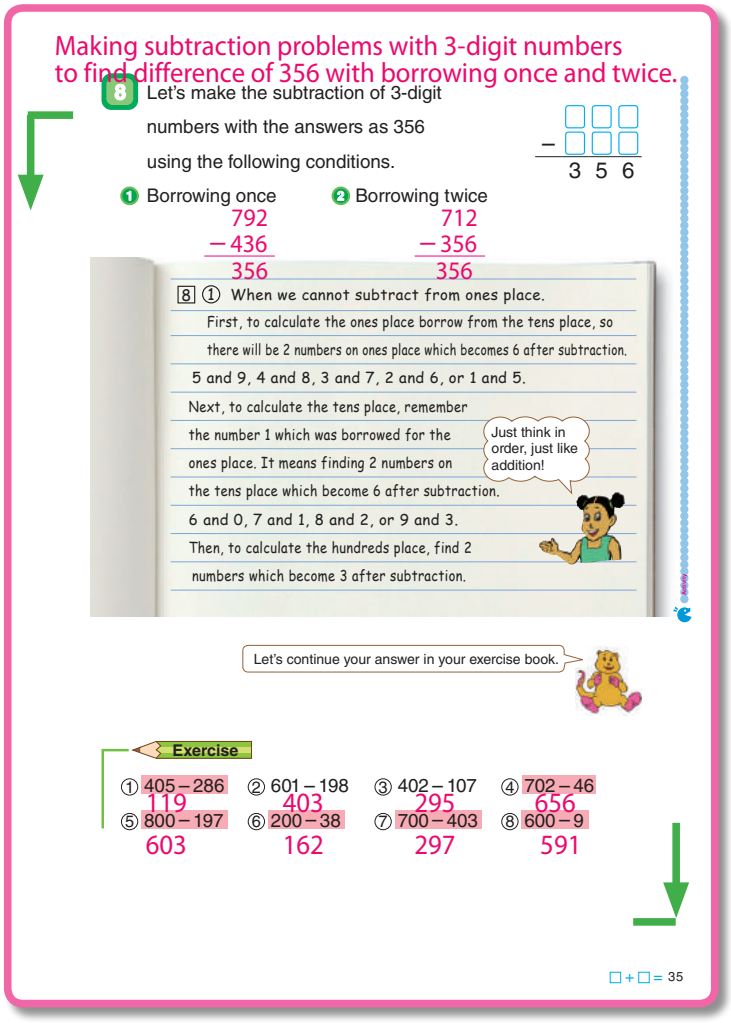
Assessment

- Make subtraction problems with 3-digit numbers subtracted from 3-digit numbers and explain the process of making. F
- Do the exercises correctly. S

• Teacher's Notes •

Help students to understand the process of borrowing superior values and for them to know that 10 sets is borrowed and added to the next inferior value.

Borrowing may occur once, twice or 3 times depending on the number of subtrahends that are less than the minuends.



Lesson Flow

1 8 1 Make a subtraction problem of 3-digit numbers of which the answer is 356 with borrowing once.

T Introduce the main task.

S Think and explain how they can select pair of numbers for each place value that can subtract to give the answer 356, for example;
When we cannot subtract from ones place, we borrow from tens place, first, to calculate the ones place, find two(2) numbers which becomes 6 after subtraction, for example 5 and 9, 4 and 8, 3 and 7, 2 and 6, 1and 5.
Next, to calculate the tens place, remember the number 1 which was borrowed for the ones place. It means find two (2) numbers which becomes 6 after subtraction, for example 6 and 0, 7 and 1, 8 and 2, 9 and 3.
Then, to calculate the hundreds place, find two (2) numbers which comes 3 after subtraction like, 9 – 6, 8 – 5, 7 – 4, 6 – 3, 5 – 2, 4 – 1.

2 2 Make a subtraction problem of 3-digit numbers of which the answer is 356 with borrowing twice.

S Think and explain how they can select pair of numbers for each place value that can subtract to give the answer 356, for example;
When we cannot subtract from ones place, we borrow from tens place, first, to calculate the ones place, find two(2) numbers which becomes 6 after subtraction, for example 5 and 9, 4 and 8, 3 and 7, 2 and 6, 1and 5.
Answer, when we cannot subtract from tens place, to calculate the tens place, remember the 1 which was borrowed for the ones place. It means find two (2) numbers which becomes 6 after subtraction, for example 5 and 9, 4 and 8, 3 and 7, 2 and 6, 1 and 5.
Then, to calculate the hundreds place, find two (2) numbers which becomes 4 after subtraction like, 9 – 5, 8 – 4, 7 – 3, 6 – 2, 5 – 1.

3 Do the exercise.

T Supervise those who need assistance and collect students exercise books for marking.

Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Topic: Subtraction of 3-digit numbers Lesson Number: 5 of 5

MT

Main Task: Let's make subtraction problems with 3-digit numbers.

8 Let's make the subtraction of 3-digit numbers that the answers is 356.

❶ Borrowing once

Students Ideas
Working out with answers

	7	8	10 2
-	4	3	6
	3	5	6

When we cannot subtract from ones place.
Firstly we find two numbers whose subtrahend is less than minuend but when we subtract it becomes 6.
Then we find two numbers to subtract and remember the one we borrowed for ones place to get 5.
Lastly we calculate the hundreds place.

❷ Borrowing twice

Students Ideas
Working out with answers

	6 1	10	10 2
-	3	5	6
	3	5	6

When we cannot subtract from tens and ones place.
Firstly we find two numbers whose subtrahend is less than minuend but when we subtract it becomes 6.
Then we find two numbers in tens place, which we subtract will give 6.
Lastly we think of number we borrowed for tens place and we calculate the hundreds place.

Summary

When calculating in vertical form;
① Calculate numbers on the same place value.
② When you can not subtract, borrow from the superior place and calculate.

Do **Exercise**

(1) 405 – 286
(4) 702 – 46
(5) 800 – 197
(6) 200 – 38
(7) 700 – 403
(8) 600 – 9

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 3. Calculating Larger Numbers
Lesson 1 of 1 (Double Period)

Textbook Page : p.36
Actual Lesson 025

Sub-unit Objectives

- To think of ways in how to calculate the addition and subtraction of larger numbers based on prior knowledge.
- To understand ways to calculate addition and subtraction of large numbers with carrying and borrowing.

Lesson Objectives

- To explain how to calculate the addition and subtraction of large numbers in vertical form with carrying and borrowing from next higher place values such as thousands and ten thousands.
- To think about how to calculate larger numbers using prior knowledge and understand about the process of carrying and borrowing.

Prior Knowledge

- Addition and subtraction of 3-digit number.

Preparation

- Worksheet that has addition and subtraction problems of large numbers.

Assessment

- Explain how to calculate large numbers in vertical form using what they already learned. F
- Understand the process of carrying over and borrowing when calculating large numbers. F
- Do the exercises correctly. S

• Teacher's Notes •

Emphasis should be done on the importance and convinience of vertical calculation and how it can be easily applied to adding large numbers by carrying over and subtracting large numbers by borrowing.

(3-digit number) + or − (3-digit number) Carry over and borrowing from thousands place.

3 Calculating Larger Numbers

1 Let's explain how to calculate using the carrying over and borrowing.

① 865 + 746

	8	6	5
+	7	4	6
1	6	1	1

② 1248 − 936

	1	2	4	8
−		9	3	6
		3	1	2

③ 1000 − 895

	1	0	0	0
−		8	9	5
		1	0	5

2 Let's think about how to calculate larger numbers using what you already learned.

(4-digit number) + or − (4-digit number) Carry over to the thousands place or borrowing from thousands place

① 4175 + 3658

	4	1	7	5
+	3	6	5	8
	7	8	3	3

② 6073 + 3927

	6	0	7	3
+	3	9	2	7
1	0	0	0	0

Even in larger numbers, we use the same method.

③ 3925 − 1947

	3	9	2	5
−	1	9	4	7
	1	9	7	8

④ 10000 − 5089

	1	0	0	0	0
−		5	0	8	9
		4	9	1	1

Exercise

① 525 + 913 = 1438
② 258 + 745 = 1003
③ 483 + 517 = 1000
④ 1237 − 414 = 823
⑤ 1358 − 567 = 791
⑥ 1002 − 946 = 56
⑦ 4563 + 3125 = 7688
⑧ 2606 + 3198 = 5804
⑨ 3587 + 6413 = 10 000
⑩ 6497 − 2135 = 4362
⑪ 8114 − 3518 = 4596
⑫ 10000 − 6001 = 3999

36 = □ × □

Lesson Flow

1 ① Explain how to calculate using carrying over and borrowing.

S ① Identify that the addition with carrying over can be done in the same way as in previous lessons however when adding 8+7+1 or 800+700+100 in the hundreds place, the 10 of hundreds will be carried over to the next high place which is thousand.

S ② Identify that the subtraction with borrowing can be done in the same way as in previous lessons however when subtracting 2−9 or 200−900 in the hundreds place, you borrow 10 of hundreds from the next high place which is thousand.

S ③ 1000−895, the students identify that the subtraction with borrowing can be done in the same way as in previous lessons however when calculating 0−3 it's impossible because of an empty place or 0; therefore they have to borrow however again it's impossible because the next two place values are also 0 except for the next high place which is thousands place where it's possible to borrow from directly.

TN Thousands place becomes 1−1 or 1000−1000, hundreds place becomes 10−1−8 or 1000−100−800, Tens place becomes 10−1−9 or 100−10−90 and Ones place becomes 10-5.

T Introduce the main task.

2 ② Think about how to calculate large numbers using what you already learned.

S ① Apply the same way of adding in previous lesson when adding 4-digit numbers to 4-digit numbers.

S ② Same way of adding however when adding 4-digit numbers to 4-digit numbers, it results in carrying over to the next higher value of ten thousand.

S ③ Apply the same way of subtracting like in previous lesson.

S ④ Identify that 4-digit numbers are subtracted from 5-digit numbers with minuends with four empty places or 0 in the ones, tens, hundreds and thousands resulting 10 to be borrowed from the next higher place which is ten thousands.

3 Do the exercise.

S Supervise those who need assistance and collect student exercise books for marking.

Sample Blackboard Plan

Date:
Lesson Number : 1 of 1

Chapter : Addition and Subtraction 2

Sub - Chapter/Topic: Calculating Larger Numbers

Main Task : Let's think about how to calculate using carrying over and borrowing.

1 Let's explain the calculation below.

❶ 865 + 746

Students Ideas
Working out with answers

	8	6	5
+	7	4	6
1	6	1	1

Answer: 1611

❷ 1248 − 936

Students Ideas
Working out with answers

1	2	4	8
−	9	3	6
	3	1	2

Answer: 312

❸ 1000 - 895

~~1~~	~~0~~	~~0~~	0
−	8	9	5
	1	0	5

Answer: 105

MT

2 ❶ 4175 + 3658

4	1	7	5
+	3	6	5	8
7	8	3	3

Answer: 7833

❷ 6073 + 3927

6	0	7	3
+	3	9	2	7
1	0	0	0

Answer: 1000

❸ 3925 − 1947

~~2~~	~~10~~	~~10~~	~~10~~
~~3~~	~~9~~	~~2~~	~~1~~	5
−	1	9	4	7
	1	9	7	8

Answer: 1978

❹ 10 000 − 5089

	~~9~~	~~9~~	~~9~~	
1	~~0~~	~~0~~	~~0~~	~~0~~
−	5	0	8	9
	4	9	1	1

Answer: 4911

Summary

Even when calculating large numbers, the same method is used.

Exercise

(1) 525 + 913
(4) 1237 − 414
(6) 1002 - 946
(7) 4563 + 3125
(9) 3587 + 6413
(10) 6497 − 2135
(12) 1000 - 6001

Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 4. Considering How to Calculate More Easily
Lesson 1 of 1 (Double Period)

Textbook Page : p.37-p.38
Actual Lesson 026

Sub-unit Objectives

- To understand how to calculate the addition and subtraction of 3-digit numbers using easier ways of calculation.

Lesson Objectives

- To calculate the addition and subtraction of 3-digit numbers using easier ways avoiding carrying and borrowing.

Prior Knowledge

- Addition and subtraction of 3-digit number.

Assessment

- Think about how to calculate addition and subtraction of 3 numbers using easier ways. F
- Appriciate the easier ways of calculation. F
- Understand the process of how to add and subtract 2-digit numbers mentally. F
- Do the exercises correctly. S

Calculate addition and subtraction of 3-digit numbers to avoid carrying over and borrowing

4 Considering How to Calculate More Easily

1 Let's calculate easily.

❶ 298 + 120 ❷ 500 − 198

1 ① 298+120	1 ② 500−198
When you add 2 to the augend and make 300, calculating becomes easier. You added 2 to the addend, so you subtract 2 from the augends.	When you add 2 to the subtrahend it becomes 200, calculating becomes easier. You added 2 to the minuend, so you add 2 to the number subtracted.
298 + 120	500 − 198
add 2 ↓ ↓ subtract 2	add 2 ↓ ↓ add 2
300 + 118 = 418	502 − 200 = 302
Answer 418	Answer 302

In addition, the answer does not change by adding the same number to the addends and subtracting the same number to the augends.
In subtraction, the answer does not change by adding the same number to both the subtrahend and the minuend.

2 Using the idea in **1**, calculate the following problems easily.

❶ 308 + 197 305 + 200=505 ❷ 305 − 99 306 − 100 =206

Exercise

① 499 + 350 ② 199 + 299 ③ 600 − 297 ④ 200 − 95

1) 500 + 349 =849 2) 200 + 298= 498,
3) 603 - 300 =303 4) 205 - 100 =105

□ + □ = 37

Addition of 3 numbers order of calculation does not change the answer.

3 Let's think about how to calculate 875 + 47 + 53.

If you use these methods, you can add any large number!

When you are adding 3 numbers, the order of calculations does not change the answer.
(875 + 47) + 53 = 875 + (47 + 53)

The ( ) is a symbol that means you should calculate the numbers inside first.

Compare ideas of how to calculate mentally using easier ways.

Mental Calculations

4 Let's calculate mentally.

❶ 35 + 46

Vavi's idea
Calculate in vertical form,
① 5 + 6 = 11
② 3 + 4 + 1 = 8
then 81.

Ambai's idea
① Split 46 to 40 and 6.
② 35 + 40 = 75
③ 75 + 6 = 81

❷ 81 − 27

Sare's idea
Calculate in vertical form,
① 11 − 7 = 4
② 7 − 2 = 5
then 54.

Mero idea
① Split 27 to 20 and 7.
② 81 − 20 = 61
③ 61 − 7 = 54

Exercise

1 Let's calculate easily.

① 492 + 84 + 16 1) 492 + (84 + 16) =492 + 100 =592

② 52 + 365 + 48 2) 52 + 365 + 48 = (52 + 48) + 365 = 100 + 365 =465

2 Let's calculate mentally.

① 18 + 6	② 38 + 411	③ 68 + 291	④ 52 + 18
24	439	359	70
⑤ 23 − 8	⑥ 45 − 24	⑦ 71 − 46	⑧ 90 − 76
15	21	46	14

38 = □ × □

Lesson Flow

1 **1 Calculate the operations using easier ways.**

T Introduce the main task.

S 1 Identify that to avoid carrying over, when 2 is added to the augends to make 300, calculation becomes easier because the addend is then reduced by 2 becoming 118 therefore 118 added to 300 is 418.

S 2 Identify that to avoid borrowing, when 2 is added to the subtrahend, it becomes 200, calculation becomes easier because 2 is also added to the minuend to make 502 therefore 200 subtracted from 502 is 302.

2 **Go through the important point of how to calculate more easily.**

3 **2 Use the idea in task 1 to calculate the oprerations.**

S 1 Identify that to avoid carrying over, when 3 is added to the addend to make 200, calculation becomes easier because the augends is then reduced by 3 becoming 305 therefore 200 added to 305 is 505.

S 2 Identify that to avoid borrowing, when 1 is added to the subtrahend, it becomes 100, calculation becomes easier because 1 is also added to the minuend to make 306 therefore 100 subtracted from 306 is 206.

4 **Do the exercise.**

5 **3 Think about how to calculate 875 + 47 + 53 using easier ways.**

T First let students solve the problem on their own. When everybody finishes they share and compare their own way of calculating.

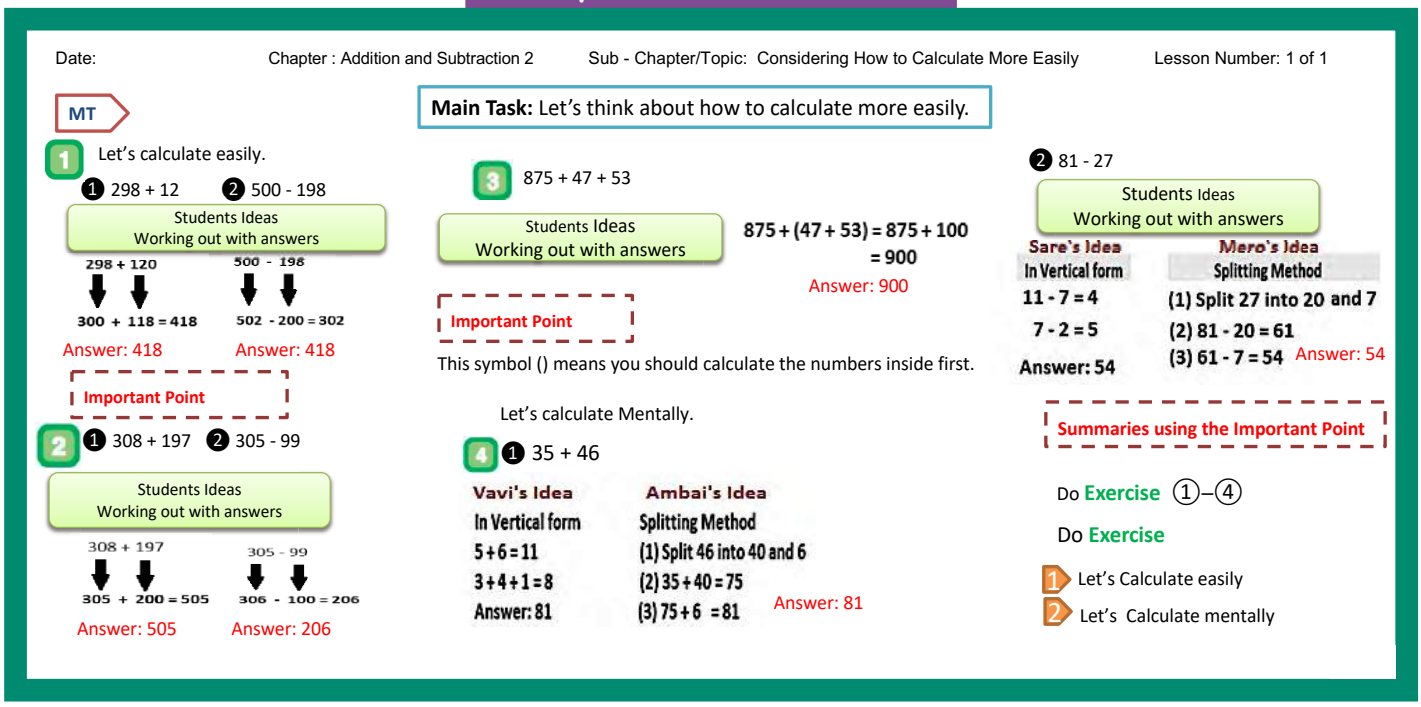
T Go through the important point in the box .

6 **4 Calculate mentally.**

T Let students discuss the idea for calculating mentally and find the easiest way by themselves.

7 **Do the exercise.**

Sample Blackboard Plan



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 5. What Kind of Calculation is This?
Lesson 1 of 1 (Single Period)

Textbook Page : p.39
Actual Lesson 027

Sub-unit Objectives

- To understand the situation of the word problem with the use of tape diagram.

Lesson Objectives

- To understand the problem situation and mathematical expression using the tape diagram.
- To use mathematical expression for each situation and solve the problem.

Prior Knowledge

- Addition and subtraction of 3-digit numbers.

Preparation

- Paper strips (tapes)

Assessment

- Enjoy word problems with the use of tape diagram and make mathematical expression based on relational diagram to solve the problem. F
- Solve word problem correctly. S

• Teacher's Notes •

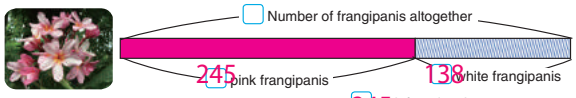
Situations of Subtraction
It can be understood that when one set can be divided in two subsets, the finding of remainders (opposite of increase) or finding of the other one (opposite of addition) are the situations of finding a quantity of the other subset when already knowing a quantity in total and quantity of one subset.
Also, the finding of difference, larger one, and smaller one are considered as comparing largeness of two sets.

To understand the situation of word problem to make the mathematics expression based on relation diagram to solve the problem.

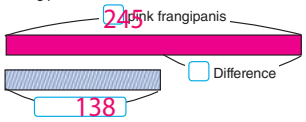
5 What Kind of Calculation is This?

1 There are 245 pink frangipanis and 138 white frangipanis that blossomed.

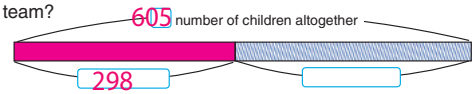
① How many frangipanis blossomed ?



② Which colour blossomed the most?

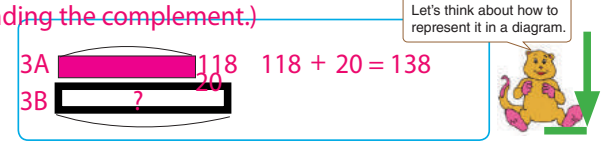


2 There are 605 children in Eileen's school. In a sports day, children are divided into red and blue teams. There are 298 children in the red team. How many children are in the blue team?



3 The 3A students gathered 118 dry coconuts. The 3B students gathered 20 more dry coconuts than 3A students. How many dry coconuts did the 3B students gather?

Decision of operations between addition and subtraction (Finding the complement.)



□ + □ = 39

Decision of operations between addition and subtraction (Finding the bigger number based on smaller number and the difference)

Lesson Flow

1 ① Read and understand the situation of the word problem with the use of tape diagram.

T Introduce the main task.

T Use a tape diagram to describe the situation showing the number of 245 pink frangipanis blossomed and 138 white frangipanis blossomed.

S ① Recognise that pink frangipanis and white frangipanis blossomed is an addition situation as putting together so they are to write a math expression based on the relational diagram.

S ② Recognise that it is a subtraction situation as the difference between two sets of frangipanis that blossomed so they are to write a math expression based on the relational diagram.

2 ② Read and understand the situation of the word problem with the use of tape diagram.

T Use a tape diagram to describe the situation showing the number of all 605 children and 298 children in the red team and finding the number of children in the blue team.

S Identify that it is a subtraction situation where the number of children in the red team are subtracted from the number of all children to find the completion of the number of children in the blue team so they are to write a math expression based on the relational diagram.

3 ③ Read and understand the situation of the word problem with the use of tape diagram.

T Use a tape diagram to describe the situation showing the number of 118 coconuts gathered by 3A students and 3B students having to gather 20 more dry coconuts to match and compare the length of how many exactly.

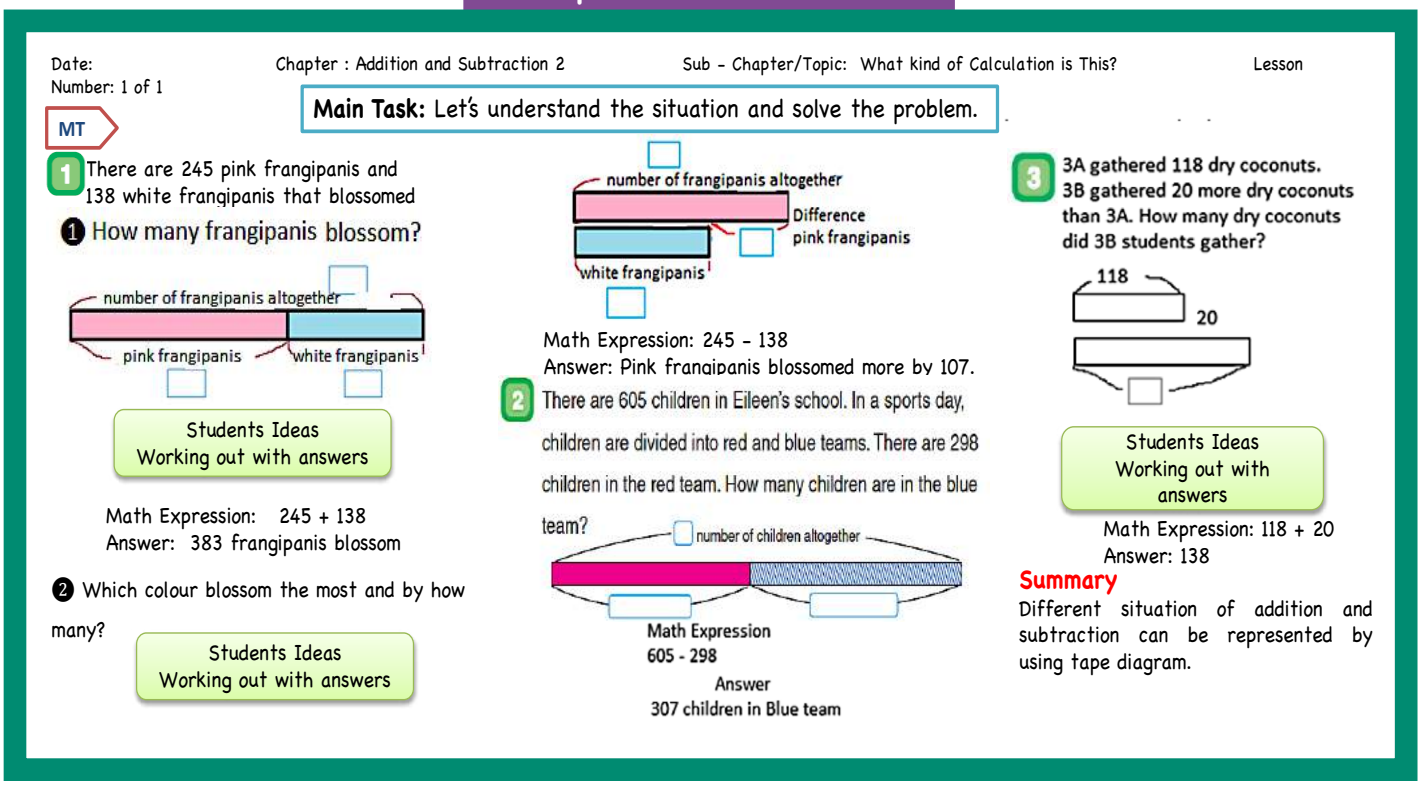
S Identify that it is a subtraction situation where you find the bigger number based on the difference so they are to write a math expression based on the relational diagram.

S Think about how to represent it in a diagram.

T Let students share with friends and discuss.

S Explain the diagram they drew to the whole class.

Sample Blackboard Plan



Unit 2

Unit: Addition and Subtraction 2
Sub-unit: 6. Exercise and Evaluation
Lesson 1 of 1 (Double period)

Textbook Page :
p.40-p.41
Actual Lesson 028

Lesson Objectives

- To review what has been learned.
- To make sure careful calculations are done without forgetting numbers that carried or borrowed.

Prior Knowledge

- All the contents of this Unit

Preparation

- Evaluation sheet

Assessment

- Do the exercises correctly confirming what they learned in the unit. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercises

1 Let's calculate in vertical form. Pages 27 ~ 35

① 324 + 253 577 ② 146 + 537 683 ③ 473 + 261 734
④ 246 + 485 731 ⑤ 354 + 249 603 ⑥ 464 + 368 832
⑦ 658 − 325 333 ⑧ 374 − 138 236 ⑨ 546 − 369 177
⑩ 432 − 136 296 ⑪ 604 − 247 357 ⑫ 700 − 463 237

2 Let's calculate in vertical form. Page 36

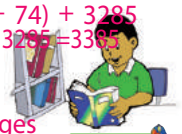
① 734 + 862 1596 ② 947 + 587 1534 ③ 457 + 546 1003
④ 4137 + 1425 5562 ⑤ 2056 + 3794 5850 ⑥ 2361 + 7639 10000
⑦ 1529 − 716 813 ⑧ 1153 − 645 508 ⑨ 1000 − 437 563
⑩ 3947 − 1925 2022 ⑪ 3142 − 1734 1408 ⑫ 10000 − 4005 5995

3 Let's calculate. Page 38

① 5387 + 57 + 43 = 5387 + (57 + 43) = 5387 + 100 = 5487
② 26 + 3285 + 74 = (26 + 74) + 3285 = 100 + 3285 = 3385

4 You read 165 pages of a book with 240 pages in total. How many pages are left?

240 − 165 = 75 Answer 75 pages



5 There are 2368 boys and 2356 girls in Elementary schools in Manus Province.

How many elementary school children are there in total? Also, which gender is more and by how many? Page 39

2368 + 2356 = 4724 Answer 4724 students
2368 − 2356 = 12 Answer 12 students

Let's calculate. Grade 2 Do you remember?

① 3×6 18 ② 8×4 32 ③ 6×9 54 ④ 4×7 28
⑤ 9×1 9 ⑥ 1×8 8 ⑦ 5×3 15 ⑧ 2×2 4

40 = □ × □

Problems

1 Let's calculate in vertical form.
● Understanding how to calculate in vertical form.

① 451 + 137 588 ② 274 + 508 782 ③ 662 + 150 812
④ 186 + 357 543 ⑤ 109 + 698 807 ⑥ 558 + 745 1303
⑦ 3096 + 5518 8614 ⑧ 2048 + 1952 4000 ⑨ 6272 + 3728 10000
⑩ 797 − 246 551 ⑪ 258 − 139 119 ⑫ 966 − 288 678
⑬ 653 − 399 254 ⑭ 703 − 316 387 ⑮ 1032 − 634 398
⑯ 2356 − 1848 508 ⑰ 5126 − 2835 2291 ⑱ 10000 − 1781 8219

2 In 2 years Cathy saved 3596 kina and her sister saved 4487 kina.
● Distinguish the situation for addition or subtraction and find the answer.

① Who has more savings and by how much? Her sister . By 891 kina

② What is the total of their savings? 8083 kina

3 Let's find mistakes in the calculations done in vertical form and find the correct answers.
● Identifying the mistakes in calculations in vertical form and correcting.

2 9 4 + 1 1 9 = 4 0 3		2 9 4 + 1 1 9 = 4 1 3
4 3 7 − 1 9 8 = 3 6 1		4 3 7 − 1 9 8 = 2 3 9

□ − □ = 41

Lesson Flow

1 ① **Calculate the addition and subtraction of 3-digit numbers in vertical form.**

S Recall previous lessons and solve the exercises.

2 ② **Calculate the addition and subtraction of 4 and 5-digit numbers in vertical form.**

3 ③ **Think of how to calculate the addition of 3 numbers using easier ways.**

4 ④ **Read the word problem and solve it.**

TN Students draw their attention to the words 'number of pages read, number of pages in total and 'pages not read' in order for them to identify the number of pages read and the number of pages in total.

TN Use a tape diagram to describe or relate the situation showing the number of pages read and the number of pages in total. Students realise that it is a subtraction situation as finding the difference from the number of pages in total to find the completion so they are to write a math expression.

Addition and Subtraction	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 383 + 264

383
+264
647

② 897 + 436

897
+436
1333

③ 1347 + 4458

1347
+4458
5805

④ 413−245

413
+245
658

⑤ 897−436

897
−436
461

⑥ 6000 − 5236

6000
−5236
764

2. In a building, there are 1200 stair steps from the ground floor to the top floor. He climbed up 618 stair steps. How many steps left to reach the top floor.

① Mathematical sentence: 1200 − 618 = 582

② Answer: 582steps

3. Anne collected 186 stones. Ratu collected 298 stones. How many stones did they collect in total?

① Mathematical sentence: 186 + 298 = 484

② Answer: 484stones

5 ⑤ **Read the word problem and solve it.**

TN Students draw their attention to the words 'number of school boys, number of school girls and 'school children in total' in order for them to identify the number of school boys and the number of school girls.

T Which gender is more and by how many?

6 ① **Calculate the addition and subtraction of 3-digit numbers in vertical form.**

7 ② **Read the word problem and solve it**

TN Students think of the word problem and draw their attention to the words 'Cathy's savings, her sister's savings and 'total of their savings' in order for them to identify the amount Cathy saved and her sister saved.

8 ③ **Find mistakes done in the calculations in vertical form and find the corrections to them.**

End of Chapter Test: Chapter 2 **Date:**

Addition and Subtraction	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 383 + 264

② 897 + 436

③ 1347 + 4458

④ 413−245

⑤ 897−436

⑥ 6000 − 5236

2. In a building, there are 1200 stair steps from the ground floor to the top floor. He climbed up 618 stair steps. How many steps left to reach the top floor.

① Mathematical sentence: _____

② Answer: _____

3. Anne collected 186 stones. Ratu collected 298 stones. How many stones did they collect in total?

① Mathematical sentence: _____

② Answer: _____

Chapter 3 Multiplication 1

Chapter 4 Multiplication 2
Chapter 5 Thinking about How to Calculate

1. Unit Objective

- To understand the meaning and the representations of numbers, and extend their ability to use numbers.
- To consider a number in relation to other numbers by regarding it as product of other numbers.
- To know situations where multiplication is used and to understand the meaning of multiplication through activities of showing diagram.
- To multiply up to rows of 9.

2. Teaching Overview

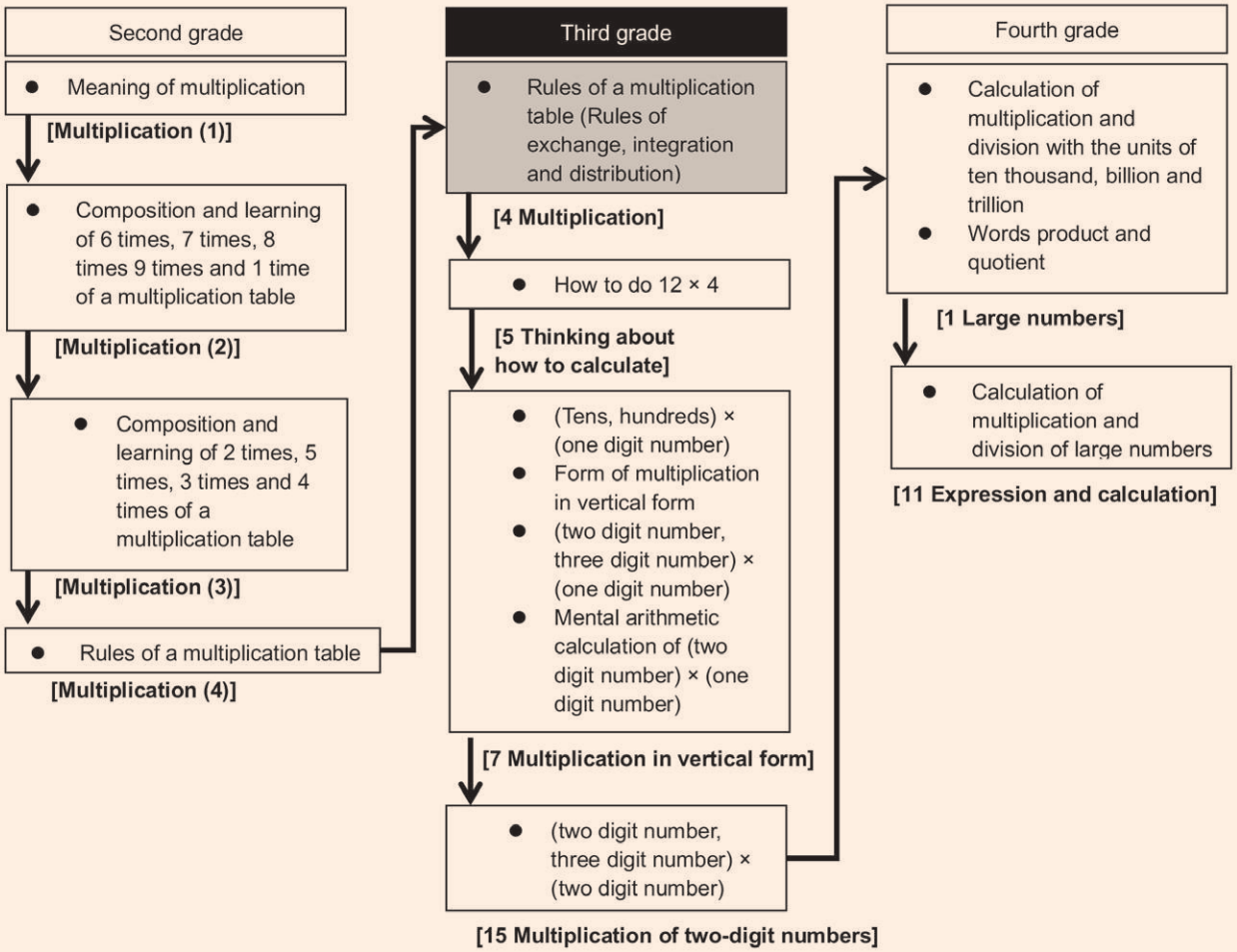
Unit 3 is revision from previous grades and actual learning for grade 3 is in Unit 4.

What we learned at Elementary School: This topic is to consolidate the meaning of multiplications. The following topics will require correct memories of multiplication tables of 1-digit numbers. Let students memorise all multiplications of 1 digit numbers.

The Rules of Multiplication: This is the first step of leaning commutative and distributive laws. Let students understand the laws/rules with diagrams and change of mathematical expressions. Don't teach the rules itself but let them experience why the rules are applicable in multiplication. Let students pay attention to the amount of increase/decrease of product when multiplicand/multiplier increases by 1.

Multiplication with 0 and 10: Students may forget the rules if you teach the rules itself. Student will not forget the rules if they understand it through games and real-life experiences.

3. Related Learning Contents



Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 1 of 5 (Single Period)

Textbook Page : p.42 - p.43
Actual Lesson 029

Sub-unit Objectives

- To recall what the students learned in elementary schools.
- To make the multiplication table.

Lesson Objectives

- To review how to interpret situations as multiplication.
- To find the number of groups of each units and express it as mathematics sentence.

Prior Knowledge

- Addition and subtraction(Grade 1 & 2)

Preparation

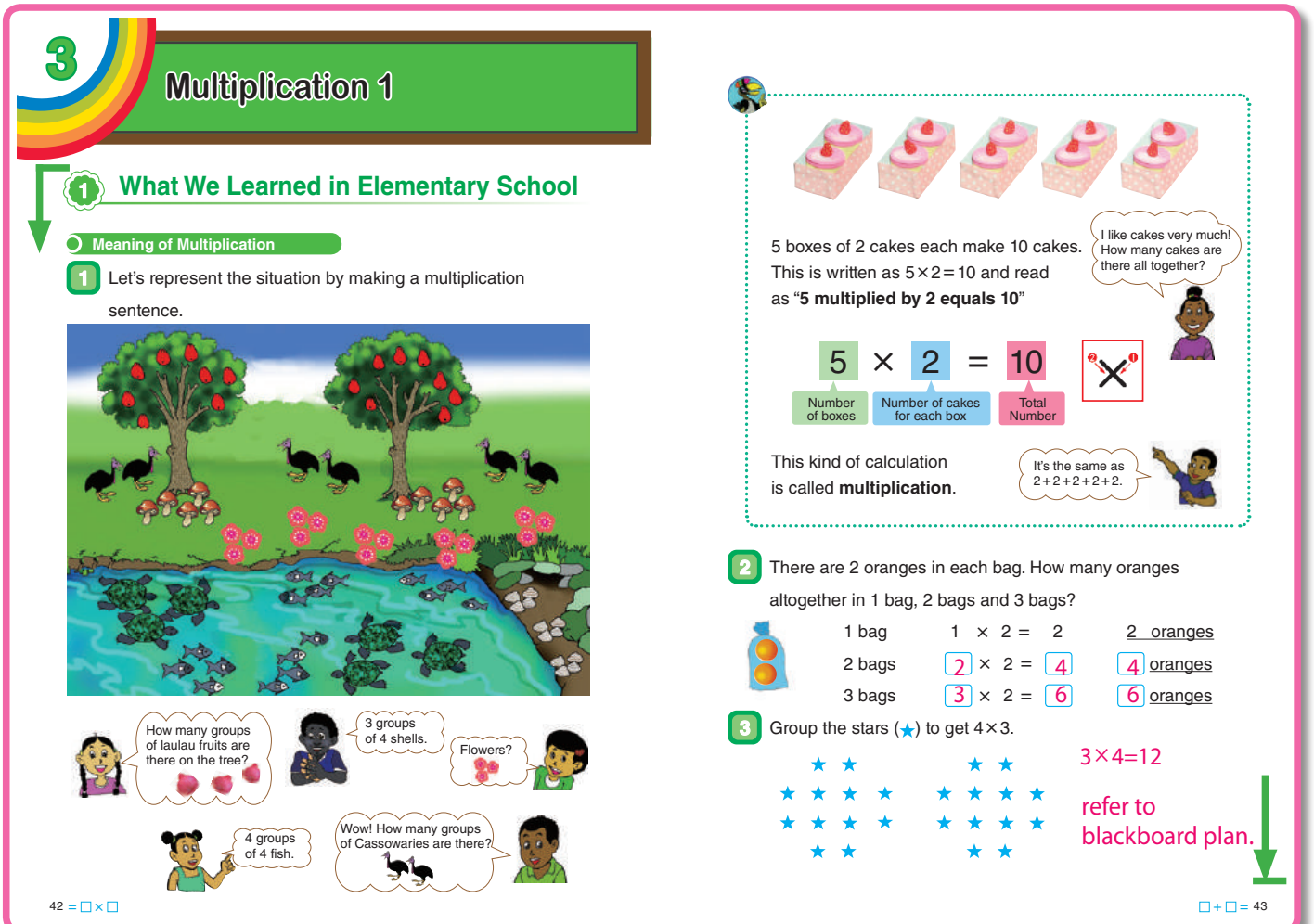
- Important point on chart

Assessment

- Think about mathematical expression of multiplication. S
- Understand the meaning of multiplication as repeated addition. F

• Teacher's Notes •

Definition: Multiplication is repeated addition.
$5 \times 2 = 2+2+2+2+2 = 10$
Through this lesson the students should identify groups and see the relationship between multiplication and repeated addition.
Example: 7 groups of 3 flowers can be written as 7×3 and calculated as $7+7+7=21$



3 Multiplication 1

1 What We Learned in Elementary School

Meaning of Multiplication

1 Let's represent the situation by making a multiplication sentence.

How many groups of laulau fruits are there on the tree?
3 groups of 4 shells.
Flowers?
4 groups of 4 fish.
Wow! How many groups of Cassowaries are there?

42 = □ × □

5 boxes of 2 cakes each make 10 cakes.
This is written as 5×2=10 and read as "**5 multiplied by 2 equals 10**"

I like cakes very much! How many cakes are there all together?

5 × 2 = 10
Number of boxes
Number of cakes for each box
Total Number

This kind of calculation is called **multiplication**.

It's the same as 2+2+2+2+2.

2 There are 2 oranges in each bag. How many oranges altogether in 1 bag, 2 bags and 3 bags?

1 bag	1 × 2 = 2	2 oranges
2 bags	2 × 2 = 4	4 oranges
3 bags	3 × 2 = 6	6 oranges

3 Group the stars (★) to get 4×3.

3×4=12

refer to blackboard plan.

□ + □ = 43

Lesson Flow

1 1 Make groups from the picture.

T How many groups can you find for each object in the picture? Allow for class discussion.
S I find 2 groups of 3 turtles.
S I find 3 groups of 2 cassowaries.
S I find 3 groups of 4 shells
S I find 7 groups of 3 flowers
T Introduce the main task.

2 Understand the meaning of multiplication.

T Put up the chart about the important point on the blackboard
T Confirm the meaning of each number.

5	×	2	=	10
No. of boxes		No. of cakes		Total no. of cakes

3 Make mathematics sentence.

T Redirect the class attention to the introductory activity. Allow students to write the mathematics sentence by themselves.
S 3 groups of 2 cassowaries can be written as 3×2=6
3 groups of 4 shells can be written as 3×4=12
7 groups of 3 flowers can be written as 7

4 Solve 2 and 3.

TN Confirm the meaning of each number in every question.

5 Summarise the lesson.

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we learned at Elementary Lesson Number: 1 of 5

Main Task: Let's represent the situation by making a multiplication sentence .

Students Ideas
Multiplication Sentences

1 Let's make groups. Lets make mathematics sentences

Two groups of 3 turtles	2 x 3 = 6
Three groups of 4 shells	3 x 4 = 12
Three groups of 7 flowers	3 x 7 = 21
Twos groups of 5 balls	2 x 5 = 10
Three groups of 2 cassowary	3 x 2 = 6

Let's Study the meaning of multiplication (SN)
"5 boxes of 2 cakes each make 10 cakes. It is written as 5 x 2 = 10 and read as 5 multiplied by 2 equals 10"

5	x	2	=	10
Number of boxes		Number of cakes		Total number

This kind of calculation is called multiplication.
It is the same as repeated addition where 2 + 2 + 2 + 2 + 2 = 10

MT

Students Ideas
Multiplication Sentences

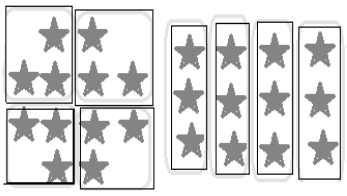
2

1 bag	1 x 2 = 2	2 oranges.
2 bags	2 x 2 = 4	4 oranges
3 bags	3 x 2 = 6	6 oranges

3 Group stars to get 4 x 3

Students Ideas

Sample Answer



Summary:

- Multiplication is a repeated addition.
- 3 x 2 is the same as 2 + 2 + 2 = 6

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 2 of 5 (Single Period)

Textbook Page : p.44
Actual Lesson 030

Lesson Objectives

- To identify that the answer will be the same even if the order of multiplicand and multiplier changes.
- To explain why the rules are true in properties of multiplication.

Prior Knowledge

- Meaning of Multiplication

Preparation

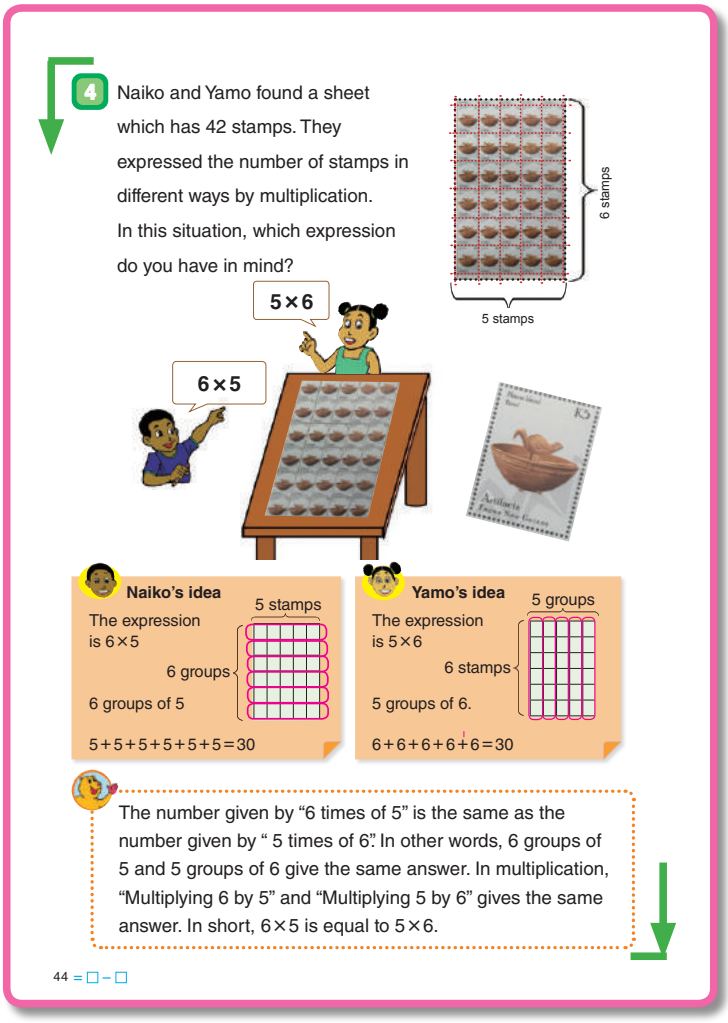
- Paper blocks for 5×6 and 6×5.

Assessment

- Analyse the mathematical expression of 5×6 and 6×5. F
- Understand that even the multiplicand and the multiplier are switched the answer does not change. S

• Teacher's Notes •

The main objective of the lesson is for the students to understand that the order of 1st and 2nd number can change but the answer will remain the same. They should also be able to explain why the rule is true using the illustration.



Lesson Flow

1 Review previous lesson: Number of Groups × Number of each item = Total number of items

T Introduce the main task.

2 4 Think about how to express the picture of stamps by multiplication.

T What is the mathematical expression to find the number of stamps?

S1 (Naiko's idea)
The expression is 5×6 because, if I observe the stamps vertically there are 5 groups and each group has 6 stamps.

S2 (Yamo's idea)
The expression is 6×5 because, there are 6 groups and each group has 5 stamps horizontally.

T What is the answer of those expressions?

S Both answers are 30.

T Confirm that the answer will be the same even if the order of 1st and 2nd number change.

T Summarise the important point in the box .

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we Learnt in Elementary Lesson Number: 2 of 5

Main Task: Let's find out more about multiplication.

Let's review previous lesson:

"5 boxes of 2 cakes each make 10 cakes. It is written as 5 x 2 = 10 and read as 5 multiplied by 2 equals 10"

5	x	2	=	10
Number of boxes		Number of cake		Total

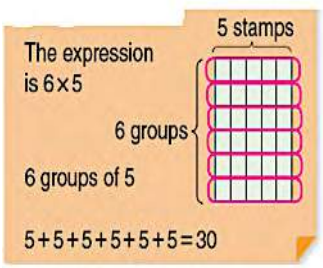
This kind of calculation is called multiplication.

MT

Let's discuss Naiko and Yamo's idea.

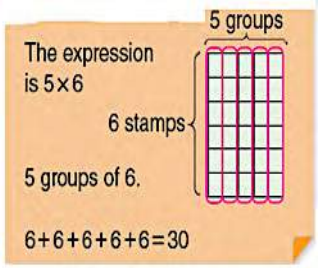
Naiko's Idea

The math sentence is 5 x 6 = 30



Yamo's Idea

The math sentence is 6 x 5 = 30



Summary:

In multiplication, multiplying 6 x 7 and multiplying 7 x 6 gives the same answer.

In short 6 x 7 = 7 x 6

4 Which expression do you have in mind?

Important Point

Students Ideas
Multiplication Expressions

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 3 of 5 (Single Period)

Textbook Page : p.45-p.46
Actual Lesson 031

Lesson Objectives

- To deepen the understanding about multiplication of 5.
- To develop multiplication table of 5.

Prior Knowledge

- Meaning of Multiplication.
- Commutative law of multiplication (Previous lesson)

Preparation

- Cardboards, drawing paper, multiplication table of 5
- Pictures of task 3 and 4

Assessment

- Think about the meaning of the multiplication of 5. F
- Understand the multiplication table of 5. S

• Teacher's Notes •

The students have learned about multiplication in Elementary. Here the purpose of the lesson is to deepen their understanding. Guide them to make meaning of 5×2 and 2×5.

For example, for every leaf with 5 peanuts added the total number of peanuts increases by 5. For 5 leaves that have one peanut added, the total peanut increases by 5.

Cards of multication table

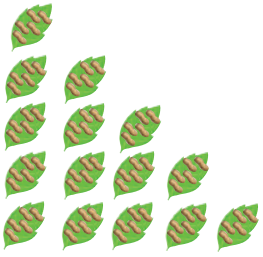
The Multiplication of 5

5 Let's make a mathematical expression of multiplication for the number of lollies.

Express the table of 2 by pictures

6 Let's draw a picture of 3×5.

7 There are 5 peanuts on each leaf. Let's find the total number of peanuts as the number of leaves increases from 1 to 5 and read the sentence.



1×5=5
1 multiplied by 5 equals 5

2×5=10
2 multiplied by 5 equals 10

3×5=15
3 multiplied by 5 equals 15

4×5=20
4 multiplied by 5 equals 20

5×5=25
5 multiplied by 5 equals 25

1 Complete the mathematical sentences from 6 leaves to 9 leaves.

2 Explain what you found.

How many peanuts increase as 1 leaf is added?

5×6=30
6×6=36
7×6=42
8×6=48
9×6=54

□×□=45 46=□+□

8 Let's consider the following pictures.

There are 5 leaves of 1 peanut each.

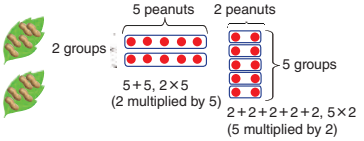
5×1=5

5×2=10

5×3=15

1 Complete the mathematical sentences from 4 peanuts to 9 peanuts.

2 Think about the difference compared to 3.



5×4=20
5×5=25
5×6=30
5×7=35
5×8=40
5×9=45

In task 7, second number is always 5. However, in task 8, first number is always 5.

We learned even we switch 1st and 2nd numbers, answer does not change.

Grade 2 Do you remember?

Multiplication tabel of 5

5×1=5	Five ones are 5	5×6=30	Five sixes are 30
5×2=10	Five twos are 10	5×7=35	Five sevens are 35
5×3=15	Five threes are 15	5×8=40	Five eights are 40
5×4=20	Five fours are 20	5×9=45	Five nines are 45
5×5=25	Five fives are 25		

Lesson Flow

1 5 Make a mathematical expression for the drawing.

T Introduce the main task.
T How many groups are there?
S 6 groups.
T How many lollies does each group have?
S 5
T What is the mathematical expression?
S 6×5

2 6 Draw a picture of 3×5.

S Draw a picture of 3×5 and share with friends.

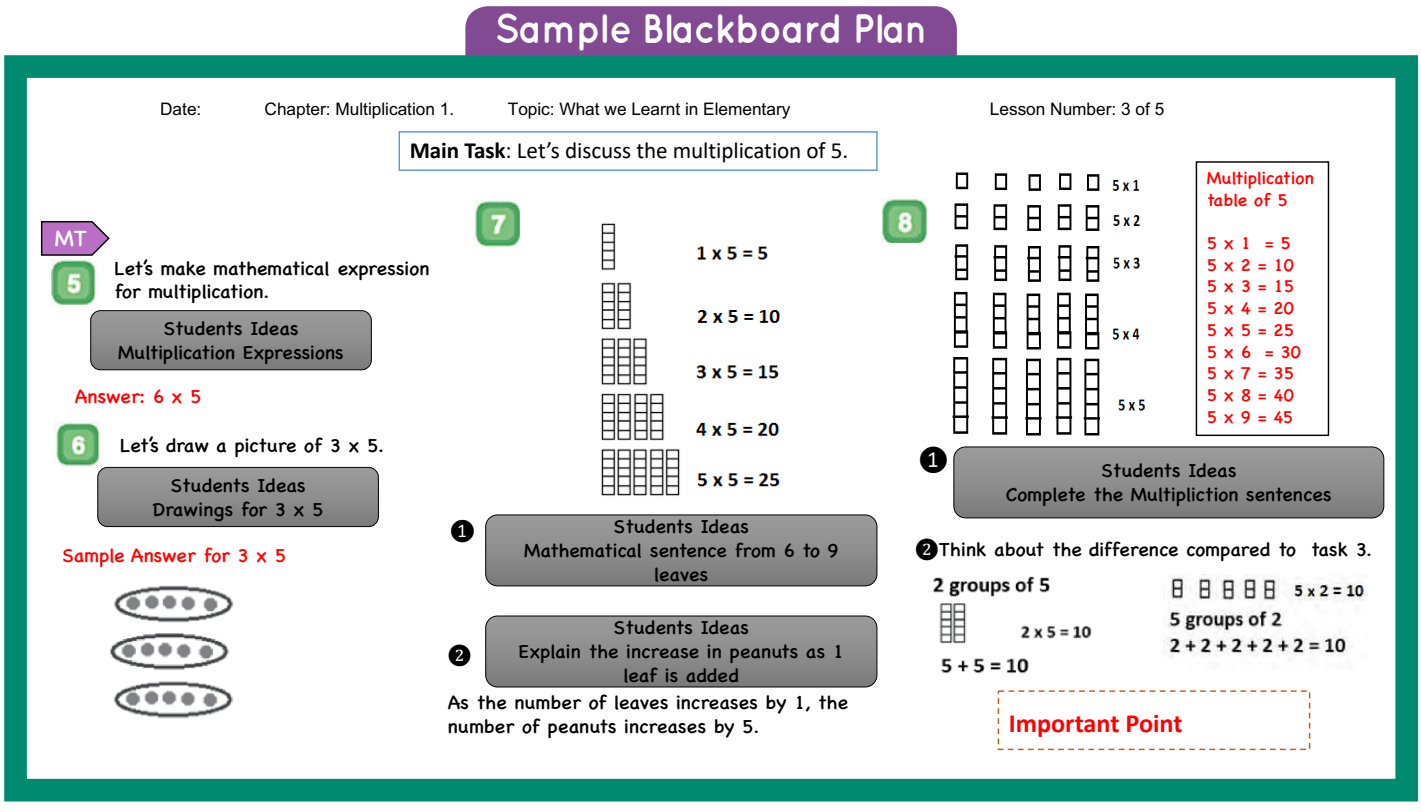
3 7 Make mathematical sentences and discuss the findings.

T How many peanuts does each leaf have?
S 5
S ❶ Fill in the boxes to complete the mathematical sentences.
T ❷ What did you find?
S The number of leaf increased by 1, the total number of peanuts increased by 5.

4 8 Make mathematical sentences and compare to 3.

S ❶ Complete the mathematical sentences by filling in the boxes.
T What did you find compared to task 3.
S ❷ In task 3, the number of leaf increases 1 by 1, but in task 4, the number of leaf remains 5 and the number of peanuts increases 1 by 1.
S Even the 1st and 2nd number of the expressions changes the answer are same.
T Summarise multiplication table of 5. The 1st number is always 5 but the second number increases 1 by 1.

Sample Blackboard Plan



Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 4 of 5 (Single Period)

Textbook Page : p.47
Actual Lesson 032

Lesson Objectives

- To review the multiplication table 1, 2, 3 and 4.

Prior Knowledge

- Meaning of multiplication
- Structure of multiplication table 1, 2, 3, and 4

Preparation

- Cardboard, drawing paper
- Multiplication Cards of table 1, 2, 3 and 4

Assessment

- Enjoy memorising multiplication table 1, 2, 3 and 4. S
- Memorise multiplication table 1, 2, 3 and 4. F

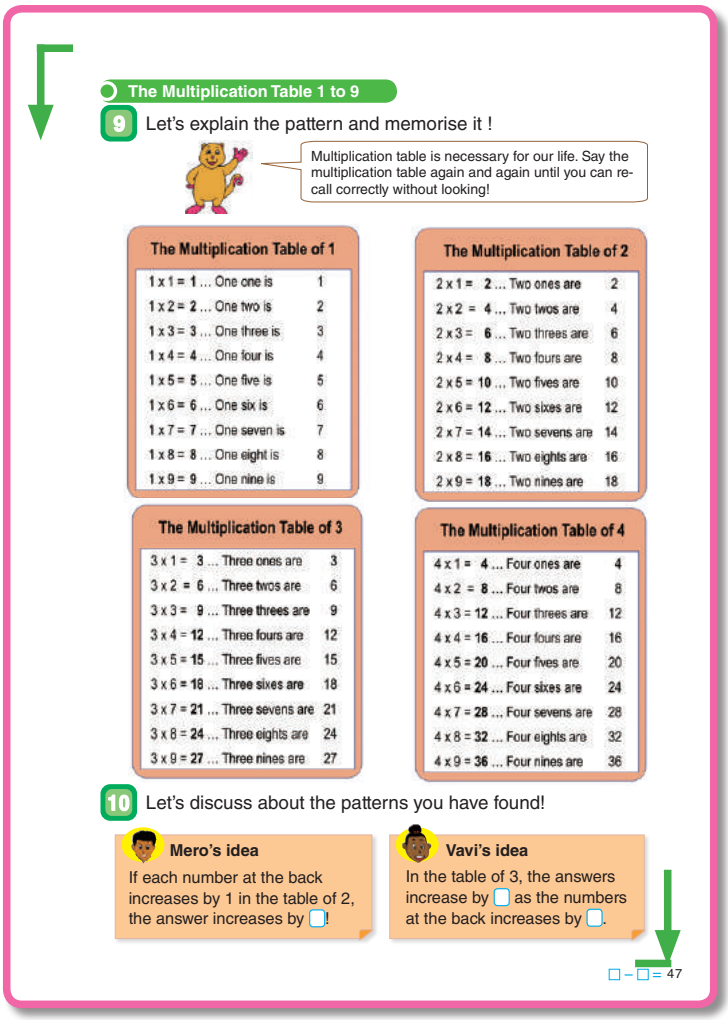
• Teacher's Notes •

Importance of memorising multiplication table

In general, most of the teachers think it is important to teach meaning of multiplication, however they are not serious to let students memorise multiplication. Multiplication table from 1×1 up to 9×9 will be the base for calculating division and further multiplication. If students do not memorise the table it is for sure they will have problem to learn those contents. Therefore, it is extremely important to let the students memorise the table. It takes time to do it but when you continue practice memorising every day, it is for sure one day they can memorise all multiplication table.

How to memorise the table.

Having each student to develop their own multiplication cards from 1×1 to 9×9 using the ideas developed in table 2 and table 5 may help them to memorise well.



The Multiplication Table 1 to 9

9 Let's explain the pattern and memorise it !

Multiplication table is necessary for our life. Say the multiplication table again and again until you can re-call correctly without looking!

The Multiplication Table of 1

1 x 1 = 1 ... One one is	1
1 x 2 = 2 ... One two is	2
1 x 3 = 3 ... One three is	3
1 x 4 = 4 ... One four is	4
1 x 5 = 5 ... One five is	5
1 x 6 = 6 ... One six is	6
1 x 7 = 7 ... One seven is	7
1 x 8 = 8 ... One eight is	8
1 x 9 = 9 ... One nine is	9

The Multiplication Table of 2

2 x 1 = 2 ... Two ones are	2
2 x 2 = 4 ... Two twos are	4
2 x 3 = 6 ... Two threes are	6
2 x 4 = 8 ... Two fours are	8
2 x 5 = 10 ... Two fives are	10
2 x 6 = 12 ... Two sixes are	12
2 x 7 = 14 ... Two sevens are	14
2 x 8 = 16 ... Two eights are	16
2 x 9 = 18 ... Two nines are	18

The Multiplication Table of 3

3 x 1 = 3 ... Three ones are	3
3 x 2 = 6 ... Three twos are	6
3 x 3 = 9 ... Three threes are	9
3 x 4 = 12 ... Three fours are	12
3 x 5 = 15 ... Three fives are	15
3 x 6 = 18 ... Three sixes are	18
3 x 7 = 21 ... Three sevens are	21
3 x 8 = 24 ... Three eights are	24
3 x 9 = 27 ... Three nines are	27

The Multiplication Table of 4

4 x 1 = 4 ... Four ones are	4
4 x 2 = 8 ... Four twos are	8
4 x 3 = 12 ... Four threes are	12
4 x 4 = 16 ... Four fours are	16
4 x 5 = 20 ... Four fives are	20
4 x 6 = 24 ... Four sixes are	24
4 x 7 = 28 ... Four sevens are	28
4 x 8 = 32 ... Four eights are	32
4 x 9 = 36 ... Four nines are	36

10 Let's discuss about the patterns you have found!

Mero's idea
If each number at the back increases by 1 in the table of 2, the answer increases by □!

Vavi's idea
In the table of 3, the answers increase by □ as the numbers at the back increases by □.

□ – □ = 47

Lesson Flow

1 9 10 Think about the patterns of each multiplication table.

T Introduce the main task.
T Let's look at table 1 to 4. Do you notice any pattern?
S The left number is always the same.
S The right number is increasing one by one.
S The answer is increasing by same amount of the left number. For example in table 3, the answer increases by 3.
T Confirms characteristics of multiplication table 2 then move to the next.

2 Memorise the multiplication table 1 to table 4.

S Memorise multiplication table using various methods such as reciting, singing songs etc.

Sample Blackboard Plan

Date: Topic: What we Learnt in Elementary Lesson Number: 4 of 5

Main Task: Let's think about the patterns of each multiplication table.

MT

9 Let's explain the pattern and memorize it.

Students Ideas
Multiplication Expressions

Pattern:

- Multiplicand is the number that is increases one by one.
- Multiplier is the number that is always the same.
- The answer increases by the same amount of number vertically.

Example: Table 4, the answer increases by 4.

2 x 4 = 8 Answer
Multiplier Multiplicand

10 Let's discuss patterns you have found.

Mero's Idea

If each number at the back increases by 1 in the table of 2, the answer increases by 2.

Vavi's Ideas

In the table of 3, the answer increases by 3 as the number at the back increases by 1.

Summary

Increase of the answer is the same as increase of the number at the back.

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 5 of 5 (Single Period)

Textbook Page : p.48
Actual Lesson 33

Lesson Objectives

- To review the multiplication table of 5, 6, 7, 8 and 9.

Prior Knowledge

- Meaning of multiplication
- Structure of multiplication table of 5, 6, 7, 8 and 9
- Making Multiplication Cards of table 5, 6, 7, 8 and 9

Preparation

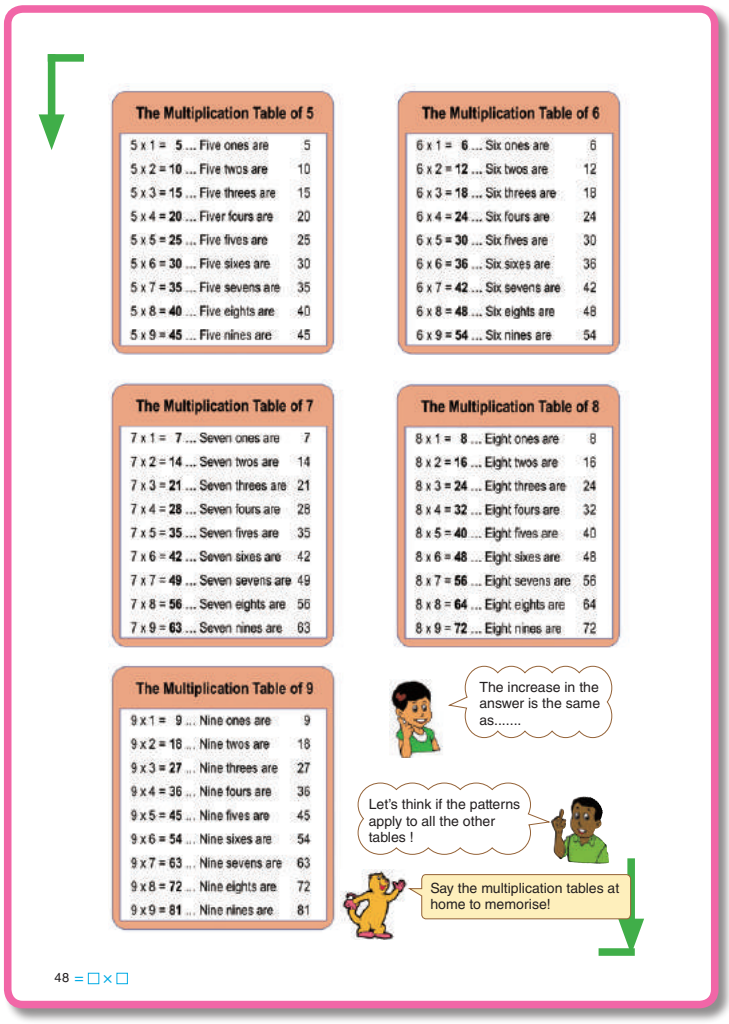
- Cardboard, drawing paper, the multiplication
- Multiplication Cards of table 5, 6, 7, 8 and 9

Assessment

- Enjoy memorising multiplication table of 5, 6, 7, 8 and 9. F
- Memorise multiplication table of 5, 6, 7, 8 and 9. S

• Teacher's Notes •

Emphasis on Keywords:
Multiplicand increases one by one in the table.
It is the number to be multiplied.
Multiplier is always the same number, the number that multiplies.



Lesson Flow

1 Practice multiplication table.

T Introduce with flash cards for multiplication table 1 to table 9.

T Introduce the main task.

2 Confirm the patterns of each multiplication table.

T Let's look at Multiplication table of 6 to 9. Do you notice any pattern?

S The 1st number is always the same.

S The 2nd number is increasing one by one.

S The answer is increasing by same amount of the left number. For example in table 6, the answer increases by 6.

3 Memorise multiplication table.

T Let students memorise multiplication table using various methods such as reciting, singing songs etc. May organise competition in class to assist students memorise the table.

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we Learnt in Elementary Lesson Number: 5 of 5

Task: Let's memorise multiplication table.

Introduce Flash Cards

Develop cards for table 1 to 4 with answers in front and expressions at the back of the card.

A student with the card show expression to a friend and the friend gives the answer.

Memorise multiplication table 1 to 9 by:

- Repeating again and again
- Using number cards
- Playing card games with friends

MT

Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 1 of 4 (Double Period)

Textbook Page : p.49-p.50
Actual Lesson 34

Sub-unit Objectives

- To recognise the relationships between multiplicands, multipliers and answer and identify rules and patterns.

Lesson Objectives

- To complete the arrangement of the multiplication table.
- To identify that the answer will be the same even if the order of multiplicand and multiplier changes.
- To explain why the rules are true in properties of multiplication.

Prior Knowledge

- Meaning of multiplication
- Multiplication table 2−9

Preparation

- Blank multiplication table (photocopy and prepare several copies for each student)
- Multiplication table on Chart

Assessment

- To find various rules focusing on order of multiplication table. F
- Understand the rule that the order of multiplier and multiplicand can change but the answer will remain the same. S

• Teacher's Notes •

There are 3 laws of multiplication as you go through the lessons in this sub–unit you will apply them.

1. Commutative law
2. Associative law
3. Distributive law

4 Multiplication 2

1 Rules of Multiplication

1 Completing multiplication table (discussion on the rules of multiplication.)

Let's think about the multiplication table.

1. What are the multiplications to get 14 in the table ?
2. Write all the answers in the blanks.
3. Look for the answers 27 and 48 in the multiplication table.

2×7, 7×2

27 is 3×9, 9×3　48 is 6×8, 8×6

Multiplier \ Multiplicand	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	36	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

4. Let's find any patterns in the table and share with your friends.

The number we multiply is called the **multiplier**.
The number to be multiplied is called the **multiplicand**.

2×4=8 ← Answer
↑ Multiplicand
Multiplier

□×□=49

Finding an answer expected to be in the expression or write sentence

2 Let's find various rules from the expression that has the same answer for 7×3.

1. What number goes in the □ below.

7×3=21　　3×7=21

Let's remember what you studied on multiplication in 2nd grade.

7 Sets
3
7
3 sets

Confirm your answer with the multiplication table.

When you express this in a mathematical sentence, it can be written as follows; 7×3=3×7

"=" is called equal sign. This symbol is not only used for writing the answer of the calculation, but also used for showing that the expressions or numbers on the left side and the right side are equal.

In multiplication, the answer is the same even if the order of the multiplicand and multiplier are changed.

2. How much larger is the answers for 7×6 than answer for 7×5?

Multiplicand
1 2 3 4 5 6 7 8 9
7 7 14 21 28 35 49 56 63

Increase by □　Decrease by □

When you express this in a mathematical sentence, it can be written as follows; 7×6=7×5+□

50=□+□

Lesson Flow

1 Play multiplication card game.

S Play multiplication card game as an introduction of the lesson.

T Introduce the main task.

2 ❶ Understand the given task and use prior knowledge to complete the multiplication table.

T Give out the blank copies of the multiplication table.

S ❶ Write two expressions that give 14 in the multiplication table. "2×7 and 7×2"

T "What rules of multiplication can be used to complete the table?"

S ❷ Focus on the arrangement of the multiplication table and find rules of multiplication as they fill in the blanks.

S ❸ Write the expressions for 27 and 48 on the board and explain their answers.

❹ Find patterns with friends.

3 ❷ ❶ What number goes in the box below?

S Look at the multiplication table to confirm the expected number to be represented in the mathematical sentence.

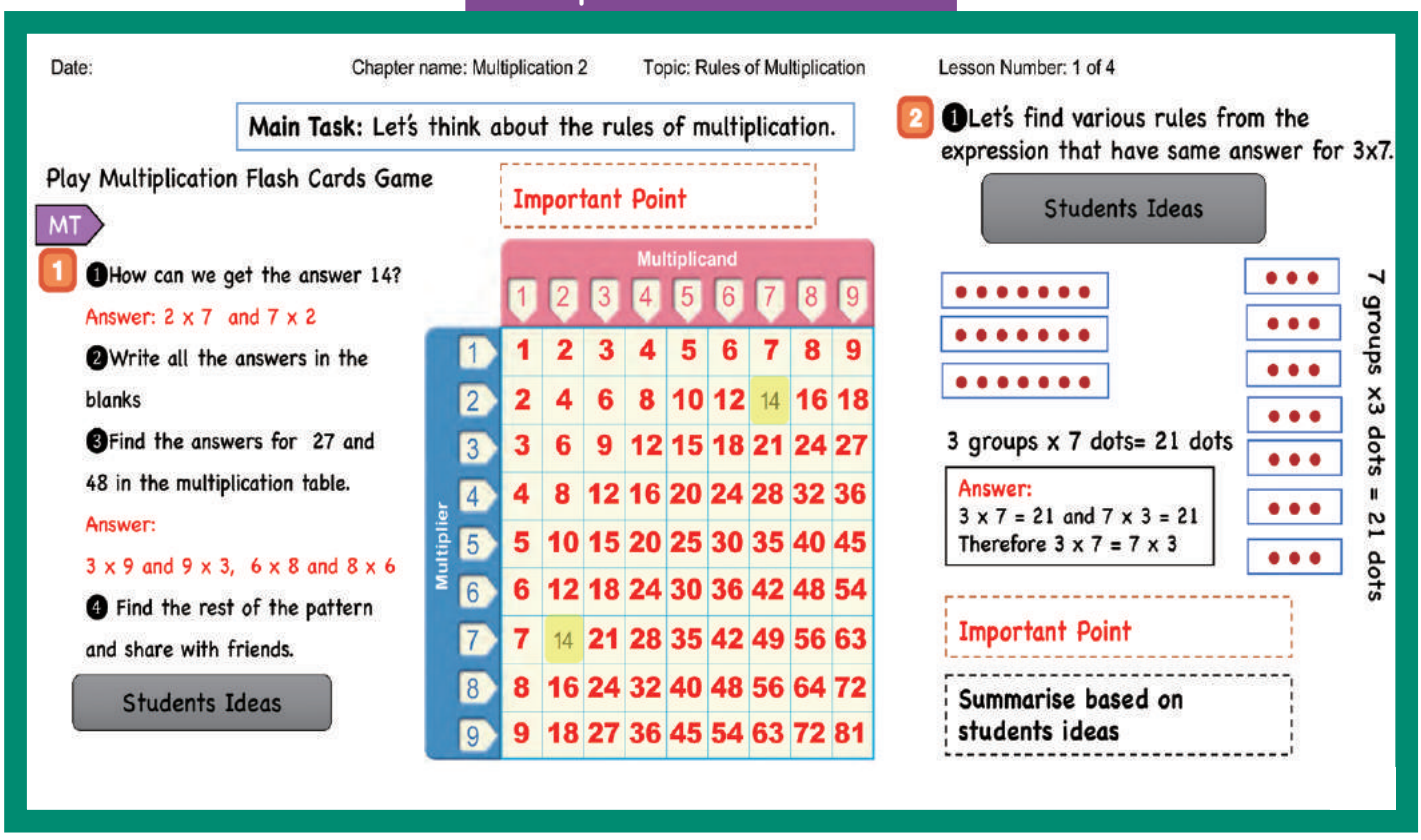
T Introduce new mathematics expression; when we have two mathematics sentences with same answer as 3×7=21 and 7×3=21 we can combine the expressions and write them as 3×7=7×3.

4 Summarise the lesson.

T Explain the important point in the box ⬚ and ⬚.

T Ask students to copy both important points in the box into their exercise books.

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 2 of 4 (Double Period)

Textbook Page : p.50-p.51
Actual Lesson 35

Lesson Objectives

- To complete mathematics sentence using increase and reduce rule of multiplication.
- To split 1st and 2nd number, in total get the same answer.
- To explain characteristic of distributive law and why it works.

Assessment

- Explain rules of multiplication using multiplication table, dot diagram, blocks and so on. F
- Understand the increase and reduce rule when finding the answer in multiplication. F
- Understand that if we calculate by splitting the 1st or the 2nd, in total the answer are the same. S

Prior Knowledge

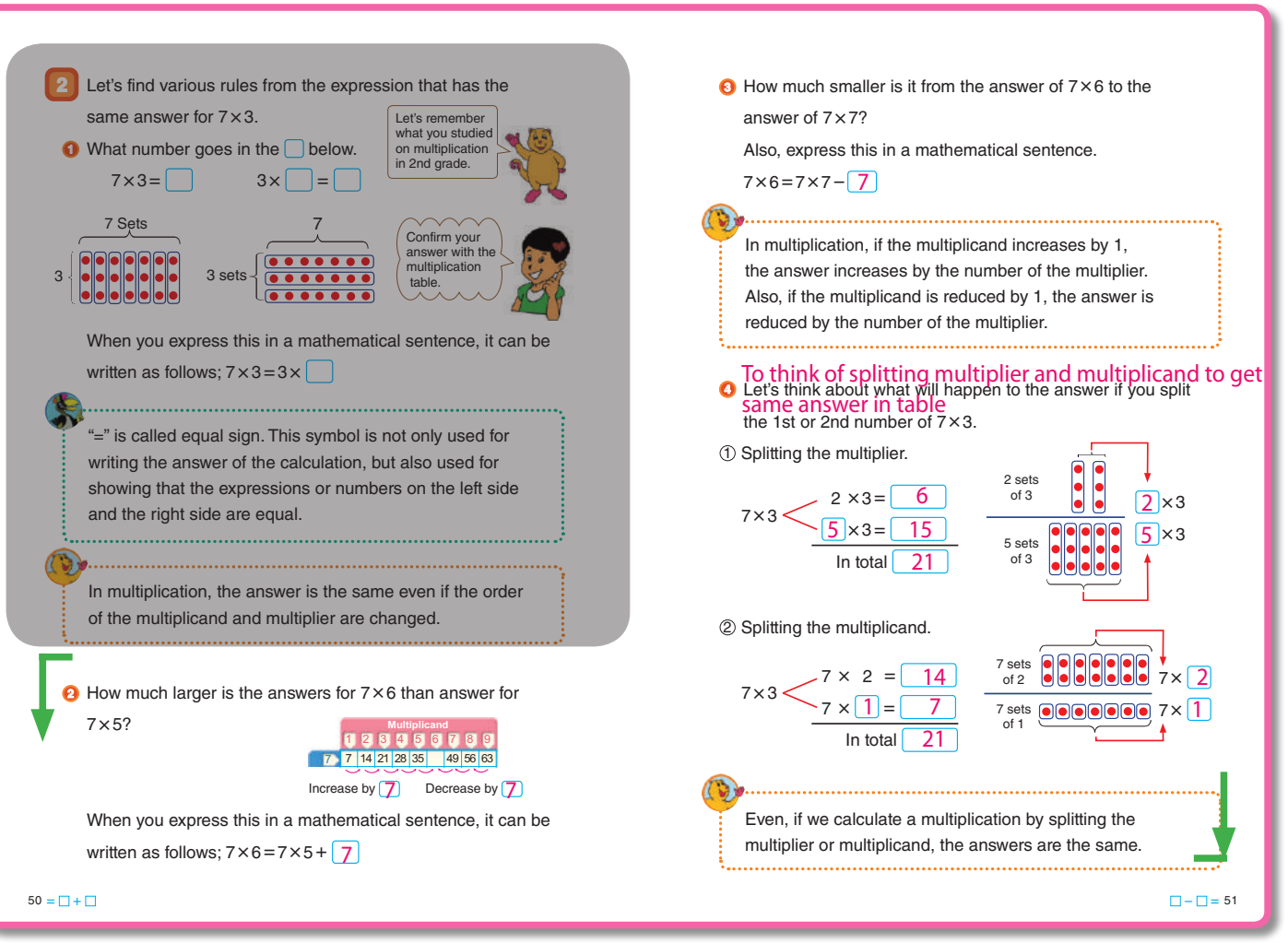
- Multiplication table
- Commutative law of Multiplication

Preparation

- Blank Multiplication table (photocopy and prepare several copies for each student)

• Teacher's Notes •

In this lesson the focus is the distributive law of multiplication. As the students discuss the increase and reduce method in multiplication with the splitting method they should be able to conclude that when we apply the two methods we still end up with the same answer.
Example: $a \times (b+c) = (a \times b) + (a \times c)$.



Lesson Flow

1 ① Let's make a multiplication table of 7.

T What have you learned about the multiplication table and rule on how much the answer increases as the 2nd number increases by 1?

S In multiplication table of 7, as the 1st number increases by 1, the answer increases by 7. As the 2nd number reduces by 1, the answer is reduce by 7.

T Introduce the main task.

2 Let's compare 7×6 and 7×5.

T ② "How much larger is the answer for 7×6 than the answer for 7×5?"

S 7

T How do we express this in a mathematical sentence?

T Allow students to study and express in a mathematical sentence.

T Do the same for ③.

T What can we say about the multiplier and the multiplicand in row 7?

S As the 2nd number increases by 1, the answer is increased by 7. As the 2nd number is reduced by 1, the answer is reduced by 7.

T Ask students to summarise the rule of multiplication in relation to increase and reduce of the 2nd number.

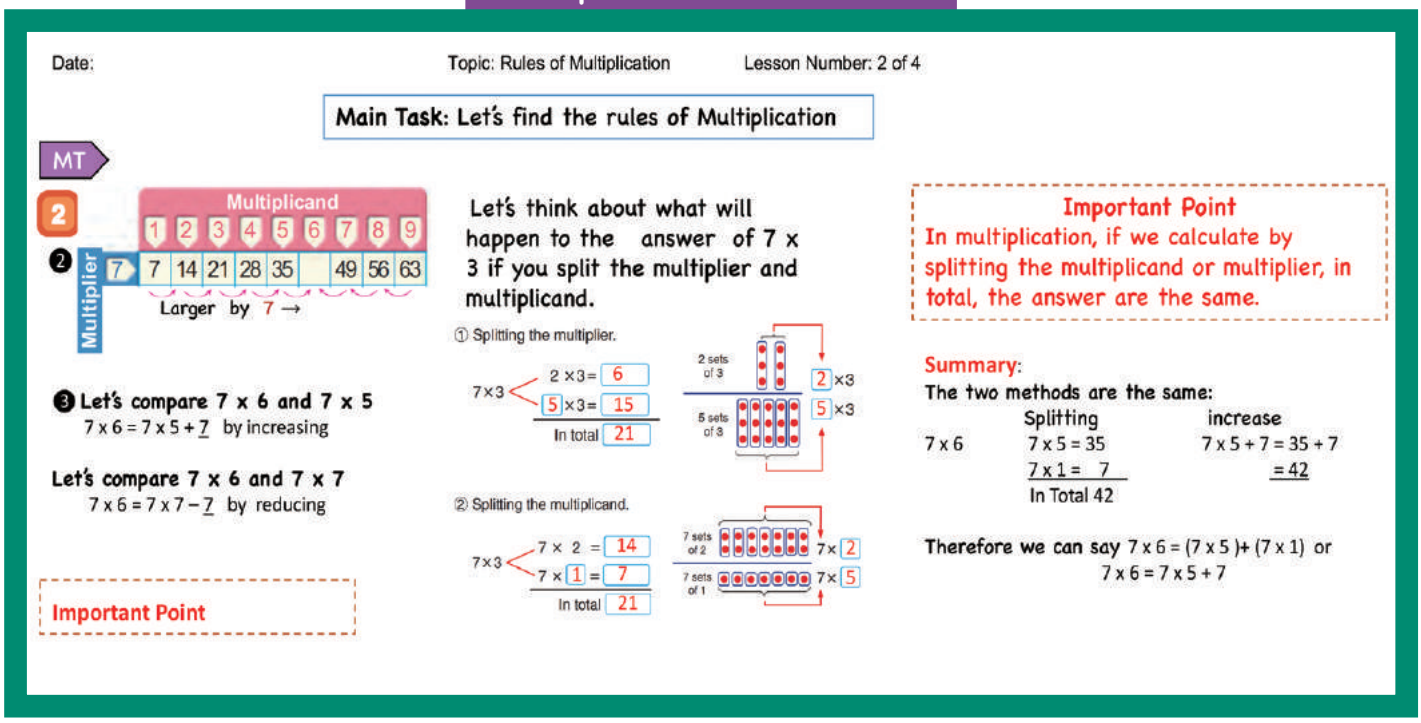
3 ④ Think of splitting 7×6.

S Explain ① Splitting Multiplicand in their own words as well as ② splitting the multiplier.

T What can we say about the rule of splitting in multiplication?

S Assist students to summarise in the box ☐.

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 3 of 4 (Double Period)

Textbook Page : p.52
Actual Lesson 36

Lesson Objectives

- To represent the rules of multiplication by using mathematics sentence and diagrams.
- To explain and express the rules of commutative and distributive law of multiplication.

Prior Knowledge

- Commutative law and distributive law of multiplication

Preparation

- Dot diagram

Assessment

- Explain the rules of multiplication using mathematics sentences or diagrams. F
- Do the exercises correctly. S

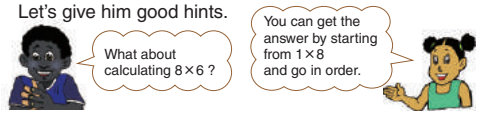
• Teacher's Notes •

The students should be able to master the different rules of multiplication. They should be able to use the mathematical sentence and dot diagram to show their understanding of the rules of multiplication.
Emphasise more on the use of equal sign, so that the students must use it in their conclusion such as: therefore, $9\times4=4\times9$ or therefore $8\times5=8\times4+8$.

To think of the rule of multiplication.

3 Samuel has difficulties in calculating the answer for 6×8.

Let's give him good hints.

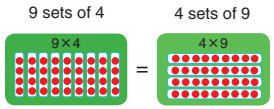


To represent the order by mathematical sentence.

4 Represent the following by using mathematical sentences and diagrams.

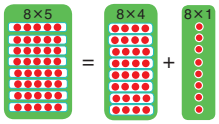
1. If you exchange the order of the 1st and 2nd number in the expression 9×4, the answers will be the same as;

$9\times4=\boxed{4}\times\boxed{9}$



2. The answer for 8×5 will be the same to the answer for 8×4 by adding 8.

$8\times5=\boxed{8}\times\boxed{4}+\boxed{8}$



Same as 8×5

Exercise

Let's find the number which applies to the $\square$.

① $8\times7=\boxed{7}\times8$ ② $9\times\boxed{3}=3\times9$

③ 4×6 is $\boxed{4}$ bigger than 4×5.

④ 5×8 is $\boxed{5}$ smaller than 5×9 .

⑤ $7\times7=7\times\boxed{6}+7$ ⑥ $3\times\boxed{6}=3\times7-3$

52 = □ + □

6×8
Splitting multiplicand
6×8 $3\times8=24$
$3\times8=24$
48

6×8
Splitting multiplier
6×8 $6\times4=24$
$6\times4=24$
48

$8\times5=40$ Increase multipier by 1
$8\times6=48$ Increase multiplicand by 8

Lesson Flow

1 ③ Find various ways of calculating 6×8.

T Ask few students to calculate 6×8 using the different rules learned from the previous lessons.

S Go to the black board to write and explain the different ways of calculating 6×8 using the rules of multiplication.

TN May use different methods learned, they may use order rule 6×8=8×6, where 8×5+8=8×6, they may use the increase or reduce method for the row of 6 or row of 8 or they may also use the splitting method to find their answers. Teacher should give enough time for them to express their ideas.

T Introduce the main task.

2 ④ Represent 9×4 and 4×9.

T Put the dot diagram of 9×4 and 4×9 on the board. Let's represent the following by using the mathematical sentence and the diagram.

S ① Study the diagram and try to understand multiplication in different order. They explain the diagram and complete the mathematical sentence.

T ② Put up the dot diagram for 8×5 and ask "Are the answer for 8×5 same to 8×4+8?"

S Explain their answers, they may use the black board or diagram.

T Emphasis more on equal sign; we can use equal sign to show that the mathematical expression on the right is the same as the mathematical expression on the left side.

3 Conclude the lesson.

T Give 9×6 and ask five students to go to the black board and express it in a mathematical sentence.

S 9×6=9×5+9 , 9×6=6×9, 9×6=(5×6)+(4×6), 9×6=(9×3)+(9×3), 9×6=(9×5)+(9×1)

4 Do the exercise.

Sample Blackboard Plan

Date: Topic: Rules of Multiplication Lesson Number: 3 of 4

Main Task: Let's confirm rules of multiplication.

③ What rules of multiplication can we use to calculate 6 x 8?

Students Ideas
Working out and Answer

6 x 8
Splitting Multiplicand
3 x 8= 24
3 x 8 = 24
48

Splitting Multiplier
6 x 4 = 24
6 x 4 = 24
48

Answer: Therefore 6 x 8 = 48

MT

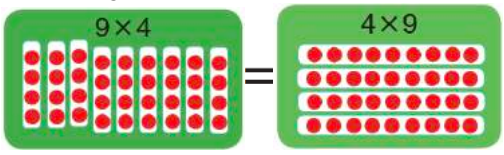
④ Let's represent the 9 x 4 and 8 x 5 by using mathematical sentence and diagram .

Students Ideas

① 9 x 4 = 4 x 9

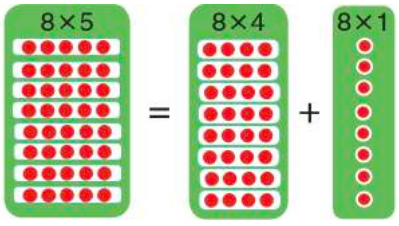
9 groups of 4
9 x 4

4 groups of 9
4 x 9



Answer: Therefore 4 x 9 = 9 x 4

② 8 x 5 = 8 x 4 + 8



Answer: Therefore 4 x 8 = 8 x 4

Summary
How many rules of multiplication did you learn today?

Let's Complete Exercise

Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 4 of 4 (Single Period)

Textbook Page : p.53
Actual Lesson 37

Lesson Objectives

- To represent diagram with a mathematical sentence.
- To show the order of multiplication using brackets.

Prior Knowledge

- Commutative law and Distributive law of multiplication

Preparation

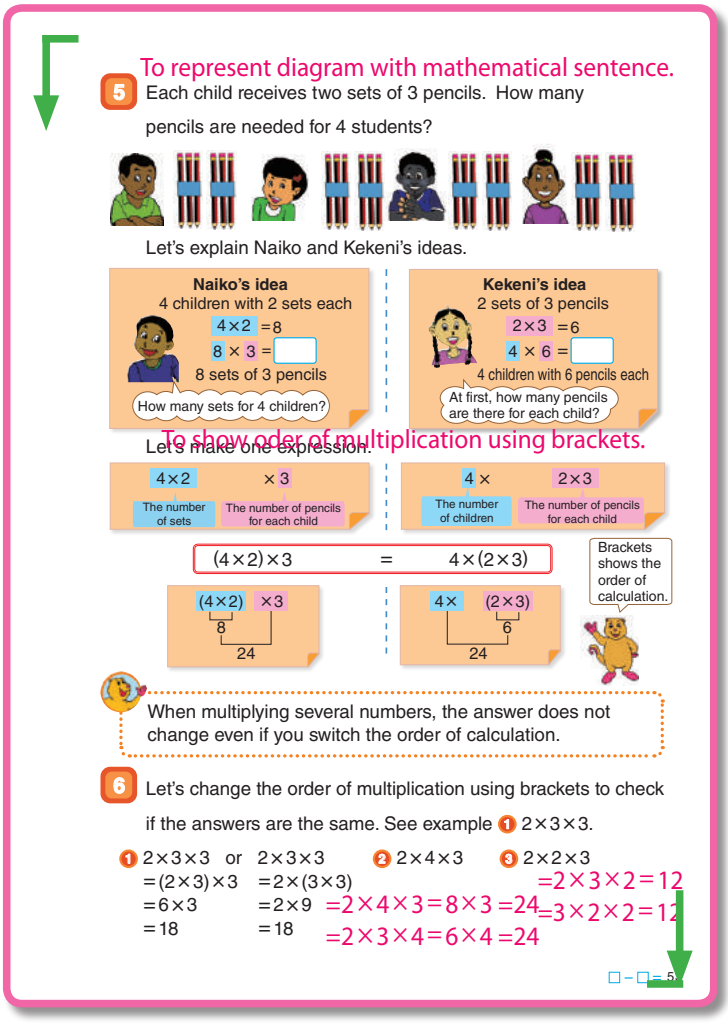
- 18 pencils, rubber band (May use the textbook only where there is no materials)

Assessment

- Solve the word problem considering various ways of multiplication. F
- Do the exercises correctly. S

• Teacher's Notes •

The idea of bracket is first introduced in this lesson, therefore go slowly in the explanation of Naiko and Kekeni's idea. Synthesise the two ideas, Naiko's idea should not be taught separately from Kekeni's.
Brackets show the order of calculation and should be used in the expression that will be calculated first. At the end the students should conclude the final answer with therefore, $(a \times b) \times c = a \times (b \times c)$.



Lesson Flow

1 5 Let's represent objects with a mathematical sentence.

T Introduce the main task.

T Set the pencils on the desk and bind three (3) pencils together. Then ask, "If each child receives two sets of three pencils. How many pencils are needed for 4 students?"

S Work out the expressions for the problem and write them on the black board.

2 Compare Naiko and Kekeni's idea.

T Directs students to page 53; "When do we use the brackets?"

S Try to combine expressions together with brackets.

T Which expression do you want to work with first? We put the brackets in them.

S Work out their answer, switching the order of brackets.

TN This is the first time the students are expose to brackets, work with them slowly so they should see that the answers are the same even if the order of calculation changes.

S Summarise the Lesson; "When multiplying several numbers the answer does not change even if you switch the order of calculation" as

3 Conclude the lesson.

T Give $2\times3\times3$ to students as practice to conclude lesson.

S Calculate $2\times3\times3$

$2\times3\times3=(2\times3)\times3$
$=6\times3$
$=18$

$2\times3\times3=2\times(3\times3)$
$=2\times9$
$=18$

Therefore, $(2\times3)\times3=2\times(3\times3)$

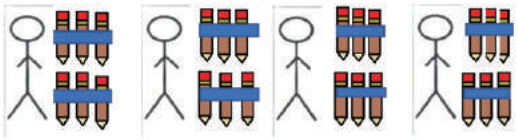
4 Complete 6 .

Sample Blackboard Plan

Date: Topic: Rules of Multiplication Lesson Number: 3 of 4

MT **Main Task: Let's represent the diagram with multiplication expression**

5



Students Ideas
Working out and Answer

1 Mathematical Expressions:
4 x 2 x 3

Naiko's Idea
4 children with 2 sets each

3 x | 2 x 4

4 groups of 2
4 x 2 = 8
8 x 3 = 24.

Using the Brackets it can be written as:
3 x (2 x4)
3x 8 = 24

Kekeni's Idea

2 sets of 3 pencils
2 x 3 = 6
6 x 4 = 24

2 x 3 | x 4

Using the Brackets it can be written as:
(2 x3) x 4
6 x 4 = 24

2 Let's make one expression:
(2 x 3) x 4 = 3 x (2 x 4)

Important Point:

6

(1) 2 x 3 x 3 or 2 x 3 x 3
= (2 x 3) x 3 = 2 x (3 x 3)
= 6 x 3 = 2 x 9
= 18 = 18
Answer:
Therefore (2 x 3) x 3 = 2 x (3 x 3)

(2) 2 x 4 x 3 or 2 x 4 x 3
= (2 x 4) x 3 = 2 x (4 x 3)
= 8 x 3 = 2 x 12
= 24 = 24
Answer:
Therefore (2 x 4)x 3 = 2 x (4 x 3)

(3) 2 x 2 x 3 or 2 x 2 x3
= (2 x 2) x 3 = 2 x (2 x 3)
= 4 x 3 = 2 x 6
= 12 = 12
Answer:
Therefore (2 x 2)x 3 = 2 x (2 x 3)

Unit 4

Unit: Multiplication 2
Sub-unit: 2. Multiplication with 0
Lesson 1 of 2 (Double Period)

Textbook Page : p.54-p.55
Actual Lesson 38

Sub-unit Objectives

- To think about how to find the answer for the multiplication with 0.

Lesson Objectives

- To recognise the rule of multiplication in the Point Scoring Game.
- To write the expression for calculating the total points.
- To write the expression for multiplication with 0.

Prior Knowledge

- Multiplication table of 2 – 9
- Commutative, associative and distributive law of multiplication in mathematical sentences and diagrams

Assessment

- Enjoy playing the game and get the experience of getting zero. F
- Write the multiplication expression with 0. S

Preparation

- Design Point cards with numbers 0, 1, 3, and 5 to be used as point card. (Each student should make and bring at least 5 of each point card to school)
- Bring 10 bottle tops or 20t coins (Students Homework before lesson)
- Make enough copies of the Game Board (see below)for each groups
- Prepare score boards for Tom and Henao's results

• Teacher's Notes •

The aim of the game is for the students to experience zero point.
Once a bottle top gets into a point area, the student should receive a point card for that area. For example a student will receive 0 point card if the bottle top goes into 0 point area.

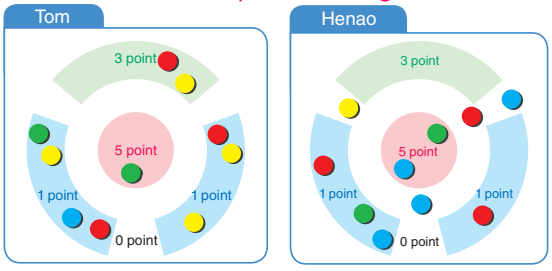
To recognise the rule of multiplication in point scoring game.

2 Multiplication with 0

Point Scoring Game

In this game, you toss the bottle caps and gain point cards according to where the bottle caps stop. When 10 bottle caps are tossed, the team with the higher score wins.

To show oder of multiplication using brackets.



To note number of points in math expression.

54 = □ × □

1 Let's see how many points Tom has.

Tom's points table

Points on card	5	3	1	Total
Number of cards obtained	1	2	7	10
Total points	5	6	7	18

1 card of 5 points: 1 × 5 = 5
2 cards of 3 points: 2 × 3 = 6
7 cards of 1 point: 7 × 1 = 7
(Number of cards × Points on card = Total points)

On Tom's table, 1×5=5 is easier!

2 Let's see how many points Henao has.

Henao's points table

Points on card	5	3	1	0	Total
Number of cards obtained	2	0	4	4	10
Total points	10	0	4	0	14

1 Write the mathematical expressions for finding the total points.

2 cards of 5 points: 2×5
0 card of 3 points: 0×3
4 cards of 1 point: 4×1
4 cards of 0 point: 4×0

What is the mathematical expression for 0 point cards?

Let's think about how to find the answer for the multiplication with 0 later.

□ + □ = 55

Lesson Flow

1 Introduce the Point Scoring Game.

T Set the table and introduce the Bottle Top Point Scoring Game.

S 3 Students play the game in their groups. No replay, once 10 bottle top is used; the child's turn is up and next child plays.

T Picks up most effective cards that can develop the lesson.

T Introduce the main task.

2 1 Study Tom's score Board.

T Put up the prepared table for Tom on the board and ask students to copy.

T "Let's see how many points Tom has, these are the cards for Tom's; 1 card for 5 point area, 2 cards for 3 point area and 7 cards for 1 point area."

T "What is the total score for 5 point area?"

S Count the cards, "5"

T Continue to 3 point and 1point area.

T Ask students to work out the total score for Tom and complete the score board on the black board.

3 Write the mathematical sentence for Tom's scores.

T Assist students to express Tom's score in a mathematical sentence.

S Fill in the Tom's table in their exercise book and write the mathematical sentence for each point.
$5 \times 1 = 5$, $3 \times 2 = 6$, $1 \times 7 = 7$

4 2 Fill in the scores and write mathematical expressions for Henao.

T Put up the table for Henao on the board and ask the student to express each point in mathematical expressions.

S Draw Henao's table into their exercise books and write the mathematical expression for each point.

T 1 Allow the students to write the expression for Henao's score on the board. Then conclude, "We will think about how to find the answer for multiplication with 0 in the next lesson."

S May complete their own table using their cards in hand and express in mathematical sentence.

Sample Blackboard Plan

Date:

Topic: Multiplication with 0

Lesson Number: 1 of 2

Main Task: Let's find the rule of multiplication in a game.

Play the point scoring game.

1. Have point cards label as 1, 3 and 5 points.
2. For every tops that stops at a certain point area the player gets the point card.
3. The cards are then counted and recorded onto the table.

MT

1 Let's see how many points Tom has.

Tom's points table

Points on card	5	3	1	Total
Number of cards obtained	1	2	7	10
Total points				

Students Ideas
Working out and Answer

1 card of 5 points $1 \times 5 = 5$

2 cards of 3 points $2 \times 3 = 6$

7 cards of 1 point $7 \times 1 = 7$

Number of cards | Points on card | Total points

2 Let's see how many points Henao has.

Henao's points table

Points on card	5	3	1	0	Total
Number of cards obtained	0 2	4	4	4	10
Total points					

1 Write the mathematical expressions for finding the total points.

2 cards of 5 points 2×5

0 card of 3 points 0×3

4 cards of 1 point 4×1

4 cards of 0 point 4×0

Summary

How can we calculate Expression with 0?

3 x 0

0 x 4

Exercise

Unit 4

Unit: Multiplication 2
Sub-unit: 2. Multiplication with 0
Lesson 2 of 2 (Double Period)

Textbook Page : p.56
Actual Lesson 39

Lesson Objectives

- To find the answer for multiplication with 0 using the reducing method.
- To reduce the Multiplier by 1 in row 1, so the answer becomes 0.
- To discuss the rules of Multiplying any number with 0 and get the answer 0.
- To understand the rules of calculating and multiplying by 0.

Prior Knowledge

- Commutative Law of multiplication

Preparation

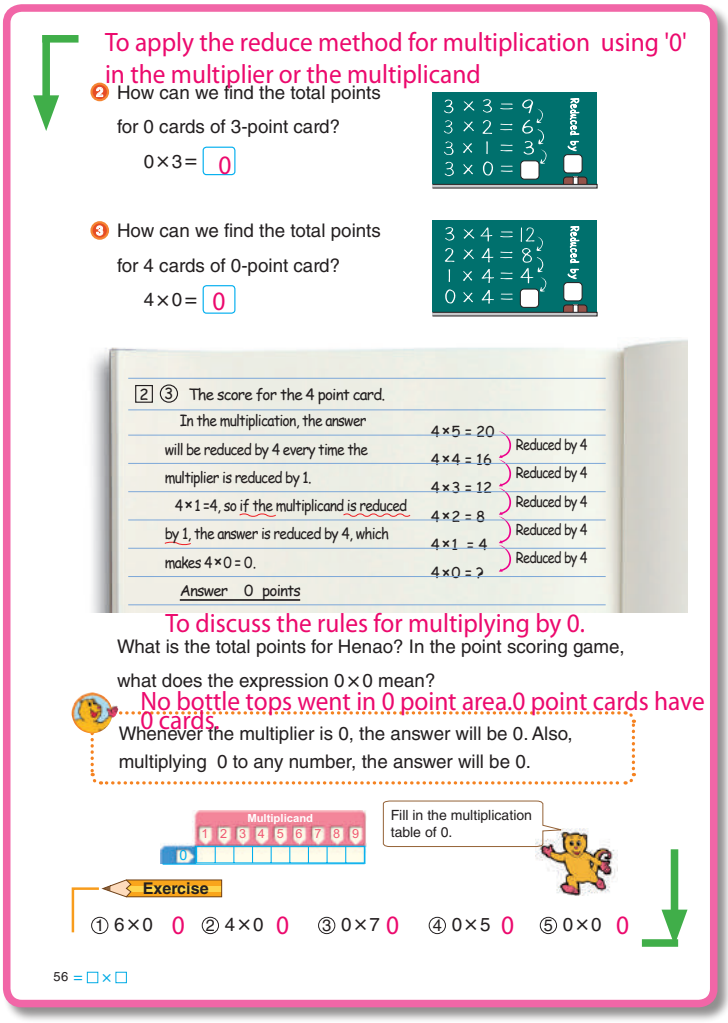
- Henao's score board on the blackboard

Assessment

- Consider the reason why the answer becomes 0 of multiplication with 0 applying the characteristic of multiplication. F
- Recognise the process of multiplying with 0. F
- Do exercise correctly. S

• Teacher's Notes •

Multiplying 3×0, the students can use the reduce method to calculate from 3×3 to 3×1 and 3×0. Assist students to see the pattern as individual column where the multiplicand and the multiplier can be switch but the answer will be the same.
They do the same for 0×4.



Lesson Flow

1 Review of the previous lesson.

T Put up Score board for Henao's point on the black board.
S Read the question and understand the reduced multiplication rule for 0.
T Asks students to look at the mathematics expressions for Henao. "What would the expression with 0 be?"
T Introduce the main task.

2 Calculate the total points of 3 point card and 0 point card.

T ❷ Ask a student to show working out on the board, they can apply their rules in multiplication to explain their answer for multiplier with 0.
S Write and explain their answers on the board.
T Ask students to explain what the expression 4×0 mean in their exercise book.
TN Give more emphasis on number reduced by 3 (same for 4).
S Explain their answer for 4×0 in the point scoring game. "4 times scored 0"
T ❸ What is the total point for Henao?
S Complete Henao's total score.
S Copy notes from the textbook [ ].
(The score for point 3 card and the notes in the summary box)

3 Do the exercise.

T Let the students to complete the exercises. Then complete their multiplication table with row of 0 in their exercise books.

4 Conclude the lesson.

S Explain that whatever number multiplied to 0, the answer will be 0. Also multiplying 0 to any number, the answer will be 0.

Sample Blackboard Plan

Date:
Topic: Multiplication with 0
Lesson Number: 2 of 2

Review:

Main Task: Let's multiply with 0.

Henao's Points

Points of cards	5	3	1	0	Total
Number of cards obtained	2	0	4	4	10
Points					

What would expression with 0 be?

Students Ideas
Working out and Answer

MT

❷ How can we find the total points for 0 cards of 3-point card?

0×3=□

3 × 3 = 9
3 × 2 = 6
3 × 1 = 3
3 × 0 = 0

Reduced by 3

❸ How can we find the total points for 4 cards of 0-point card?

4×0=□

3 × 4 = 12
2 × 4 = 8
1 × 4 = 4
0 × 4 = 0

Reduced by 4

❹ What is the total points for Henao? 14

What does the expression 0 x 0 mean?

Students Answers

Answer: There is no score.

SUMMARY

Whatever number multiplied to 0, will be 0. Also, multiplying 0 to any number, the answer will be 0.

Exercise

1. 6 x 0 = 0
2. 4 x 0 = 0
3. 0 x 7 = 0
4. 0 x 5 = 0
5. 0 x 0 = 0

Unit 4

Unit: Multiplication 2
Sub-unit: 3. Multiplication with 10
Lesson 1 of 1 (Single Period)

Textbook Page : p.57
Actual Lesson 40

Sub-unit Objectives

- To use the rules of multiplication, think about how to multiply using 10.

Lesson Objectives

- To understand the rules of calculating and multiplying by 10.
- To appreciate the splitting rules of multiplication when multiplying by 10.

Prior Knowledge

- Meaning of multiplication
- Multiplication table

Preparation

- Chart of stickers (5×10)

Assessment

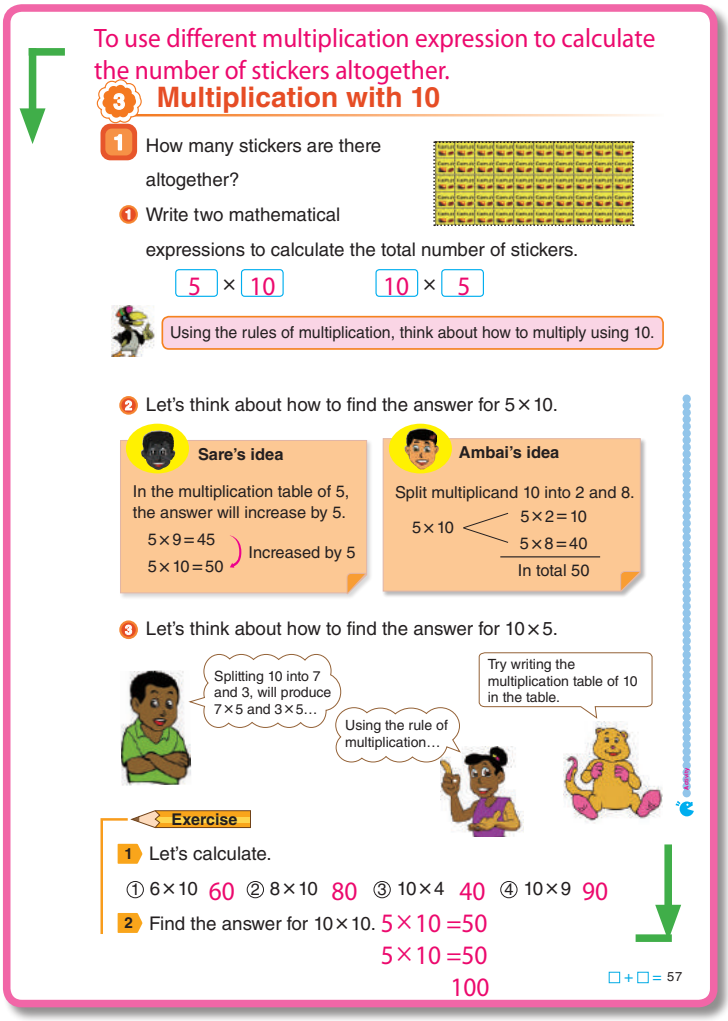
- Appreciate the rule of multiplication when multiplying by 10. F
- Do the exercises correctly. S

• Teacher's Notes •

Students may use the following to explain their answers for 5×10 and 10×5.

- Splitting 10
- Increase multiplicand from 9
- Switch order and use the table of 5

The focus is to make the table of 10.



To use different multiplication expression to calculate the number of stickers altogether.

3 Multiplication with 10

1 How many stickers are there altogether?

1 Write two mathematical expressions to calculate the total number of stickers.

5 × 10　　10 × 5

Using the rules of multiplication, think about how to multiply using 10.

2 Let's think about how to find the answer for 5×10.

Sare's idea

In the multiplication table of 5, the answer will increase by 5.

5×9=45
5×10=50 Increased by 5

Ambai's idea

Split multiplicand 10 into 2 and 8.

5×10 < 5×2=10, 5×8=40

In total 50

3 Let's think about how to find the answer for 10×5.

Splitting 10 into 7 and 3, will produce 7×5 and 3×5…

Using the rule of multiplication…

Try writing the multiplication table of 10 in the table.

Exercise

1 Let's calculate.

① 6×10 60　② 8×10 80　③ 10×4 40　④ 10×9 90

2 Find the answer for 10×10. 5×10=50
5×10=50
100

□+□=57

Lesson Flow

1 ❶❶ Study the stickers on page 57.

T Put up the stickers on the black board and ask students to write the different multiplication expression for the stickers.

TN Students' possible answer.

1×50 or 50×1
2×25 or 25×2
5×10 or 10×5

T Checks the students' exercise book.

T Introduce the main task.

2 ❷ Think about how to find the answer for 5×10.

T Direct students' attention to Sare and Ambai's idea to work out their answer using the multiplication rules.

S Apply the different rules of multiplication to find their answers.

T Allow two students whose answer is not the same as Sare or Ambai's idea to explain their answer on the black board.

T Write and explain their answers on the black board.

T Now let us think of 5×10.

S Volunteered students try to explain the ideas on the black board.

3 Complete the exercise.

S Complete exercises and allow the teacher to check their exercise book.

Sample Blackboard Plan

Date: Topic: Multiplication with 10 Lesson Number: 1 of 1

Task: Let's think about how to multiply by 10

1

❶ Write two expressions to calculate the number of sticker.

Students Ideas

5 x 10
10 x 5

MT

❷ Show different multiplication rules for 5 x 10.

Students Ideas

Sare's Idea Increase by 5
5 x 9 = 45 increase by 5
5 x 10 = 50

Ambai's Idea Split 10
Split 10 into 2 and 8

5 x 2 = 10
5 x 8 = 40
Total 50. Answer: 50

❸ Let's find answers for 10 x 5

Students Ideas

Splitting 10 into 3 and 7

10 × 5 → 7 x 5 = 35, 3 x 5 = 15
Total 50

SUMMARY

Using rules of multiplication we can multiply with 10.

Exercise

1 Let's calculate
1) 6 x 10 = 60 2) 8 x10 = 80
3) 10 x 4 = 40 4) 10 x 9 = 90

2 Find the answer for 10 x 10
10 x 10 = 100

10 times table

10 × 1 = 10	10 × 7 = 70
10 × 2 = 20	10 × 8 = 80
10 × 3 = 30	10 × 9 = 90
10 × 4 = 40	10 × 10 = 100
10 × 5 = 50	
10 × 6 = 60	

Unit 4

Unit: Multiplication 2
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.58-p.59
Actual Lesson 41

Lesson Objectives

- To review what students learned in the Unit.

Prior Knowledge

- To review what students learned in the Unit.

Preparation

- Evaluation sheet

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

It is impossible to solve all the problem in the lesson. Therefore, choose some questions from each exercise and the rest can be given as homework.

Exercise

To multiply with 0 , 10 and using the brackets.

1 Let's calculate. Pages 56 ~ 61

① 9×0 0 ② 7×0 0 ③ 0×8 0 ④ 0×2 0

⑤ 4×10 40 ⑥ 7×10 70 ⑦ 10×8 80 ⑧ 10×7 70

⑨ 3×2×4 ⑩ 4×2×5 ⑪ 3×3×10

=(3×2)×4 =(4×2)×5 =(3×3)×10

=6×4 =24 =8×5 =40 =9×10 =90

2 Let's find the number which goes in □. Pages 48 ~ 51

① 3×8=8×[3] ② 4×[6]=6×4

③ 7×5=7×4+[7] ④ 6×[4]=6×5−6

⑤ (3×3)×2=3×([3]×2) ⑥ 7×(2×4)=7×[8]

To split multiplicand or multipier and get the same answer in total

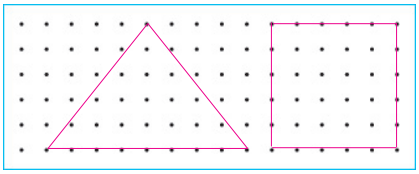
3 Let's find the number which goes in □. Page 55

① 8×7 → 8×[3]=[24], 8×[4]=[32], In total [56]

② 9×6 → 9×[6]=[54], 9×[0]=[0], In total [54]

Draw triangles and squares by connecting dots with straight lines.

Grade 2 Do you remember?



58 = □ − □

Problems

1 Let's find the number which goes in the □.

Understand the rules of calculating and multiplying by 0.

① 0×6=[0] ② 1×0=[0] ③ 5×6=[6]×5

④ 3×9 is larger than 3×8 by [3]

⑤ 4×3 is smaller than 4×4 by [4]

2 Let's calculate the following.

Multiplication with 0, 10 and using the brackets.

① 0×9 0 ② 8×0 0 ③ 0×0 0 ④ 2×10 20

⑤ 10×6 60 ⑥ (2×2)×5 20 ⑦ 4×(2×3) 24 ⑧ (2×5)×9 90

3 A point scoring game was played using bottle caps.

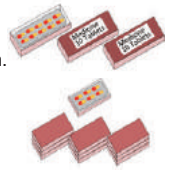
Let's find the total points gained by Mea.

Multiplication with 0 and 10.

Mea's Score

Points on card	0	2	5	10	Total
Number of cards obtained	3	0	4	3	10
Total points	0	0	20	30	50

4 There are 3 boxes of 10 capsules of medicine and 10 boxes of 6 capsules each. How many capsules are there altogether? Express as one expression only and calculate it.



Solving a story problem by developing the expression.

(3×10)+(10×6)
= 30+60
= 90

□ + □ = 59

Lesson Flow

1 ① Various multiplication

TN 1-4: Multiplication with 0
5-8: Multiplication with 10
9-11: Associative law of Multiplication

2 ② Rules of multiplication

TN 1 and 2: Commutative law of Multiplication
3 and 4: Multiplication and addition or subtraction
5 and 6: Associative law of Multiplication

3 ③ Find the number which goes in the box.

4 ① ② Various multiplication

5 ③ Multiplication with 0 and 10

6 ④ Word problem of multiplication.

TN Solve using Associative law of Multiplication.

7 Do the evaluation.

T Distribute the evaluation sheet to individual students.
S Complete the sheet and submit to the teacher.
T Mark the sheet for individual student and give them feedback.

Multiplication	Name:	Score

1. Michelle played a card game. The following table is the result of the game.
(Each question is worth 10 points)

Score(points) of each card	10	5	3	1	0	Total
The number of cards she got	2	0	3	2	3	10
Score	20	0	9	2	0	31

① What is the score of the 10-point cards?
Operation: 10× 2=20 Answer: 20 points

② What is the score of the 5-point cards?
Operation: 5 ×0=0 Answer: 0 points

③ What is the score of 0-point cards?
Operation: 0×3=0 Answer: 0 points

2. Calculate.
(Each question is worth 5 points)

① 7 × 0 = 0 ② 0 × 0 = 0 ③ 10 × 9 = 90

④ 3 × 10 = 30 ⑤ 3 × 2 × 5 = 30 ⑥ 8 × 4 × 2 = 64

3. Fill in the blanks.
(Each question is worth 10 points)

① 7 × 5 = 5 × 7 ② 6 × 9 = 6 × 8 + 6

③ 8 × 3 = 8 × 4 − 8

④ (3 × 2) × 5 = 3 × (2 × 5)

Unit 5

Unit: Thinking about How to Calculate

Lesson 1 of 1 (Double Period)

Textbook Page : p.60 - p.61
Actual Lesson 42

Sub-unit Objectives

- To think about how to calculate and explain using expression.

Lesson Objectives

- To think about how to calculate 4×12 by yourself using the multiplication table and rules of multiplication.

Prior Knowledge

- Multiplication table

Preparation

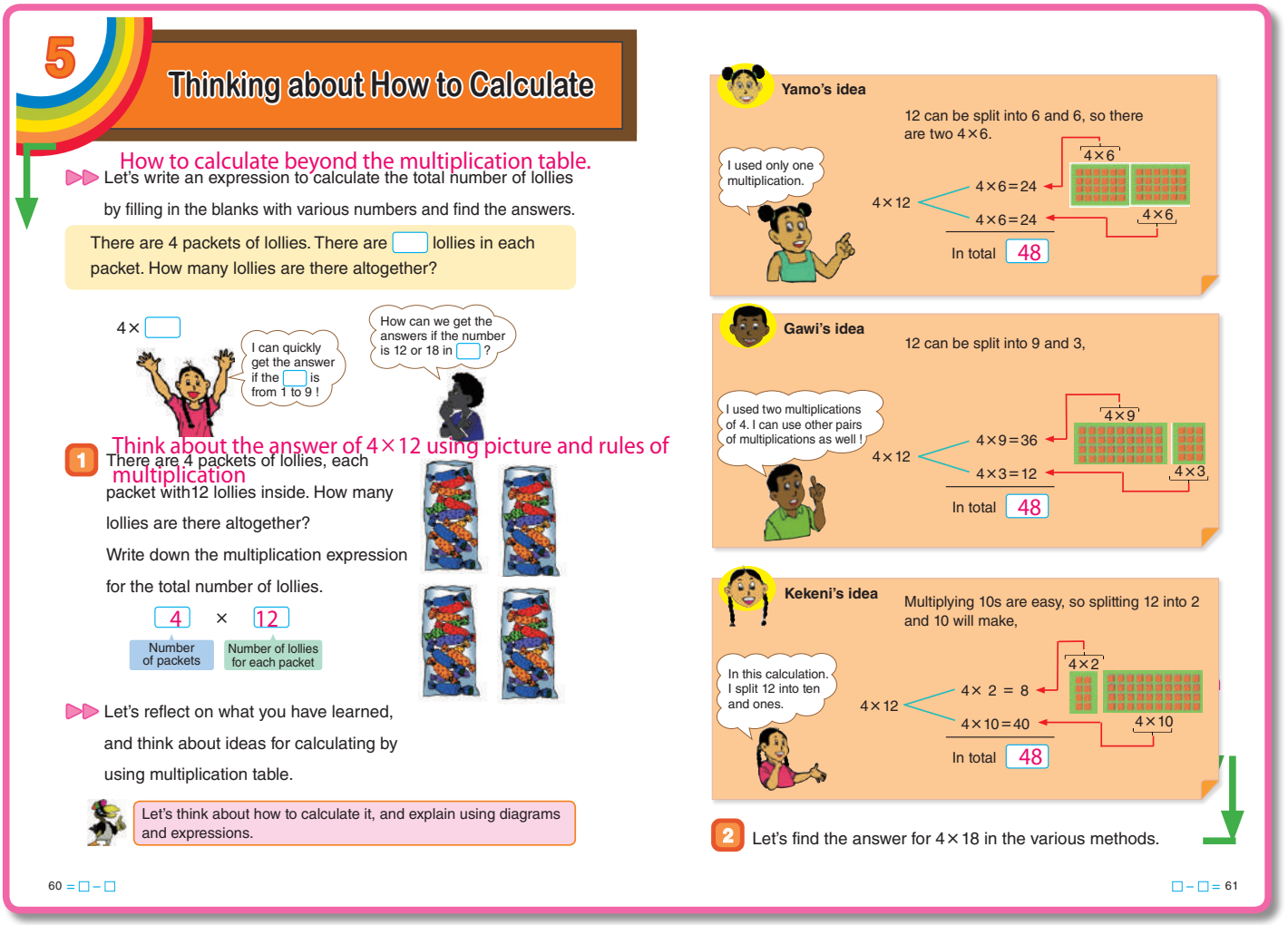
- Block diagram of 4×12

Assessment

- Try to solve the problems using prior knowledge of multiplication. F
- Express their thought using concrete objectives, diagram, operations and so on, and think of solution using prior knowledge of multiplication. F
- Understand that there are various ways of solving. S

• Teacher's Notes •

The 3 ideas express the understanding of calculating 1-digit by 2-digit.
Using the prior knowledge based on table 1-9, the students will work out 4×12.
Allow for students to explain each idea on the board to show their understanding.



Lesson Flow

1 Make mathematical expressions inserting your favourite number from 1 to 9 and find the answer.

T Read the problem.
T Insert your favourite number from 1 to 9 in the square and find the total number of lollies.
TN Let the students remember the table of multiplication in this step.
T Introduce the main task.

2 1 Make a mathematical expression in the case of 12 lollies in one bag, and let them think about the difference from what they have learned.

T Make a mathematical expression to find the answer.
S 4×12
T What is the difference compared with what we have learned before?
S We have to multiply 2-digit numbers.

3 Present the methods.

T Let's present your idea on how to calculate 4×12.
TN Show three ideas in the textbook.
Yamo's idea: Split 12 into half and half (6 and 6).
Gawi's idea: Split 12 into 9 and 3
Kekeni's idea: Split 12 into 10 and 2.

4 Discuss the ideas presented by students.

T Are there any same or different points to your idea?
TN Let the students notice that it is good to divide 12 to 1-digit number so that you can calculate using the multiplication table.

5 2 Solve the task.

S Solve the task applying learned knowledge.

Sample Blackboard Plan

Date: Chapter Name: Thinking about how to Calculate Topic: Thinking about how to calculate Lesson Number: 1 of 1

Main Task: Let's think about how to calculate 2 – digit numbers when multiplying.

1 There 4 packets of lollies, each packet with 12 lollies inside.
How many are there altogether?

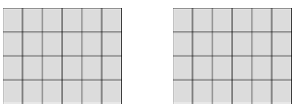
Students Ideas

MT

Math Expression:
4 x 12

Yamo's Idea is to split 12 into 6 and 6

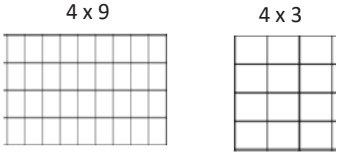
4 x 6 4 x 6



4 x 12 < 4 x 6= 24 / 4 x 6 = 24
In Total 48

Gawi's Idea is to split 12 into 9 and 3.

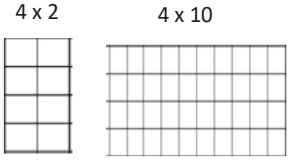
4 x 9 4 x 3



4 x 12 < 4 x 9 = 36 / 4 x 3 = 12
In Total 48

Kekeni's Idea is to split 12 into 10 and 2.

4 x 2 4 x 10



4 x 12 < 4 x 2 = 8 / 4 x 10 = 40
In Total 48

2 Let's find the answer for 4 x 18

Students Ideas
Working out and Answers

End of Chapter Test: Chapter 3-5 **Date:**

Multiplication	Name:	Score

1. Michelle played a card game. The following table is the result of the game.
(Each question is worth 10 points)

Score(points) of each card	10	5	3	1	0	Total
The number of cards she got	2	0	3	2	3	10
Score			9	2		

① What is the score of the 10-point cards?
Operation: _____ Answer: _____

② What is the score of the 5-point cards?
Operation: _____ Answer: _____

③ What is the score of 0-point cards?
Operation: _____ Answer: _____

2. Calculate.
(Each question is worth 5 points)

① $7 \times 0 =$ ② $0 \times 0 =$ ③ $10 \times 9 =$

④ $3 \times 10 =$ ⑤ $3 \times 2 \times 5 =$ ⑥ $8 \times 4 \times 2 =$

3. Fill in the blanks.
(Each question is worth 10 points)

① $7 \times 5 = 5 \times$ ____ ② $6 \times 9 = 6 \times 8 +$ ____

③ $8 \times 3 = 8 \times 4 -$ ____

④ $(3 \times 2) \times 5 = 3 \times ($____ $\times 5)$

Chapter 6 Duration and Time

1. Unit Objective

- To know about seconds. (3. 2. 3. a)
- To understand duration of time. (3.2.3.b)
- To find out time and duration needed for everyday life. (3.2.3.c, d and e)

2. Teaching Overview

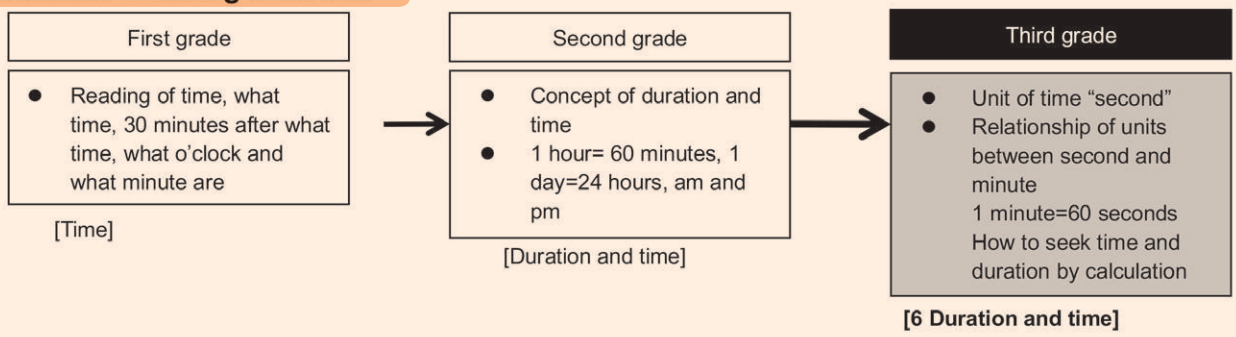
This chapter is for learning and calculating durations and time in daily life. In grade 2, students learned minutes, hours and days.

Short Duration: They learn seconds for the first time in this topic. Through the activity of measuring durations of standing with a leg, they experience again and again that 60 seconds make a minute and get the sense of how short a second is.

Air Niugini Timetables: Students practice reading and hearing time in both am-pm and 24-hour systems before learning the next topic. They need to be fluent in reading and hearing time such as understanding 20 to 8 pm means 19:40.

Duration and Time: Number lines will assist students to understand the difference between duration and time easily. For calculating time and durations, they should be able to identify what and by what they are going to find, which is time or duration, by addition or subtraction. In vertical calculations, students are expected to understand carrying and borrowing 60 to the next unit. This is base 60 calculation.

3. Related Learning Contents



[6 Duration and time]

Unit 6

Unit: Duration and Time
Sub-unit: 1. Short Duration
Lesson 1 of 2 (Double Period)

Textbook Page : p.62 - p.63
Actual Lesson 043

Sub-unit Objectives

- To know about time units of “seconds” which are shorter than minutes.
- To record short time accurately by using stopwatch.
- To convert time units of seconds and minutes.
- To understand how to read timetables and expressed with 24 hour clock.

Lesson Objectives

- To think about how to record duration shorter than minutes.
- To think about time units of “seconds” which are shorter than minutes.
- To record short time accurately by using a stopwatch.

Prior Knowledge

- Concepts of Time and Duration and their difference
- Read time from clock.
- 24 hours = 1 day and 60 minutes = 1 hour

Preparation

- Stop watch, watch or clock or mobile phone
- Chart

Assessment

- Enjoy the game and measure time using stopwatch. F
- Calculate time and duration. S
- Understand the relationship between “minute” and “second”. S

• Teacher’s Notes •

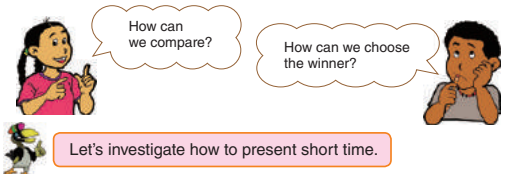
Let students to have the feel of seconds. Other activities may include short sprint or timing something for few seconds/minute. For the first activity, apply distractions if students go beyond 3 minutes.

6 Duration and Time

Let’s challenge standing on one foot while closing one eye.
How long can you stand? Ready to go!

1 Short Duration

1 Let’s stand on one foot with closing an eye.
Who stands the longest ?



Let’s investigate how to present short time.

62 = □ + □

Seconds are time units shorter than 1 minute.
1 minute = 60 seconds

Using a stopwatch, let’s record the duration of how long you can stand on one foot?

The Time Taken on One Foot	
Name	Time (seconds)

2 The table on the right shows the time that Bethel and other students who stood on one foot. Who stood the longest?

Name	Time
Bethel	1 minute 38 seconds
Fred	1 minute 47 seconds
Jeff	104 seconds

1 Let’s represent the time using only seconds, then fill in the blanks.
Bethel: 1 minute 38 seconds = 98 seconds
Fred: 1 minute 47 seconds = 107 seconds

38
+60 (1 minute)

2 Let’s represent the duration of time using minutes and seconds.
Jeff: 104 seconds = 1 minutes 44 seconds

104
− 60 (1 minute)

3 Let’s record the time taken for a paper airplane flight, and record many other time represented by different situation.

□ + □ = 63

Lesson Flow

1 ❶ Think about how to choose the winner who can stand on one foot the longest time.

T Ask students to stand on one foot closing eyes. Count with students using mobile phone to see how many students can stand longer.
T Who had the longest time?
S It's difficult to decide orders when everyone do not start together.
S It's difficult to choose the winner when there is only little difference of time.
T Introduce the main task.

2 Think about how to choose the winner.

T How can we choose the winner?
S Record the time one by one with a mobile.

3 To know about time units of "seconds" which are shorter than minute.

T Have students to know 1 minute = 60 seconds.
T Let the students to summarise by using their own words.

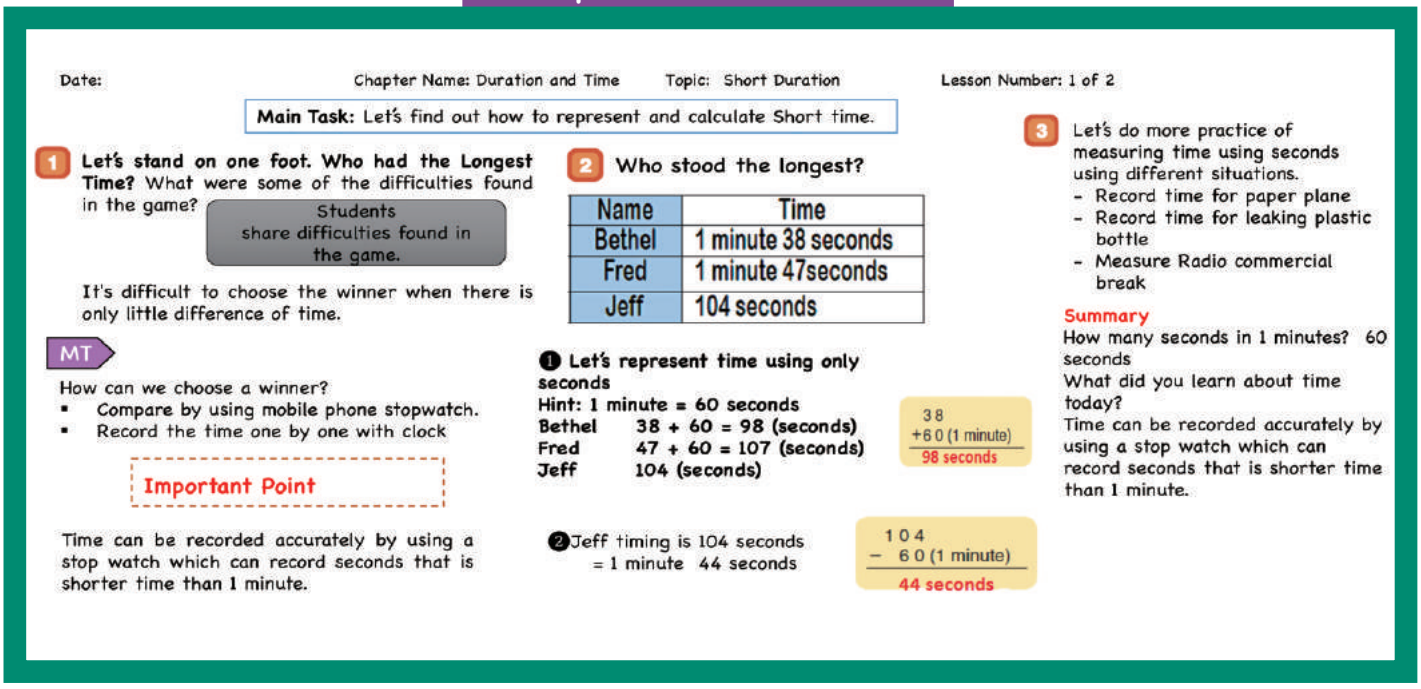
4 ❷ Think about representing with "○ minutes △ seconds".

T Let's see the table who stands the longest?
S Cannot compare "how many seconds" and "how many minutes and seconds". It needs to be the same time units.
Bethel: 60 + 38 = 98 (seconds), Fred: 60 + 47 = 107 (seconds), Jeff: 104 − 60 = 1 minute and 44 seconds

5 ❸ Record the time taken for paper airplane flight.

S Throw paper airplane in air while others record the time of flight.
T Let student carefully use a stopwatch without dropping and hitting and have them learn pushing the buttons on starting and finishing using a stopwatch.

Sample Blackboard Plan



Unit 6

Unit: Duration and Time
Sub-unit: 1. Short Duration
Lesson 2 of 2 (Single Period)

Textbook Page : p.64
Actual Lesson 044

Lesson Objectives

- To understand how to read a timetable expressed with the 24 hour clock and convert into 12 hour clock.

Prior Knowledge

- How to read a timetable expressed with the 12 hour clock.

Preparation

- Enlarge copy of Flight Schedule, pictures with various times and a clock
- Have a chart of a Flight schedule written.
- Time line drawn representing 24 hours time on a chart.

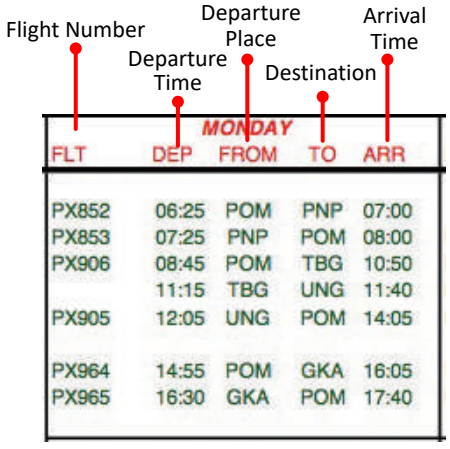
Assessment

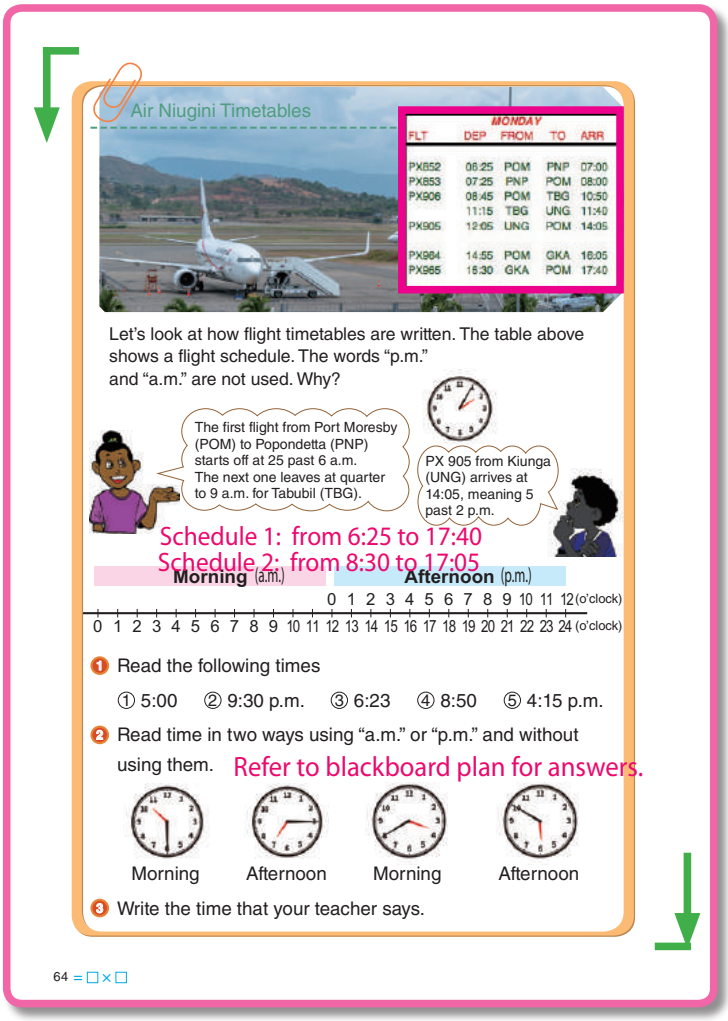
- Investigate the structure of the time table converting the time expressed with the 12 hour clock into 24 hour clock, and to convert vice versa. F
- Notice that it is nice to express without using words “morning” and “afternoon” in timetables. F
- Convert the time with 12 hour clock into 24 hour clock and vice versa. S

• Teacher’s Notes •

- Conversion of 12 hours to 24 hours is a new topic to students. Help students using the clock face then to time line for the students to understand.
- Morning is from 0:00 – 12:00. Afternoon time is 12:00 – 24:00. We do not say morning and afternoon in 24 hour time.
- When telling time;
  a.m: stands for **a**nte **m**eridiem (from Latin), meaning before mid-day.
  p.m: stands for **p**ast **m**id-day
- Assist students to read the Flight details on the Chart. For example:
  PX 852 is flight number for plane travelling from Port Moresby (POM) to Popondetta (PNP), leaving Port Moresby at 6:25 and arriving 7: 00 in the morning.

Air Nugini Flight Schedule on Monday





Lesson Flow

1 Think about why the words "morning" and "afternoon" in Flight Timetables.

T Place the enlarged copy of flight time table on the board. If you cannot use a copy on the blackboard, use textbook directly. 'Why are the words morning and afternoon not recorded?'

S Think of posed questions on why the words "morning" and "afternoon" are not used in flight timetables.

T Let students notice timetables are expressed with the 24 hour clock by having them realise that the words "morning" and "afternoon" are not used.

S Realise that the 24 hour clock is common by showing timetables other than flight timetables.

T Introduce the main task.

2 Think about how to convert the time expressed with 24 hour clock into 12 hour clock.

S ❶ Read the time in various ways.

T For example, The question (4) 8:50 can be read as 'eight fifty' or 'ten to nine'.

S ❷ Read the time in two ways.

T Ask students to see the number line for changing 12 hour clock to 24 hour clock.

T ❸ Tell the following time to students to write.

(1) Four thirty a.m.

(2) Half past 3 in the afternoon

(3) Twelve to ten in the evening

TN Let students practice more for reading and telling the time both in 12 and 24 hours.

3 Find situations where the time is expressed with 24 hour clock in our everyday life.

T Let's think about where the time is expressed with 24 hour clock in our life.

S On the receipts, time on the mobile phone, on the printed photos.

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Short Duration Lesson Number: 2 of 2

Main Task: Let's express time in 24 hour.

MONDAY

FLT	DEP	FROM	TO	ARR
PX852	06:25	POM	PNP	07:00
PX853	07:25	PNP	POM	08:00
PX906	08:45	POM	TBG	10:50
	11:15	TBG	UNG	11:40
PX905	12:05	UNG	POM	14:05
PX964	14:55	POM	GKA	16:05
PX965	16:30	GKA	POM	17:40

What can you notice about the departure time?
- The numbers written are larger than 12.
- There is no *morning* or *afternoon* written after the time.

MT

❶ Read the following time
1) 5: 00 2) 9: 30 p.m
3) 6:23 4) 8: 50 5) 4: 15 p.m

➢ Why are the words "*a.m*" and "*p.m*" not used?

There are 12 hours in the morning

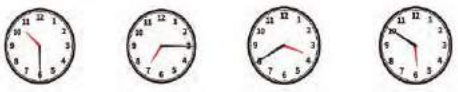
There are 12 hours in the afternoon.

We use a.m and p.m to tell time in the morning and in the afternoon.

In total there are 24 hours

We do not use the words *a.m and p.m* are not used in 24 hour time because time continues.

❷ Read the clock using "a.m" and "p.m" and without using them.



Morning	Afternoon	Morning	Afternoon
10:30 a.m 10:30	7:15p.m 19:15	3:40am 3:40	5:50p.m, 17:50

❸ Write the time your teacher says.

Now let's find situation where tie is expressed in 24 hours.

Possible Answers
- on receipt
- On mobile phones
- On printed photos

Summary
- We use a.m and p.m to tell time in the morning and in the afternoon.
- We do not use the words *a.m and p.m* are not used in 24 hour time because time continues.

Unit 6

Unit: Duration and Time
Sub-unit: 2. Duration and Time
Lesson 1 of 2 (Single Period)

Textbook aPage : p.65-p.66
Actual Lesson 045

Sub-unit Objectives

- To find out the time duration based on arrival and departure time.
- To find the duration of two time in total.
- To find the arrival and departure time based on departure time, arrival time and how long it takes to arrive.

Lesson Objectives

- To know the difference between the duration of time passed and time as both durations end.
- To calculate duration and time.

Prior Knowledge

- Conversion of time from hours to minutes and minutes to seconds.

Preparation

- Picture with map of PNG, two clocks for demonstration, number line (clock in bar – style).
- Time line drawn on the chart.

Assessment

- Understand the situation and think about how to calculate time which carries up or borrows by using concrete objects, diagrams and expressions. F
- Calculate the duration of time. S

• Teacher's Notes •

How to calculate duration
Consider the following when finding out duration and time by calculations.

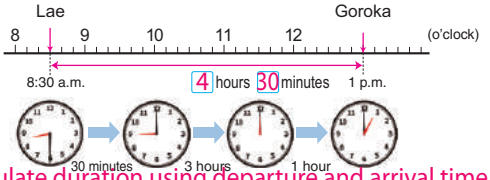
- Calculate by using the same time units
- Convert to "hour" after addition becomes more than 60 minutes.
- Calculate by converting 1 hour into 60 minutes when minute of time minuend are larger than that of time subtracted.

Example:
Minutes calculation:
(60 + 55) – 56 = 59 or 55 + (60 – 56) = 59

2 Duration and Time

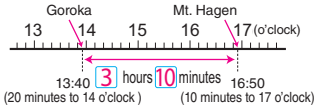
1 Asa wants to travel the highlands highway from Lae to Mt. Hagen. He thought about the duration which will take him to reach there.

1 If he leaves Lae at 8:30 a.m. and arrives in Goroka at 1:00 p.m., how long will it take him from Lae to Goroka?



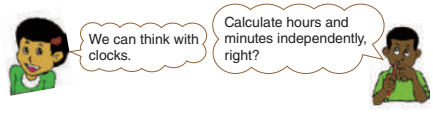
Calculate duration using departure and arrival time.

2 If he will board another bus from Goroka to Mt. Hagen and the bus departs Goroka at 13:40, he will arrive in Mt. Hagen at 16:50. How many hours and minutes will it take him to reach Mt. Hagen from Goroka?



Mathematical expression: 16:50 – 13:40

o'clock	minutes
16	50
– 13	40
☐	☐
hours	minutes

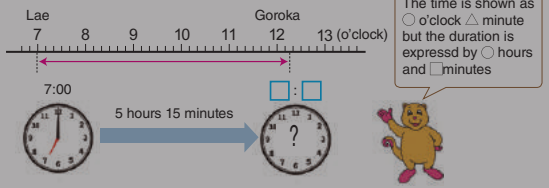


☐ + ☐ = 65

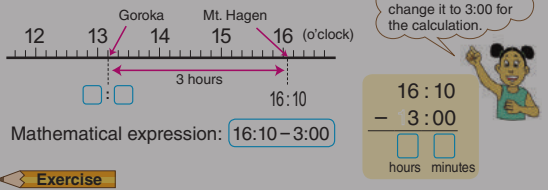
3 If you board both buses at 1 and 2, how long will it take you in total by bus? Answer in hours and minutes?

7 hours and 40 minutes

4 The bus "Tulait Tulait" leaves Lae city at 7o'clock, it will take the duration of 5 hours and 15 minutes to reach Goroka town. At what time will it reach Goroka town?



5 The bus will arrive in Mt. Hagen at 16:10 from Goroka. It will take the duration of 3 hours to reach Mt.Hagen from Goroka. What time will it leave Goroka town?



Mathematical expression: 16:10 – 3:00

Exercise

1 Ray was reading from 4:40 in the afternoon to 5:25 in the afternoon of the same day. How many minutes did he spend reading?

2 If you leave your house at 40 past 9 in the morning, and it took you the duration of 1 hour and 30 minutes to reach the garden. At what time in the morning will you reach the garden?

66 = ☐ – ☐

Lesson Flow

1 ❶ Think about how long it takes based on departure and arrival time.

T Let students read duration between the two times in 1 and 2 by associating with a clock board and number line.

TN Find out how long it takes with the bus based on departure and arrival. Have the students to find a relationship between duration and time by showing that from the clock board to the number line.

T ❶ Let's think about how many hours and minutes it took.

TN Give students advice to count duration by using the clock boards (departure and arrival time) and to think about that by expressing in the number line.

S Count duration between the departure time of 8:30 and arrival time of 1:00p.m through imagining the clock.

T Introduce the main task.

2 ❷ Find the duration from Goroka to Mt. Hagen by calculation.

S Calculate to find the duration of time which departs Goroka at 13:40 and arrive in Mt.Hagen at 16 : 50.

S Calculate by subtraction in vertical form.

3 ❸ Find out the duration of time in total from Lae to Mt. Hagen.

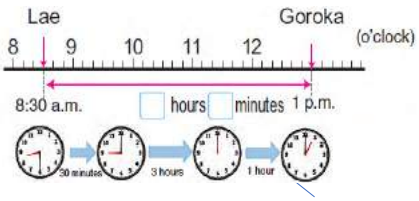
S 4 hours 30 minutes + 3 hours 10 minutes = 7 hours 40 minutes

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Duration and Time Lesson Number: 1 of 2

Main Task: Let's think about how long it takes using departure and arrival time.

1 ❶ Lets think about how many hours and minutes it took from Lae to Goroka?



Answer: Duration of 4 Hours and 30 minute

❸Now let's find the total time for ❶ and ❷.

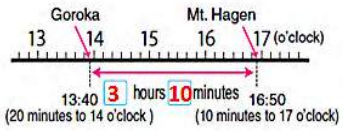
Students Ideas

o'clock	minutes	
4	30	(Time)
+3	10	(Time)
7	40	(Duration)

Answer: 7 hours 40 minutes

MT

❷ How many hours and minutes will it take to reach Mt. Hagen from Goroka?



o'clock	minutes	
16 :	50	(Time)
− 13 :	40	(Time)
3	10	(Duration)
hours	minutes	

Mathematical expression: 16:50 − 13:40

Summary
To calculate time. Calculate hours and minutes independently.

Unit 6

Unit: Duration and Time
Sub-unit: 2. Duration and Time
Lesson 2 of 2 (Single Period)

Textbook Page : p.66
Actual Lesson 046

Lesson Objectives

- To calculate duration and time.

Prior Knowledge

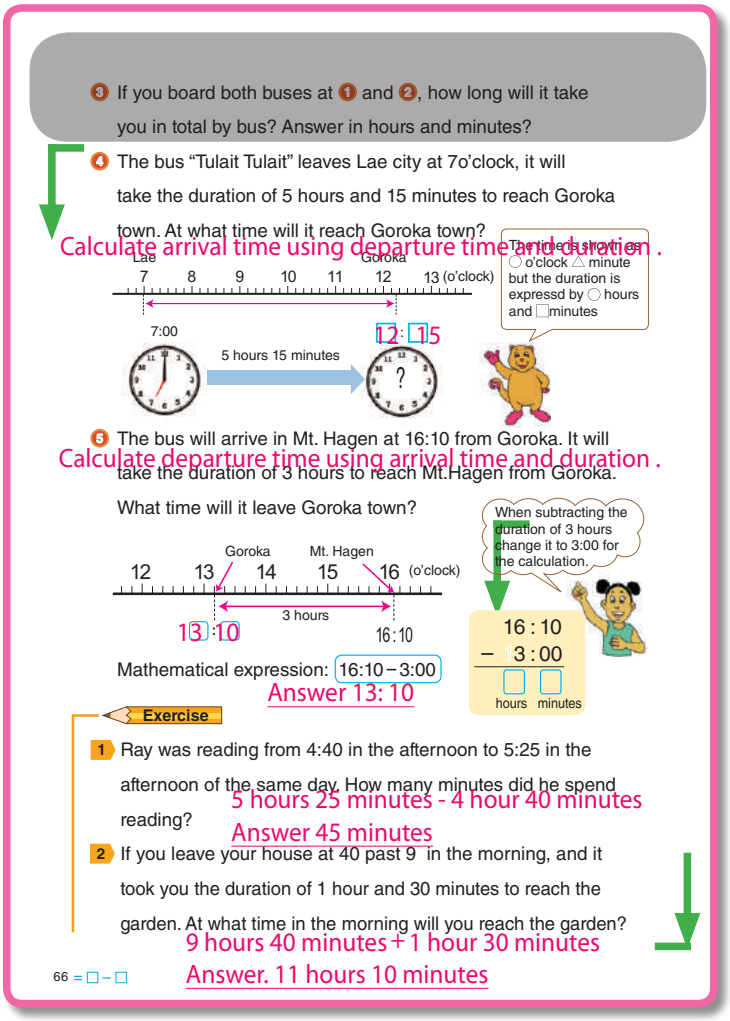
- Calculate duration using departure and arrival time.

Preparation

- Picture with map of PNG, two clocks for demonstration, number line.

Assessment

- Find out about arrival and departure time based on a departure time, arrival time, and how long it takes to arrive. F
- Do the exercise correctly at the end of the lesson. S



• Teacher's Notes •

Addition and Subtraction of Duration of time. When making expressions to calculate in vertical form, it is important to differentiate the numbers in vertical form whether they are specific times or the duration of times.

1) When thinking about the time after a certain duration of time based on a specific time, we can add the duration onto the time to get the new time.
(Time) + (Duration) = (Time)

Example: 3: 40 (Time)
+ 2: 10 (2 hours 10 minutes: Duration)
5: 50 (Time)

2) When thinking about the duration of time between two certain times, we add them to get the combined duration.
(Time + Time = Duration of Time)

Example: 15 minutes (Time)
+ 35 minutes (Time)
50 minutes (Duration)

3) When thinking about the specific time before the duration based on a certain time, we subtract the duration from the time after to find the time before.
(Time After) − (Duration) = (Time before)

Example: 7 : 20 (Time)
− 3 : 10 (3 hours 10 minutes- Duration)
4 : 10 (Time)

4) When converting time units,
1 hour and 40 minutes = x minutes
60 minutes + 40 minutes = 100 minutes
(Time) + (Time) = (Time)

Lesson Flow

1 ❹ Find out an arrival time based on a departure time and how long it takes to arrive.

T Introduce the main task.

T The bus departs Lae at 7:00 and it takes 5 hours and 15 minutes to arrive in Goroka. Let's think about the time it arrives in Goroka.

T Have students to discover that the question is to find time although the previous lessons were to find the duration of time by using a diagram of a number line.

T Give students' advice to confirm which time is asked by filling in the duration of time and time already known in the number line.

S Make an addition because it leaves Lae at 7:00 and arrives in Goroka after 5 hours and 15 minutes. It will be (7 o'clock) + (5 hours and 15 minutes), which is 12:15.

2 ❺ Find out departure time based on arrival time and how long it takes to arrive.

T From Goroka, it takes 3 hours to arrive in Mt. Hagen at 16:10. Let's think about the time it departs Goroka.

T Which operation shall we use to find the answer?

S This time we know an arrival time but don't know the departure time so we need to reverse the time. So it will be subtraction.

S 16:10 − 3 hours = 13:10

3 Complete the exercises.

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Duration and Time Lesson Number: 2 of 2

Review

MT

1 What are the ways we can use to calculate duration of Time

Students Ideas

Answer: We can use the clock or we can calculate hours and minutes independently.

Main Task: Let's find the departure and arrival time.

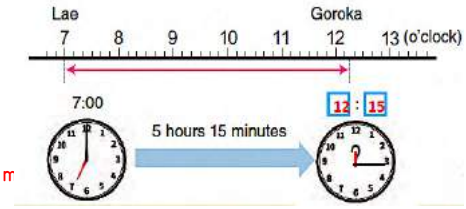
❹ Lets think about the arrival time for a bus travelling from Lae to Goroka. At what time will it reach Goroka town?

Students Ideas

o'clock	minutes	
7	00	(Time)
+ 5	15	(Duration)
12	15	(Time)

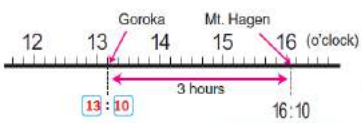
7 hour 0 minutes plus 5 hour 15 m

Answer: Arrival Time 12 : 15



❺ Bus will arrive at Mt. Hagen in 16: 10 at what time will it depart Goroka?

Students Ideas



Mathematical expression: 16:10 − 3:00

16 : 10 (Time)
− 3 : 00 (Duration)
13 10 (Time)
hours minutes

EXERCISE

1 How many minutes did Ray spend reading?

5: 25 − 4 : 40 = 45 minutes.

2 At what time in the morning will you reach the garden?

9: 40 + 1 Hour and 30 minutes

9 : 40 (Time)
+ 1: 30 (Time)
11: 10 (Duration)

Summary

What did you learn about time in today's lesson?

Unit 6

Unit: Duration and Time
Sub-unit: Excercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page :
p.67-p.68
Actual Lesson 047

Lesson Objectives

- To deepen the understanding of what has been learned in the unit.

Prior Knowledge

- All contents of the unit.

Preparation

- Evaluation sheet for the students.

Assessment

- Solve the exercises confirming what has been learned in the sub-unit. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

Page 63

1 Let's write the correct number in the following ☐.

① 1 minute = 60 seconds

② 1 minute 20 seconds = 80 seconds

③ 180 seconds = 3 minutes

2 Vali and Utu participated in the town running. Vali finished the marathon in 5 minutes and 43 seconds. Utu finished the marathon 25 seconds later than Vali's time. What was Utu's record?

Page 63

5 minutes 43 seconds + 25 seconds. Answer : 6 minutes 8 seconds

3 One Sunday morning, Tim read a book for 1 hour and 10 minutes, and later read for 45 minutes in the afternoon. In total, how long did Tim read that Sunday?

Pages 65 ~ 66

1 hour 10 minutes + 45 minutes Answer : 1 hour 55 minutes

4 Sandy attended soccer practice from 9:30 to 11:10 in the morning. How many hours and minutes did she practice?

Pages 65 ~ 66

11 hours 10 minutes - 9 hours 30 minutes
Answer : 1 hour 40 minutes

5 It takes 25 minutes from Rui's home to the bus stop. To board the bus leaving at 10 minutes past 10 hours in the morning, at what time would she have to leave her home?

Pages 65 ~ 66

10 hours 10 minutes - 25 minutes
Answer : 9 hours 45 minutes

Let's calculate. Grade 3 Do you remember?

① 4×0 0 ② 1×0 0 ③ 0×3 0 ④ 0×9 0

⑤ 7×10 70 ⑥ 5×10 50 ⑦ 10×3 30 ⑧ 10×6 60

Problems

1 Arrange the duration of time in order from the longest.
● Understanding units and duration of time.

15 hours (2) 1 day (1) 3 hours 45 minutes (3)

75 seconds (5) 60 minutes (4)

2 Let's write numbers in the ☐.
● Understanding the relationship between units.

① 3 minutes = 180 seconds

② 1 minute 40 seconds = 100 seconds

③ 125 seconds = 2 minutes 5 seconds

④ 2000 seconds = 33 minutes 20 seconds

3 Let's write the units of time which fits in the ☐.
● Using units of time correctly.

① The duration you took to eat breakfast: 20 minutes.

② The duration you took to run 50 m: 13 seconds.

③ The duration you took for a school trip: 7 hours.

4 A class period is 30 minutes long. If the class starts at 10 minutes after 10 o'clock, when does the class end?
● Getting time by using calculation.

10:40

How Long Is the Duration of 3 Minutes?

How long is the duration of 3 minutes? Please guess the time with your eyes closed. Close your eyes, count in your mind after the start sign. Then raise your hand when you counted 3 minutes.
Please measure your time using stopwatch.
Let's find out something in the duration of 3 minutes.

☐ + ☐ = 67 68 = ☐ − ☐

Lesson Flow

1 ① **Convert the unit of time.**

TN Confirm if students understand the relationship among hour, minute and second.

2 ② ③ ④ ⑤ **Solve word problem about time.**

3 **Do the exercise "Do you remember".**

4 ① **Compare the time considering the unit.**

TN Confirm that 1 day = 24 hours, 1 hour = 60 minute, 1 minute = 60 second.

5 ② **Convert the unit of time.**

TN Typical error of students is as follows: 125 seconds = 1 minute and 25 second, 1 minute and 40 seconds = 140 seconds. Let the students confirm repeatedly 1 minute = 60 seconds.

6 ③ **Convert the unit of time.**

TN Let students improve a sense of time imagining their daily life.

7 ④ **Solve the word problem.**

TN Let students read the problem carefully and think of using addition or subtraction.

8 **Evaluation**

T Distribute the evaluation sheet to each student and let them complete.

Duration and Time	Name:	Score

1. Fill in the blanks.
   - ① 130 seconds = 2 minutes and 10 seconds
   - ② 90 minutes = 1 hour and 30 minutes
   - ③ 1minute 40 seconds = 100 seconds
   - ④ 1 hour and 20 minutes = 80 minutes
2. Answer the following questions
   - ① What is the duration between 9:20 and 11:00. 1 hour 40 minutes
   - ② What time is 1 hour and 45 minutes after 2: 00 3:45
3. Rupert went for Rugby practice on Sunday morning from 8:30 to 11:00. How many hours and minutes did he practice for?

   2 hours 30 minutes
4. If you leave your house at 7:30 and it takes 40 min to reach your school, at what time will you reach your school?

   8:10
5. Ruwena studied Mathematics for 40 minutes in the morning and 1 hour 30 minutes in the afternoon. In total, how many hours and minutes did she study for?

   2 hours 10 minutes
6. It takes 1 hour 10 minutes to go to school. School starts at 8:30. What time should you leave the house?

   7:20

End of Chapter Test: Chapter 6 **Date:**

Duration and Time	Name:	Score

1. Fill in the blanks.

   ① 130 seconds = _____ minutes and _____ seconds

   ② 90 minutes = _____ hour and _____ minutes

   ③ 1minute 40 seconds = _____ seconds

   ④ 1 hour and 20 minutes = _____ minutes

2. Answer the following questions

   ① What is the duration between 9:20 and 11:00. _____

   ② What time is 1 hour and 45 minutes after 2: 00 _____

3. Rupert went for Rugby practice on Sunday morning from 8:30 to 11:00. How many hours and minutes did he practice for?

   _____

4. If you leave your house at 7:30 and it takes 40 min to reach your school, at what time will you reach your school?

   _____

5. Ruwena studied Mathematics for 40 minutes in the morning and 1 hour 30 minutes in the afternoon. In total, how many hours and minutes did she study for?

   _____

6. It takes 1 hour 10 minutes to go to school. School starts at 8:30. What time should you leave the house?

   _____

Chapter 7 Multiplication in Vertical Form

1. Unit Objectives

- To deepen the understanding of multiplication, delete to calculate confidently and to develop ability to use multiplication properly. (3.1.3 a)
- To think about how to multiply 2-digit or 3-digit numbers by 1 digit number, and to understand that these can be calculated based on basic calculations such as the multiplication table. Also to understand how to calculate these in vertical form. (3.1.3. a, b and c)
- To be able to multiply confidently and use it properly. (3.1.3.d)
- To represent a relation among quantities with expressions, and relate expressions with diagrams. (3.1.3. d)

2. Teaching Overview

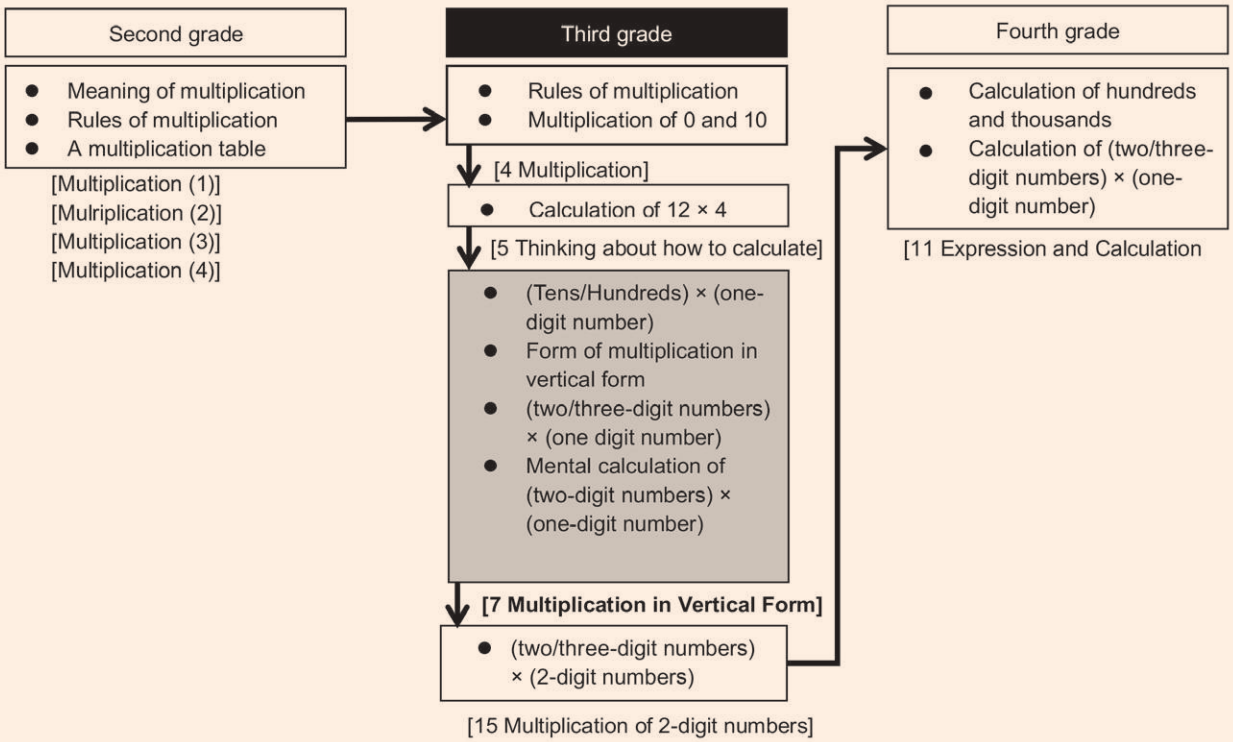
Multiplication with Tens and Hundreds: First, they are supposed to be able to recall all multiplications of 1-digit numbers. Students will understand multiplications with tens/hundreds by connecting and manipulation of numbers and its meaning in daily life. This topic will be the foundation of learning vertical multiplication in the following topics

How to Calculate (2-digit numbers) × (1-digit number): In this topic, students are expected to start thinking "How can we solve it by utilising multiplications of 1-digit numbers that we know?" to solve given problems. This is how students recognise the necessity of splitting a 2-digit numbers into 10s and 1s since they remember multiplications with numbers up to 9. If they recognise the necessity of splitting 2-digit numbers, they will discover that any 2-digit numbers can be multiplied by 1-digit number respectively; splitting into tens and ones.

How to Calculate (3-digit numbers) × (1-digit number): Here students can utilise the idea that they experienced when thinking how to calculate (2-digit numbers) × (1-digit number).

Mental Calculation: For improving skills for mental calculations, it is important that students can explain what they mentally do to make friends understand his/her ideas. Please note that it is not enough that only teacher understands what s/he says. Teacher's role here is to facilitate the discussion to be understood by everyone.

3. Related Learning Contents



Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 1. Multiplication with Tens and Hundreds
Lesson 1 of 1 (Double Period)

Textbook Page : P.69
Actual Lesson 048

Sub-unit Objectives

- To understand the meaning and how to find out answers of (tens)×(1-digit number) and (hundreds)×(1-digit number).

Lesson Objectives

- To find out answers of multiplication when multiplicands or multipliers are tens and hundreds by thinking about how many sets of 10 and 100, by using the multiplication table.

Prior Knowledge

- Meaning of multiplication and expressions
- Multiplication tables of 2–9
- Multiplication by 1, 10s and 100s
- Increased and splitting method in multiplication
- Decomposing and composing of numbers
- Associative law in multiplication

Preparation

- Charts

Assessment

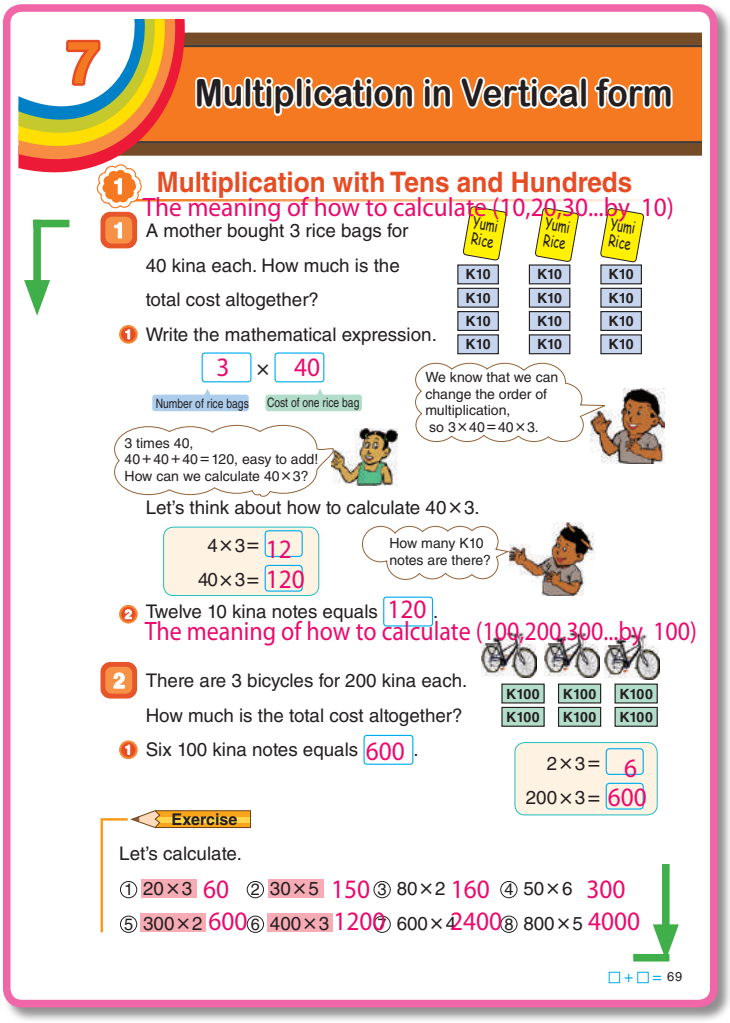
- Understand the situation and find out an answer by focusing on sets of 10 and 100. F
- Do the exercises correctly. S

• Teacher's Notes •

Multiplication by 10 is a necessary skill for students to learn in order to multiply by 2-digit numbers. Multiplication by 10s becomes easy when children use decomposing. Example: 3×60 can be decomposed to 3×6×10, and using associative law we multiply 3×6 first, so we have 18×10=180. We can just multiply the digits then add a 0.

When asking students to calculate 200×3, some students put 0 in the answer of 2×3. Only few students can explain the reason why it can be calculated in this way when asked.

So in this lesson it is important to have students understand with confidence why the answer 200×3 can be calculated with using 2×3 by having them use model money and blocks. By doing so, students are able to realise that 200×3 has 2 sets of 100, and that of 3 sets, so it can be calculated with "2×3" in the multiplication table, and the answer shows the number of 100 sets.



Lesson Flow

1 ❶ Think about how to calculate total cost of the Yumi rice.

S ❶ Write an expression based on the idea that the total cost of Yumi rice can be calculated by (number of rice bags) 3×(Cost of one rice bag) 40.
TN It can be calculated as 40×3 by using rules of multiplication.
T Let's think about how to calculate 40×3.
S Pay attention to the number of rice by showing a diagram and explain by using it.
T ❷ How much in total?
S There are twelve 10 kina notes which are equal to 120 kina.
T We can also calculate 1-digit by 1-digit then add the zero. (4×3=12 then bring zero gives 120).
T Introduce the main task.

2 ❷ Think about how to calculate the total cost of bicycles.

T ❶ Make an expression.
S 3×200
S There are six 100 kina notes which are equal to 600 kina.
T ❷ Let's think about how to calculate 200×3.
S 2×3=6, then add two zeros to make 600.

3 Summarise how to calculate.

S Confirm whether students understood that it can be calculated using the multiplication table focusing on sets of 10 and 100. For example, when multiplying by sets of 10 or 100 add one 0 or two 0 to the product.

4 Do the exercise.

S Complete 1, 2, 5 and 6. The rest can be for homework.

Sample Blackboard Plan

Date: Chapter Name: Multiplication in Vertical Form Topic: Multiplication with Tens and Hundred Lesson Number: 1 of 1

Main Task: Let's calculate using 10s and 100s by thinking about adding zeros.

1

K10	K10	K10
K10	K10	K10
K10	K10	K10
K10	K10	K10

Mathematics Expression
40 x 3 No. of rice Bag
❶ Cost of 1 rice

We know that twelve 10 kina notes is 120 kina.
Also price of 3 rice bags is 40 + 40 + 40.
Therefore,

4×3= 12
40×3= 120

40 x 3 can be calculated as 4 x 3 then add the 0 to get 120.

MT

2 Let's think about how to calculate total cost of 3 bicycle for price of 200 kina.

100 Kina	100 Kina	100 Kina
100 Kina	100 Kina	100 Kina

❶ Mathematical Expression
200 x 3
No. of bicycle Cost of 1 bicycle

We know that six 100 kina notes is 600 kina.
Also price of 3 bicycles are 200 + 200+ 200
Therefore,

2×3= 6
200×3= 600

It is easier to multiply 2 x 3 then add the 00 to get 600.

Summary:
When multiplying with 10s and 100s, we can multiply the digits first then add the zeros.
Example:

40 x 3 can be calculated as 4 x 3 then add the 0 to get 120.

Also 2 x 3 can be calculated then add the 00 to get 600.

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 2. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 1 of 2 (Single Period)

Textbook Page : p.70 - p.71
Actual Lesson 049

Sub-unit Objectives

- To try to find an answer of (2-digit numbers)×(1-digit number) by using multiplication table with ways such as breaking down multiplicands.
- To understand how to calculate (2-digit numbers)×(1-digit number).
- To understand how to calculate (2-digit numbers)×(1-digit number) in vertical form.

Lesson Objectives

- To think about how to calculate 21×3.
- To divide a multiplicand into each place value in vertical form in order to use the multiplication table.
- To calculate (2-digit numbers)×(1-digit number).

Prior Knowledge

- Meaning of multiplication and expressions
- Multiplication tables of 2–9
- Multiplication by 1, 10s and 100s
- Increased and splitting method in multiplication
- Decomposing and composing of numbers
- Associative law in multiplication

Preparation

- Blocks

Assessment

- Think about how to calculate (2-digit numbers)×(1-digit) decomposing a multiplicand into each place value in vertical form in order to use the multiplication table. F
- Do the exercises correctly. S

• Teacher's Notes •

When calculating 21×3 in vertical form, 2×3=6 is done and 6 is written in tens place. It important to explain clearly why 6 is written in tens place.
This is because 2×3=6 acutually means 20×3=60.
Please explain clearly the process of 1 3.

2 How to Calculate (2-digit numbers)×(1-digit number)

The meaning of how to calculate (2-digit) x (1-digit)

1 Teacher bought 21 chocolates which cost 3 kina each for a class party. How much is the total cost of chocolates altogether?

1 Write an expression to find the total cost.

21 × 3
Number of chocolates / Cost of one chocolate

If we change the order of multiplication, how can we find the answer?

2 Let's think about how to calculate 21×3.

Can we use the multiplication table?

Let's think about how to calculate (2-digit numbers)×(1-digit number).

21×3

Considering How to Calculate 21×3

1×3

Using the place values, 21 split into 1 on ones and 2 on tens. We can calculate 1×3 and 20×3.

21×3 < 1×3=3, 20×3=60, Total 63

There are 3×2 sets of 10's blocks.

20×3 — There are 3 sets of 20 blocks.

3 For calculating multiplication, we can use vertical form. Let's explain how to multiply 21×3 in vertical form.

$$\begin{array}{r} 21 \\ \times\ 3 \end{array}$$

Using the row of the multiplier in the multiplication table makes the calculation easier. When multipying vertically, we swap the order of multiplication.

3×1

$$\begin{array}{r} 21 \\ \times\ 3 \\ \hline 3 \end{array}$$

3×20

$$\begin{array}{r} 21 \\ \times\ 3 \\ \hline 60 \\ \hline 63 \end{array}$$

Multiplication Algorithm for 21×3 in Vertical Form

Ones place / Tens place

$$\begin{array}{r} 21 \\ \times\ 3 \end{array} \rightarrow \begin{array}{r} 21 \\ \times\ 3 \\ \hline 3 \end{array} \rightarrow \begin{array}{r} 21 \\ \times\ 3 \\ \hline 63 \end{array}$$

Multiplicand / Multiplier

$$\begin{array}{r} 21 \\ \times\ 3 \\ \hline 63 \end{array}$$

Line up the ones and tens places vertically.

1 times 3 equals 3. 3 in the ones place.

2 times 3 equals 6. 6 is in the tens place.

Exercise

Let's multiply in vertical form.

① 34×2 68 ② 23×3 69 ③ 42×2 84 ④ 11×4 44

70 =□×□

□−□=71

Lesson Flow

1 Read and understand the given situtation ❶.

S Think about the given situation.
T ❶ Let's think about the mathematical expression.
S Write an expression based on the idea that the total cost of chocolates can be calculated by (number of chocolate) 21 × (Cost of one chocolate) 3.
TN It can be calculated as 21 × 3 by applying rules of multiplication.
T Let's think about how to calculate 21 × 3.
T Introduce the main task.

2 ❷ Develop ways to solve the problem.

T Have students express their ideas on how to solve the problem using diagrams, expressions and words.
TN Possible responses:
1. (Find out with addition) 21 + 21 + 21 = 63
2. (Break down a multiplicand) 21 = 7 + 7 + 7 so 7 × 3 = 21,(7 × 3 = 21, 7 × 3 = 21, 7 × 3 = 21), 21 + 21 + 21 = 63
3. (Break down a multiplicand) 21 = 20 + 1, 20 × 3 = 60, 1 × 3 = 3, 60 + 3 = 63

T Write students' responses on the black board as discussion.

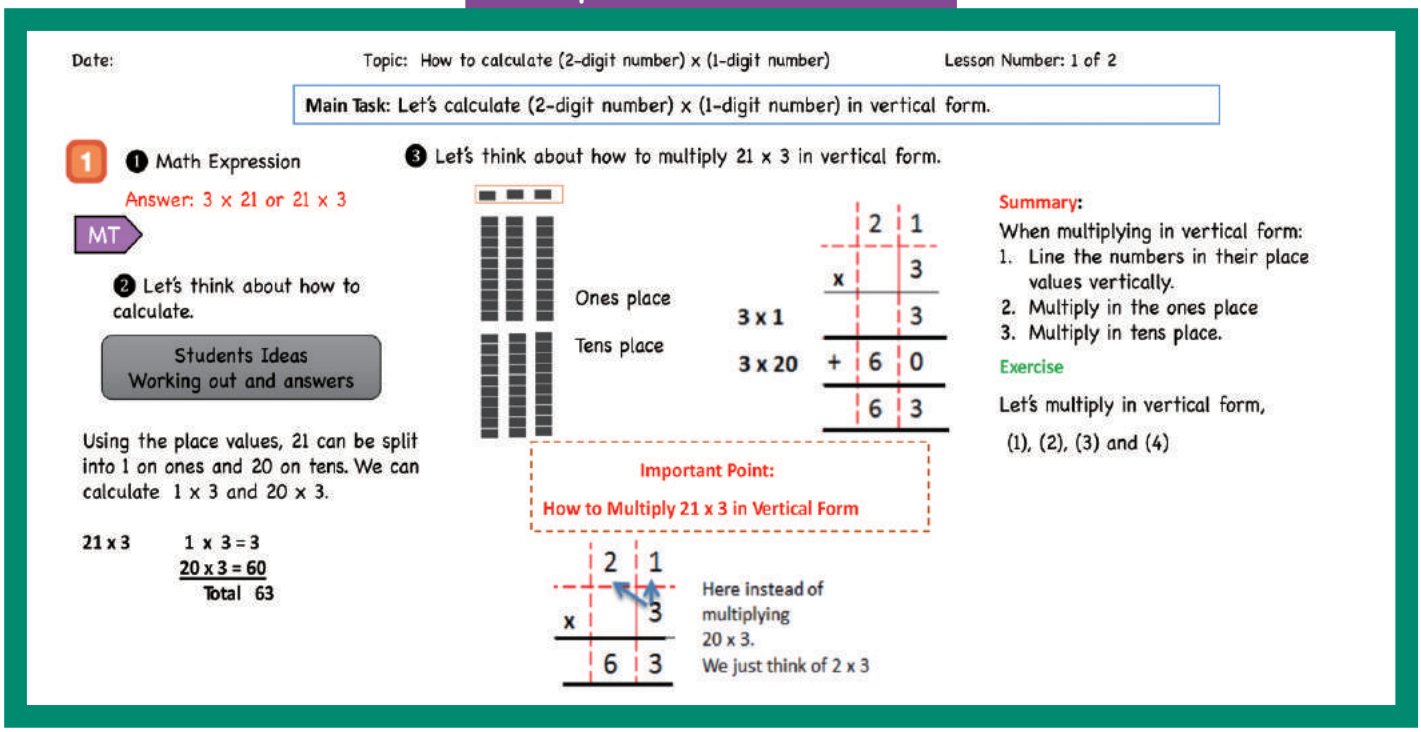
3 ❸ Think about how to calculate 21 × 3 in vertical form.

S Discuss with others on how to calculate 1 × 3 = 3 and 20 × 3 = 60 in vertical form.
T Confirm the meaning of each operation which is 3 × 1 and 3 × 20.
Also confirm the place of where the products will be written.
T/S Conclude how to calculate 21 × 3 using the explanation in the textbook.

4 Complete the exercises.

S Complete 1 - 4.

Sample Blackboard Plan



Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 2. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 2 of 2 (Double Period)

Textbook Page : p.72-p.73
Actual Lesson 050

Lesson Objectives

- To calculate (2-digit numbers)×(1-digit number) with carrying in vertical form.

Prior Knowledge

- How to calculate (2-digit numbers)×(1-digit number)in vertical form.

Preparation

- Refer to the black board plan.

Assessment

- Think about how to calculate (2-digit numbers)×(1-digit) in vertical form. F
- Do the exercises correctly. S

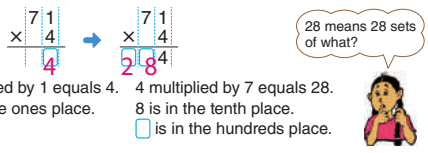
• Teacher's Notes •

The sequence 71×4, 13×7 and 95×3 reflect the increasing complexity when calculating multiplication of (2-digits)×(1-digit) in vertical form.
71×4 has carry over to hundreds place without addition.
13×7 students need to do addition with the carry over.
95×3 students will carry over and add in the tens place and carry over to the hundreds place.
46×7 students will add and carry in the tens place as well as in the hundreds place.
Prioritised Exercises
(1) Carries up to hundreds place.
(5) Add a number carried up to tens place.
(9) Carries up to the tens and hundreds place.
(11) Adding a number up to the hundreds place.

(2-digit) × (1-digit) with carrying

2 Let's think about how to multiply in vertical form.

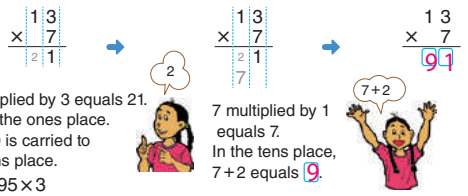
1 71×4



4 multiplied by 1 equals 4. ☐ is in the ones place.

4 multiplied by 7 equals 28. 8 is in the tenth place. ☐ is in the hundreds place.

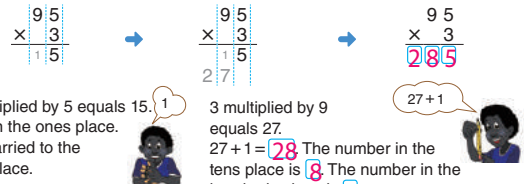
2 13×7



7 multiplied by 3 equals 21. 1 is in the ones place. 2 of 10 is carried to the tens place.

7 multiplied by 1 equals 7. In the tens place, 7+2 equals 9.

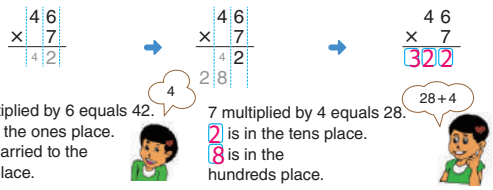
3 95×3



3 multiplied by 5 equals 15. 5 is in the ones place. 1 is carried to the tens place.

3 multiplied by 9 equals 27. 27+1=28. The number in the tens place is 8. The number in the hundreds place is 2.

3 Let's think about how to multiply 46×7 in vertical form.



7 multiplied by 6 equals 42. 2 is in the ones place. 4 is carried to the tens place.

7 multiplied by 4 equals 28. 2 is in the tens place. 8 is in the hundreds place.

72 = ☐×☐

Exercise

Let's multiply in vertical form.

① 93×3 279	② 41×5 205	③ 63×2 126	④ 30×8 240
⑤ 14×7 98	⑥ 13×5 65	⑦ 24×3 72	⑧ 49×2 98
⑨ 64×3 192	⑩ 85×9 765	⑪ 18×6 108	⑫ 26×4 104
⑬ 59×7 413	⑭ 35×9 315	⑮ 65×8 520	⑯ 84×6 504

Exercise

1 Let's multiply in vertical form. Pages 71 ~ 73

① 15×3 45	② 24×4 96	③ 47×2 94	④ 12×6 72
⑤ 42×6 252	⑥ 63×7 441	⑦ 58×4 232	⑧ 74×9 666
⑨ 38×8 304	⑩ 35×6 210	⑪ 80×4 320	⑫ 500×6 3000

2 Kazu bought 4 piglets. 1 piglet costs 55 kina. How much is the total cost altogether? Page 70

4×55=220 A. 220 kina

3 Make a phrase by arranging in order of putting the following letters from the lowest to the largest answer. Pages 72

Ⓣ 73×8 584 Ⓢ 87×9 783 Ⓗ 93×8 744 Ⓥ 68×4 272 Ⓞ 30×9 270
Ⓐ 57×8 456 Ⓜ 42×9 378 Ⓘ 12×8 96 Ⓔ 46×6 276 Ⓛ 31×5 155

「ⒾⓁⓄⓋⒺⓂⒶⓉⒽⓈ」

☐−☐=73

Lesson Flow

1 Review the previous lesson.

2 ② Understand how to multiply in vertical form.

T Introduce the main task.
T Present students with 71×4, and have them compare with the calculations without carrying over in the previous lesson.
S Understand that "how to calculate with carrying over" will be the task to solve in this lesson.
T Let's think about and explain how to calculate in vertical form.

3 ① Think about how to calculate 71×4 in vertical form.

S Find the answer by recalling how to calculate by splitting a multiplicand into tens and ones place like that in the previous lesson.
TN It is important to multiply (bottom number)×(top number). Explain using arrows.
T 4×7=28, 28 means 28 sets of what?
S 10
T Where should we write 28?
S Hundreds place and tens place.
S Solve in the same way as the previous one.

4 ② Think about how to calculate 13×7 in vertical form.

S Solve in the same way as the previous one.
T Discuss how to remember the number of carrying over.
TN As for a number carried over, in order to lead to calculate mentally, it is recommended in the textbook to add the number which carried over to the superior place value instead of writing down a partial product one by one.

5 ③ Explain how to calculate 95×3 in vertical form.

S Explain how to calculate 95×3.

6 ④ Calculate 46×7.

S Explain how to calculate 46×7.

7 Complete the exercise.

S Complete 1 - 4 and 6, and the rest can be given as homework.

Sample Blackboard Plan

Date:

Topic: How to calculate (2 – digit number) x (1 – digit number)

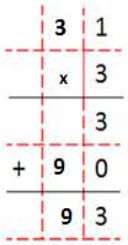
Lesson Number: 2 of 2

Main Task: Let's think about how to multiply with carrying.

MT

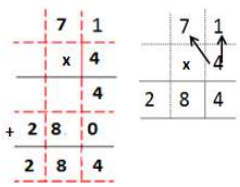
Review:
Explain the calculation of 31 x 3 in vertical form.

Students Ideas
Working out and answers



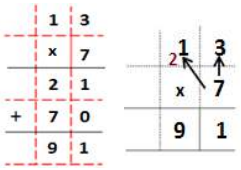
2 Let's think about how to multiply in vertical form.

1 71 x 4



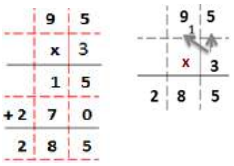
There is carry over once without adding.

2 13 x 7



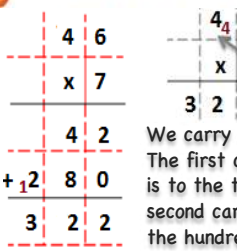
There is carrying over once with adding.

3 95 x 3



We carry over twice here with addition. The first carrying over is to the tens place which is added and carried to the hundreds place.

3 Let's think about how to multiply 46×7 in vertical form.



We carry over and add twice here. The first carrying over and adding is to the tens place, and the second carry over and adding is in the hundreds place.

Summary:

When multiplying in vertical form with carry over:

1. Line the numbers in their place values vertically.
2. Multiply in the ones place
3. Carry over when needed.
4. Multiply in tens place.
5. Carry over

Exercise

1, 2, 3, 4 and 6

EXERCISE (for Home Work)

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 3. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 1 of 2 (Double Period)

Textbook Page : p.74
Actual Lesson 051

Sub-unit Objectives

- To understand the meaning of (3-digit numbers)×(1-digit number) and to be able to calculate in vertical form accurately.
- To be able to explain how to calculate (3-digit numbers)×(1-digit number) by using the method of how to calculate (2-digit numbers)×(1-digit number).

Lesson Objectives

- To think about and explain how to calculate (3-digit numbers)×(1-digit number) by using splitting method.
- To understand how to calculate (3-digit numbers)×(1-digit number) in vertical form, without carrying over.

Prior Knowledge

- How to calculate (2-digit numbers)×(1-digit number) in vertical form (Previous lesson).

Preparation

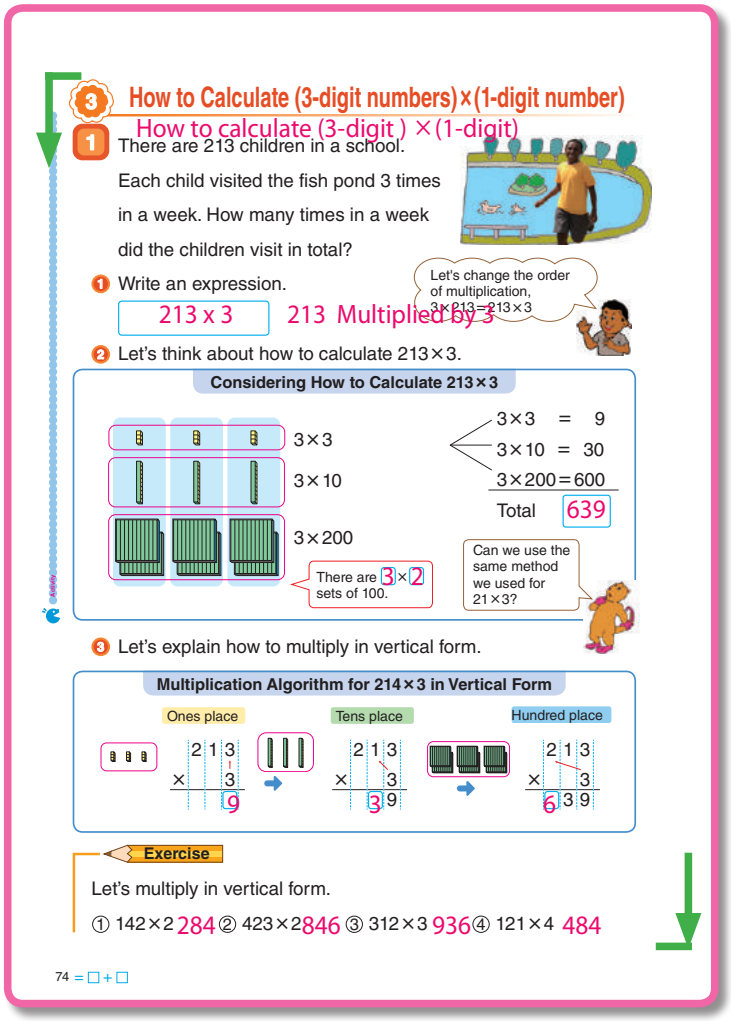
- Blocks

Assessment

- Think and explain about how to calculate (3-digit numbers)×(1-digit). F
- Do exercises correctly. S

• Teacher's Notes •

Help the students to think individually on how to calculate (3-digits)×(1-digit) in vertical form without carry over. They may use the splitting method to assist themselves if they have problems with direct calculation using the vertical form.



Lesson Flow

1 ❶ Read and understand the problem.

T ❶ Have students to read and understand the situation and make an expression.
T Ask the students to discuss the difference from previous calculations.
S Identify that in the previous lesson, it was (2-digits)×(1-digit). Now it's (3-digits)×(1-digit).
T Introduce the main task.

2 ❷ ❸ Think about how to calculate 213×3.

S Calculate by recalling methods used for the calculation of (3-digit numbers)×(1-digit number).
T Observe students whether they can calculate and have them solve the problem. Demonstrate how to calculate (3-digit numbers)×(1-digit number) in case many students have no idea.

3 Present one's own method and consider each method.

TN Many students might calculate in vertical form . In that case, have them explain why such procedures are appropriate (procedures of how to calculate in vertical form).

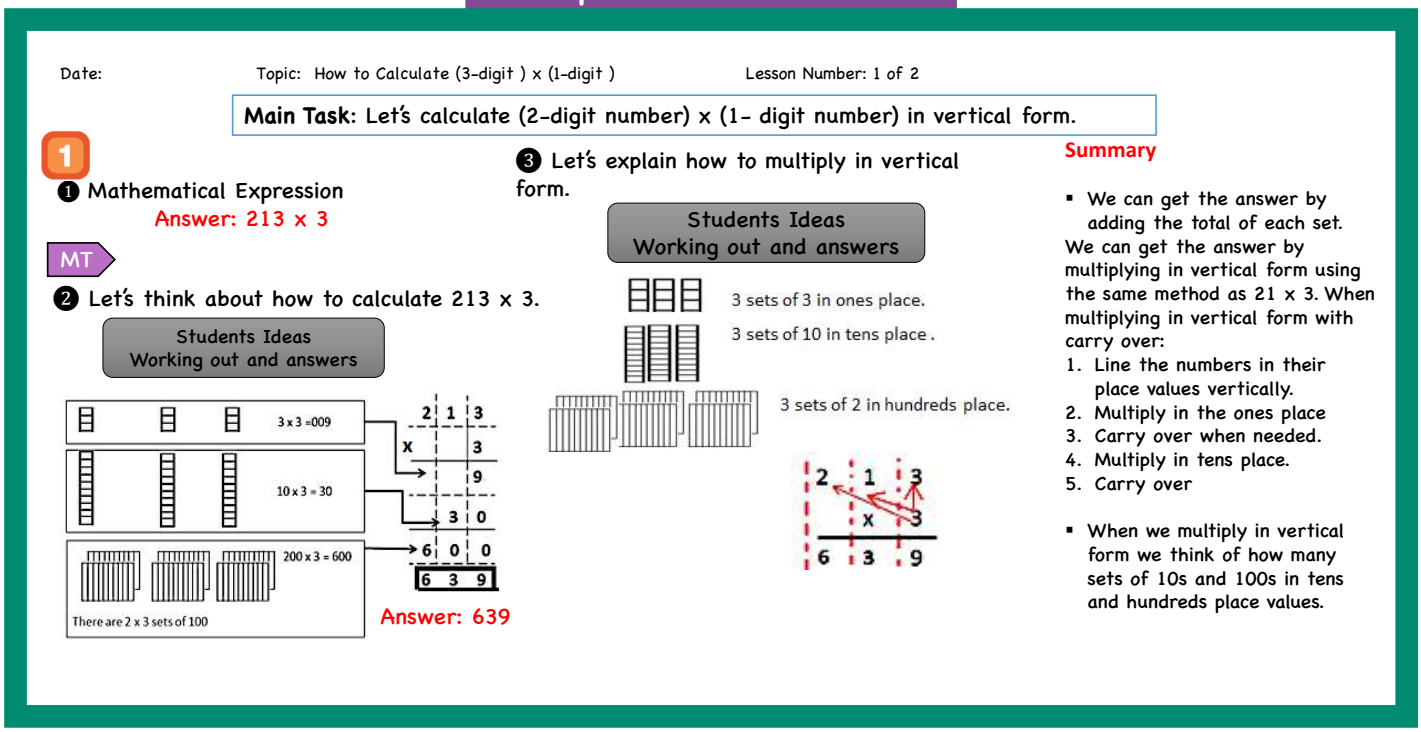
4 Summarise how to calculate (3-digit numbers)×(1-digit number).

S Split into each place value and multiply 1-digit number.
T Confirm that calculations in vertical form are made with thinking of how many sets of 10 and 100 for tens and hundreds places each just like 1-digit number and that is based on the same idea of (2-digit numbers)×(1-digit number) and as well as 1-digit number calculations.

5 Complete the exercises.

S Complete 1 - 4.

Sample Blackboard Plan



Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 3. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 2 of 2 (Single Period)

Textbook Page : p.75
Actual Lesson 052

Lesson Objectives

- To calculate (3-digit numbers)×(1-digit number) with carrying over in vertical form.
- To calculate (3-digit numbers)×(1-digit number) with 0 as the product.

Prior Knowledge

- How to calculate (3-digit numbers)×(1-digit number)in vertical form (Previous lesson).

Preparation

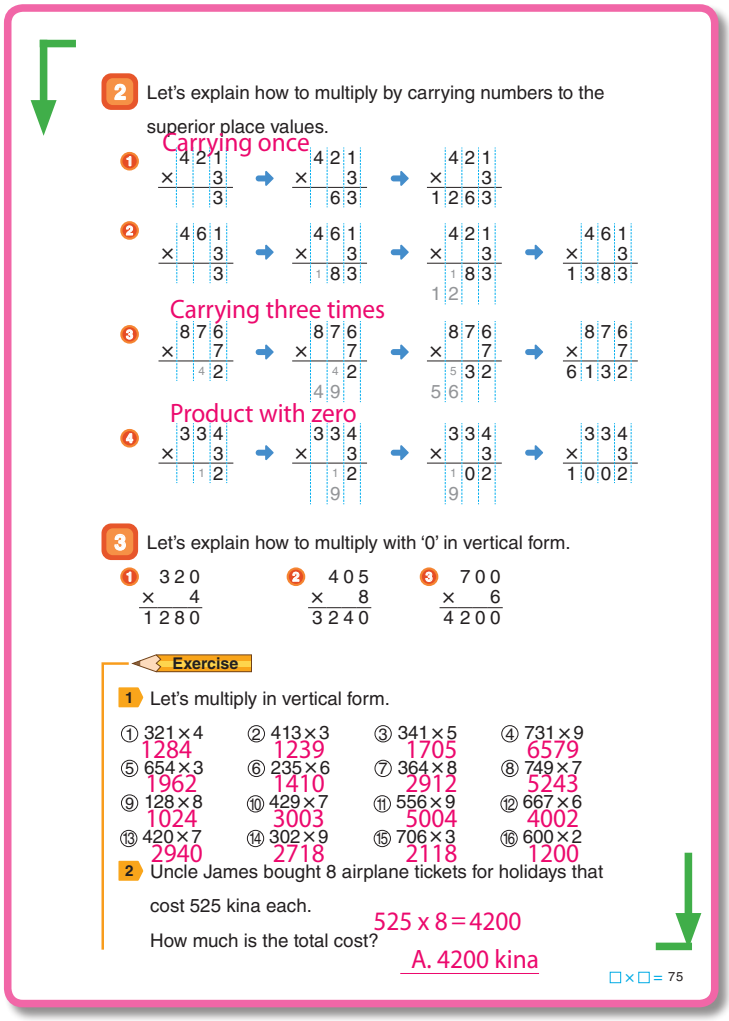
- Prepare according to the black board plan.

Assessment

- Think about how to calculate (3-digit numbers)×(1-digit) with carrying up and with a multiplicand having (zero) empty place in vertical form. F
- Do exercises confirming the steps of multiplication in vertical form. S

• Teacher's Notes •

Students may use their prior knowledge on calculating tens and hundreds to do estimation before calculation. For example: For 461×3, have students to calculate 400×3 to get their estimate product of 1200. Then they can think that the answer will be larger than 1200 before calculating 461×3.
This is to help students avoid making mistakes. For example in 207×8;
Some students may calculate the numbers but not the zero. They will get 207×8=216. By estimating the product they will notice that the product will be larger than 1600 (200×8). This will assist them to avoid making mistake in the calculation of 207×8=1656



Lesson Flow

1 ❷ ❶ Think about how to calculate 421×3.

T Introduce the main task.
TN Task 2 activity 1 - 4, encourage students to estimate the product before calculating.
S Estimate the largeness of the product by calculating 400×3.
S Think about how to calculate it in vertical form considering carrying over once.
T Have them think about on which place values for an answer to be written.
For example: 421×3; 3×1, 3×20 and 3×400

2 ❷ Think about how to calculate 461×3.

S Do the same as activity ❶.
S Think about how to calculate in vertical form considering carrying over twice.
T Have them think about the place values for an answer to be written.
For example: 461×3; 3×1, 3×60 and 3×400

3 ❸ Think about how to calculate 876×7.

S Estimate and Calculate.
S Think about how to calculate it in vertical form considering carrying over three times.
T Have them think about the place values for an answer to be written.
For example: 876×7; 7×6, 7×70 and 7×800

4 ❹ Think about how to calculate 334×3.

S Estimate and Calculate.
TN This activity focuses on the calculation with 0 in the product.

5 ❸ Solve the problems of ❶, ❷ and ❸ using one's ideas.

S Do the activity ❶-❸ and identify the differences between these problems and the previous problems.
TN Let students calculate in vertical form. Emphasis on multiplying with 0 and write 0 in the appropriate place value.

6 Complete the exercises.

S Complete ①, ⑤, ⑨ and ⑬. The rest can be for homework.

Sample Blackboard Plan

Date: Topic: How to Calculate (3-digit) x (1-digit) Lesson Number: 1 of 2

Main Task: Let's calculate (2-digit number) x (1- digit number) in vertical form.

MT

❷ ❶ 421 x 3, the answer should be over 1200.

$$\begin{array}{r} 421 \\ \times\ \ 3 \\ \hline 1263 \end{array}$$

There is carry over once without adding.

❷ 461 x 3, the answer should be over 1200.

$$\begin{array}{r} {\scriptstyle 1}\ \ \ \\ 461 \\ \times\ \ 3 \\ \hline 1383 \end{array}$$

There is carry over twice with adding.

❸876 x 7, the answer should be over 5600.

$$\begin{array}{r} {\scriptstyle 5\ 4}\ \ \ \\ 876 \\ \times\ \ 7 \\ \hline 6132 \end{array}$$

We carry over three times here with addition. The first carrying over is to the tens place which is added and carried to the hundreds place. The third carry over is to the thousands place.

❹334 x 3, the answer should be over 900.

Product is with zero.

$$\begin{array}{r} {\scriptstyle 1\ 1}\ \ \ \\ 334 \\ \times\ \ 3 \\ \hline 1002 \end{array}$$

❸ The multiplicand is with zero.

❶ 320 x 4, the answer should be over 1200.

$$\begin{array}{r} 320 \\ \times\ \ 4 \\ \hline 1280 \end{array}$$

❷ 405 x 8, the answer should be over 2400.

$$\begin{array}{r} 405 \\ \times\ \ 8 \\ \hline 3240 \end{array}$$

❸700 x 6, the answer should be 4200 .

$$\begin{array}{r} 700 \\ \times\ \ 6 \\ \hline 4200 \end{array}$$

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 4. Mental Calculation
Lesson 1 of 1 (Single Period)

Textbook Page : p.76
Actual Lesson 053

Sub-unit Objectives

- To calculate (2-digit numbers) × (1-digit number) mentally based on an estimation of multiplication.
- To understand that multiplication starts with larger place values in calculating mentally.

Lesson Objectives

- To calculate (2-digit number) × (1-digit number) mentally based on an estimation of multiplication.

Prior Knowledge

- How to calculate (3-digit numbers) × (1-digit number)in vertical form (Previous lesson).

Preparation

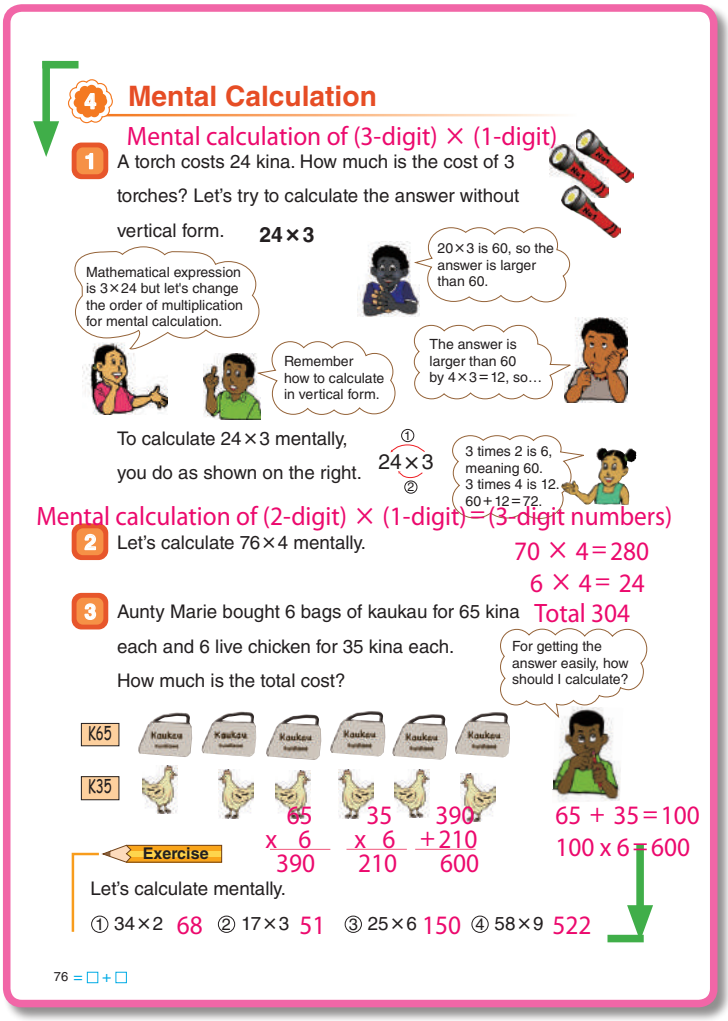
- Prepare according to the black board plan.

Assessment

- Think about how to calculate (2-digit or 3-digit numbers) × (1-digit) mentally. F
- Calculate (2-digit or 3-digit numbers) × (1-digit) mentally. F S
- Do the exercises correctly. S

• Teacher's Notes •

For mental calculation it is important that the students work from tens and hundreds place then to the ones place.
For example: 24 × 3
Students think of 20 × 3 = 60, estimate product to be larger than 60.
In their head they should work out 20 × 3 = 60 then 4 × 3 = 12, in total 60 + 12 = 72.



Lesson Flow

1 ① Read and understand the given situation. Let's think about an expression to calculate the total cost of 3 battery torches for 24 kina each.

T Introduce the main task.
S Matematical expression: 24×3
T What can we do to get the answer?
S I think the answer is larger than 60 because 24×3 is larger than 20×3.
S We can calculate separately splitting 24 into 20 and 4.
S We can do the same as calculating in vertical form.
S 20×3=60
4×3=12
60+12=72
TN Respect and appreciate students method. Put more emphasis on vertical calculation and estimation. Refer to teachers note.

2 ② Calculate 76×4 mentally.

T Remind students to carry up with doing the calculation.

3 ③ Solve problems mentally.

S Read and interpret the picture of the situation and present the ideas of mental calculation.
TN There are two ways to find answer.
a: 65×6=390, 35×6=210, 390+210=600 (Calculate kaukau and chicken separately and add.)
b: 65+35=100, 100×6=600 (Add the cost of 1 kaukau bag and 1 chicken, then multiply their cost by 6 (The number of groups of bags and chickens).

4 Complete the Exercises.

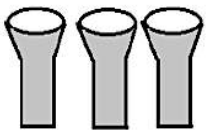
S Complete 1 - 4.

Sample Blackboard Plan

Date: Topic: Mental Calculation Lesson Number: 1 of 1

Main Task: Let's do Mental Calculation.

1 One torch cost 24 kina. How much is the cost of 3?



Math Expression:
24 x 3

Estimation price should be over 60 kina.

20 x 3 = 60
4 x 3 = 12
Hence 60 + 12 = 72

MT

Answer: 72 kina

2 Let's calculate 76 x 4 mentally.
76 x 4

Students Ideas
Working out and answers

70 x 4 = 280
6 x 4 = 24
Total 304

Answer: 304

3 Aunty Marie bought 6 bags of kaukau for 65 Kina each and 6 live chicken for 35 kina each. How much is the total cost?

Students Ideas
Working out and answers

Math Sentence
Bags of kaukau 65 x 6 = 390
Live chicken 35 x 6 = 210
Total cost 390 + 210 = 600

Or add total cost 35 + 65 = 100
6 sets of 100 is 100 x 6 = 600
Answer: 600 Kina

Summary:

For getting the answer easily how should you calculate?

- Estimate, multiply from tens to the ones.
- We can add total then multiply with the number of items when the number of items are same.

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.77-p.79
Actual Lesson 054

Lesson Objectives

- To deepen the understanding of things learned already.
- To make sure careful calculations are done concerning the rule of multiplication.

Prior Knowledge

- All the contents in this Unit.

Preparation

- Exercise sheets for all students.

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

1 Let's calculate mentally. Pages 72 ~ 75

① 33×3 99　② 76×8 608　③ 43×7 301
④ 56×4 224　⑤ 29×5 145　⑥ 94×6 564
⑦ 324×2 648　⑧ 254×6 1524　⑨ 483×5 2415
⑩ 112×9 1008　⑪ 527×7 3689　⑫ 638×8 5104

Mental calculation

2 Let's fill in the □ with an appropriate number.

For calculating 84×7, we split it into 4×[7] and 80×[7] and then add the answers for the total. Pages 72 ~ 75

(3-digits) × (1-digit) word problem

3 Father purchased 6 boat tickets each costing 125 kina.

How much is the total cost? Pages 74 ~ 76

$$\begin{array}{r} 125 \\ \times\ 6 \\ \hline 750 \end{array}$$

Answer K750

4 There is a park which is 340 metres in perimeter near Roni's house. Roni ran around the park 4 times.

(3-digits) × (1-digit) word problem

How many metres did he run in total? Pages 74 ~ 76

$$\begin{array}{r} 340 \\ \times\ 4 \\ \hline 1360 \end{array}$$

Answer 1360 m

Grade 3 Do you remember?

Let's find the number which applies in the □.

① 5×8=[8]×5　② 7×[3]=3×7
③ 3×6=3×5+[3]　④ 9×4=9×[5]−9
⑤ (3×3)×2=3×([3]×2)　⑥ 7×2×4=7×[8]

□×□= 77

Problems

1 Let's fill in the □ with an appropriate number.

Understanding how to calculate (3-digit number)× (1-digit number).

For calculating 384×7, split the calculation into 7×[4], 7×[80] and 7×[300] and then add the answers for the total.

384×7
- 7×4= [28]
- 7×80= [560]
- 7×300= [2100]

Total [2688]

2 Let's calculate in vertical form. (2 or 3-digits) × (1-digit)

Understanding how to calculate in vertical form.

① 50×3 150　② 300×3 900　③ 600×7 4200
④ 22×4 88　⑤ 45×6 270　⑥ 64×8 512
⑦ 223×3 669　⑧ 379×7 2653　⑨ 584×5 2920

3 Let's find the mistakes in the vertical calculations below and calculate the correct answer.

Finding mistakes in calculations and calculate in the appropriate ways.

① Find mistakes (2 or 3-digits) × (1-digit)

$$\begin{array}{r} 85 \\ \times\ 3 \\ \hline 2415 \end{array}$$
(255)

$$\begin{array}{r} 276 \\ \times\ 4 \\ \hline 804 \end{array}$$
(1104)

$$\begin{array}{r} 504 \\ \times\ 2 \\ \hline 108 \end{array}$$
(1008)

(3-digits) × (1-digit) word problem

4 If you buy 8 sets of sports shoes and socks when one pair of shoe costs 125 kina and socks which costs 10 kina, how much is the total cost?

Distinguishing the situations for the multiplication and calculate the answer.

125 + 10 = 135　135 × 8 = 1080

Answer 1080 kina

78 = □×□

Lesson Flow

1 ① Calculate in vertical form.

T Have students to complete exercise 1 using vertical form. Try to time them in the first half of the lesson.

① to ⑥:(2-digit)×(1-digit)

① : without carrying

② to ⑥:with carrying

⑦ to ⑫:(3-digit)×(1-digit)

⑦: without carrying

⑧ to ⑫:with carrying

2 ② Fill in the blank.

T Have students remember that multiplication is addition of product of each digit.

3 Let's calculate the word problem ③ and ④.

S Have students to complete Exercise 3 and 4.

S They may use any method of multiplication that they have learned to complete the exercise.

4 Complete the problems ① - ④.

① 3 adults and 3 children went to Mailu from Alotau by boat. The fare costs 60 kina for a child and 120 kina for an adult. What was the total cost?

● Distinguishing the situations for the multiplication and calculating the answer.

3×60=180 3×120=360 180 + 360=540 A. 540 kina

② There is a set of number cards from 0 to 9, one card for each number. Using these cards, make calculation problems for a (2-digit number)×(1-digit number).

×

① Find a calculation with the largest answer. 87×9=783

② Find a calculation with the largest answer with 2-digits numbers. Also, explain why that is the largest answer.

● Making calculation problems with estimation. 98×1=98, 49 × 2=98

③ There is a 3-digit number. If you multiply 3 to that number, the answer is shown below. In the same letter, the same number fits in. Think about a 3-digit number A B C.

A B C
× 3
4 C A

A=1
B=5
C=7

Explain how you found the 3-digit number in order.

● Thinking about the vertical form.

□ − □ = 79

Multiplication in Vertical Form	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 54 × 8

54
× 8
432

② 649 × 5

649
× 5
3245

③ 580 × 6

580
× 6
3480

④ 300 × 3

300
× 3
900

⑤ 109 × 4 =

109
× 4
436

2. Fill in the blanks.

For calculating 372×4, we split it into 2 × 4, 70 × 4 and 300 × 4, and then we add the answers for the total.

3. You bought 6 fish. Each fish costs 16 kina. How much is the total cost?

Mathematical sentence: 16 × 6=96

Answer: 96 kina

4. There are 234 students in the school. 6 pencils are to be given to each student. How many pencils are needed in total?

Mathematical sentence: 234 × 6=1404

Answer: 1404 pencils

End of Chapter Test: Chapter 7 **Date:**

Multiplication in Vertical Form	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 54 × 8

② 649 × 5

③ 580 × 6

④ 300 × 3

⑤ 109 × 4 =

2. Fill in the blanks.

For calculating 372×4, we split it into 2 × _____, 70 × _____ and 300 ×_____, and then we add the answers for the total.

3. You bought 6 fish. Each fish costs 16 kina. How much is the total cost?

Mathematical sentence: _____

Answer: _____

4. There are 234 students in the school. 6 pencils are to be given to each student. How many pencils are needed in total?

Mathematical sentence: _____

Answer: _____

Chapter 8 Division

1. Unit Objectives

- To know when division is used. (3.1.5.a)
- To recognise relationship between division and multiplication or subtraction. (3.1.5.c)
- To calculate division of 1 digit of divisor and quotient. (3.1.5.a)
- To read a situation and make operation of division. (3.1.5.a)
- To understand the meaning and how to divide by 1 and 0. (3.1.5 b)

2. Teaching Overview

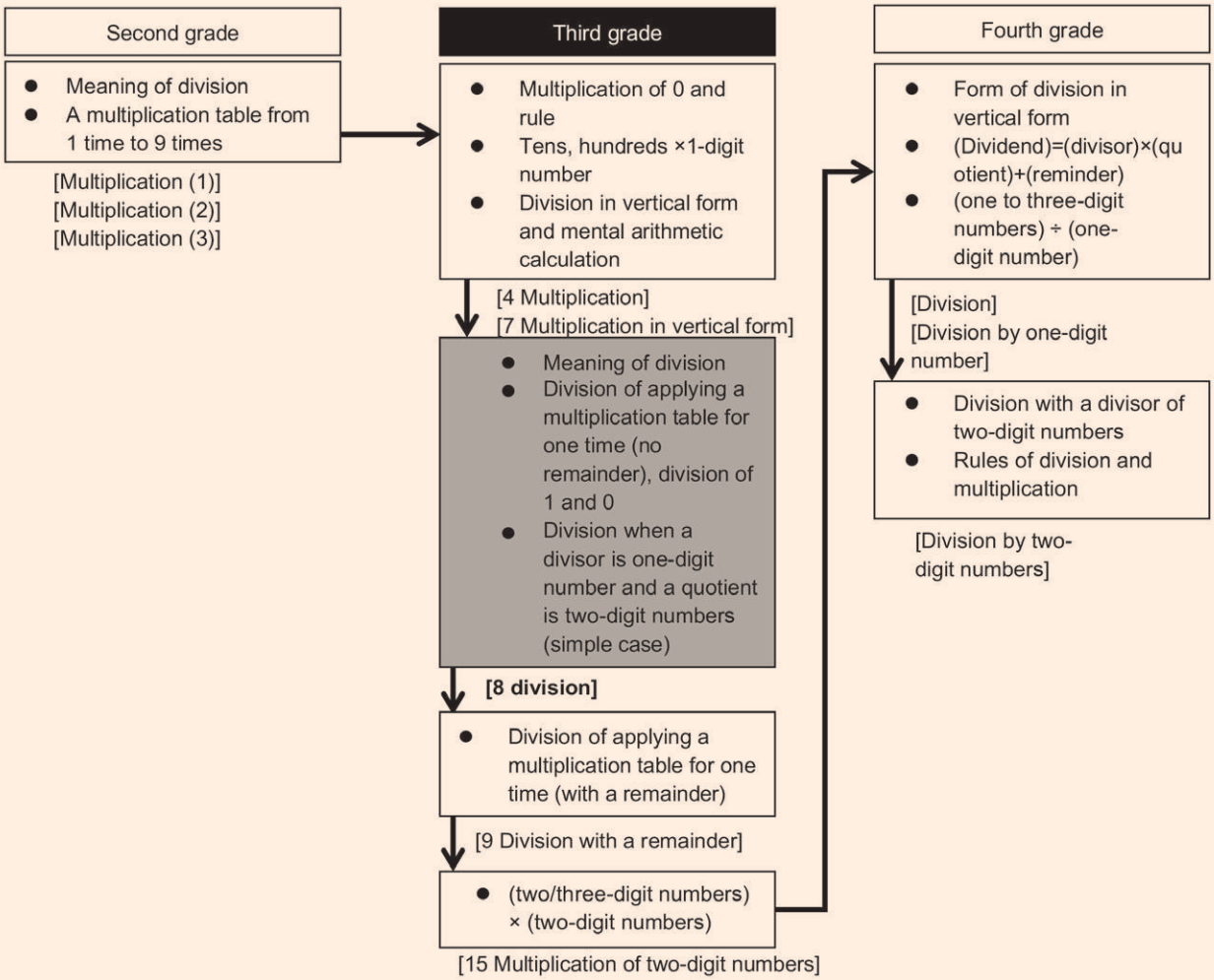
In this chapter, students learn division in relation to sharing. Note that division is based on equal sharing.

Division : 2 different types of division: One is called partitive division based on situations to make each share equal. Partitive divisions are to find quantity for each share. Another one is called quotative division based on situations of equal distributions. Quotative divisions are to find how many shares are made by equal distributions. Students should become friendly to both situations by relating to multiplication.

Division with 1 and 0 : It is important for students to understand division with 0 and 1. Teacher should not just impart the results but make students understand the reasons with concrete examples.

Finding Patterns in Divisions : Students are to find patterns by comparing multiplications and divisions with the same multipliers and divisors. The way of thinking here will help students understand vertical divisions.

3. Related Learning Contents



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 1 of 6 (Double Period)

Textbook Page : p.80~p.83
Actual Lesson 055

Sub-unit Objectives

- To understand the situation of partitive and quotative division, and how to make operations to find the answer.

Lesson Objectives

- To recognise the difference of the meaning 'dividing' and 'dividing equally' and to find the number for each person through manipulation.

Prior Knowledge

- Meaning of multiplication (Unit 2).
- Memorisation of Multiplication table (Elementary).

Preparation

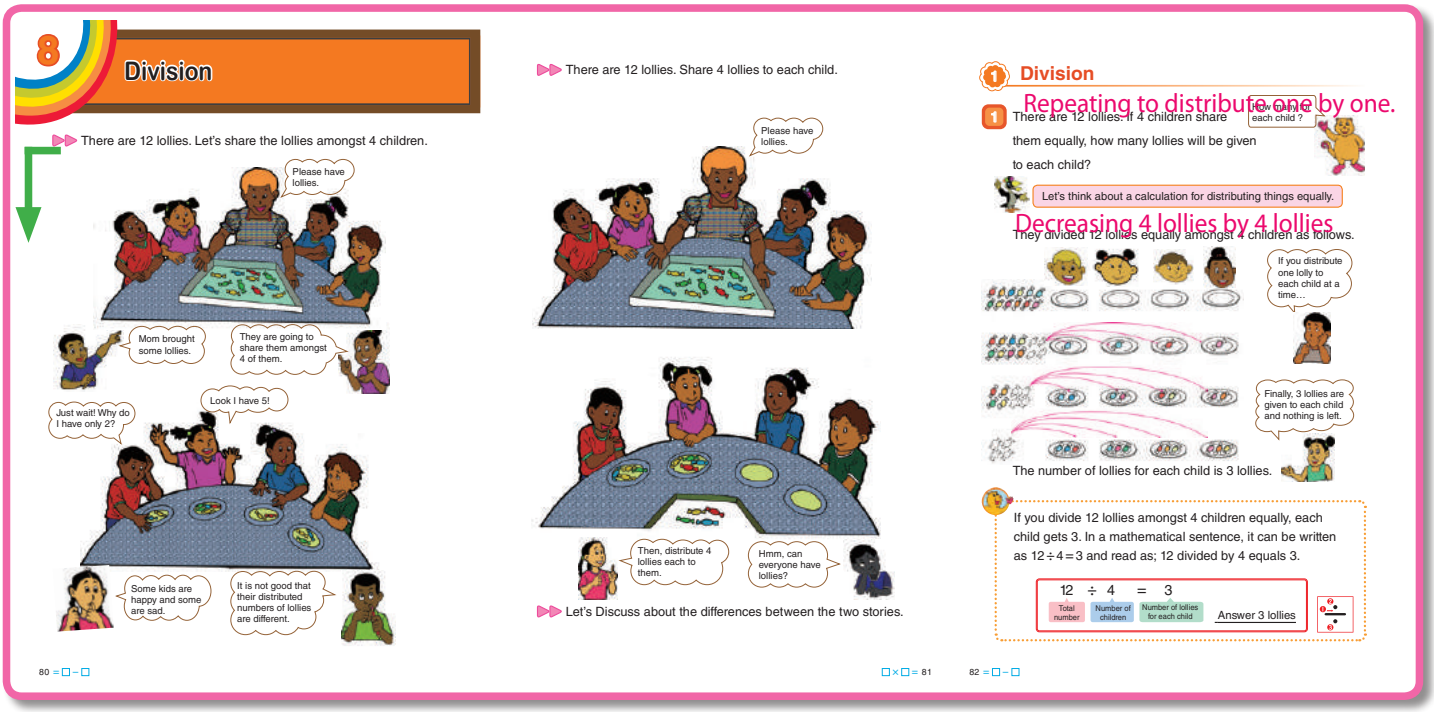
- Paper blocks or other items that can be used as replacement for lollies. eg stones, lids, seeds, etc.

Assessment

- Enjoy and recognise the situation of dividing lollies. F
- Make mathematical expressions of the situation of division and to find the answer. S

• Teacher's Notes •

This is the first lesson of division that the students will have. The first part of the lesson is to get students to practically share items so they can experience the feeling of dividing equally. The second part of the lesson is for the students to share the items one by one so that they can observe the increase in each person's share and the decrease in the total number of items before distribution.



Lesson Flow

1 Look at the pictures and find the difference of how to divide 12 lollies.

S Discuss the difference between 'dividing' and 'dividing equally' by observing the pictures.

TN Let the students notice that :

- When we do not divide equally, not all will get an equal share.
- Important to divide equally and obtain an equal amount.

2 1 Understanding the situation.

T Explain the situation of sharing 12 lollies for 4 children. And tell students to think about a calculation for distributing things equally.

3 Manipulate blocks and find the number of Lollies for each child.

TN Let the students:

- Predict how many lollies each child will get before using blocks.
- Notice the importance of 'dividing equally'

S Divide the blocks to each plate in their own way.

4 Understanding how to divide one by one.

TN Advise students that if you divide one by one, you decrease 4 blocks from the total and increase 1 block to each child each time, you divide.

T Introduce the main task.

T If you divide one by one, how many lollies decrease at one time?

S "4 at one time"

T How many lollies increase in each person's plate each time?

S "1 lolly increases each time on a plate".

5 Think about the operations.

S Make various operations of what they did and discuss the reasons for the operations.

6 Understand the sign '÷' and the meaning of '12÷4=3'.

TN Let the students understand the meaning of each number 12, 4 and 3.

T What is '12' ?

S The total number of lollies.

T What is '4'?

S The number of children.

T What is '3'?

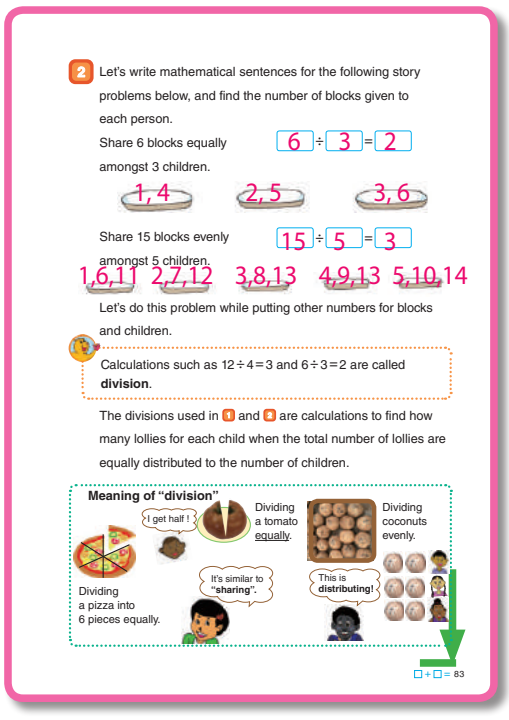
S The number of lollies for each child after dividing equally to 4 children.

T Summarise Kapuls explanation. Teach how to write the sign of division ÷.

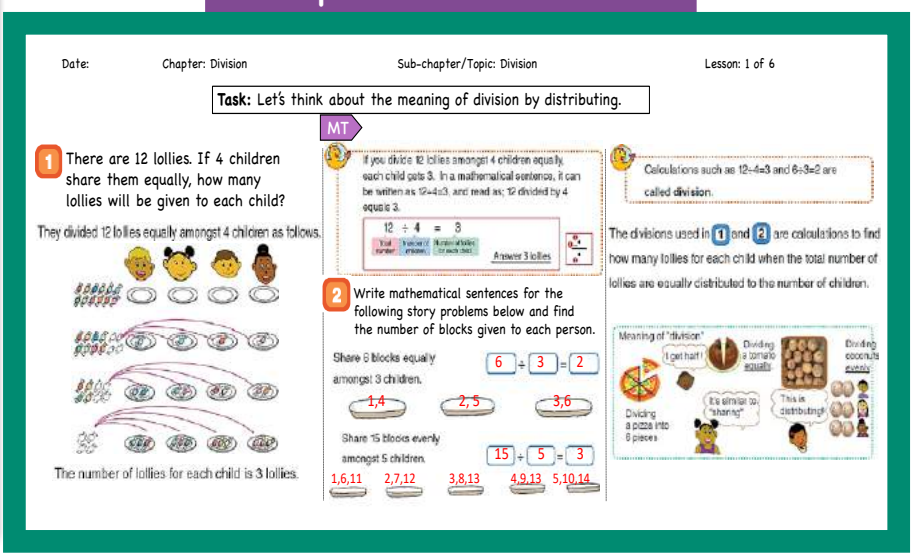
7 2 Manipulate blocks, write a mathematical expression and find the answer.

S Manipulate the blocks one by one and write mathematical expressions.

S Read the summary and know the meaning of the term 'division'



Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 2 of 6 (Single Period)

Textbook Page : p.84-p.85
Actual Lesson 056

Lesson Objectives

- To find the answer of partitive division using multiplication.

Prior Knowledge

- Meaning of division (Previous lesson).

Preparation

- Blocks and cups

Assessment

- Find the answers of partitive division using multiplication. F S

• Teacher's Notes •

Partitive division

If the number of groups is known, and you are trying to find the number in each group, then the problem is called partitive division problem. In partitive division, we know the number of groups. We do not know how many items each group can get.

Unit of Decilitre

Decilitre as a unit of measurement of volume.

10 dL = 1 litre.

1dL = 0.1 litre, $\frac{1}{10}$ litre

How to find the answer of partitive division

3 Divide 15 blocks equally amongst 3 children.

How many blocks does each one receive?

If each child gets 2, 2×3 is 6, so everyone can get more!

Connection between multiplication table of 3 and dividing blocks.

		Number of children	Blocks per child	Blocks in total
3 blocks for each child	3 × □ = 9			
4 blocks for each child	3 × □ = 12			
5 blocks for each child	3 × □ = 15			

The answer to 15 ÷ 3 is in the box in 3 × 5 = 15.

The answer is found by using the the multiplication table of 3.

15 ÷ 3 = 5

Three threes are 9.
Four threes are 12.
Five threes are 15.

How to make a math sentence of partitive division with quantity.

4 Divide 10 dL of juice equally amongst 5 children.

How many dL of juice does each child receive?

10 ÷ 5 = 2

Answer: 2 dL

Which column of the multiplication table should we use?

Exercise

1 Divide a 18 m skipping rope equally amongst 6 children.

How many metre (m) does each child receive?

18 m

unit for one child

18 ÷ 6 = 3 Answer : 3 m

2 Which column or row of the multiplication table should you use to do these division problems? Mention the column or row and find the answer.

① 8 ÷ 2 4 Row 2
② 21 ÷ 7 3 Row of 7
③ 72 ÷ 9 8 Row of 9
④ 28 ÷ 4 7 Row of 4
⑤ 20 ÷ 5 4 Row 5
⑥ 56 ÷ 8 7 Row of 8
⑦ 21 ÷ 3 7 Row of 3
⑧ 54 ÷ 6 9 Row of 6

5 Make a problem of equal sharing that is solved by division and by looking at the picture.

① 8 Chocolates

The problem developed by Asa

□ chocolates are divided equally among □ children. How many chocolates are given to each child?

②

6 Let's divide.

① 14 ÷ 2	② 4 ÷ 2	③ 27 ÷ 9	④ 40 ÷ 5	⑤ 32 ÷ 8
⑥ 12 ÷ 2	⑦ 18 ÷ 3	⑧ 45 ÷ 9	⑨ 42 ÷ 7	⑩ 16 ÷ 8
⑪ 24 ÷ 4	⑫ 25 ÷ 5	⑬ 12 ÷ 6	⑭ 49 ÷ 7	⑮ 24 ÷ 3

84 = □ − □

□ + □ = 85

Lesson Flow

1 Review the previous lesson which is how to divide equally.

TN As a review of the previous lesson, let the students practice dividing 6 blocks equally amongst 3 people.

S Should confirm that the mathematical expression will be 6÷3, and divide blocks equally amongst 3 people to find the answer.

2 3 Understand that the objective is finding the answer without manipulating blocks.

TN Let the students think about how they can find the answer without the use of blocks.

S Try to find answers using their own ways.
- using multiplication, drawing pictures, counting and so on.

T Introduce the main task.

3 Present their methods and make connections.

T Ask students to connect the method of drawing diagram or counting to the method of using multiplication.

S Realise that they will use multiplication table of 3 because the question is to divide equally amongst 3 people.

4 Think about the relationship of dividing one by one and using multiplication.

TN From the picture of dividing one by one, the situation is expressed in an operation of multiplication '□×3'. Dividing block finishes at '5×3=15'.

5 Understand the relationship '15÷3=□ and '□×3=15' and how to find the answer.

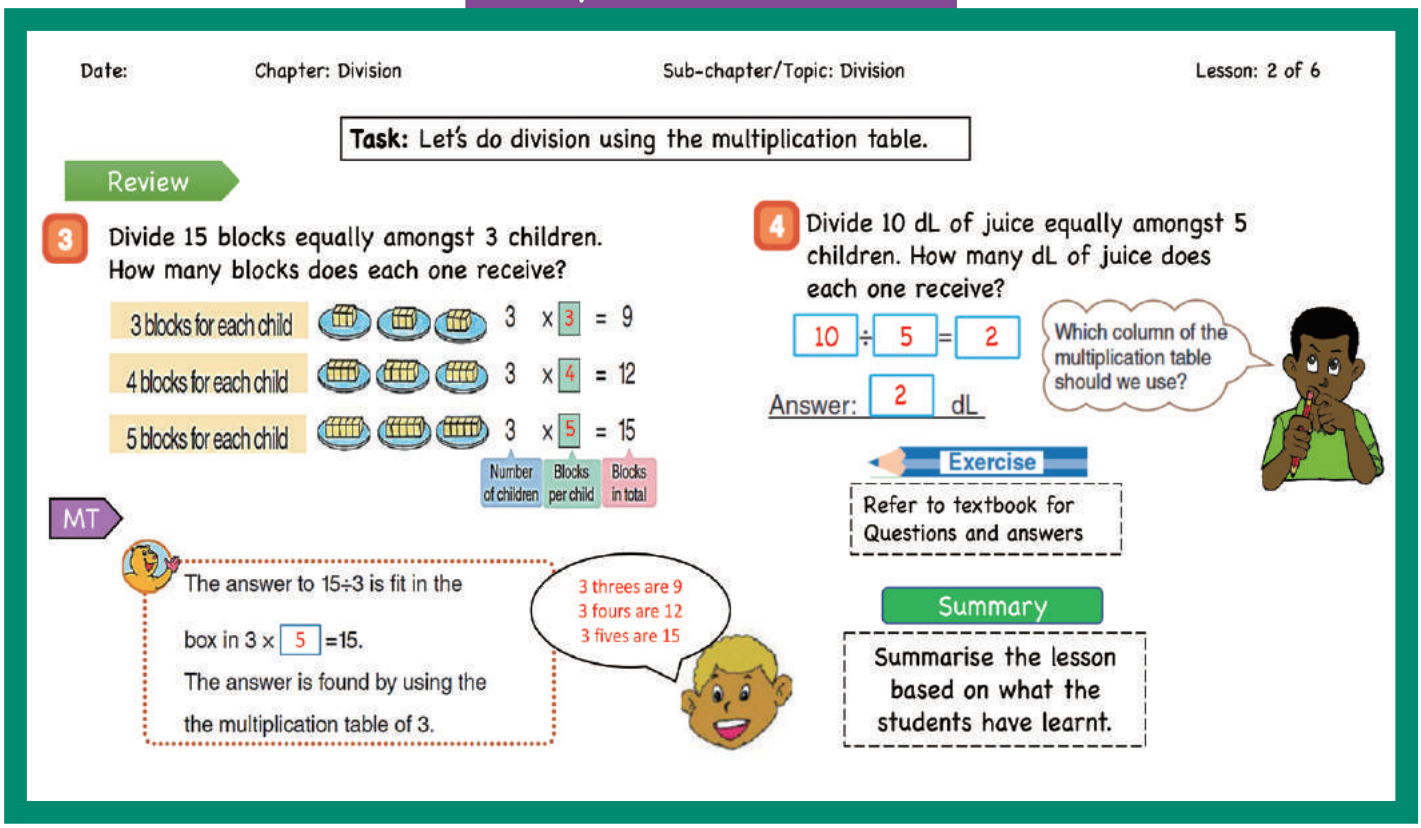
T Let the students remember '□×3=3×□, and recognise that the answer can be found using table of 3 which is the divisor of the operation in division.

6 4 Recognise how to use division with continuous quantity.

TN For the students who have difficulty of understanding how to divide 10 dL, show 10 of 1dL and divide them into 5 cups.

7 Complete the exercise 1 and 2.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 3 of 6 (Single Period)

Textbook Page : p.85
Actual Lesson 057

Lesson Objectives

- To make word problems of partitive division when sharing equally.

Prior Knowledge

- Meaning of division
- Finding answers of partitive division using multiplication (Previous lesson).

Preparation

- Blocks and cups

Assessment

- Enjoy making word problems by thinking about the situation. F
- Solve the exercises of division. F
- Do the exercises correctly. S

• Teacher's Notes •

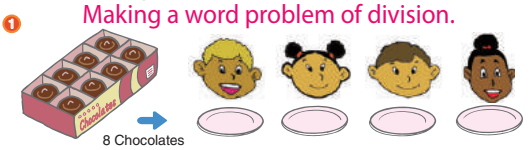
The calculation is to find how many items each child will receive when the number of items is equally distributed to the number of children.

2 Which column or row of the multiplication table should you use to do these division problems? Mention the column or row and find the answer.

① 8÷2 ② 21÷7 ③ 72÷9 ④ 28÷4
⑤ 20÷5 ⑥ 56÷8 ⑦ 21÷3 ⑧ 54÷6

5 Make a problem of equal sharing that is solved by division and by looking at the picture.

① Making a word problem of division.



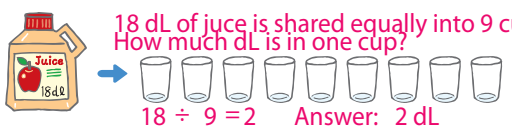
8 Chocolates

The problem developed by Asa

8 chocolates are divided equally among 4 children. How many chocolates are given to each child?

8 ÷ 4 = 2 Answer : 2 chocolates

② 18 dL of juce is shared equally into 9 cups. How much dL is in one cup?



18 ÷ 9 = 2 Answer: 2 dL

6 Let's divide.

① 14÷2 7 ② 4÷2 2 ③ 27÷9 3 ④ 40÷5 8 ⑤ 32÷8 4
⑥ 12÷2 6 ⑦ 18÷3 6 ⑧ 45÷9 5 ⑨ 42÷7 6 ⑩ 16÷8 2
⑪ 24÷4 6 ⑫ 25÷5 5 ⑬ 12÷6 2 ⑭ 49÷7 7 ⑮ 24÷3 8

□+□=85

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 5 1 Make word problems of partitive division.

TN Ask the students 'What and how many are dividing?' 'To how many people?' and 'What do we want to know?' so that students find it easier to make a problem.

S Make a problem each and share with friends.

S Find the answer using multiplication.

3 2 Make word problem using diagram representation.

T Confirm the key words: '18 dL juice' , '9 cups' and 'divide the same amount'.

S Make a word problem using key words and share with friends.

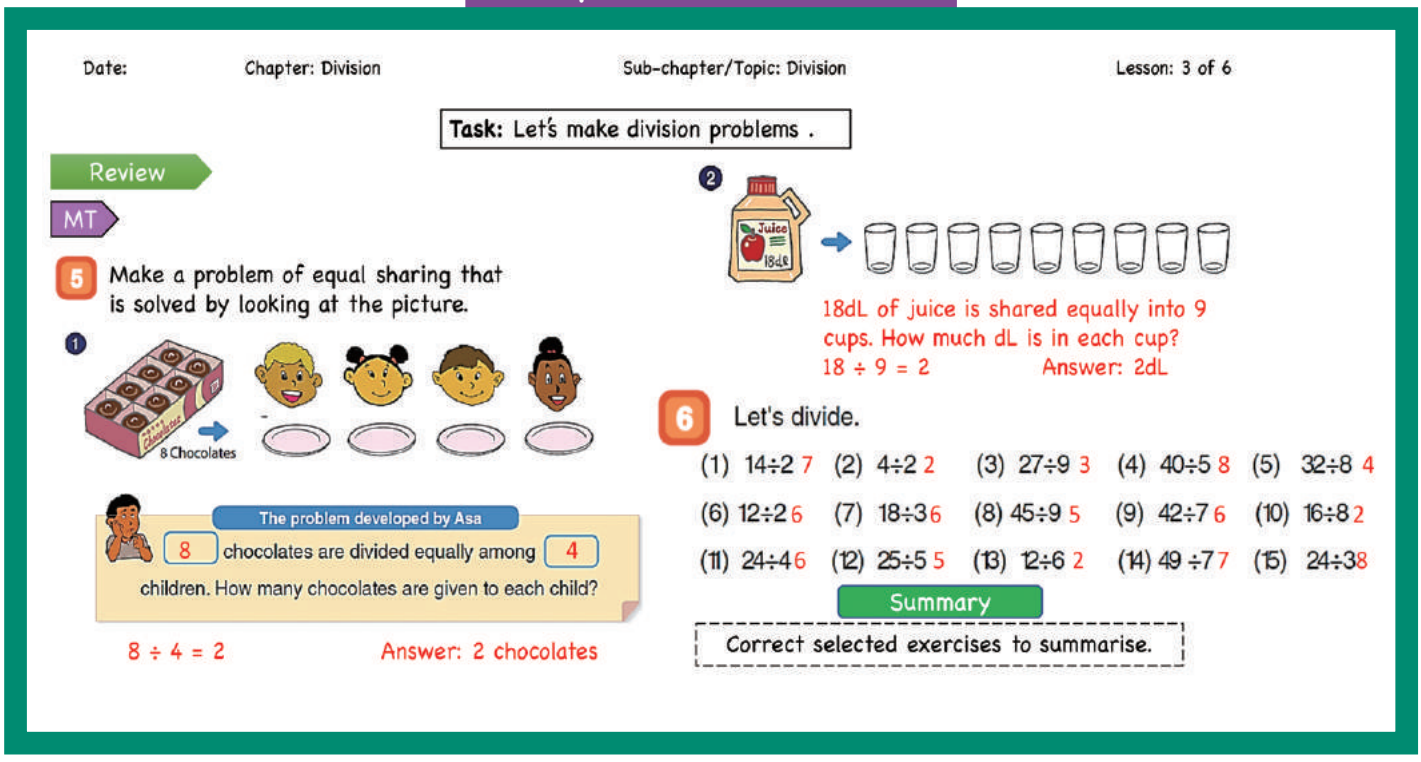
S Find the answer using division.

4 6 Solve the problems.

T Use multiplication to solve problems

TN Assist the students individually who still do not understand how to calculate.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 4 of 6 (Double Period)

Textbook Page : p.86
Actual Lesson 058

Lesson Objectives

- To solve problems of quotative division.
- To compare and understand partitive and quotative division.
- To recognise the situation which is applied to quotative division and express the situation by mathematical expression.

Prior Knowledge

- Meaning of division.
- Finding answers of partitive division using multiplication.

Preparation

- Blocks and cups or other materials such as stones, marbles etc.

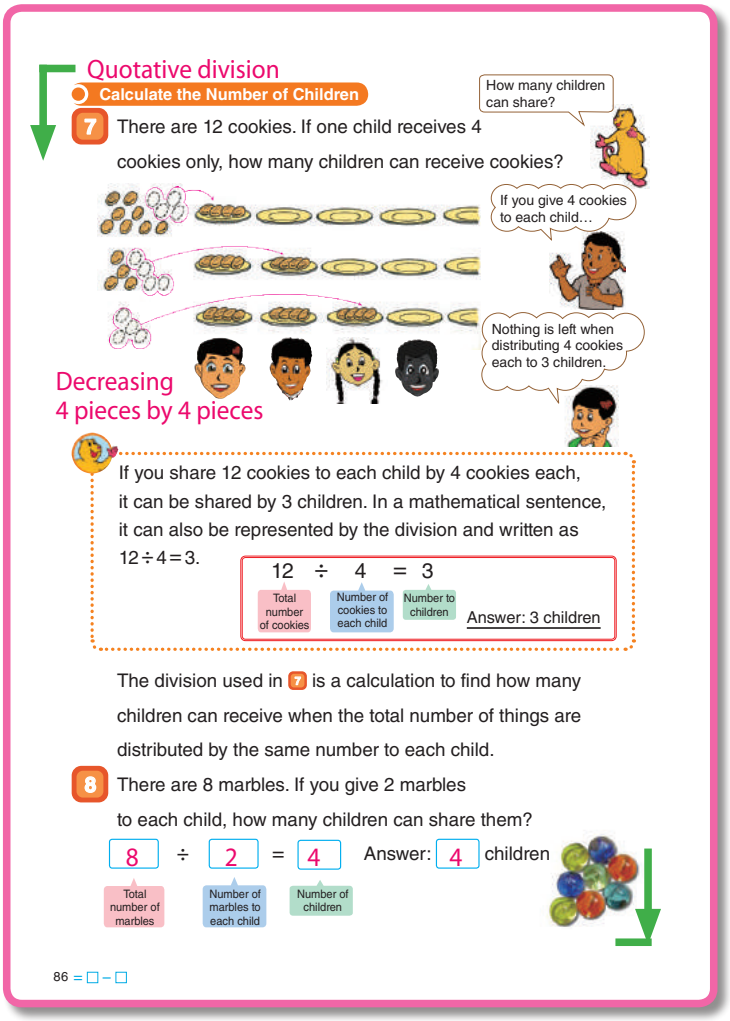
Assessment

- Enjoy solving word problems by thinking about the situation. F
- Identify the difference between partitive and quotative division. F
- Complete task 8. S

• Teacher's Notes •

Quotative division

If the number in each group is known, and you are trying to find the number of groups, then the problem is called quotative division problem. In quotative division, we know the number of items each group can get. We do not know to how many groups we can distribute the items.



Lesson Flow

1 Review the previous lesson.

2 7 Read the problem and find the difference of division learned previously.

T What are the similarilties and differences compared to the previous problem in task 1.
S Same: There were 12 lollies and cookies.
Different: Dividing 4 each
How many children can receive?
T Introduce the main task.

3 Investigate the same and different points to partitive division by observing pictures or manipulating blocks.

S Same: After dividing 4 each, each child gets the same amount.
Answer is same, 3.
Different: Before, it was divided 1 by 1 but this time dividing 4 by 4.
Answer is 3 but the meaning is different.

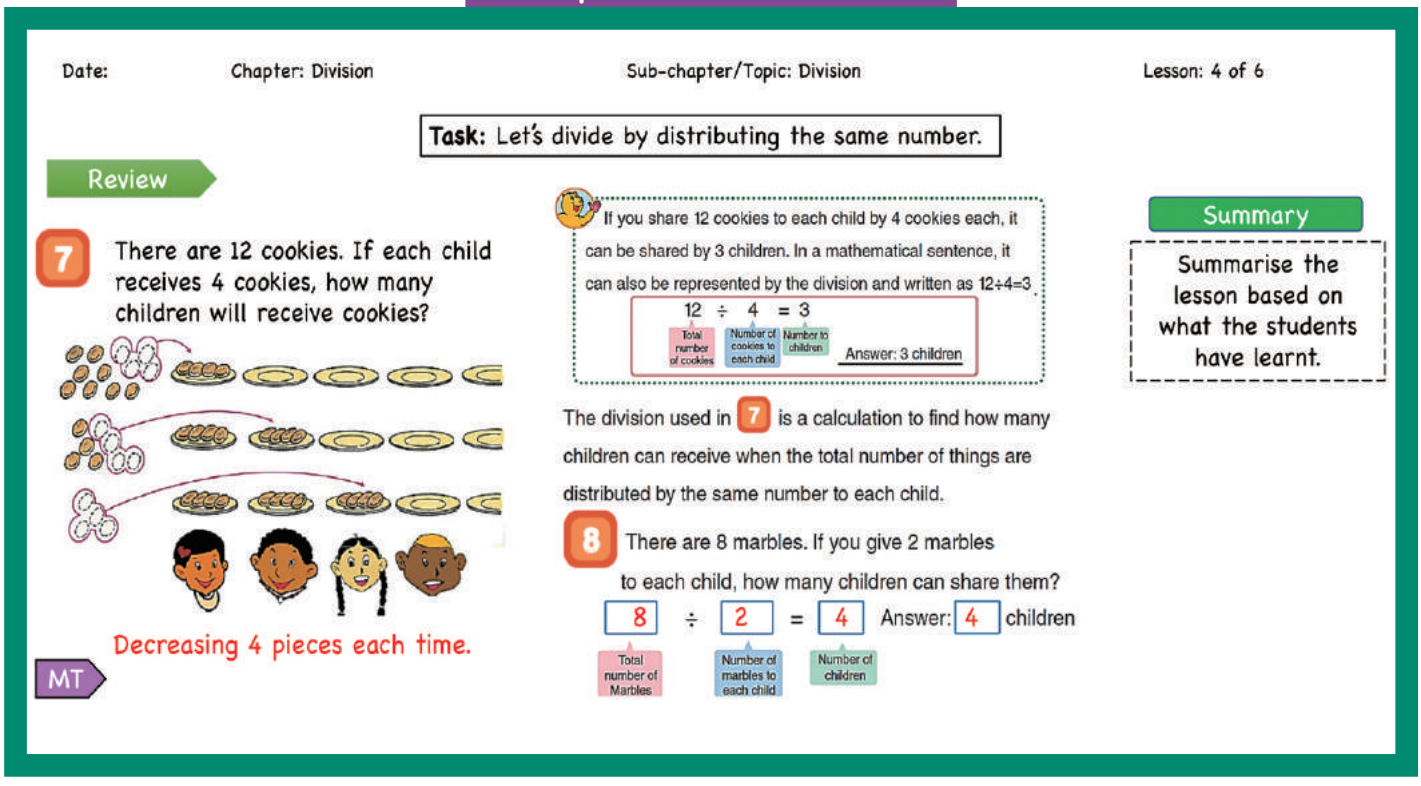
4 Recognise that this method is also expressed by mathematical expression of division.

S Form a mathematical sentence considering '12 cookies, '4 cookies each' ' divided to 3 children'.
T Show; 'Total number' ÷ the number of each child get' = 'the number of children', and let the students notice the difference to the previous.

5 8 Consider which meaning of division is used.

S Read the problem, make mathematical expression and find the answer.
S Consider which meaning of division is used to solve the problem.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 5 of 6 (Double Period)

Textbook Page : p.87
Actual Lesson 059

Lesson Objectives

- To find the answers of quotative division using multiplication.

Prior Knowledge

- Meaning of division.
- Finding answers of quotative division.

Preparation

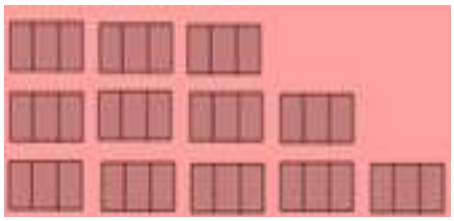
- Blocks and cups or other materials such as stones or marbles etc.

Assessment

- Think about 2 different types of division. F
- Enjoy making division story. F
- Do exercises correctly. S

• Teacher's Notes •

In this division problem help the students to visualise the division of sharing using the idea of removing the same amount. How many times can we remove the same amount till none remains?

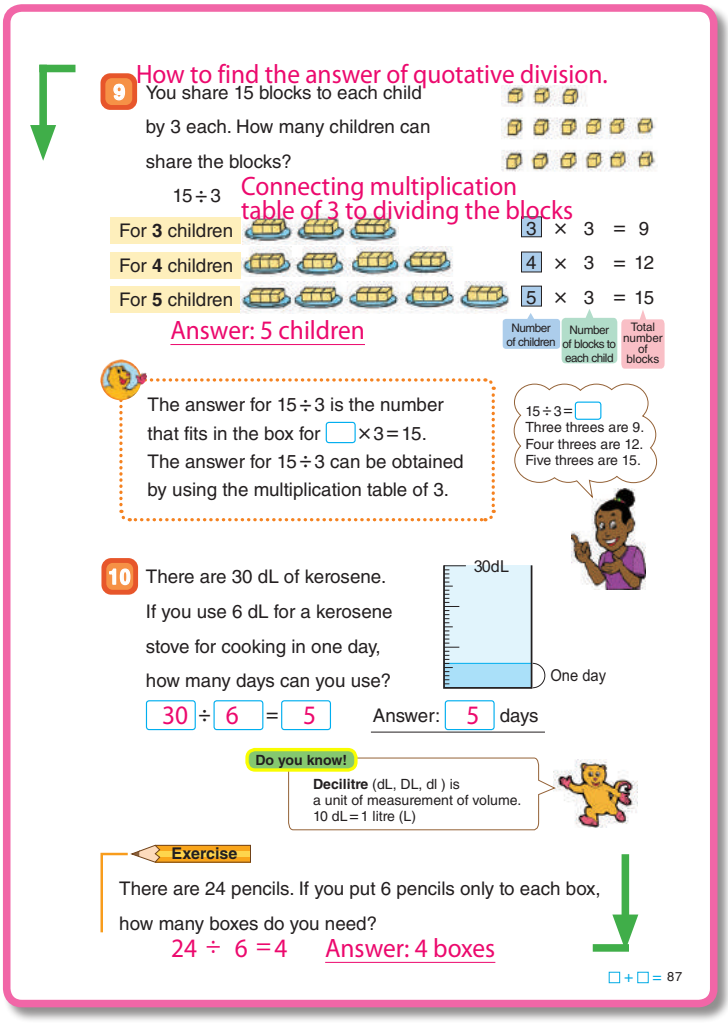


Using Multiplication

3×3=9

4×3=12

5×3=15



9 How to find the answer of quotative division.

You share 15 blocks to each child by 3 each. How many children can share the blocks?

15÷3

Connecting multiplication table of 3 to dividing the blocks

For 3 children 3 × 3 = 9

For 4 children 4 × 3 = 12

For 5 children 5 × 3 = 15

Number of children | Number of blocks to each child | Total number of blocks

Answer: 5 children

The answer for 15÷3 is the number that fits in the box for □×3=15.
The answer for 15÷3 can be obtained by using the multiplication table of 3.

15÷3=□
Three threes are 9.
Four threes are 12.
Five threes are 15.

10 There are 30 dL of kerosene. If you use 6 dL for a kerosene stove for cooking in one day, how many days can you use?

30dL

One day

30 ÷ 6 = 5 Answer: 5 days

Do you know!

Decilitre (dL, DL, dl) is a unit of measurement of volume.
10 dL = 1 litre (L)

Exercise

There are 24 pencils. If you put 6 pencils only to each box, how many boxes do you need?

24 ÷ 6 = 4 Answer: 4 boxes

□+□= 87

Lesson Flow

1 Review the previous lesson.

2 9 Connect division using multiplication.

S Read and understand the problem and write a mathematical expression.
S Use multiplication table to identify the answer.
T Summarise the important point in the box .
T Introduce the main task.

3 10 Solve problem.

S Read and understand the problem and write a mathematical expression.
S Use the multiplication table to identify the answer. □×6=30 and 6×□=30

4 Complete the exercise.

Sample Blackboard Plan

Date: Chapter: Division Sub-chapter/Topic: Division Lesson: 5 of 6

Task: Let's do division by multiplying.

Review

9 You share 15 blocks to each child by 3. How many children can share the blocks?

15 ÷ 3

For 3 children 3 x 3 = 9
For 4 children 4 x 3 = 12
For 5 children 5 x 3 = 15

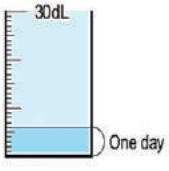
(Number of children, Number of blocks, Total number of blocks)

Answer: 5 children

The answer for 15÷3 is the number that fits in the box for □×3=15. The answer for 15÷3 can be obtained by using the multiplication table of 3.

MT

10 There are 30 dL of kerosene. If you use 6 dL for a kerosine stove for cooking in one day, how many days can you use?



30 ÷ 6 = 5 Answer: 5 days

Do you know!! Decilitter (dL,DL, dl) is a unit of measurement of volume. 10dL = 1 litter (L)

Exercise

Refer to textbook for Questions and answers.

Summary

Summarise the lesson based on what the students have learnt.

Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 6 of 6 (Double Period)

Textbook Page : p.88
Actual Lesson 060

Lesson Objectives

- To recognise the difference of partitive division and quotative division.
- To make partitive and quotative division problems from one mathematical expression.

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

- Refer to the blackboard plan.

Assessment

- Think about the 2 different types of division. F
- Enjoy making division story. F
- Do the exercises correctly. S

• Teacher's Notes •

Through this Lesson the students will identify the difference between the two divisions. It is not necessary for the students to know their names.

The main difference between the two divisions:

1. Sharing equal quantities to find out how many people can receive from the total quantity.

Example; sharing 12 lollies among 4 children, how many will each child receive?

Using Multiplication

$4 \times 3 = 12$

2. Sharing amongst a group to find out how many each member can receive.

Example; sharing 12 lollies by 3 to each child. How many children can receive the lollies?

Using Multiplication

$4 \times 3 = 12$

Making a story problem of partitive and quotative divisions

11 Look at the tomatoes on the right and make a story problem for **10 ÷ 5**.

Division to find the number of tomatoes in each plastic bag.
① Divide 10 tomatoes equally into 5 plastic bags.
How many ☐ are in each ☐ ?
tomatoes plastic bag
10 ÷ 5 = 2

Division to find the number of plastic bags.
② There are 10 tomatoes.
5 tomatoes are distributed into each plastic bag. How many ☐ are needed?
plastic bags
10 ÷ 5 = 2

① is a calculation to find the number in the box for 5 × ☐ = 10.

② is a calculation to find the number in the box for ☐ × 5 = 10.

Both answers can be calculated by the multiplication of 5 and 2 giving 10.

The Answer to a division problem can be calculated by using the multiplication table of divisor (In this case, 5)

10 ÷ 5 = 2
Dividend Divisor Answer

12 Let's make a story problem for 32 ÷ 8.

Exercise

Let's calculate the following divisions. Which column or row of the multiplication table will you use to find the answer?

① 9 ÷ 3 3 row of 3
② 24 ÷ 8 3 row of 8
③ 10 ÷ 2 5 row of 2
④ 32 ÷ 4 8 row of 4
⑤ 35 ÷ 5 7 row of 5
⑥ 6 ÷ 2 3 row of 2
⑦ 36 ÷ 9 4 row of 9
⑧ 45 ÷ 5 9 row of 5
⑨ 14 ÷ 7 2 row of 7
⑩ 48 ÷ 6 8 row of 6
⑪ 20 ÷ 4 5 row of 4
⑫ 56 ÷ 7 8 row of 7
⑬ 48 ÷ 8 6 row of 8
⑭ 40 ÷ 8 5 row of 8
⑮ 81 ÷ 9 9 row of 9

88 = ☐ − ☐

Lesson Flow

1 Review the previous lesson.

2 11 Think about how to divide 10 tomatoes applying the expression '10÷5'.

T Introduce the main task.
T Let's make stories of '10÷5' using 10 tomatoes.
S Explore and come up with their own stories.
T What are they looking for in each story.
S Eg: Number of bags, friends, children or Number of tomatoes in each bag.
TN Let the students recognise making partitive and quotative of division from one expression.

3 Think about what kind of number and word should be in the boxes to make '10÷5'.

S Read two stories in the textbook and fill in the boxes.
T Explain the bubbles to the students : The two types of division with relation to the meaning of multiplicaiton.
(1) 5 bags times 2 tomatoes (5 set of 2),
(2) 2 bags times 5 tomatoes (2 sets of 5)
T Summarise the important point in the box .
T Let the students understand the term 'dividend' and 'divisor' and their meaning because they will be used from now on.

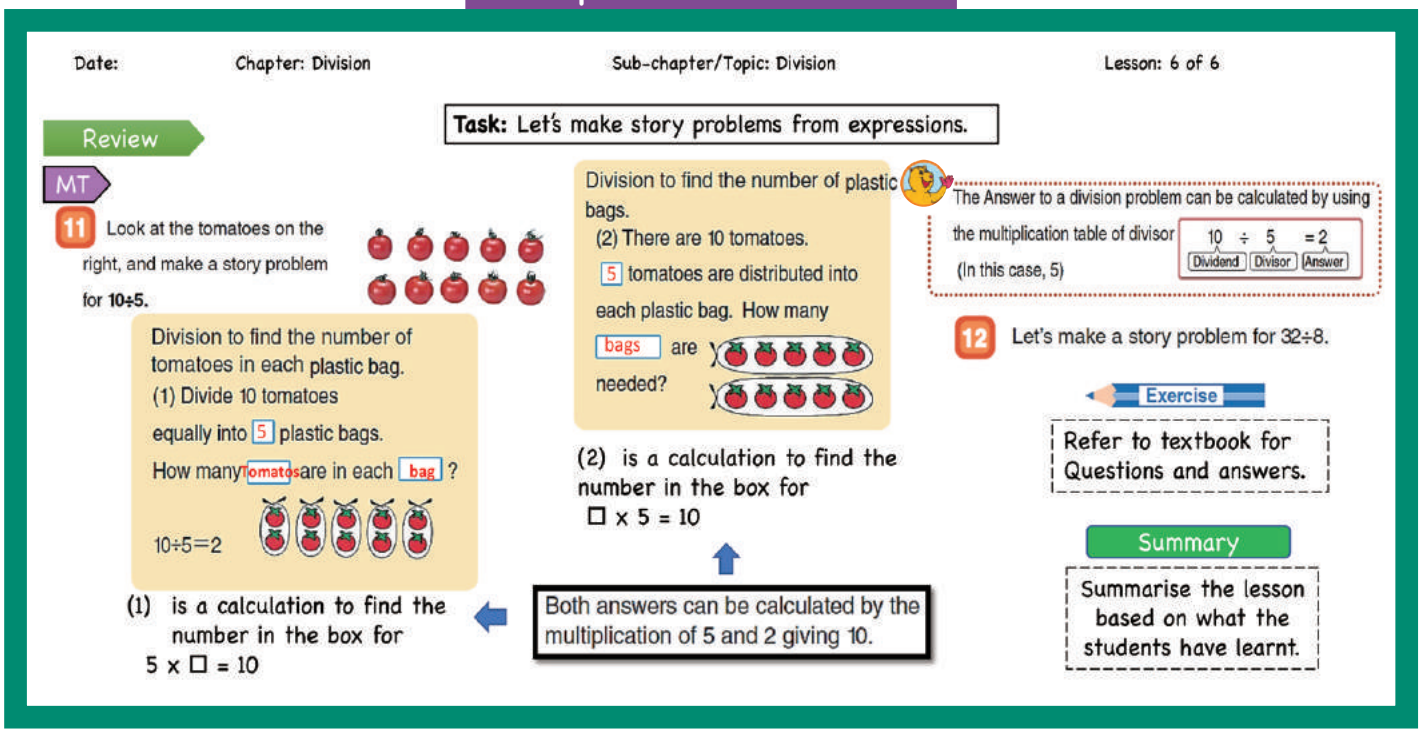
4 12 Make two types of story problems of '32÷8'.

S Make problems and share with friends to confirm if they are correct or not.

5 Complete the exercises.

T Complete from (1) to (5). The rest can be given as homework.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 2. Division with 1 and 0
Lesson 1 of 1 (Single Period)

Textbook Page : p.89
Actual Lesson 061

Sub-unit Objectives

- To understand the meaning and how to find the answer of the following 3 types.
  1. a ÷ a (Answer is 1)
  2. 0 ÷ a (Answer is 0)
  3. a ÷ 1 (Answer is a)

Lesson Objectives

- Same as Sub-Unit objectives

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

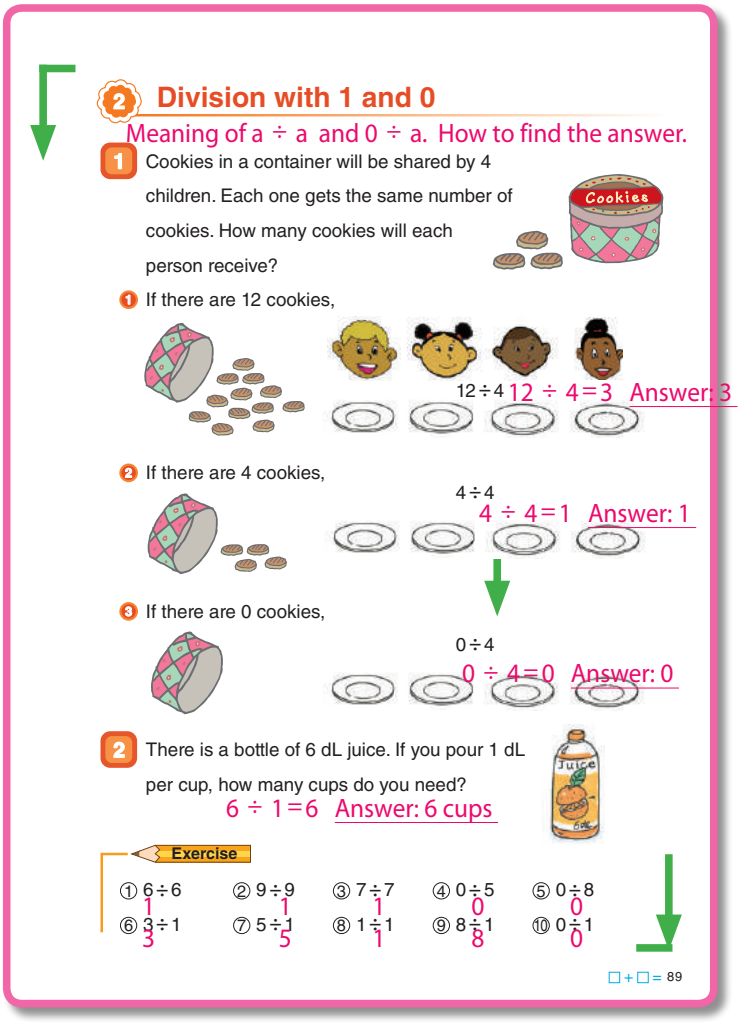
- 12 blocks and 4 cups or other materials such as stones or marbles etc.

Assessment

- Think of the meaning of a ÷ a, 0 ÷ a and a ÷ 1, and solve the problems. F
- Do the exercises correctly. S

• Teacher's Notes •

When learning these types of division, students should be able to imagine the situation to calculate. Therefore, it is important to ask students to draw pictures of the problem given in the introduction part. Students use pictures to help them to understand 3 types of division.



2 Division with 1 and 0

Meaning of a ÷ a and 0 ÷ a. How to find the answer.

1 Cookies in a container will be shared by 4 children. Each one gets the same number of cookies. How many cookies will each person receive?

Cookies

1 If there are 12 cookies,

12 ÷ 4 = 3 Answer: 3

2 If there are 4 cookies,

4 ÷ 4 = 1 Answer: 1

3 If there are 0 cookies,

0 ÷ 4 = 0 Answer: 0

2 There is a bottle of 6 dL juice. If you pour 1 dL per cup, how many cups do you need?

6 ÷ 1 = 6 Answer: 6 cups

Juice

Exercise

① 6 ÷ 6 = 1 ② 9 ÷ 9 = 1 ③ 7 ÷ 7 = 1 ④ 0 ÷ 5 = 0 ⑤ 0 ÷ 8 = 0
⑥ 3 ÷ 1 = 3 ⑦ 5 ÷ 1 = 5 ⑧ 1 ÷ 1 = 1 ⑨ 8 ÷ 1 = 8 ⑩ 0 ÷ 1 = 0

□ + □ = 89

Lesson Flow

1 **(1) Think about the mathematical sentence and answer of problems that 12, 4 and 0 cookies are divided by 4 people.**

T Give the 3 cases of situations and facilitate.
(1) Share 12 to 4 children
(2) Share 4 to 4 children
(3) Share 0 to 4 children

S Make mathematical expression of case (1), (2) and (3) , and find the answer using multiplication table of 4.

S Discuss the finding from each case.

T Generalise two cases. (a÷a and 0÷a)
(2) If the dividend and divisor are the same, the answer is 1
(3) If the dividend is 0, the answer is 0.

T Introduce the main task.

2 **(2) Solve the word problem.**

S Make mathematical expression and find the answer.

T Generalise the case. (a÷1) If the divisor is 1, the answer is the same as the dividend

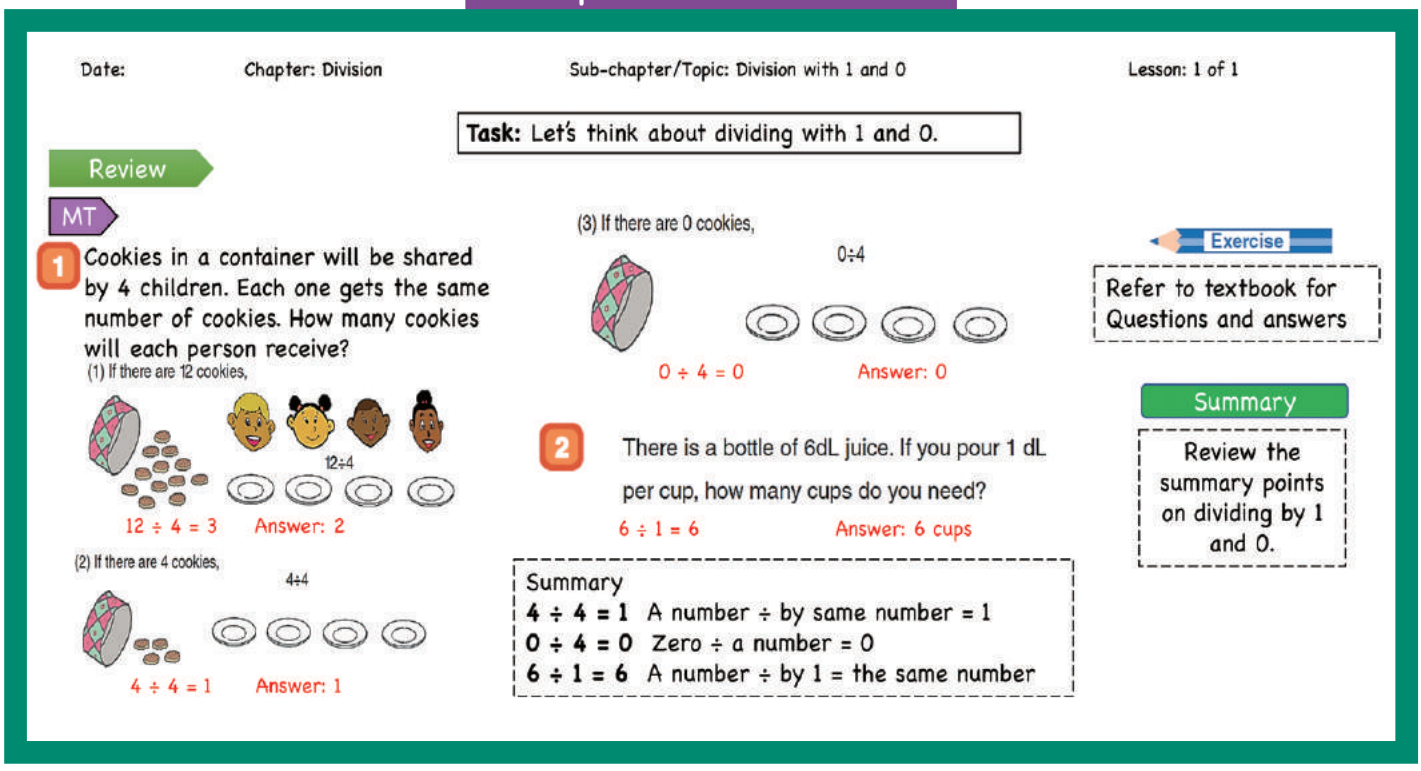
3 **Complete the exercises.**

S Complete (1) (4) (6) and the rest can be given as homework.

4 **Summarise the lesson.**

T/S Emphasise the 3 cases.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 3. Using Rules of Calculation
Lesson 1 of 1 (Double Period)

Textbook Page : p.90
Actual Lesson 062

Sub-unit Objectives

- To understand how to calculate division (divisor is 1-digit and answer is 2-digits).

Lesson Objectives

- Pay attention to patterns of numbers in divisions with fixed divisors.
- To find the relationship between multiplication and division.
- To find the relationship of the increase of dividends and answer.

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

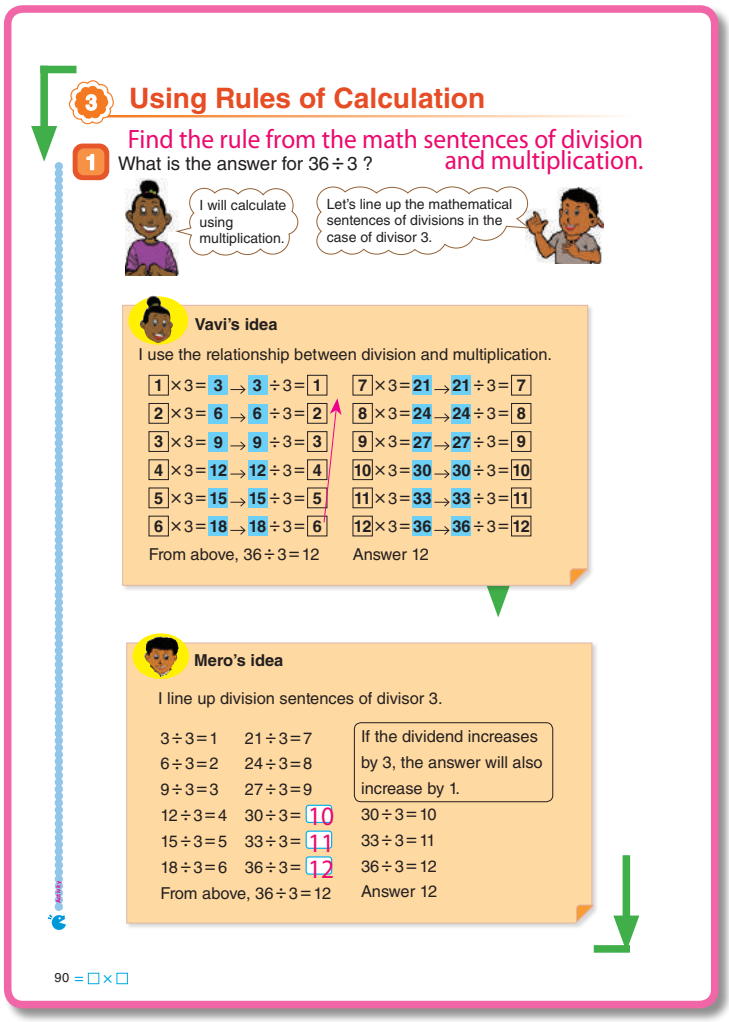
- Student: the same set of numbers for groups consisting of 12 cards of '□×3=□' and 12 cards of '□÷3=□'
- Teacher: 1 set of cards mentioned above, blue tac.

Assessment

- Find the rules between multiplication and division. F
- Find the rules of increase of dividends and quotients. F
- Solve exercise 24÷2 by using two ideas. S

• Teacher's Notes •

The lessons focus is on the relationship of division and multiplicaiton.
Vavi and Mero's ideas are based on table of 3.
Help students to see that they can use their multiplication to find their answer to division.



3 Using Rules of Calculation

1 Find the rule from the math sentences of division and multiplication.

What is the answer for 36÷3 ?

I will calculate using multiplication.

Let's line up the mathematical sentences of divisions in the case of divisor 3.

Vavi's idea

I use the relationship between division and multiplication.

1×3=3 → 3÷3=1	7×3=21 → 21÷3=7
2×3=6 → 6÷3=2	8×3=24 → 24÷3=8
3×3=9 → 9÷3=3	9×3=27 → 27÷3=9
4×3=12 → 12÷3=4	10×3=30 → 30÷3=10
5×3=15 → 15÷3=5	11×3=33 → 33÷3=11
6×3=18 → 18÷3=6	12×3=36 → 36÷3=12

From above, 36÷3=12 Answer 12

Mero's idea

I line up division sentences of divisor 3.

3÷3=1	21÷3=7
6÷3=2	24÷3=8
9÷3=3	27÷3=9
12÷3=4	30÷3=10
15÷3=5	33÷3=11
18÷3=6	36÷3=12

If the dividend increases by 3, the answer will also increase by 1.

30÷3=10
33÷3=11
36÷3=12

From above, 36÷3=12 Answer 12

90 =□×□

Lesson Flow

1 Think about how to calculate 36÷3.

T Which multiplication table should we use to solve 36÷3?
S Multiplication table of 3.
T Introduce the main task.

2 Think about Vavi's idea.

TN Try to find the answer using prior ideas before introducing divison in vertical form.
T/S (Showing a card one by one up to 4×3 written □×3=□) Can you make a mathematical sentence by putting a number in each box?
S Complete 5×3=15 and more.
T (Showing a card one by one up to 12÷3 written □÷3=□) What about this division?
S Complete 15÷3=5 and more.
TN All cards should be arranged in order from smallest to largest.
S The answer of the multiplication is the dividend of division so 36÷3=12.

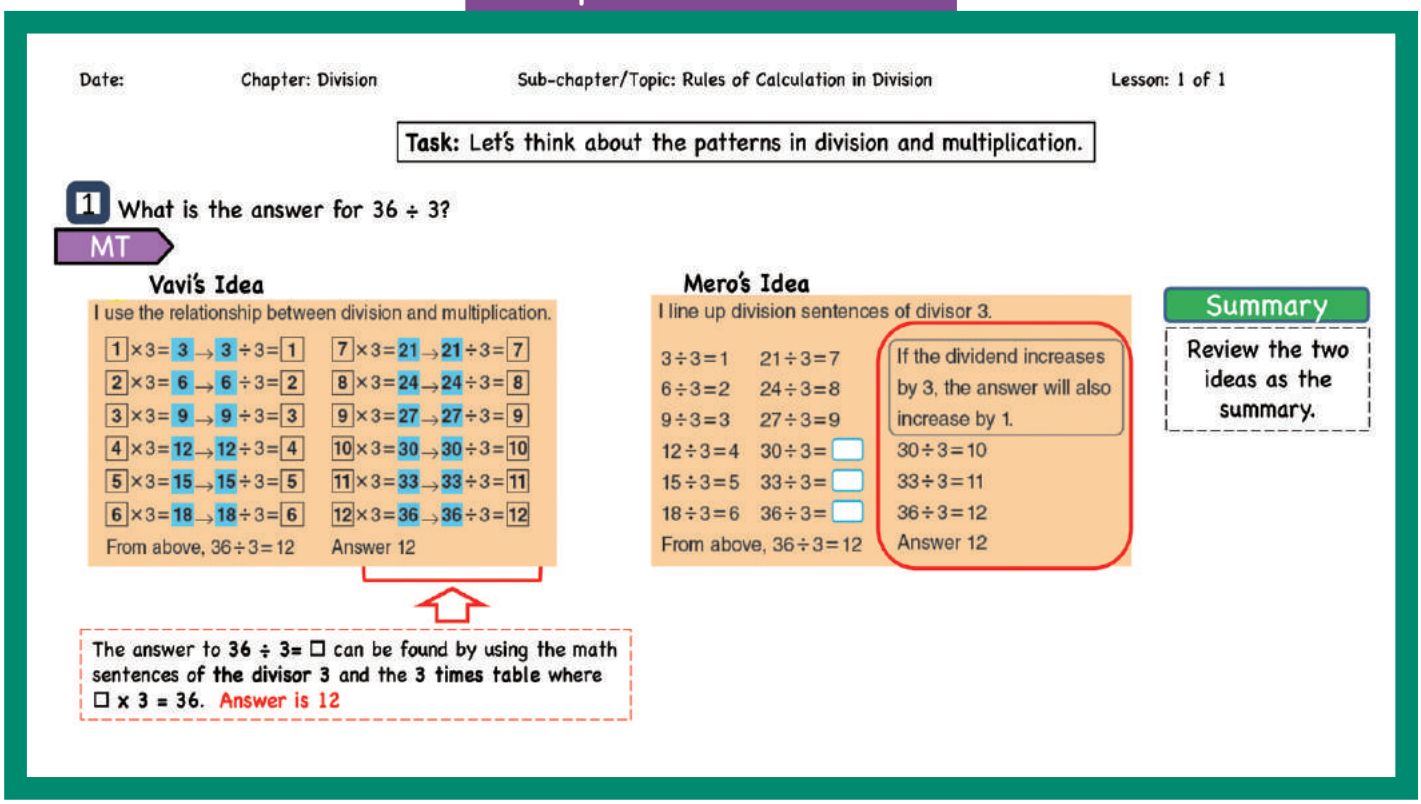
3 Think about Mero's idea.

T Look at Mero's idea in the textbook.
TN Focus on the division part of Mero's idea and relate it to Vavi's idea.
T Have you found any rules? Explain.
S The answer of divisions are increasing by one as the dividends increase by 3 so 36÷3=12.

4 Do the exercise 24÷2 by using two ideas.

S Apply Vavi or Mero's Idea 24÷2=12

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.91-p.92
Actual Lesson 063

Lesson Objectives

- To deepen the understanding of things learned in this unit.

Prior Knowledge

- All the contents in this Unit.

Preparation

- Evaluation sheet for all students.

Assessment

- Solve the exercises correctly and confidently. F S
- Enjoy solving exercises confirming understanding of what they learned. F

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

1 Let's divide. Pages 84, 85, 88, 89

① 35÷7 = 5　② 72÷9 = 8　③ 18÷6 = 3　④ 28÷4 = 7
⑤ 12÷3 = 4　⑥ 21÷3 = 7　⑦ 20÷4 = 5　⑧ 30÷5 = 6
⑨ 64÷8 = 8　⑩ 36÷6 = 6　⑪ 8÷2 = 4　⑫ 16÷2 = 8
⑬ 81÷9 = 9　⑭ 63÷7 = 9　⑮ 42÷6 = 7　⑯ 4÷1 = 4
⑰ 8÷8 = 1　⑱ 0÷2 = 0　⑲ 69÷3 = 23　⑳ 84÷4 = 21

2 Let's find the number which applies to the □. Pages 84, 87

① 5×3=15　② 7×5=35
③ 3×8=24　④ 9×4=36
⑤ 7×6=42　⑥ 3×3=9
⑦ 8×4=32　⑧ 6×8=48

3 There are 28 cookies. Page 86

① If you distribute 4 cookies to each friend, how many can each friend receive?
28 ÷ 4 = 7　Answer: 7 friends

② If you distribute the same number of cookies to 4 friends, how many cookies can each friend receive?
28 ÷ 4 = 7　Answer: 7

Let's calculate. Grade 3 Do you remember?

① 24×6 = 144　② 72×7 = 504　③ 56×8 = 448　④ 62×5 = 310
⑤ 284×3 = 852　⑥ 643×7 = 4501　⑦ 206×9 = 1854　⑧ 999×9 = 8991

Problems

1 Distribute 36 sheets of coloured papers.
● Finding out how many to each person and how many persons.

① If you distribute the same number to 9 children, how many does one child get?
36 ÷ 9 = 4　Answer: 4 sheets

② If you distribute 9 papers to each child, how many children can receive?
36 ÷ 9 = 4　Answer: 4 children

2 Let's calculate the following divisions.
● Using the multiplication table to calculate division.

① 27÷3 = 9　② 30÷6 = 5　③ 18÷2 = 9　④ 56÷8 = 7　⑤ 36÷4 = 9
⑥ 20÷5 = 4　⑦ 21÷7 = 3　⑧ 63÷9 = 7　⑨ 15÷5 = 3　⑩ 42÷6 = 7
⑪ 16÷4 = 4　⑫ 49÷7 = 7　⑬ 28÷7 = 4　⑭ 54÷9 = 6　⑮ 72÷8 = 9
⑯ 7÷1 = 7　⑰ 3÷3 = 1　⑱ 0÷6 = 0　⑲ 2÷1 = 2　⑳ 5÷5 = 1

3 Let's make a story problem for 32÷4. Write a number or word which applies to the □.
● Making a story problem from expression.

①
Division to Find the Number for Each
There are 32 pencils distributed to 4 friends equally. How many pencils can 1 friends receive?

②
Division to Find the Number of Times
There are 32 pencils. 4 pencils are distributed to each friend. How many friends can receive?

□ + □ = 91　92 = □ − □

Lesson Flow

1 ① Calculate in vertical form.

TN (1) to (6) : (2-digits)×(1-digit)
(1) : without carrying
(2) to (6) :with carrying
(7) to (12) : (3-digits)×(1-digit)
(7): without carrying
(8) to (12) : with carrying

2 ② Fill in the blank.

T Have students remember that multiplication is addition of product of each digit.

3 ③ Solve the word problem.

S Use any method of multiplication to complete the exercise.

4 Do you remember?

TN (1) and (2) Commutative law of multiplication (3) and (4) When multiplicand increase 1, the product increase a number of multiplier.
(3) and (4) Associative law of multiplication

5 ① Solve the problems of partitive and quotative division.

T The math expression will be 36÷9 in both question. What is the difference of those two questions?

S How to divide the paper and the meaning of the answer. The first question is separating paper for 9 people but second question, finding the number of people when 9 papers are distributed.

6 ② Practice division.

T If there are students who have difficulty of multiplication in certain rows, let them practice those rows.

7 ③ Make two types of division and find the answers.

T Let the students understand the situation of each problem and the difference of what to divide and how to divide.

Division	Name:	Score

1. There are 20 apples. (Each question is worth 5 points)
   ① If you distribute the same number to 4 people, how many does each person get?
   Mathematical sentence: 20 ÷ 4=5
   Answer: 5 apples
   ② If you distribute 2 apples to each person, how many people can receive apples?
   Mathematical sentence: 20 ÷ 2=10
   Answer: 10 apples

2. Calculate the following divisions.
   (Each question is worth 5 points)
   ① 9 ÷ 3 =3 ② 16 ÷ 8 =8 ③ 48 ÷ 6 =8 ④ 81 ÷ 9 =9
   ⑤ 6 ÷ 6 =1 ⑥ 5 ÷ 1 =5 ⑦ 0 ÷ 1 =0 ⑧ 60 ÷ 5 =12

3. My class has 30 children. We are divided into 6 groups with the same number of children. How many children are in each group?
   Mathematical sentence: 30 ÷ 6=5
   Answer: 5 apples

4. Make a mathematics story problem for 28÷7.
   Tobby found 28 mud shells along the mangroves. He decide to cook 7 daily. How many days will it take for him to cook all the shells?

End of Chapter Test: Chapter 8 **Date:**

Division	Name:	Score

1. There are 20 apples. (Each question is worth 5 points)

   ① If you distribute the same number to 4 people, how many does each person get?

   Mathematical sentence: _____

   Answer: _____

   ② If you distribute 2 apples to each person, how many people can receive apples?

   Mathematical sentence: _____

   Answer: _____

2. Calculate the following divisions.

   (Each question is worth 5 points)

   1. 9 ÷ 3 ② 16 ÷ 8 ③ 48 ÷ 6 ④ 81 ÷ 9

   ⑤ 6 ÷ 6 ⑥ 5 ÷ 1 ⑦ 0 ÷ 1 ⑧ 60 ÷ 5

3. My class has 30 children. We are divided into 6 groups with the same number of children. How many children are in each group?

   Mathematical sentence: _____

   Answer: _____

4. Make a mathematics story problem for $28 \div 7$.

Chapter 9 Division with Remainders

1. Unit Objectives

- Understand a meaning of division with remainders and how to calculate it. (3.1.6 a)
- Understand a relation between a divisor and largeness of remainders.(3.1.6 c)
- Understand how to confirm division with remainders. (3.1.6 b)
- To solve various problems of division with remainder (3.1.6 c)

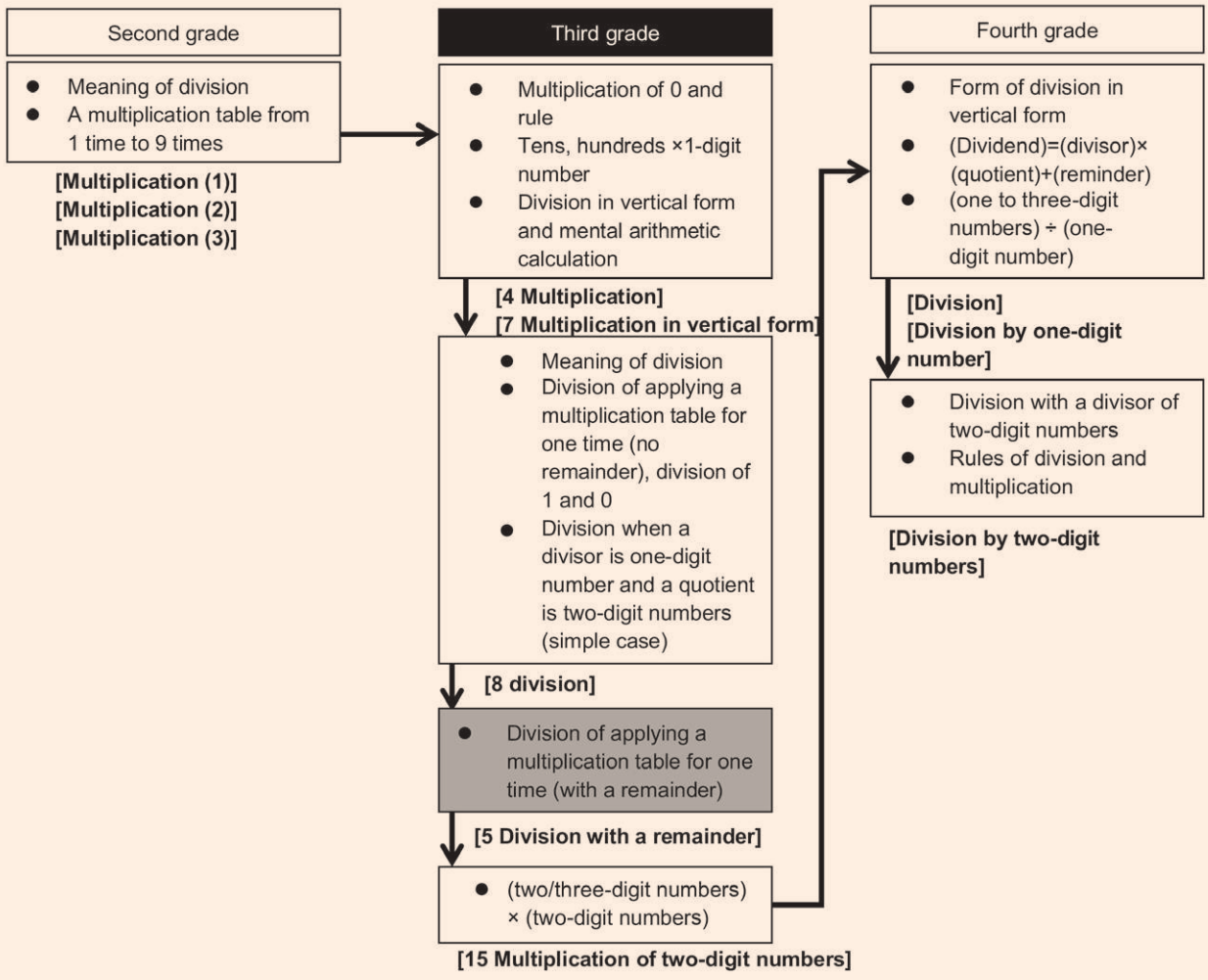
2. Teaching Overview

The difference between the last and this chapters is if there are remainders or not. Students are to think about the meaning of remainders and relationship between remainder and divisor.

Division with Remainders : In this topic, students think about indivisible situations. Students are to compare divisible and indivisible situations and think about the meaning of remainders and relationship between sizes of divisor and remainder. They should have a habit to check if their division is calculated correctly by multiplication and addition.

Let's solve various problems : In this topic, students are to get familiar with various situations and how to deal with remainders. Depending on what is asked, the answer will be changed (See Question 2). They also should be familiar with division situations by making maths stories.

3. Related Learning Contents



Unit 9

Unit: Division with Remainders
Sub-unit: 1. Division with Remainders
Lesson 1 of 2 (Double Period)

Textbook Page : p.93 - p.94
Actual Lesson 064

Sub-unit Objectives

- To understand the meaning of division with remainders and how to calculate it.
- To understand the relationship between a divisor and the largeness of remainders.
- To understand how to confirm division with remainders.

Lesson Objectives

- To know that an expression of division can also be made with remainders and find out an answer by using multiplication table.

Prior Knowledge

- Meaning of division.
- Division without remainder (2 or 3-digits) ÷ (1-digit).
- Using multiplication to calculate division.

Preparation

- Pictures of fruits and counters such as blocks or stones etc.

Assessment

- Enjoy investigating expression of division made with remainders and finding out an answer by using the multiplication table. F
- Do the exercises correctly. S

• Teacher's Notes •

Use semi-concrete materials or images of oranges and apples for students to understand the meaning of division with remainders.
Teacher should read and explain the key ideas to the students.
Remember the terms divisible, dividend, divisor, answer and remainder can be used. Quotient and its meaning will be discussed in Grade 4.

9 Division with Remainders

Division with no remainders

Division with remainders

There are 20 apples and 23 oranges.

Put 4 of each type of fruits into separate bags.

1 Division with Remainders

1 There are 23 oranges. If you put 4 oranges into each bag, how many bags can you use?

Meaning of division with remainders (Partitive division)

❶ Write an expression.

23 ÷ 4

23: Total number; 4: Number to each bag

This is a calculation distributing the same number to each unit, so we can use division.

Is there any number that fit □ in 4×□=23?

❷ Let's think about how to calculate.

Let's think about how to calculate divisions with remainders.

□+□=93

Sare's idea

I circled groups of 4 oranges.

Ambai's idea

I used the column of 4 in the multiplication table.
For 4 bags, 4×4=16, 7 oranges remainder.
For 5 bags, 5×4=20, 3 oranges remainder.
Total 23
For 6 bags, 6×4=24, 1 orange short.

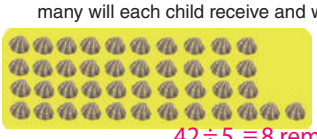
There are 5 bags and 3 remainders.

We will write this as follows: 23÷4=5 remainder 3

Answer: 5 bags and a remainder of 3 oranges

As in 23÷4, if we have a **remainder**, it is called "**not divisible**". In other words, the dividend 23 is not divisible by divisor 4. In 20÷4, if we have no remainder, it is called "**divisible**". In other words, the dividend 20 is divisible by divisor 4.

2 There are 42 shells distributed to 5 children equally. How many will each child receive and what will be the remainder?



Five nines is 45, it's too much, so how about five eights is 40?

42÷5 =8 remainder 2
Answer : 8 shells and remainder 2

Exercise

There are 34 cards. If they give 6 cards to each child, how many children can receive cards and what is the remainder?

34÷6 =5 remainder 4
Answer : 5 children, 4 cards remainder

94 =□+□

Lesson Flow

1 Think about the situation of 20 apples.

T "If you put 4 apples into each plastic bag, how many plastic bags do you have?"
S Make the expression and solve the problem because 20÷4 is prior knowledge.
T Confirm that it will actually be 5 plastic bags without remainders.

2 1 Think about the situation of 23 oranges.

T "If you put 23 oranges into each plastic bag, how many plastic bags do you use?"
S Make the expression and solve the problem.
T What is the answer of 23÷4?
S There is no answer of 23 in the multiplication table of 4.

3 Think about how to calculate division of 23÷4 with remainders.

S Arrange 23 oranges and divid into groups of 4 oranges using blocks.(Sare's idea)
S Identify that 5 bags and 3 oranges are left.
T Explain Ambai's idea using the multiplication table of 4.
4×4=16, 7 oranges left
5×4=20, 3 oranges left
6×4=24, 1 orange more than the actual number of oranges.
S Identify the meaning of 5 bags and 3 oranges to complete the mathematical sentence.
T Confirm that 23÷4 will be "5 remainder 3" and the answer of problem will be "5 bags and remainder of 3 oranges."
T Summarise important point in the box.
T Introduce the main task.

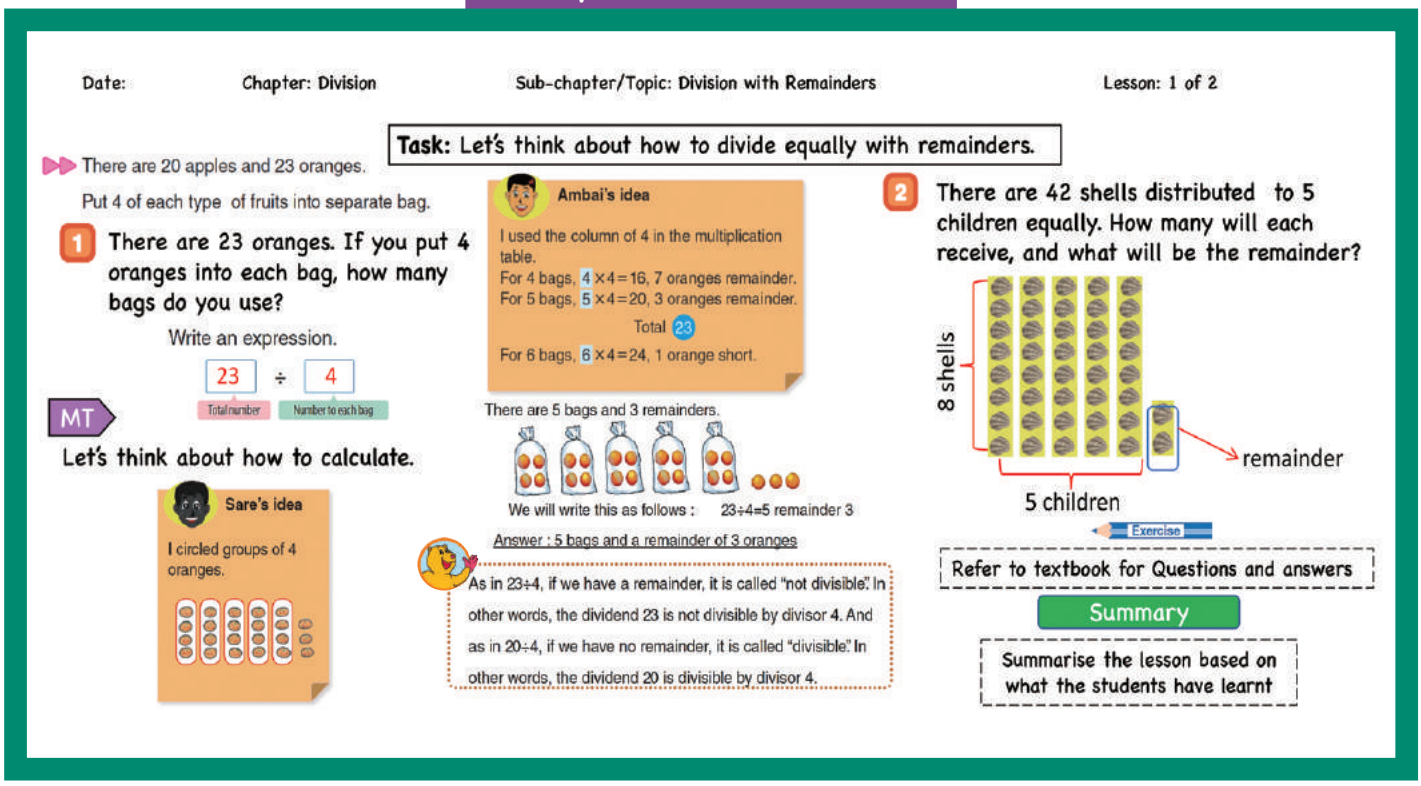
4 2 Solve the problem.

S Make mathematical expression 42÷5.
S Find the answer using multiplication table. (Ambai's idea)
T Confirm the answer 42÷5=8 remainder 2.

5 Solve the exercises.

S Solve the exercises using the multiplication table.

Sample Blackboard Plan



Unit 9

Unit: Division with Remainders
Sub-unit: 1. Division with Remainders
Lesson 2 of 2 (Single Period)

Textbook Page : p.95
Actual Lesson 065

Lesson Objectives

- To check divisors and remainders of division and know about the relationship between divisors and remainders.
- To understand how to check calculations of division.

Prior Knowledge

- Division with remainder (Previous lesson).

Preparation

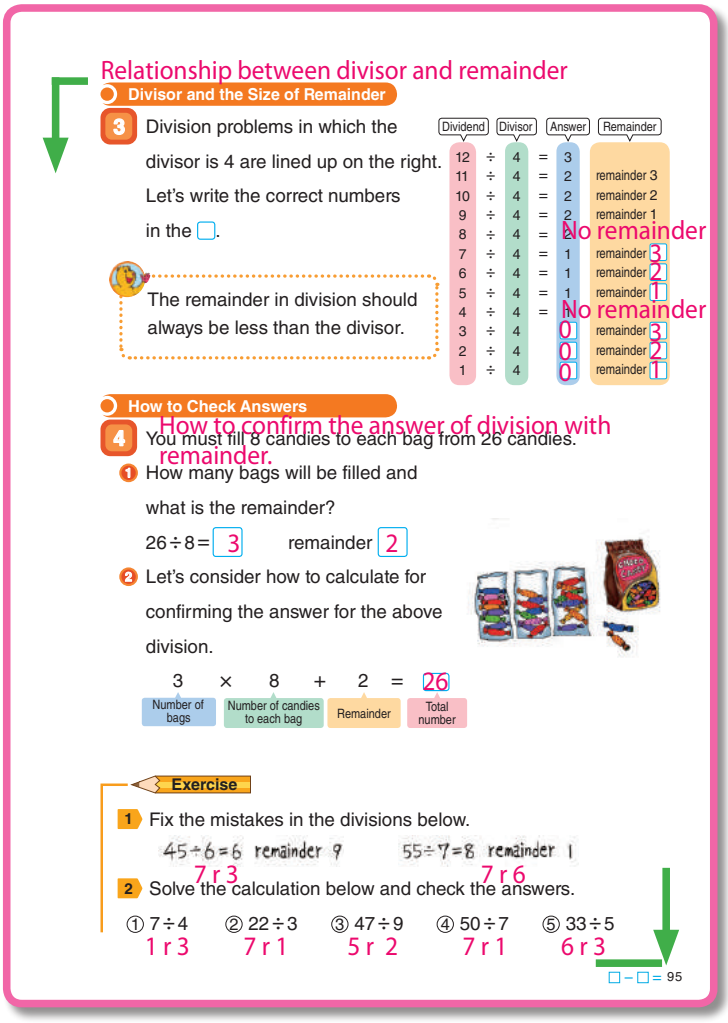
- Cards of division with a divisor of 4 (Dividend of 0 to15) for demonstration.

Assessment

- Investigate the relationships between divisors and remainders. F
- Understand how to confirm the answer of division with remainder. F
- Do the exercises correctly. S

• Teacher's Notes •

Encourage students to confirm answers using "How to Check Answers" for every divisional problems.



Relationship between divisor and remainder

Divisor and the Size of Remainder

3 Division problems in which the divisor is 4 are lined up on the right. Let's write the correct numbers in the □.

The remainder in division should always be less than the divisor.

Dividend		Divisor		Answer	Remainder
12	÷	4	=	3	
11	÷	4	=	2	remainder 3
10	÷	4	=	2	remainder 2
9	÷	4	=	2	remainder 1
8	÷	4	=	2	No remainder
7	÷	4	=	1	remainder 3
6	÷	4	=	1	remainder 2
5	÷	4	=	1	remainder 1
4	÷	4	=	1	No remainder
3	÷	4		0	remainder 3
2	÷	4		0	remainder 2
1	÷	4		0	remainder 1

How to Check Answers

4 How to confirm the answer of division with remainder.
You must fill 8 candies to each bag from 26 candies.

1 How many bags will be filled and what is the remainder?
26 ÷ 8 = 3 remainder 2

2 Let's consider how to calculate for confirming the answer for the above division.

3 × 8 + 2 = 26
Number of bags | Number of candies to each bag | Remainder | Total number

Exercise

1 Fix the mistakes in the divisions below.
45 ÷ 6 = 6 remainder 9 → 7 r 3
55 ÷ 7 = 8 remainder 1 → 7 r 6

2 Solve the calculation below and check the answers.
① 7 ÷ 4 → 1 r 3
② 22 ÷ 3 → 7 r 1
③ 47 ÷ 9 → 5 r 2
④ 50 ÷ 7 → 7 r 1
⑤ 33 ÷ 5 → 6 r 3

□ − □ = 95

Lesson Flow

1 ③ Think about the relationship between a divisor and the size of the remainder.

T Let's find out rules of division with a divisor of 4.
S Remainders will decrease as 3, 2, 1 and the next will be divisible with no remainder.
S Remainders repeat as 3, 2, 1, and 0.
S Remainders will not be larger than the divisor of 4.

2 Understand that 'remainder' is smaller than the 'divisor'.

S Discuss their findings.
T Summarise the important point in the box.
T Introduce the main task.

3 ④ Solve the task.

S ① Read the problem and make complete mathematical sentence.

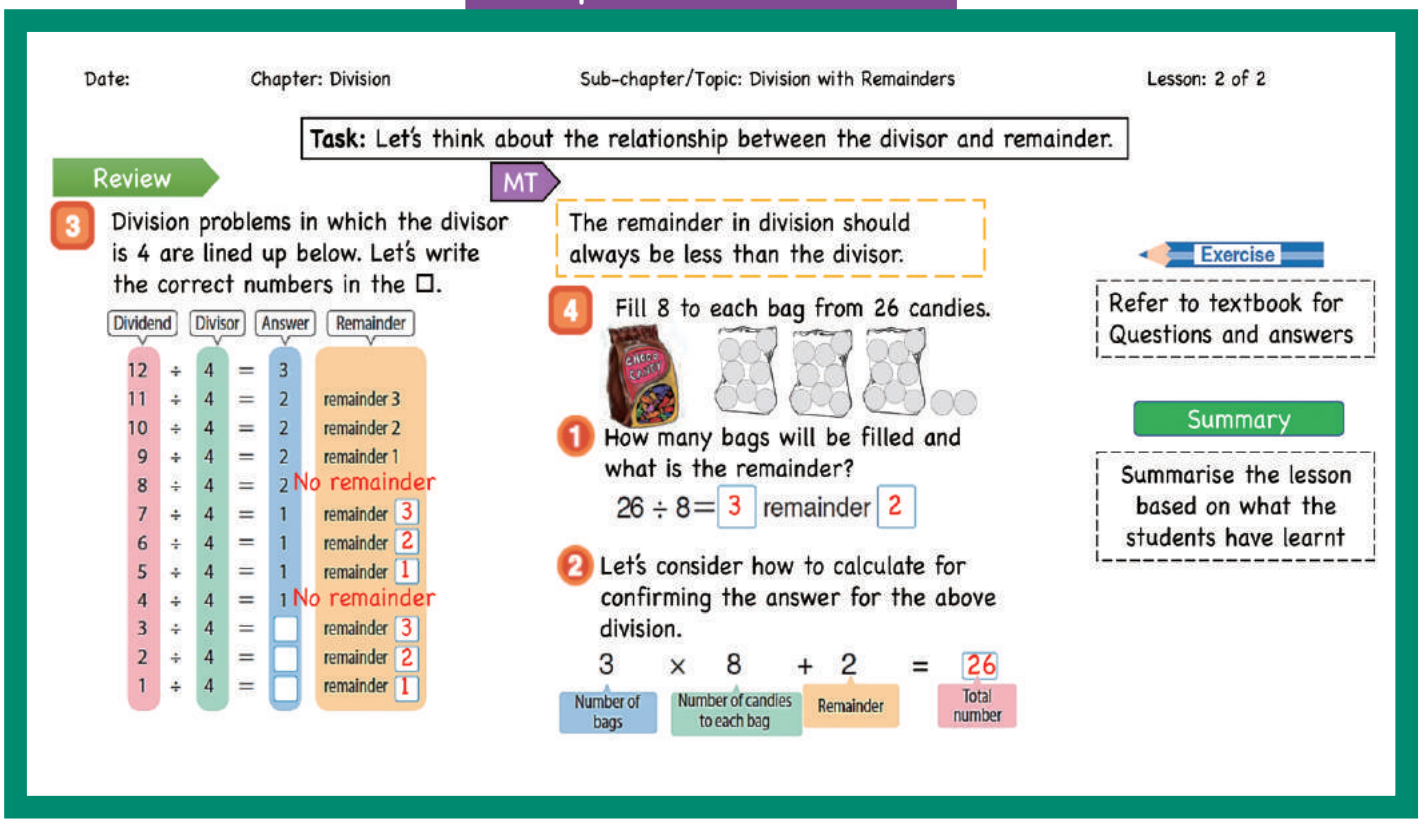
4 ② Confirm the answer of division.

T Think about each number and check by looking at the pictures.
S Think about 8×3+2=26 and explain it.
T/S Summarise how to check answers.

5 Solve the exercise.

S Complete 1 and 2.
TN To fix the mistake compare the divisor and the reminder.

Sample Blackboard Plan



Unit 9

Unit: Division with Remainders
Sub-unit: 2. Let's Solve Various Problems
Lesson 1 of 1 (Double Period)

Textbook Page : p.96
Actual Lesson 066

Sub-unit Objectives

- To solve various problems of division with remainders and deepen an understanding on division.

Lesson Objectives

- To solve problems of division with remainders and deepen the understanding on division.

Prior Knowledge

- Meaning of division.
- Division (2-digit) ÷ (1-digit) without remainder.
- Division with remainders.
- Relationship between dividend, divisors, quotient and remainder.

Preparation

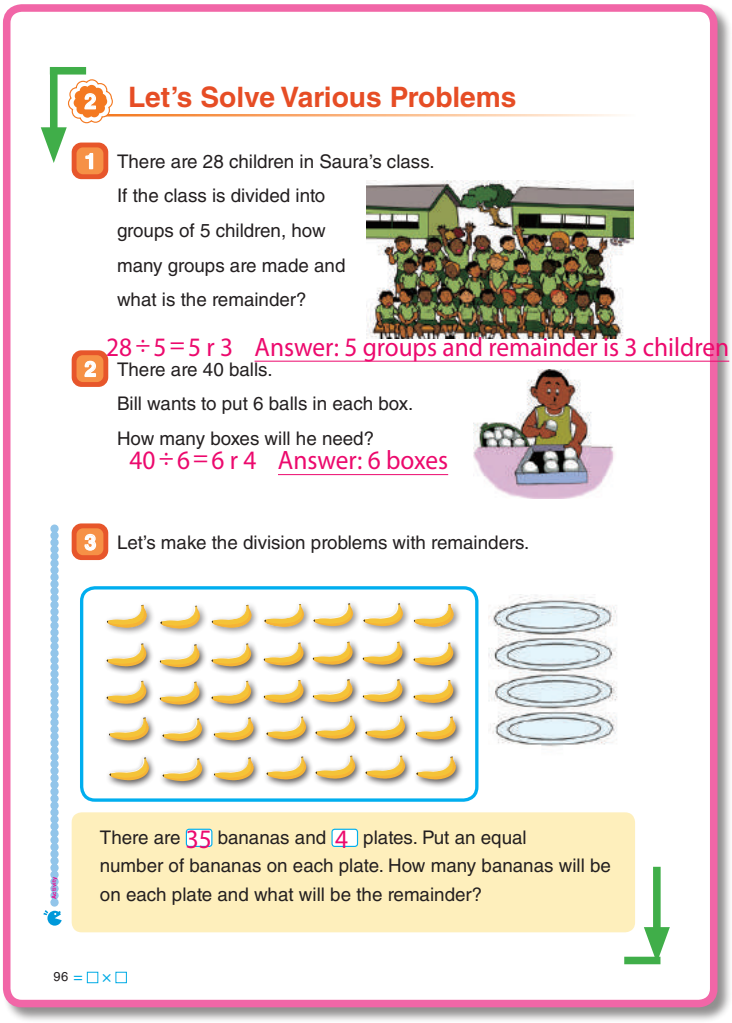
- Blocks and counters.

Assessment

- Enjoy solving problems of division with remainders and deepen understanding on division. F
- Solve the tasks correctly. F S

• Teacher's Notes •

Word problem may need more time for students in Grade 3. Double Period should give enough time for students to complete each task. Encourage them to recall their multiplication through problem solving and do checking at the end of their calculations.



2 Let's Solve Various Problems

1 There are 28 children in Saura's class.
If the class is divided into groups of 5 children, how many groups are made and what is the remainder?

28 ÷ 5 = 5 r 3 Answer: 5 groups and remainder is 3 children

2 There are 40 balls.
Bill wants to put 6 balls in each box.
How many boxes will he need?

40 ÷ 6 = 6 r 4 Answer: 6 boxes

3 Let's make the division problems with remainders.

There are 35 bananas and 4 plates. Put an equal number of bananas on each plate. How many bananas will be on each plate and what will be the remainder?

96 = □ × □

Lesson Flow

1 ① Read the problem and make an expression.

T Introduce the main task.
S Read the given problem and make a mathematical expression and solve it.
S 28 ÷ 5 = 5 remainder 3
S Confirm that the answer is 5 × 5 + 3 = 28.

2 ② Read the word problem, understand its situation well and solve it.

T Make a mathematical expression and solve it.
S 40 ÷ 6 = 6 r 4
T What is the meaning of each number?
S 40 balls, 6 balls in each box, 6 balls in 6 boxes can be made and 4 balls remaining.
T How do we have to treat the remainder.
S 4 balls of remainder also needs a box, so 6 + 1 = 7 Answer: 7 boxes
TN The expression will be "40 ÷ 6 = 6 remainder 4," students realise that one more box will be needed to put the remainder of 4 balls.

3 ③ Make a word problem of division with remainders.

T Have the students to fill in numbers in the boxes to complete the word problem.
S Make an expression and solve it.
S 35 ÷ 4 = 8 r 3, 8 bananas and 3 remainder. 8 bananas in each plate and 3 remain.
S Make another word problem and share ideas in groups.

Sample Blackboard Plan

Date: Chapter: Division Sub-chapter/Topic: Solving Problems Lesson: 1 of 1

Task: Let's solve division problems with remainders.

Review

MT

1 There are 28 children in Saura's class. If the class is divided into groups of 5 children, how many groups are made and what is the remainder?

Expression: 28 ÷ 5

Math Sentence:
28 ÷ 5 = 5 remainder 3

Answer:
5 groups and a remainder of 3 children

2 There are 40 balls. Bill wants to put 6 balls in a box. How many boxes does he need?

Expression: 40 ÷ 6

Math Sentence:
40 ÷ 6 = 6 remainder 4

Answer:
6 boxes and remainder of 4 balls

3 Let's make division problems with remainders.

There are 35 bananas and 4 plates. Put an equal number of bananas on each plate. How many banana will be on each plate, and what will be the remainder?

Math Sentence: 35 ÷ 4 = 8 remainder 3
Answer: 8 bananas on each plate and remainders 3 bananas.

Summary

Summarise the lesson based on what the students have learnt

Unit 9

Unit: Division with Remainders
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page :
p.97-p.98
Actual Lesson 067

Lesson Objectives

- To review what has been learned.
- To make sure careful calculations of divisions with remainders are done by using a multiplication table and also knowing about the relationship between divisors and size of remainders.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheet for all students.

Assessment

- Enjoy solving problems confirming what they learned in this unit. F
- Solve the problems correctly. S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

1 Let's calculate and check the answers. Page 94

① 29 ÷ 3 = 9 r 2 ② 36 ÷ 5 = 7 r 1 ③ 17 ÷ 6 = 2 r 5
④ 43 ÷ 9 = 4 r 7 ⑤ 34 ÷ 7 = 4 r 6 ⑥ 55 ÷ 8 = 6 r 7

2 There are 48 pencils. The same amount will be distributed to 7 children. How many pencils can be distributed to each child and what will be the remainder? Page 96

48 ÷ 7 = 6 r 6 A. 6 pencils and remainder is 6 pencils.

3 There are 66 cards. Pages 94 ~ 96

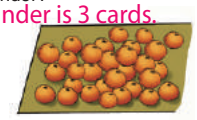
If the same amount is distributed to 9 children, how many cards will each child get and what will be the remainder?

66 ÷ 9 = 7 r 3 A. 7 cards and remainder is 3 cards.

If 9 cards are distributed to each child, how many children can receive and what will be the remainder?

66 ÷ 9 = 7 r 3 A. 7 children remainder is 3 cards.

4 There are 30 oranges. You will put these oranges in each plastic bag. In each bag, 4 oranges can fit. In order to put all the oranges in the plastic bag, how many plastic bags do you need? Page 96



30 ÷ 4 = 7 r 2 A. 8 plastic bags.

Solve the calculations below. Grade 3 Do you remember?

① 595 − 288 = 307 ② 460 − 132 = 328 ③ 906 − 742 = 164
④ 892 − 625 = 267 ⑤ 1234 − 695 = 539 ⑥ 1006 − 759 = 247
⑦ 5613 − 3424 = 2189 ⑧ 7411 − 5079 = 2332 ⑨ 9000 − 8021 = 979

□ + □ = 97

Problems

1 Let's find the mistakes in the following calculations?

Write the correct answer in the □.

● Understanding the meaning of the division with remainder.

28 ÷ 3 = 8 remainder 4 → 9 r 1 Remainder is larger

37 ÷ 5 = 8 remainder 3 → 7 r 2 Quotient isn't too large

2 There are 46 tomatoes. They will be divided equally amongst 6 people.

● Considering the remainder depending on the story.

① How many tomatoes can be distributed to each person and what will be the remainder?

46 ÷ 6 = 7 r 4 A. 7 tomatoes and remainder is 4 tomatoes.

② How many more tomatoes do you need to distribute 8 to each person?

2 tomatoes

3 Let's calculate.

● Perform divisions with remainders.

① 33 ÷ 8 = 4 r 1 ② 48 ÷ 5 = 9 r 3 ③ 17 ÷ 4 = 4 r 1
④ 26 ÷ 7 = 3 r 5 ⑤ 56 ÷ 9 = 6 r 2 ⑥ 41 ÷ 6 = 6 r 5
⑦ 11 ÷ 2 = 5 r 1 ⑧ 39 ÷ 7 = 5 r 4 ⑨ 74 ÷ 9 = 8 r 2

4 There are 11 plastic bottles of juice in total. 4 plastic bottles of 2 L and 7 plastic bottles of 1 L. If you distribute equally amongst 3 people, what are the possible methods?

● Considering the various ways of distributions.

98 = □ − □

Lesson Flow

1 ① Calculate and check the answers.

TN There are some students who still have difficulty in multiplication table or some have a difficulty of division with remainder. Therefore, the teacher has to find out their difficult part and review that part by taking time.

2 ② Read the problem and think about how to calculate the division with remainders.

T Let students imagine the situation of dividing 48 pencils amongst 7 children equally by using pictures, blocks or counters. Teacher can draw picture on the blackboard if students do not understand well.

3 ③ Make an expression in a situation and find out a quotient and remainder by using the multiplication table.

TN Let the students confirm that
(1) : (Amount of 1 person) × (9 people) = (Amount of total cards) We have to find the amount of 1 person

T What is the mathematical expression?
S 66 ÷ 9
S Each child receives 7 cards and 3 card are remainder.
TN Let the students confirm that (2) : (9 cards) × (The number of people) = (Amount of total cards) We have to find the number of people
T What do we have to find?
S The number of people we can distribute to.
T What is the mathematical expression?
S 66 ÷ 9
S 7 people and 3 cards are remainder.

4 ④ Read the problem and think about how to find the answer.

TN Identify and understand the meaning of 30 and 4 and write an expression. Then use plastic bags to distribute the same number of oranges

5 Solve the exercise 'Do you remember'.

6 ① Find any mistakes done in the following calculations and write corrections to them.

T Let the students focus on the relationship among the dividend, divisor, quotient and remainder.

7 ② Read the word problem and solve it.

S 46 ÷ 6
T What is the answer ?
S 46 ÷ 6 = 7 r 4 (7 tomatoes and remainder of 4 tomatoes)
T How many tomatoes do you need to distribute for 8 people?
S 8 × 6 = 48
T How many more do we need ?
S 48 − 46 = 2 2 tomatoes

8 ③ Calculate the following divisions with remainders.

TN Assist students individually who still have difficulty of calculation.

Division with Remainders	Name:	Score

(Each question is worth 10 points)

1. Calculate the following divisions and check the answers.

① 15 ÷ 4 = 3 remainder 3 Check the answer: 3 x 4 + 3 = 15
② 62 ÷ 7 = 8 remainder 6 Check the answer: 8 x 7 + 6 = 62
③ 6 ÷ 5 = 1 remainder 1 Check the answer: 1 x 5 + 1 = 6
④ 87 ÷ 9 = 9 remainder 6 Check the answer: 6 x 9 + 6 = 8

2. Find the mistakes and write the correct answers.

① 17 ÷ 3 = 4 remainder 4
17 ÷ 3 = 5 remainder 2

② 23 ÷ 4 = 6 remainder 1
23 ÷ 4 = 5 reaminder 3

3. There are 60 balls. Jayden wants to put 7 balls in each box. How many boxes does he need?

Mathematical sentence: 60 ÷ 7 = 8 remainder 4
Answer: 9 boxes

4. There are 46 cakes. You will need to distribute the same number of cakes to 8 people equally.

① How many cakes does each person get and how many cakes are left?
46 ÷ 8 = 5 remainder 6
Each person gets 5 cakes and 6 cakes are left.

② How many cakes are needed to distribute 6 cakes to each person?
8-6 = 2 2 cakes

End of Chapter Test: Chapter 9 **Date:**

Division with Remainders	Name:	Score

(Each question is worth 10 points)

1. Calculate the following divisions and check the answers.

   ① 15 ÷ 4 = Check the answer: _____

   ② 62 ÷ 7 = Check the answer: _____

   ③ 6 ÷ 5 = Check the answer: _____

   ④ 87 ÷ 9 = Check the answer: _____

2. Find the mistakes and write the correct answers.

   ① 17 ÷ 3 = 4 remainder 4 ② 23 ÷ 4 = 6 remainder 1

   _____ _____

3. There are 60 balls. Jayden wants to put 7 balls in each box. How many boxes does he need?

   Mathematical sentence: _____

   Answer: _____

4. There are 46 cakes. You will need to distribute the same number of cakes to 8 people equally.

   ① How many cakes does each person get and how many cakes are left?

   _____

   ② How many cakes are needed to distribute 6 cakes to each person?

   _____

Chapter 10 Circles and Spheres

1. Unit Objectives

- To focus on elements to form shapes through activities such as observing and forming shapes, and are able to understand shapes. (3.3.2a,c and d)
- To know about circles and spheres, and also to understand about their centre, radius and diameters. (3.3.2b)

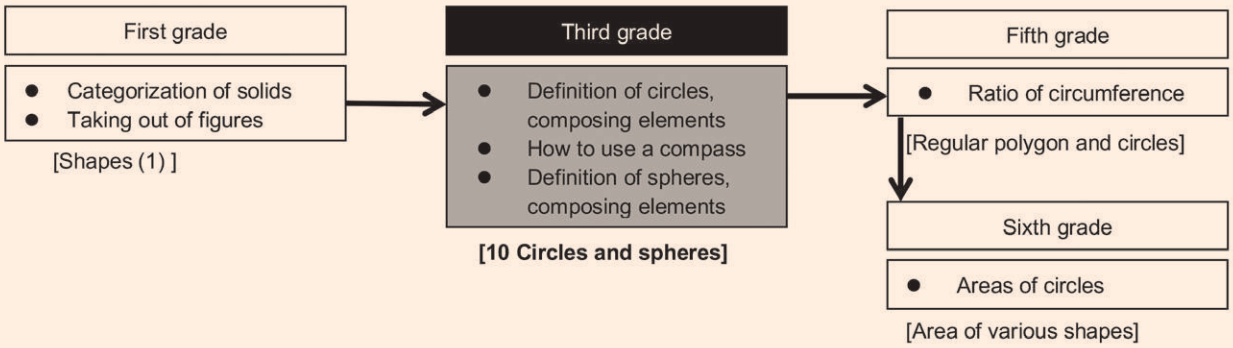
2. Teaching Overview

Students have knowledge of circles as "round shapes" in an intuitive manner. However, learning of shapes in mathematics requires proper investigations with mathematical definitions as evidences for proving. Another important aspect to learn shapes is to capture properties of each shape by cutting, projecting and observing the shade, opening to observe the net, rolling, observing where we commonly find each shape etc.

Circles : Teacher should practice how to use compasses before teaching the topic. Students are to find that many points which are in equal distances from a certain point (centre) looks like a proper circle through several activities and learn the definition afterwards. Students are also required to practice drawing proper circles with compasses. Note that they should also draw the centre properly to identify for verification if all points on the circumference are in the same distance as its radius.

Spheres : In the same manner of circles, the sphere should be understood based on the definition. If spheres are recognised as "similar shape of balls", it is not enough. If a shape is a sphere, every cross section should be circles. For understanding spheres, physical models will help student understand where they can find radius, which cross section is maximum in size, etc.

3. Related Learning Contents



Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 1 of 4 (Double Period)

Textbook Page : p.99~p.100
Actual Lesson 068

Sub-unit Objectives

- To understand the definition of circles through the mathematical activities.
- To have students realise the functions of compass.
- Students are able to use compass to draw circles and transfer line segments.
- To understand terms such as “radius, diameter, and centre” of circles and be able to explain about circles.

Lesson Objectives

- To realise that putting many points at an equal distance from a certain point will gradually form a round shape.

Prior Knowledge

- Shapes (Grade 2)

Preparation

- Sets of ring toss (several sets), ropes to measure and compare distances, worksheets for taking a look at a standing position for ring toss.

Assessment

- Enjoy playing the game and thinking about the shape. F
- Realise that when having more children, points of their standing positions will gradually form a line and it will become closer to a round (circle). S

Lesson Flow

1 Enjoy playing ring game freely altogether.

T Introduce the main task.
T Have students to play the game of ring toss from wherever points first and then realise the importance of making rules to play the game with fairness.
S Play the game of ring toss freely on the playground.

2 Think about how everyone can play the ring toss on the same conditions.

S Make rules to play ring toss game on the same condition.
T Have students to understand differences of distances from a pole of ring toss to standing positions.
T Have students discuss about their opinions on various standing positions.
TN Study positions (A), (B) and (C) on the textbook and confirm the fairness of the game.
S Realise that (B) is the answer because of the equal distance from the centre.

3 Think about what shape standing positions of everyone will form when adding more children.

T Guess what shape will be formed? Is it a shape you know.
S Stand at an equal distance from a pole by using a rope, and guess what shape will be formed.
T Have the students put their exercise book or anything on their standing positions and have them confirm standing positions expressed with points when viewed from a little higher place.
S Draw everyone's standing positions as points in the worksheets on which pole is drawn as a centre and think about the shape by themselves.
T/S Summarise the activity.
S Describe the circle in their own words.

• Teacher's Notes •

- If the surrounding of playing ring toss is not convenient, then try use textbook or improvise, this will also apply to drawing a circle with a 2 m radius on the playground using a rope.
- This lesson is to have students experience that throwing the above point through mathematical activities can help and have them identify the definitions. We would like to show students how a circle will be formed by visualising steps for gradually adding points at an equal distance from a certain point and in order.
- Also, have students develop familiarity with and have them realise that circles are used by finding things that are shaped like a circle in their life. This will help increase their motivation for learning about circles.

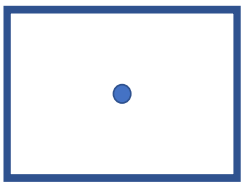
Sample Blackboard Plan

Date: Chapter Name: Circles and Sphere Topic: Circles Lesson Number: 1 of 4

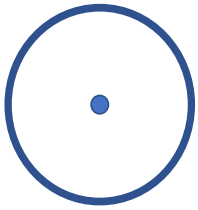
Main Task: Let's think about how we should line up for a fair game.

MT

Standing in a straight line or in a square and throw. The students at the far end will not have a fair try.



Standing around and throw. The students at every end will not have a fair try.



Summary

The circle have equal distance from the round to the center and so the students had fair play in circle.

Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 2 of 4 (Double Period)

Textbook Page : p.100~p.101
Actual Lesson 069

Lesson Objectives

- To understand the definitions, natures and the relationship of elements of circles.
- To draw circles of given size by using instruments.

Prior Knowledge

- Notion of circle (Previous lesson)

Preparation

- Ruler(30 cm), A4 papers, craft papers, thumb pins, instrument to make hole, rubber band, coloured papers and grid papers
- 1 m ruler, 2 m rope and 2 sticks

Assessment

- Think about the natures of circles through activities such as drawing and folding. F
- Understand definitions and the meaning of the terms of circles. S

• Teacher's Notes •

- If the surrounding of playing ring toss is not convenient, then try use textbook or improvise, this will also apply to drawing a circle with a 2 m radius on the playground using a rope.
- This lesson is to have students experience that through mathematical activities they identify the definition and thus allows them to draw a circle by using an instrument which has made holes in the craft paper as in the picture shown. This is based on thoughts that a circle is sets of points at an equal distance from a fixed point.
  Do not call the point as "centre point" but "centre"

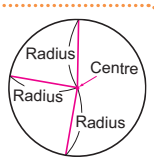
1 Circles

How to draw round shape.

1 Let's think about how to draw a round shape.

1. Draw many points that are all 3 cm from point A.
2. Using an instrument below, draw a round shape.

A round shape that has the same distance from one point is called a circle. This point is called the centre.
The straight line from the centre to any point on the circle is called the radius.



The circle you drew in 1 has a radius of 3 cm. Point A and the pin is the centre of the circle.

2 Draw a circle using rope.

Let's draw a circle with a 2 m radius in the school ground using a rope.

3 A compass is a tool used for drawing circles.

1. Draw a circle with a 4 cm radius using a compass.

① Open the compass to the length of the radius.

② Rotate the compass to draw a circle.

2. Draw another circle with a different radius and the same centre.

Lesson Flow

1 Review previous lesson.

T Introduce the main task.

2 1 Think about how to draw a round shape and understand the terms of the circle.

T Let students think about how to draw a round shape and share ideas.

S 1 Draw many points that are all 3 cm from point A using a ruler (refer to the textbook) to plot dots like a round shape.

S 2 Draw a round shape using a grid paper with 3 cm distance from thumb pin to pencil point (refer to the textbook).

TN Steps to draw a round shape:

- The paper should be placed on the soft surface.
- The grid paper is pinned in the centre with a thum pin.
- Make a hole at 3 cm from the centre with the pencil.

3 2 Understand the definitions, natures and the relationship of elements of circles.

T Explain the important point in the box .

4 Let's draw a circle with a 2 m radius on the playground.

T Allow students to measure 2 m rope and draw the circle with the rope.

S Measure and draw the circle using the idea of the previous activity.

5 Summarise the definition, nature and the relationship of the elements of a circle.

T/S Summarise the lesson as on the blackboard plan.

Sample Blackboard Plan

Date: Topic: Circles Lesson: 2 of 4

Main Task: Let's think about various ways to draw a circle.

Review

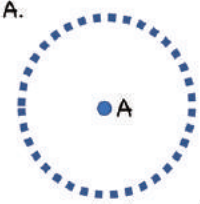
Share experience of the ring toss game.

MT

1 Let's think about how to draw a round shape.

Students Ideas
On how to draw round shape

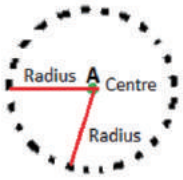
1 Draw many points that are all 3 cm from point A.



2 let's draw a round shape using a 3 cm grid paper.

Important Point

Round shape that has the same distance from one point is called a circle. This one point (A) is called centre. Straight line from the centre to any point is called radius.



2 Let's draw a circle with 2 m radius in the school ground using a rope.

Summary

The parts of the circle include;
Centre and radius.
When there is more than one radius we say radii.

Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 3 of 4 (Double Period)

Textbook Page : p.101~p.102
Actual Lesson 070

Lesson Objectives

- To draw circles with radius using compass.
- To explore natures of diameter through activities of folding a circles.

Prior Knowledge

- Parts of the circle(Previous lesson)

Preparation

- Compass, ruler(30 cm), A4 papers

Assessment

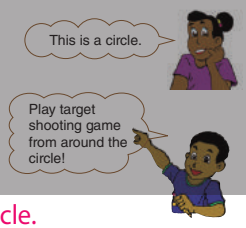
- Enjoy drawing circle and finding characteristics of circle. F
- Understand the meaning and characteristics of diameter. S

• Teacher's Notes •

How to use a compass to draw a circle:

- For accurate shapes and drawings we will need to use a drawing compaass correctly.
- Measure radius of the circle to be drawn with a ruler.
- Holding the top of the compass as shown in the Textbook.
- Pointer must be firm before rotating the pencil to draw.
- Pointer must be pushed strongly on the paper not to move the centre.
- Do not change the length of the radius while drawing.

2 Let's draw a circle with a 2 m radius in the school ground using a rope.



Characteristics of circle.

3 A compass is a tool used for drawing circles.

① Draw a circle with a 4 cm radius using a compass.

How to use a compass.

① Open the compass to the length of the radius.

② Rotate the compass to draw a circle.

② Draw another circle with a different radius and the same centre.

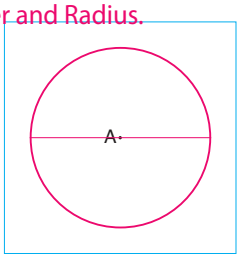
Relationship between Diameter and Radius.

Radius and Diameter

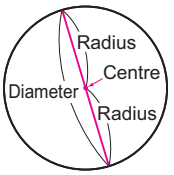
4 Draw a circle with A as the centre.

① Draw a circle with radius of 3 cm.

② Draw a straight line from one side of the circle to the other through the centre.



A straight line drawn from one point on the circle passing through the centre of the circle to the other point on the circle is called the diameter.
The lenght of the diameter is twice the length of the radius.



Characteristics of diameter.

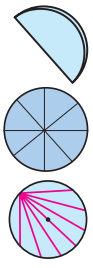
5 Let's fill in the blanks with correct words and numbers.

① A diameter is [2] times the radius.

② If you fold a circle along a [diameter], there are two equal sections.

③ There are many diameters in a circle and all diameters have the [equal] length.

④ A [diameter] is the longest straight line between two points in the circle.



Exercise

Draw circles with the following diameters.

① 8 cm ② 12 cm ③ 14 cm

□ + □ = 101 102 = □ − □

Lesson Flow

1 Review important note in the summary of previous lesson.

T Introduce the main task.

2 3 Think about how to use compassess for drawing circles.

T Explain the steps on how to draw a circle using compass.
S Draw a circle with a 4 cm radius using a compass.
TN Refer to the Teachers' note for the instruction.
T Have the students try drawing another circle with a different radius and the same centre.

3 4 Draw a circle with A as the centre using a compass.

T Draw a circle with a radius of 3 cm and then extend the radius to the circumference.
S Have the students draw a circle with its radius and then extending the radius to the circumference to understand that the straight line extended from the radius passing through the centre of the circle to the circumference is called a diameter.

4 Understand the meaning of diameter.

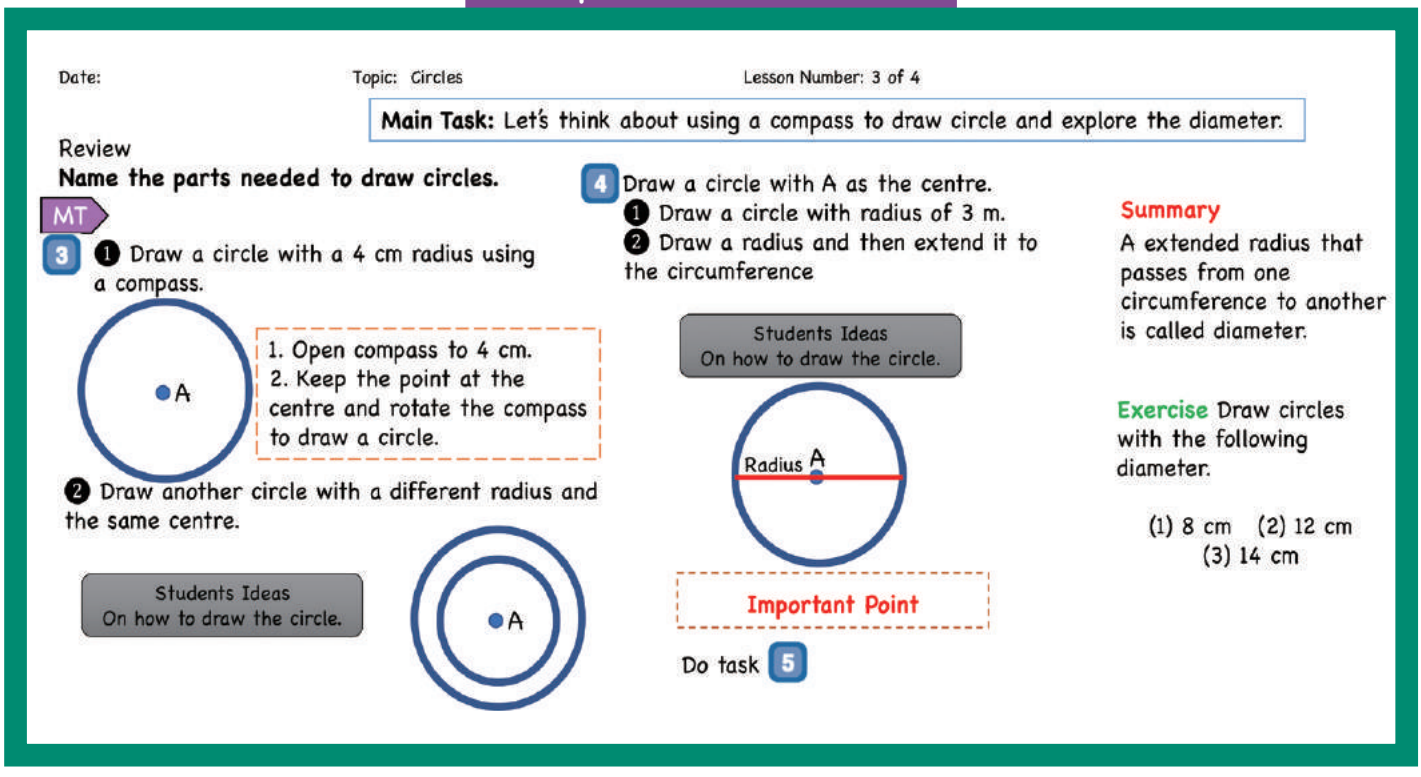
S Understand the meaning of a diameter concerning the relationship with radius.
T/S Summarise the relationship between radius and diameter.
(Diameter) = (Radius) × 2

5 5 Solve the task.

T Have the students fill in the blanks with correct words and numbers concerning characteristics of a circle.
T How to fold a circle to find a diameter?
S We have to fold exactly in half.

6 Complete the exercise.

Sample Blackboard Plan



Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 4 of 4 (Double Period)

Textbook Page : p.103-p.104
Actual Lesson 071

Lesson Objectives

- To find centres of the circles.
- To draw various sizes of circles by using compasses.
- To get used to using compasses through designing patterns.
- To understand the various ways of using a compass.

Prior Knowledge

- How to use a compass (Previous lesson).
- Parts of the circle

Preparation

- Compass, Ruler(30 cm), A4 papers

Assessment

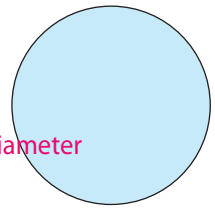
- Think about how to find the centres of the circles based on characteristic of diameters. F
- Do the exercises correctly. S

• Teacher's Notes •

This lesson is for students to explore the use of compass to make beautiful patterns. They may integrate their arts lesson in this mathematics lesson.

How to find the centre of the circle.

6 Draw a circle that is the same size as the circle on the right using a compass.

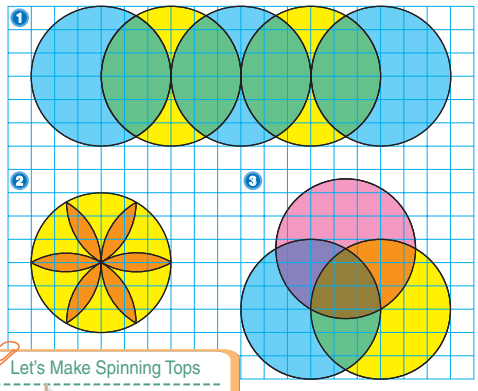


1 What do you need to have for drawing the circle? Centre and diameter

2 How can you find the centre of the circle? Fold in half

Designing Patterns

7 Let's draw different patterns and pictures using a compass.



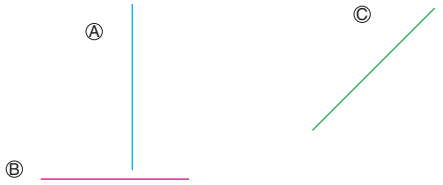
Let's Make Spinning Tops

Functions of a Compass

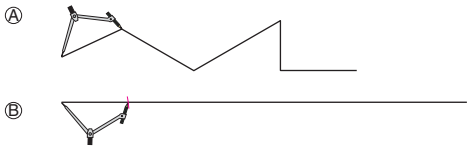
A compass can be used for other purposes other than drawing a circle.

① You can divide a straight line into sections of the same length. Try making 3 cm sections on the line below.

② You can compare the lengths of Ⓐ, Ⓑ and Ⓒ. Which of these straight lines is the longest?



③ You can transfer lengths. Transfer line Ⓐ to line Ⓑ. How long is line Ⓐ compared with line Ⓑ.



□ + □ = 103 104 = □ × □

Lesson Flow

1 Review how to use the compass.

2 6 How to find the centre of the circle.

S Draw a circle that is the same size as the circle on the right by tracing.

T ❶ What do you need to have for drawing the circle?

S Centre and diameter.

T ❷ How can you find the centre of the circle?

S Fold the paper in half and then a quarter.

S Draw the same circle using compass to confirm the centre and diameter.

T Introduce the main task.

3 7 Draw beautiful patterns using a compass.

TN Let the students notice that they can make various patterns and shapes by drawing circles systematically changing centre of the circle.

How to draw ❶

1. Draw a line.
2. Draw a circle putting the centre on the line.
3. A point which crosses the circle and the straight line is a centre of the next circle.
4. Draw a next circle with the same radius.
5. Repeat the steps from 1-4.

How to draw ❷

1. Draw a circle.
2. Draw another circle by putting the centre on the arc of the circle.
3. Draw another circle by putting the centre on the crossing point of the 2 circles.

4 Discuss other use of a compass.

S How can we use a compass in addition to drawing other circles?

TN Let the students notice that compass can be used for separating lines with same length or transferring the same length of line to another place.

5 Let's make a Spinning Top.

TN If time does not allow, remind students to do as homework or as an assignment for assessment.

Sample Blackboard Plan

Date: Topic: Circles Lesson Number: 4 of 4

Main Task: Let's draw circle of same size and make patterns.

Review

What is the relationship of Radius and Diameter.
A radius is straight line from centre to any point on the circumference.
Diameter is the straight line that passes from one circumference to the other circumference passing through the centre point.
We can say a diameter is 2 radii in a straight line.

6 Let's draw a circle that is the same size as the circle in the textbook using a compass.

Students Ideas
On how to use compass to draw the circle.

❶ What do you need to have for drawing the circle?
Centre and Diameter
❷ How can you find the centre of the circle?
By tracing and folding
By measuring the radius and diameter.

MT

7 Let's draw different patterns and pictures using compass.

Students Ideas
Display their patterns

Summary
What did you learn about the compass today?
- Compass can be used to draw different circle as well as other beautiful patterns.
- Compass can be used for separating lines with same line or transferring the same length to another place.

Unit 10

Unit: Circles and Spheres
Sub-unit: 2. Spheres
Lesson 1 of 1 (Double Period)

Textbook Page : p.105-p.106
Actual Lesson 072

Sub-unit Objectives

- To be able to find out centres, radius and diameters of spheres by cutting spheres, etc.
- To understand that a circle made by cutting through a centre of a sphere will be the largest and the radius are all the same length.

Lesson Objectives

- To understand spheres' properties by linking them with circles.

Prior Knowledge

- Properties of circles

Preparation

- Ball, a toy shaped like a sphere, 3D models of sphere in which the cross-sections can be seen (teacher).

Assessment

- Investigate the characteristics of a sphere. F
- Understand the definitions of spheres and the nature and its relationship among elements. S

• Teacher's Notes •

In this lesson the students will study the structure of sphere to understand that when a sphere is cut at any point, the cross – sections are called the centre, radius and the diameter. In other words, they will find the shape of a circle. The students will also discover that the largest circle in a sphere is found when cutting in the centre.

Meaning, characteristics and components of a sphere.

2 Spheres

1 Explore the shape of a ball.

1 What is the shape of the ball when viewed from the above and the side? (a) Circle from any side (b) certain side cannot see circle

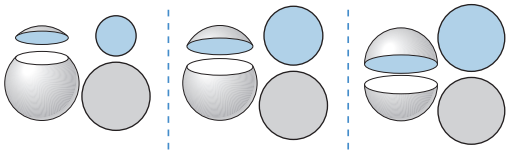
2 Roll a ball. (a) Rolled smoothly (b) Can not roll smoothly

An object that looks like a circle from any direction is called a **sphere**.

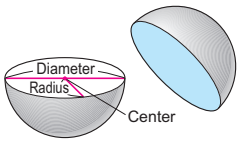
3 Look for things shaped like a sphere.

4 What is the shape of the cross-section of a sphere?

Where should we cut to make the largest cross-section from a sphere? When cuting in the centre.



When a sphere is cut in half, the centre, the radius, and the diameter of the cross-sections are called the **centre, radius and diameter** of the sphere.



How to measure diameter of sphere.

5 How can we find the diameter of a sphere?

Have two right angle objects and then measure the diameter.

Let's Find Circles and Spheres

Let's look for things shaped like circles and spheres.

□ + □ = 105 106 = □ × □

Lesson Flow

1 Review properties of circles.

T Introduce the main task.

2 ❶ Explore the shape of a ball.

T ❶ What kind of shape will be seen when viewing the ball and the balloon from various directions?

S Circle.

T ❷ Roll a ball and a balloon to understand its properties, the meaning of sphere and find out spheres from things around us.

S Roll a ball.

T Roll a ball and a balloon and compare how spheres and sphere like (balloon) roll.

S ❸ Look for things shaped like a sphere in our environment.

3 ❹ Think about and explore in what cases the cross-sections will be the same.

T What is the shape of the cross-section of a sphere?

S Circle.

T Let's think about where we should cut to make the largest cross-section from the sphere.

T Confirm shapes and sizes of cross-sections.

T Explain the important points in the box .

4 Think about how to explore diameter of a sphere, and find things shaped liked circles and spheres around us.

T ❺ Find out the diameter.

T Have the students realise that diameter of spheres are the largest in the widths of spheres.

TN • Place the ball between two right angle (parallel) objects. (Refer to the textbook image)
• Measure the distance between the two objects.

S Measure balls and models of spheres by using a method as in the picture

5 Think about more things shaped like circles and spheres.

S Find out things shaped liked circles as wheels and things shaped liked spheres as roly-poly bugs around us and think about centres and lengths of radius.

TN In case of no time, it's ok to make the above activity as homework.

Sample Blackboard Plan

Date: Topic: Spheres Lesson Number: 1 of 1

Main Task: Let's explore the shape of a ball.

Review

What are the properties of Circle?

A circle have a centre, radius and diameter.
The radius is the length from the centre to the circumference.
When a radius extends from the centre to the circumference in a straight line, we call it diameter

MT

1 ❶ What kind of shape will be seen when viewing a ball and balloon? Circle

❷ What happens when we roll the two?

Students Ideas
Give their Explanation

Ball rolls smoothly.
The balloon does not roll smoothly.

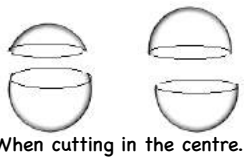
Important Point

❸ Name some of the things that look like a sphere

Students Ideas
Give their Examples

❹ What will be the cross - section of a sphere?
Where will we cut to make the largest cross - section from a sphere?

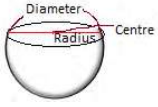
Students Ideas
Give their Explanation



When cutting in the centre.

❺ How can we find the diameter of a sphere?

Students Ideas
Give their Explanation



Summary

When a sphere is cut in half, the cross - sections are called centre, radius and diameter of a sphere.

Unit 10

Unit: Circles and Sphere
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.107~p.108
Actual Lesson 073

Lesson Objectives

- To deepen the understanding of what they learned in this unit.
- To confirm contents learned in the unit.

Prior Knowledge

- All the contents in this unit

Assessment

- Solve exercises correctly. F S

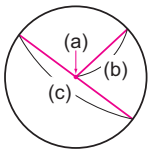
• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

Component of a circle.

1 Answer these questions about the circle shown on the right. Page 100



① What is point (a) called? (a) centre.

② What is the name given to the straight lines (b) and (c) ? (b) radius (c) diameter

Characteristics of a circle.

2 Write the correct words or numbers in the ☐. Page 102

① A straight line through the centre between 2 points on a circle is called diameter.

② The length of a diameter is 2 times the radius.

How to draw a circle.

3 Draw the following circles. Pages 101, 104

① A circle with a diameter of 4 cm.

② A circle with a radius of 4 cm.

Use of a compass. C, A, B

4 Compare the lengths of the following straight lines.

Ⓐ Ⓑ Ⓒ

Change of unit.

Let's fill in the boxes. Grade 2 Do you remember?

① 10 mm = 1 cm ② 100 cm = 1 m

③ 1dL = 100 mL ④ 2000 mL = 2 L

Problems

How to draw a circle.

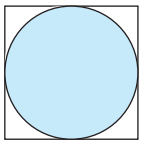
1 Draw the following circles.
● Drawing circles with a given radius or diameter.

① A circle with a 6 cm radius.

② A circle with a 10 cm diameter.

Use the characteristics of a circle.

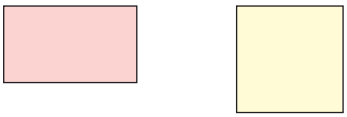
2 A circle is put in a square of the same size as shown on the right.



Find its radius and draw another circle of the same size.
● Understanding the properties of a diameter.

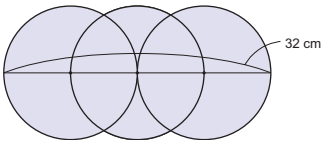
Use of a compass.

3 Which is longer around its edges, the rectangle or the square? Find the answer by using a compass.
● Understanding how to compare the lengths of lines by using a compass.



Relationship between a diameter and a radius.

4 There are 3 circles of the same size below. Find the diameter of one of these circles.
● Understanding the radius and diameter of combined circles.



☐ + ☐ = 107 108 = ☐ − ☐

Lesson Flow

1 ① Understand the components of circles.

T Evaluate if students understand very well the components of circles.

T Students confirm the terminology and meaning of centre, radius and diameter.

2 ② Understand the characteristics of circles.

T Evaluate if students understand very well the characteristics of circles.

T Let students draw circle to understand its characteristics.

3 ③ Draw circles with a given diameter.

T Confirm if students can draw circles with a given diameter.

T Check if students use compass appropriately and assist the students individually who are not able to draw properly.

T Evaluate if students can compare and order from the longest to the shortest.

4 ④ Compare the length by using a compass.

T Evaluate if students can compare the length by using a compass.

5 Review of measurement in grade 2.

S Fill in the ☐ with numbers.

1 ① Draw a circle with a given radious or diameter.

T Evaluate if student can draw circles with a given radius or diameter.

T Confirm students understanding on the properties of a diameter and radius.

S ① and ② will be the same circle.

2 ② Think about the relationship between diameter and square.

T Confirm that the side of a length of a square becomes the diameter of a circle.

T How many cm is the radius?

S 2 cm because the radius is half of the diameter.

3 ③ Compare the length of a rectangle and a square.

T Let's think about how to compare the perimetre of a rectangle and a square.

T Draw a line. Measure each side of the figure and add the lengths using the line you drew.

4 ④ Know the relationship between diameter and a radius.

S Confirm that half of 32 cm (diameter) becomes a radius of a circle.

5 Find the centre of the circle.

T If students can copy the diagram on the exercise book, let them copy and cut. If it not possible, discuss the method to draw a original circle.

T What do we have to do to draw a circle?

S We have to find a centre.

T How do we have to find a centre?

S Fold twice.

Circles and Spheres	Name:	Score

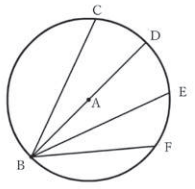
(Each question is worth 10 points)

1. The figure below is a circle and 'A' is the center of the circle.

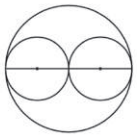
① Which one is the longest line? Line BD

② What is the answer of ① called? Diameter

③ What is line AB called? Radius



2. Two same size circles are put in a circle with a diameter of 12 cm. How many cm is the diameter and radius of the small circles?



Diameter 6cm Radius 3cm

3. Draw the following circles.

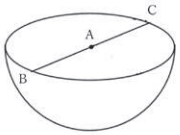
① Radius is 2cm ② Diameter is 3cm.

4. A sphere is cut into half.

① What is the shape of the cross-section of the sphere when viewed from above? Space

② Line BC is called the Diameter

③ What is point A called? Centre

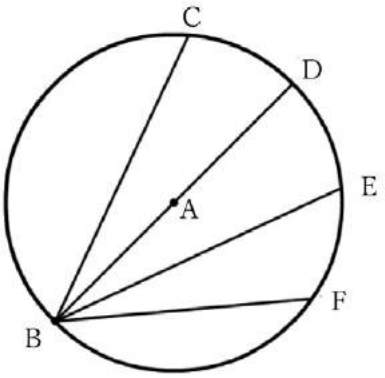


End of Chapter Test: Chapter 10 **Date:**

Circles and Spheres	Name:	Score

(Each question is worth 10 points)

1. The figure below is a circle and 'A' is the center of the circle.



① Which one is the longest line? _____

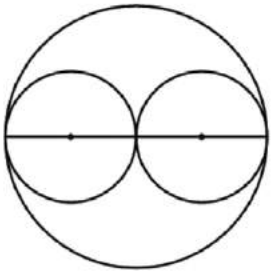
② What is the answer of ① called?

_____

③ What is line AB called?

_____

2. Two same size circles are put in a circle with a diameter of 12 cm. How many cm is the diameter and radius of the small circles?



Diameter _____ Radius _____

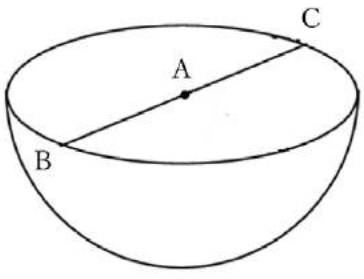
3. Draw the following circles.

① Radius is 2cm ② Diameter is 3cm.

4. A sphere is cut into half.

① What is the shape of the cross-section of the sphere when viewed from above?

_____



② Line BC is called the _____

③ What is point A called? _____

Chapter 11 Large Numbers

1. Unit Objectives

- To deepen an understanding of how to express whole numbers and develop an ability to use numbers. (3.1.1.a)
- To know about a unit of ten thousands place. (3.1.1 a)To know about numbers of 10 times, 100 times, and 1/10 and how to express them. (3.1.1.a and b)
- To deepen an understanding of the relative largeness of numbers. (3.1.1.a)
- To think about how to calculate addition and subtraction of many-digit numbers and understand that they can be calculated based on basic calculations of 2-digit numbers, etc. (3.1.2.a and c)
- To calculate addition and subtraction certainly and use them accurately. (3.1.2.b and c)

2. Teaching Overview

Students learned 4-digit numbers already. Based on the knowledge, they will expand their knowledge on reading, writing, ordering, the sizes and structures of large numbers.

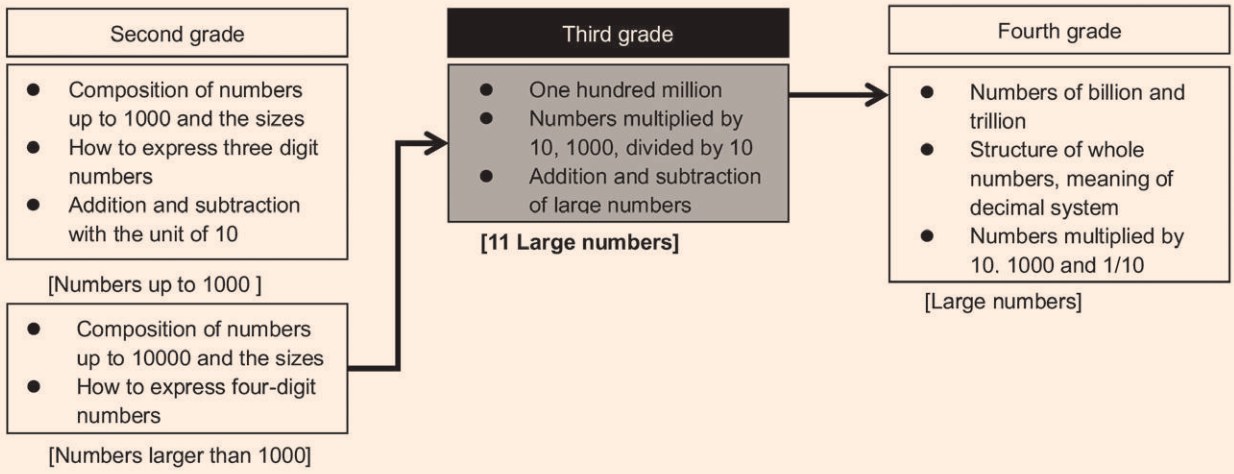
Ten and Hundred Thousands Place : First, students should be able to explain and understand 10,000 from various perspectives such as “the next number of 9999”, “the number 10 bigger than 9990”, “composed number of 5000 and 5000, the number made up with 100 of 100s, etc. In this manner, a number should be explained and understood relatively with other numbers.

Structure of Large Numbers : Students learn the structure and relative amount of 5 and 6-digit whole numbers here. Visualisation with number lines will help students understand the orders and relative sizes of numbers.

10 times, 100 times and Divided by 10 : Place value tables will help students to see and recognise that the arrangement of numbers will not change but the place moves by 1 or 2 steps to the right or left by multiplying or dividing by 10, 100 etc.

Addition and Subtraction : Encourage students to apply the knowledge of addition and subtraction already learned before for larger numbers.

3. Related Learning Contents



Unit 11

Unit: Large Numbers
Sub-unit: 1. Ten and Hundred Thousand Place
Lesson 1 of 2 (Double Period)

Textbook Page : p.109~p.110
Actual Laesson 074

Sub-unit Objectives

- To know about the structure and how to read and express numbers up to the ten thousands place and be able to write them accurately.
- To think about how to read and the structure of numbers up to the millions place and be able to write them accurately.

Lesson Objectives

- To know about the structure and how to read and express numbers up to the thousands place and write them accurately.

Prior Knowledge

- Numbers up to the thousands place
- Read and write numbers up to the thousands place.

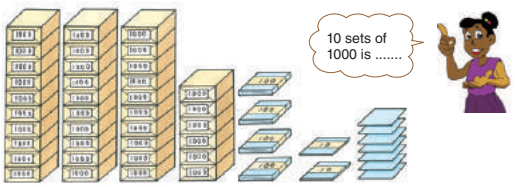
Preparation

- Enlarged picture in textbook
- Number line
- Place value charts

Assessment

- Think of how to read and express numbers up to the thousands place and read and write them accurately. F
- Do the exercise correctly. S

11 Large Numbers



1 Ten and Hundred Thousand Place

How to read and write thousands place.

1 How many sheets of paper are there in the above figure?

1 If we make bundles of ten thousand, how many can we make?

3 sets of ten thousand is written as 30000 and is read as **thirty thousand**. It is also written as 30 **thousand**.

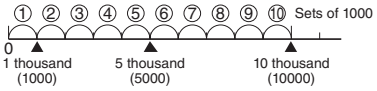
2 How many sheets of paper are there altogether? 36427 sheets.

Three ten thousand, six thousand, four hundred, two ten, and seven ones makes 36427 and it is read as thirty six thousand, four hundred and twenty seven.

Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
3	0	0	0	0
	6	0	0	0
		4	0	0
			2	0
				7

Let's find the structure of numbers larger than 10000 and how to express them.

The number that is 10 sets of one thousand (1000) is written as **10000 or 10 thousand** and is read as ten thousand.



2 Write the following numbers in numerals while being careful about their place values.

1 The number that is two sets of ten thousand, four sets of thousand, nine sets of hundred, a set of ten and eight ones.

2 The number that is the sum of seven sets of ten thousand and 860.

3 The number that is the sum of eight sets of ten thousand and nine sets of ten.

4 The number that is four sets of ten thousand.

	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
1	2	4	9	1	8
2	7	0	8	6	0
3	8	0	0	9	0
4	4	0	0	0	0

Exercise

1 Read the following numbers.
① 48219 ② 98056 ③ 28000 ④ 70006
(1) Forty eight thousand two hundred and nineteen.
(2) Ninety eight thousand and fifty six.
(3) Twenty eight thousand. (4) Seventy thousand and six

2 Write the following numbers in numerals.
① Eighty six thousand two hundred and fifty nine 86259
② Fifty thousand and thirty two 50032
③ Twenty thousand and eight hundred 20800

3 Write the following numbers in numerals.
① The number that is the sum of three sets of ten thousand, nine sets of thousand and five sets of ten. 39050

□ + □ = 109 110 = □ × □

Lesson Flow

1 ① ① Think about how many papers are there.

T Introduce the main task.
T Shows picture and ask which is 10 sets of 1000? What will be the total?
S Discuss, identify and give answer as 10 000.
T Introduce this chapter on numbers larger than ten thousand by refering to the picture.

2 ② Think about numbers which have 3 sets of ten thousand.

T How many sheets of paper are there in the picture?
TN Focus on 3 sets of ten thousand only.
S Identify and respond that there are 3 stacks of 10000. (answer 30 000 sheets)
T Explain the important point in the box

3 Think about the remaining sheets of papers.

T Ask how many remaining sheets of paper are there?
TN Focus on ; 6 sets of 1000, 4 sets of 100 and 2 sets of 10 and 7 set of 1.
S Identify remaining sheets of papers as 6427.
T Confirm using the place value chart and elaborate.
T Confirm how to write an addition of thirty-six thousand and 427 by using a place values board.
T Explain the important point in the box

4 ② Think about the structure and how to write and read numbers up to ten thousands place.

TN Explain to students based on the idea of "place values".
S Complete activities from ① to ④ on place value chart.
TN Ensure students place numbers correctly.

5 Do the exercise and summarise learning.

S Do the exercise and summarise things learned.

• Teacher's Notes •

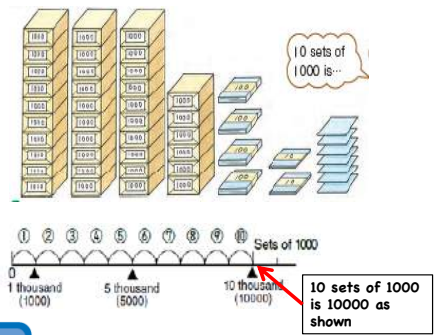
Making Use of a Place Value chart to Operate Place Values

One can deepen an understanding of how to read large numbers by using a place value chart to operate place values. It is easier to read and understand the structure of numbers after separating three digits counting from the ones place value without chanting "one, ten, hundred, thousand, ten thousand, hundred thousand, million, ten million….etc"
But, some students might find difficulties in reading and writing large numbers with empty places (zero in place value) . As for these students, have them write large numbers on a place value chart to operate place values and read them. When doing so, it is important for them to focus on empty places of 0.
Also, it is good to understand that a way of expressing is a base-10 system. So, we'd like to make a full use of a board to operate place values. Also, we'd like to have students think about numbers up to 7-digit numbers freely, write them on the board to operate place values and read them.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: Tens and Hundreds Thousands Place Lesson Number: 1 out of 2

Main Task: Let's think about the structure of numbers larger than 10000.

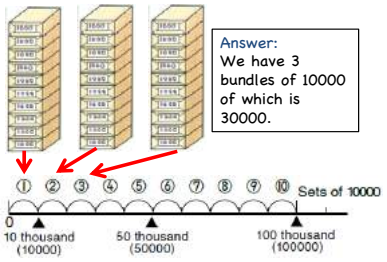


1 Let's think about how many sheets of paper are there in the above figure.

Expected response from students:
Own way of reading: 36 427

MT

1 How many bundles of 10 000 can we have?



Answer:
We have 3 bundles of 10000 of which is 30000.

2 How many sheets of paper altogether?

Answer:
1. 36427
2. Thirty six thousand four hundred and twenty seven.

2

	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
1	2	4	9	1	8
2	7	0	8	6	0
3	8	0	0	9	
4	4	0	0	0	0

Summary
■ Read and write numbers in numerals while being careful of their place values up to ten thousand.

Unit 11

Unit: Large Numbers
Sub-unit: 1. Ten and Hundred Thousand Place
Lesson 2 of 2 (Single Period)

Textbook Page : p.111-p.112
Actual Lesson 075

Lesson Objectives

- To think about how to read the structure of numbers up to hundred thousands place.
- To read and write numbers up to hundred thousands place accurately.

Prior Knowledge

- Numbers up to ten thousands place
- Read and write numbers up to ten thousands place.

Preparation

- Place value charts (enlarged)
- How to read & write number chart.

Assessment

- Think about how to read the structure of numbers up to hundred thousands place and read and write them accurately. F
- Do exercise correctly at the end of the lesson. S

3 Making 6-digit number.
In 2011, Papua New Guinea census statistic showed that the number of male living in Eastern Highlands Province was 311000. Let's think about this number.

Ten thousand		1	0	0	0	0
10 sets of ten thousand make a hundred thousand	1	0	0	0	0	0
	Hundred thousands place	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
	3	1	1	0	0	0

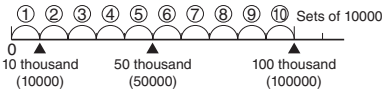
1. How many sets of the hundred thousand, ten thousand and thousand are combined to make this number?
(1) 3 sets of one hundred thousand, one set of ten thousand and one set of thousand.
2. Read the number 311000.
(2) Three hundred and eleven thousand

4 How to read and write up to hundred thousands place.
Let's read the number of people in the Highlands Region in 2011 below.

1. Southern Highlands Province: 510 245
2. Western Highlands Province: 249 449
3. Enga Province: 432 045
4. Hela Province: 249 449
5. Jiwaka Province: 343 987
6. Simbu Province: 376 473

5 Let's make the largest number and the second smallest number by arranging the number cards from 1 to 6.
Largest 654321
2nd: 123465

The number that is 10 sets of ten thousand (10000) is written as **100000 or 100 thousand** and is read as **hundred thousand**.



Exercise

1 Read the following numbers.
① The number of babies born in Papua New Guinea in 2012 was 210181.
(1)Two hundred ten thousand one hundred and eighty one.
② The number of Papua New Guinea small holder coffee producers in 2008 was 397772.
(2)Three hundred ninety seven thousand seven hundred and seventy-two.

2 Write the following numbers in numerals.
① The population of Lae city in 2000 was one hundred and nineteen thousand, one hundred and seventy four.
(1)119174
② The number of people living with HIV in Papua New Guinea in 2015 was two hundred, ten thousand, eight hundred and eleven.
(2) 210811

How to Read and Write Large Numbers

Read after separating the third and fourth place by counting from the ones place. The number is read as Four hundred and sixty eight thousand, one hundred and forty nine. 468 149
For every 3-digit numbers, we include a space or comma.
Examples: ① Include **space** 468 149
② include **comma** 468, 149

□ + □ = 111 112 = □ × □

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 ③ Explore the numbers in the hundred thousands place.

S Read and understand the situation of ③.
T Use the place value chart to confirm that the number is increased from 10 thousands place to 100 thousands place.

3 ① and ② Think about the number of each"place value"and read the number 311000.

T Let's think about how many sets of hundred thousand, ten thousand and thousand are there?
TN Explain to students based on the idea of "place values" .
S 3 sets of hundred thousand, 1 set of ten thousand and 1 set of thousand.
T ② How to read 311000?
S Read as three hundred and eleven thousand.
T Explain the important point in the box .

4 ④ Read numbers up to hundred thousands place.

T Allow students to work in pairs or groups to read the numbers of each province.
S Each member of a pair or group reads the numbers of people from (1) to (6).
S Allow corrections to be made by a friend when each group read numbers that are not correct.
T Confirm the answers.

5 ⑤ Make 6-digit numbers by arranging number cards from 1 to 6.

T Have students to arrange number cards from 1 to 6 and make 6-digit numbers.
S Find the largest and second smallest numbers.

6 Do the exercise.

7 Summarise using the note How to read and write numbers

Sample Blackboard Plan

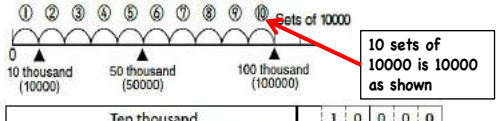
Date: Chapter 11: Large Numbers Topic: Tens and Hundreds Thousands Place Lesson Number: 2 out of 2

Main Task: Let's think about how to read and write numbers larger than 100000.

MT

③ Let's think about this number 311000 and how can we say it?

Expected response from students. Our own way of saying the number. 3 hundred, 11 thousand.



Ten thousand		1	0	0	0	0
10 sets of ten thousand make a hundred thousand	1	0	0	0	0	0

Hundred thousands place	Ten thousands place	Thousands place	Hundreds place	Tens place	Ones place
3	1	1	0	0	0

2. Study the place value chart and discuss how has the number increased?

Expected response from students.
The number has increased from ten thousands place to hundred thousands place.

① Idea of place value.

Hundred thousand	3 sets
Ten thousand	1 set
Thousand	1 set

② Read the number, 311000
Answer: Three hundred eleven thousand

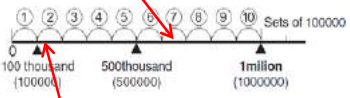
④ Read the numbers up to hundred thousands place.

1. Five hundred ten thousand, two hundred forty-five.
2. Two hundred forty nine thousand, four hundred forty-
3. ne
4. Four hundred thirty two thousand, and forty-five
   Three hundred forty three thousand, nine hundred
5. ghty-seven.
   Three hundred seventy six thousand, four hundred seventy-three

⑤ Arrange the number cards from 1 to 6.

1	2	3	4	5	6

1. Largest number is 654321



2. Second smallest number is 123465

To make the second smallest number, switch number 6 in the ones place to tens and move 5 in the tens place to ones.

Summary

■ Read and write numbers in numerals while being careful of their place values up to hundred thousand.

Unit 11

Unit: Large Numbers
Sub-unit: 2. The Structure of Large Numbers
Lesson 1 of 2 (Single Period)

Textbook Page : p.113-p.114
Actual Lesson 076

Sub-unit Objectives

- To deepen the understanding of the structure of numbers up to 100 thousand.
- To express the numbers based on the unit of thousand.
- To express, read and compare the numbers on the number line.

Lesson Objectives

- To deepen understanding of structure of numbers up to 100 thousand.
- To know 1 million.

Prior Knowledge

- Numbers up to hundred thousands place
- Read and write numbers up to hundred thousand place.

Preparation

- Place value charts (enlarged)
- Cards of numbers within 0 - 9
- Enlarged summary points

Assessment

- Think about how to read and write numbers based on the structure of the number. F
- Appreciate the advantage of reading numbers based on thousand. F
- Solve exercises correctly. S

Structure of number up to hundred thousand.

2 The Structure of Large Numbers

1 Write the following numbers in numerals and read them.

1. The number that is the sum of 3 sets of ten thousand, 7 sets of thousand and 1 hundred.
2. The number that is the sum of 361 sets of thousand and 480.
3. The number that is the sum of 7 sets of a hundred thousand and 9 sets of a hundred.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
1		3	7	1	0	0
2	3	6	1	4	8	0
3	7	0	0	9	0	0

Relative size of large number.

2 Let's think about 245000.

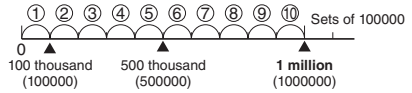
1. How many sets of hundred thousand, ten thousand and thousand are there in this number? (1) 2 sets of hundred thousand, 4 sets of ten thousand and 5 sets of thousand.
2. How many sets of 1000 are there to make this number? 245
3. How many sets of 100 are there to make this number? 2450

245000 is also written as 245 thousand.

3 How many sets of hundred thousands are there to make 1000000?

The word "million." How to read and write million.

The number that is 10 sets of hundred thousand is written as 1000000 and read as **one million**.



□ − □ = 113

Exercise

Write the following numbers and read them.

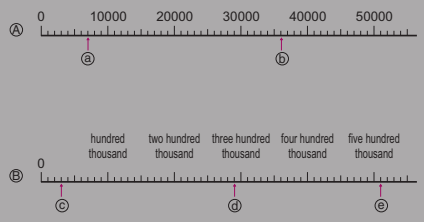
① The number that is the sum of 3 sets of ten thousand and 8 sets of thousand. 38000

② The number that is the sum of 5 sets of hundred thousand, 2 sets of ten thousand and 9 sets of hundred. 520900

4 Let's think about the following number lines.

What is expressed by each scale?

Which numbers are expressed by ⓐ, ⓑ, ⓒ, ⓓ and ⓔ ?



A straight line, with marked points that are equally spaced in every point on the line corresponds to a number, is called a **number line**.
On the number line, the number gets larger as you move towards the right.

114 = □ × □

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 1 Think about how to read and write numbers from 1 – 3 based on the structure of the numbers.

S Confirm learning on how to express large numbers using the structure of the numbers.

S Encourage 3 students to pick up number cards to represent on the place value chart.

3 2 1 Think about the relative size of large number by filling in the numbers on the place value board.

T Confirm each number and its digit by filling in the numbers in the place value chart.

4 2 2 3 Think about the number of each digit based on thousands and ten thousands.

S Understand that 245000 can be expressed as 245 thousand and its advantage.

5 Think about the necessity of new digit filling in the numbers in the place value chart.

S Write 100 thousand and 1 million on the board, and recognise that 1 million is 10 times of 100 thousand.

T/S Answer task 3 and explain the summary points .....

6 Solve the exercise.

S Solve exercises (1) and (2).

S Summarise the new digit into the place value and its structure.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: Structure of Large Numbers Lesson Number: 1 out of 2

MT **Main Task:** Let's think about the structure of large numbers.

1 Write numerals and read them.

1

Ten thousand	3 sets	3 × 10000	30000
Thousand	7 sets	7 × 1000	7000
Hundred	1 set	1 × 100	100

Ans: 30000 + 7100 = 37100

2

Thousand	361 sets	361 × 1000	361000
Hundred	48 sets	48 × 100	480

Ans: 361000 + 480 = 361480

3

Hundred thousand	7 sets	7 × 100000	700000
Hundred	9 set	9 × 100	900

Ans: 700000 + 900 = 700900

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
1		3	7	1	0	0
2	3	6	1	4	8	0
3	7	0	0	9	0	0

2

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
2	4	5	0	0	0

1

2 sets of Hundred thousand	2 × 100000
4 sets of Ten thousand	4 × 10000
5 sets of Thousand	5 × 1000

2

245 sets of Thousand	245 × 1000

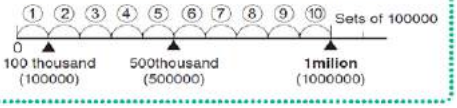
3

2450 sets of Hundred	2450 × 100

245000 is also written as 245 thousand.

3 How many sets of hundred thousand are there to make 10000000?

The number that is 10 sets of hundred thousand is written as 1000000, and read as **one million**.



Ans: 10 sets of hundred thousand makes 1 million.

Summary

- Read and write sets of numbers up to ten thousand and hundred thousand while being careful of their place values.
- 10 sets of 100000 is written as 1000000 and read as one million

Unit 11

Unit: Large Numbers
Sub-unit: 2. The Structure of Large Numbers
Lesson 2 of 2 (Double Period)

Textbook Page : p.114~p.116
Actual Lesson 077

Lesson Objectives

- To express, read and compare large numbers on the number line.

Prior Knowledge

- The structure of large numbers
- Place value chart for task 4 and 6
- Investigating numbers up to hundred thousand

Preparation

- Place value charts (enlarged)
- Number lines (Equally spaced)
- Summary points

Assessment

- Enjoy solving various problems of large number. F
- Know what number line is. F
- Solve the exercise correctly. S

• Teacher's Notes •

This is the first lesson on number line. Spend enough time with the students for them to understand what a number line is.
Also on inequality signs use terms larger than (>) and smaller than (<) or equal to (=).

Exercise

1 Fill in the ☐ with a number.
① 99900 — 99950 — 100000 — 100050
② 528 thousand — ☐ — 532 thousand ----
---- ☐ — 536 thousand — 538 thousand
534 thousand
530 thousand

2 Arrange the following numbers in ascending order.
① (30001, 190000, 210003, 99900)
30001, 99900, 190000, 210003
② (400000, 94000, 170000, 240000)
94000, 170000, 240000, 400000

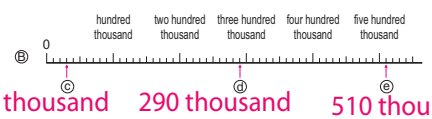
3 Fill in the ☐ with a sign of inequality.
① 54300 < 64100 ② 17300 > 17030

Exercise

Write the following numbers and read them.
① The number that is the sum of 3 sets of ten thousand and 8 sets of thousand.
② The number that is the sum of 5 sets of hundred thousand, 2 sets of ten thousand and 9 sets of hundred.

How to show the number on the number line.

4 Let's think about the following number lines.
What is expressed by each scale?
Which numbers are expressed by ⓐ, ⓑ, ⓒ, ⓓ and ⓔ ?



A straight line, with marked points that are equally spaced in every point on the line corresponds to a number, is called a **number line**.
On the number line, the number gets larger as you move towards the right.

How to make a number line.

5 Draw the number line with a (unit) Scale of 10 thousand, marked with ↑ on the line corresponding to the following numbers.

6 Fill in the ☐ with a number.
① 99998 — 99999 — 100000 — 100001 — 100002
② 750 thousand — 800 thousand — 850 thousand —
---- 900 thousand — 950 thousand

Comparing large numbers.

7 Arrange the following numbers in descending order and line them vertically in the table on the right.
① 386020 ② 378916 ③ 89000

Compare the largest place numbers.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
①	3	8	6	0	2	0
②	3	7	8	9	1	6
③			8	9	0	0	0

8 Show the relationship between the two numbers using >, < and = .
45000 < 140000

Meaning of the sign of inequality and how to use them.

The symbols < and > are called **inequality signs**.
These symbols are used to compare two numbers, whether one number is larger or smaller than the another number.

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 4 ① Think about 1 scale that expresses how many numbers.

T Paste a chart on the board for the number line of 4 Ⓐ and Ⓑ.
T What is the difference compared from before?
S The numbers are on the number line.
S Notice that it is easy to understand the size of the number if they are on the number line, and also scale should be changed depending on the size of the number.

3 Find the number based on the size of 1 scale.

S Think of a better way to find the number by comparing ideas.
T Explain ..... and confirm the definition of the number line and how to express the numbers on the line.

4 5 Think about how to draw a number line.

TN Distance among scales must be same. It is easy to understand if 5th scale is written a bit longer and 10th scale is extended further.

5 6 Think about the order of the number.

S Find the answer by thinking about the difference of before and after the number.

6 7 Compare the numbers focusing on a unit.

T Compare and write these large numbers in the number table.
TN Confirm the following two points.
① The number which has the greater digit is bigger than the other.
② If the digit is same, the number which has greater number in superior digit is bigger than the other.
S Put the numbers in the place value chart.

7 8 Know the meaning and how to use a sign of inequality .

T Explain .....

8 Solve the exercise.

T Summarise the lesson.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: Structure of Large Numbers Lesson Number: 2 out of 2

Main Task: Let's think about how to use a number line.

MT

4 How can we read off numbers expressed on a number line?
(1) Each scale represents 1000
(2) The numbers shown by the arrow are;

Ⓐ 0 10000 20000 30000 40000 50000
ⓐ 7000 ⓑ 36000

Ⓑ 0 hundred thousand, two hundred thousand, three hundred thousand, four hundred thousand, five hundred thousand
ⓒ 30 thousand ⓓ 290 thousand ⓔ 510 thousand

A straight line, with marked points that are equally spaced where in every point on the line corresponds to a number, is called a **number line**.
On the number line, the number gets larger as you move towards the right.

5 Draw a number line with a unit scale of 100thousand and mark with and arrow on the line corresponding to the number?

1.First draw a straight line with a unit.
2.The unit scale is 100 thousand.
3.Every marked point must be of the same length.
4.Numbers must corresponding to each point.
5.The more rightwards the measure extends the larger the number gets.
6.Finally use an arrow ↑ to mark the following numbers corresponding on the line.

0 100000 200000 300000 400000
180000 320000 250000

6 Missing numbers are;
① 99998 → 99999 → 100000 → 100001 → 100002
② 750 thousand → 800 thousand → 850 thousand → 900 thousand → 950 thousand

7 Arrange the numbers in descending order and line them vertically.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones place
①	3	8	6	0	2	0
②	3	7	8	9	1	6
③		8	9	0	0	0

8 Show the relationship between two numbers using the inequality signs.
45000 < 140000

The symbols < and > are called **inequality signs**.
These symbols are used to compare two numbers, whether one number is larger or smaller than the another number.

Summary
•A straight line that has every marked point with a unit scale of the same length is called a number line.
•Meaning of the signs of inequality.

Unit 11

Unit: Large Numbers
Sub-unit: 3. 10 Times, 100 Times and Divided by 10
Lesson 1of 2 (Single Period)

Textbook Page : p.117
Actual Lesson 078

Sub-unit Objectives

- To understand how to express numbers of ten times, hundred times and divided by 10.

Lesson Objectives

- To understand how to express ten times and hundred times.

Prior Knowledge

- Numbers up to hundred thousand place
- Read and write numbers up to hundred thousand place.
- Understand the structure of large numbers.

Preparation

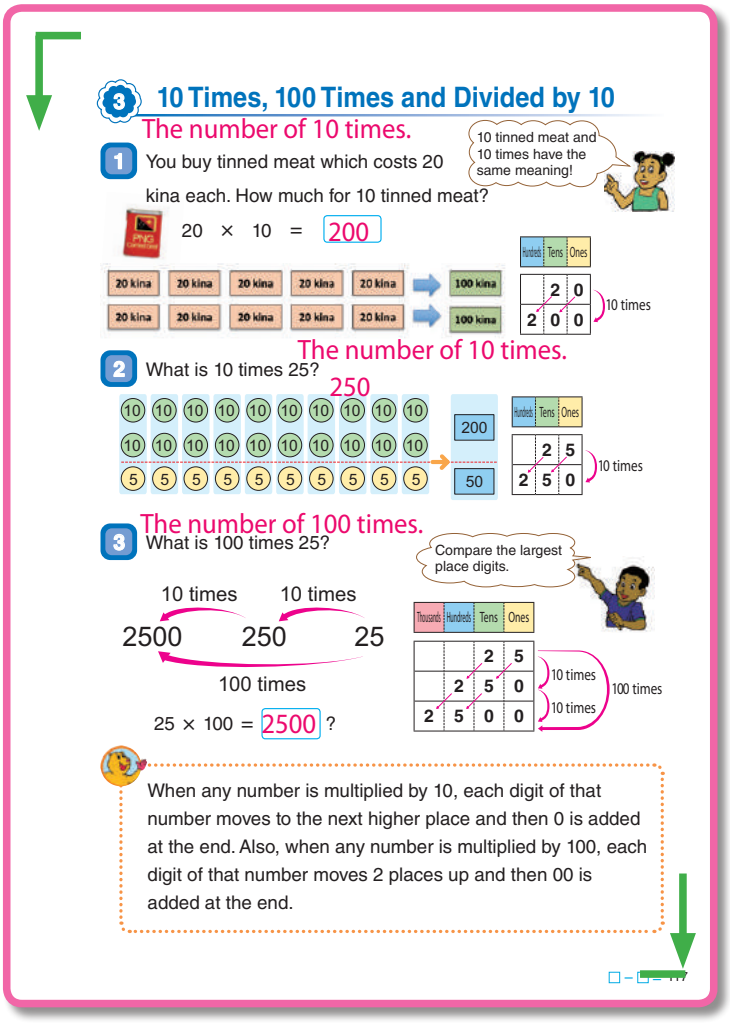
- Summary points ..... written on a chart.

Assessment

- Think about how to express numbers of ten times and hundred times. F
- Recognise how to express numbers of ten times and hundred times. S

• Teacher's Notes •

This lesson is the base of multiplication with 10,100 and divide by 10. Thus, it is important that students should be able to recognise and reason multiplying with 10 or zeros(00) to the right repectively.



3 10 Times, 100 Times and Divided by 10

The number of 10 times.

1 You buy tinned meat which costs 20 kina each. How much for 10 tinned meat?

10 tinned meat and 10 times have the same meaning!

20 × 10 = 200

20 kina 20 kina 20 kina 20 kina 20 kina → 100 kina
20 kina 20 kina 20 kina 20 kina 20 kina → 100 kina

Hundreds Tens Ones
2 0
2 0 0
10 times

The number of 10 times.

2 What is 10 times 25?

250

10 10 10 10 10 10 10 10 10 10
10 10 10 10 10 10 10 10 10 10
5 5 5 5 5 5 5 5 5 5
200
50

Hundreds Tens Ones
2 5
2 5 0
10 times

The number of 100 times.

3 What is 100 times 25?

Compare the largest place digits.

10 times 10 times
2500 250 25
100 times

25 × 100 = 2500 ?

Thousands Hundreds Tens Ones
2 5
2 5 0
2 5 0 0
10 times
10 times
100 times

When any number is multiplied by 10, each digit of that number moves to the next higher place and then 0 is added at the end. Also, when any number is multiplied by 100, each digit of that number moves 2 places up and then 00 is added at the end.

Lesson Flow

1 Review the previous lesson.

2 1 Think about the number of 10 times of 20 Kina based on the diagram shown in the text book.

S Recognise ten times of 10 becomes 100 and twenty times of 10 becomes 200.
T Let the students notice the vertical relationship of the place value chart.
T Introduce the main task.

3 2 Find the number which is ten times of 25 based on the diagram representations.

S Think of the number separating 20 and 5.
T Let the students notice the vertical relationship of 25 and 250 from the place value chart.
S Recognise that when a number becomes ten times, the number of digit increases by 1 place and 0 is added at the end.

4 3 Find the number which is hundred times of 25 based on the diagram representations.

T Let the students notice that hundred times means twice of ten times.
S Recognise the relationship between 25 and 2500.
S Recognise that when a number becomes hundred times, the number of digit increases 2 and two zeros are added at the end.

5 Conclude the lesson .

T Every number multiplied by 10 moves to the next higher place, and then a zero is added on at the end. Also, every number multiplied by 100 moves up 2 places, and then two zeros are added on at the end.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: 10 times, 100 times and divided by 10 Lesson Number: 1 out of 2

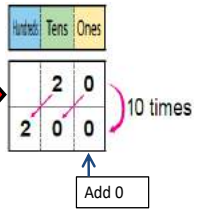
Main Task: Let's multiply numbers by 10 and 100.

1 What is 10 times of 20?

20 × 10 = ☐

MT

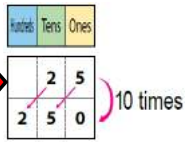
10 times
To multiply any number by 10, move all the numbers up to the next higher place and add a 0 to the right.



2 What is 10 times of 25?

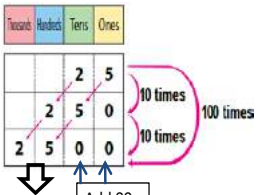
25 × 10 = ☐

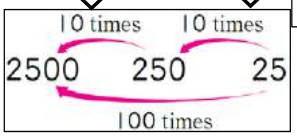
10 times
To multiply any number by 10, move all the numbers up to the next higher place and add a 0 to the right.



3 What is 100 times of 25? 25 × 100 = ☐

100 times
To multiply any number by 100, move all the numbers up to the next higher place and add 00 to the right.





The cost of 100 times should be 10 times larger than the cost of 10×25 which is 250.

When any number is multiplied by 10, each digit of that number moves to the next higher place and then 0 is added at the end. Also, when any number is multiplied by 100, each digit of that number moves 2 places up and then 00 is added at the end.

Exercise

1 (1) What number is 10 times larger than 100?
(2) 40 × 10 (4) 150 × 10
(3) 53 × 10 (5) 2500 × 10

2 1) What number is 100 times larger than 100?
(2) 6 × 100 (4) 824 × 100
(3) 12 × 100 (5) 3500 × 100

Summary

- The math was interesting because any number moves up a place when multiplied by 10 and add a 0 to the right.
- Also any number moves up two places when multiplied by 100 and add 00 to the right.

Unit 11

Unit: Large Numbers
Sub-unit: 3. 10 Times, 100 Times and Divided by 10
Lesson 2 of 2 (Single Period)

Textbook Page : p.118
Actual Lesson 079

Lesson Objectives

- To understand how to express the number divided by 10.

Prior Knowledge

- The number of 10 and 100 times and divided by ten.

Preparation

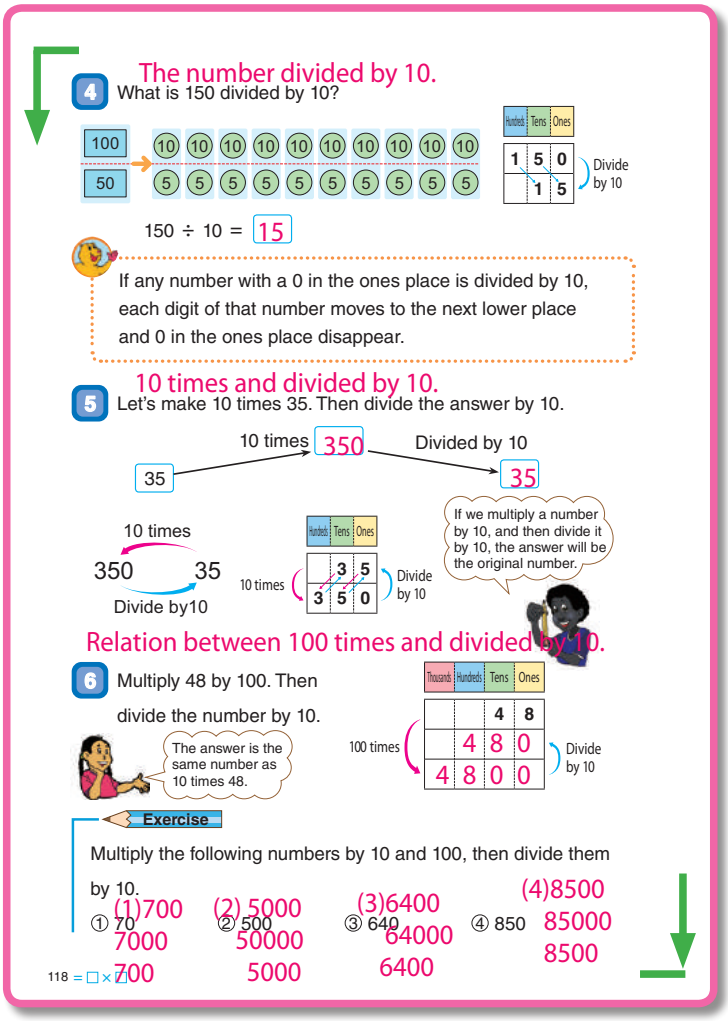
- Place value chart
- Chart on the summary points

Assessment

- Think about how to express the number divided by 10. F
- Solve exercise correctly at the end of the lesson. S

• Teacher's Notes •

The focus is to express dividend by 10 and recognising the relationship of 10 times and divided by 10.



4 The number divided by 10.
What is 150 divided by 10?

100 (10 10 10 10 10 10 10 10 10 10)
50 (5 5 5 5 5 5 5 5 5 5)

Hundreds	Tens	Ones
1	5	0
	1	5

Divide by 10

150 ÷ 10 = 15

If any number with a 0 in the ones place is divided by 10, each digit of that number moves to the next lower place and 0 in the ones place disappear.

5 10 times and divided by 10.
Let's make 10 times 35. Then divide the answer by 10.

35 → 10 times 350 → Divided by 10 → 35

10 times
350 35
Divide by10

10 times

Hundreds	Tens	Ones
3	5	
3	5	0

Divide by 10

If we multiply a number by 10, and then divide it by 10, the answer will be the original number.

Relation between 100 times and divided by 10.

6 Multiply 48 by 100. Then divide the number by 10.

The answer is the same number as 10 times 48.

Thousands	Hundreds	Tens	Ones
		4	8
	4	8	0
4	8	0	0

100 times

Divide by 10

Exercise

Multiply the following numbers by 10 and 100, then divide them by 10.

① 70 (1)700 7000
② 500 (2) 5000 50000
③ 640 (3)6400 64000 6400
④ 850 (4)8500 85000 8500

118 = □ × □

Lesson Flow

1 Review the previous lesson.

2 4 Investigate the number that 150 is divided by 10 based on the diagram representation.

T What is the difference when comparing the previous lesson?
S A number was multiplied by 10 and hundred last time and now it is divided.
S Notice the relationship between 150 and 15 from the place value chart.
T Introduce the main task.

3 Think about what happens when a number is divided by 10.

S Confirm that the digit of number is moved in the place value chart.

4 5 Investigate how the number changes when 35 is multiplied by 10 or divided by 10.

TN Explain using place value chart so that students can follow easily to understand the relationship.

5 6 Investigate how the number changes when 48 is multiplied by 100 or divided by 10.

S Confirm how 48 changes using the place value chart.
S Recognise with the place value chart if the number is multiplied by 100 and divided by 10, it becomes 10 times of the original number.

6 Solve exercises.

S Complete ① – ④.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: 10 times, 100 times and divided by 10 Lesson Number: 2 out of 2

Main Task: Let's multiply by 10, 100 and divide numbers by 10.

4 What is 150 divided by 10?

150÷10 = ☐

10 times
To divide a number with 0 in the ones place by 10, move all the numbers down to the next lower place and drop the zero at the end where it will disappear in the ones place.

Hundreds	Tens	Ones
1	5	0
	1	5

Divide by 10

MT

5 Let's make 10 times 35? Then divide the answer by 10.

35 → (10 times) 350 → (Divided by 10) 35

10 times
350 35
Divide by 10

Hundreds	Tens	Ones
	3	5
3	5	0

10 times, Divide by 10

10 times and divide by 10
When multiplying a number by 10 and then divide by 10 again, the answer becomes the original number.

6 Multiply 48 by 100. Then divide the number by 10.

48 × 100 = ☐ → ☐ ÷ 10 = ☐

Thousands	Hundreds	Tens	Ones
		4	8

100 times, Divide by 10

100 times and divide by 10
When multiplying 48 by 100 and then you divide by 10, the answer becomes the same as 10 times 48.

Exercise

1 Multiply the following numbers by 10 and 100 then divide by 10.
(1) 70 (2) 500
(3) 640 (4) 850

Summary
■ The math was interesting because any number moves up a place when multiplied by 10 and down a place when divided by 10.

Unit 11

Unit: Large Numbers
Sub-unit: 4. Addition and Subtraction
Lesson 1 of 2 (Single Period)

Textbook Page : p.119
Actual Lesson 080

Sub-unit Objectives

- To calculate addition and subtraction of large number by applying the decimal positional numeration system.

Lesson Objectives

- To calculate addition and subtraction of large number by applying the decimal positional numeration system.

Prior Knowledge

- Numbers up to hundred thousands place
- Read and write numbers up to hundred thousand place.
- Understand the structure of the large numbers.

Preparation

- 2 sets of number cards 1 – 8

Assessment

- Enjoy the calculation of large numbers using the number card. F
- Recognise that the system of calculation is the same as the calculation of 3-digit numbers. S

• Teacher's Notes •

Task 2 may be challenging for some students, give them ample time to express their ideas.

(4-digit) + (4-digit), carrying from thousands place.

4 Addition and Subtraction

1 Let's add 7356 + 8421 in vertical form.

	7	3	5	6
+	8	4	2	1
1	5	7	7	7

In the thousands place, the answer is carried up, so how should we write?

Addition and subtraction of 4-digit number

2 Let's use cards with numbers 1 , 2 , 3 , 4 , 5 , 6 , 7 and 8 , for making addition and subtraction problems of 4-digit numbers.

Naiko's problem

	6	1	4	5
+	7	3	2	8
1	3	4	7	3

Ambai's problem

	4	8	1	2
−	3	5	7	6
	1	2	3	6

1 Let's make an addition problem that has the largest answer.

In which case does the answer become largest?

It is largest when both thousands place are the largest!

2 Let's make a subtraction problem that has the smallest answer.

(2) 5123
- 4876
247

Eg. (1) 8642 + 7531 = 16173 (1) 8641 + 7532 = 16173

Lesson Flow

1 Review the previous lesson.

2 ① Think about how to do addition of carrying from the thousands place.

T Confirm how to calculate using the structure of large numbers.
S Recognise 7356 + 8421 is the addition of carrying over to the thousands place.
S Understand that system of calculation is same as before, like carrying from thousands place to ten thousands place which is one digit greater.
T Introduce the main task.

3 ② Make calculation problem using number cards from 1 to 8.

T ① How can we make an addition which has the largest number?
S Try by themselves and discuss their ideas with friends.
T Let the students notice that thousands place of both numbers must be the largest number.
S Notice that thousands place should be 8 or 7, hundreds place should be 5 or 6 and ones place should be 1 or 2.
T ② To make a smallest number, the answer from the thousands place should be 0 after borrowing number from thousands place to hundreds place. In addition, the largest number must be subtracted from the rest of the numbers.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: Addition and Subtraction Lesson Number: 2 out of 2

Main Task: Let's think about how to calculate 4 digit numbers.

① Let's add these digits in vertical form.

	7	3	5	6
+	8	4	2	1
1	5	7	7	7

Notice that the addition is same as we learnt before, adding from ones place and adding numbers in the same place value.

MT

② Let's use number cards from 1 to 8 to make addition and subtraction problems of 4 digits.

1	2	3	4	5	6	7	8

Naiko' problem

	6	1	4	5
+	7	3	2	8
1	3	4	7	3

Ambai's problem

	4	8	1	2
−	3	5	7	6
	1	3	3	6

① Let's make an addition problem that has the largest answer.

	8	6	4	2
+	7	5	3	1
1	6	1	7	3

	8	6	4	1
+	7	5	3	2
1	6	1	7	3

② Let's make an addition problem that has the smallest answer.

	5	1	2	3
−	4	8	7	6
		1	4	7

Exercise

1 Make one more
(1) addition problem with a large answer.
(2)Subtraction problem with a smaller answer.

Summary

- For a larger answer, order numbers from the largest to the smallest.
- For a smallest answer, between hundreds place and ones place put small number in the minuend and large numbers in the subtrahend except for the thousands place.
- Thousands place must be 0 after the calculation.

Unit 11

Unit: Large Numbers
Sub-unit: 4. Addition and Subtraction
Lesson 2 of 2 (Single Period)

Textbook Page : p.120
Actual Lesson 081

Lesson Objectives

- To calculate large numbers and expressing the number as a stack of 1000.
- To think about how to calculate addition with many digits.

Prior Knowledge

- Addition and subtraction of 4-digit numbers (Previous lesson)

Preparation

- Exercise written on a chart

Assessment

- Think about how to express large numbers in a simpler way. F
- Solve exercises at the end of the lesson. S

• Teacher's Notes •

Writing the term thousand to represent zeros makes calculation easier. Give opportunity for students to recognise and express numbers in a simpler way by themselves.

Addition of large number.

3 In 2011, the number of people in West Sepik Province was 248000. The number of people in East Sepik Province was 450000. How many people are there in the provinces of West and East Sepik altogether?

248000 is written as 248 thousand.

1 Write an expression.

248000 + 450000

2 Let's think about how to calculate.

248 thousand + 450 thousand = 698 thousand.

3 What is the difference in the number of people between the West Sepik Province and East Sepik Province?

450000 − 248000

450 thousand - 248 thousand
= 202 thousand

Assume 1 thousand people as one set, and then calculate. It is better to calculate by estimating sets of one thousand.

Exercise

① 4760 + 7071 11831 ② 5634 + 6509 12143

③ 8693 − 3587 5106 ④ 8606 − 8198 408

⑤ 210000 + 370000 580000 ⑥ 530000 − 180000 350000.

Addition of large number.

4 Let's add 187653 + 972784 in vertical form.

We use the same method even if there are more digits !

	1	8	7	6	5	3
+	9	7	2	7	8	4
1	1	6	0	4	3	7

This one calculation is the result of the following calculations.

$\begin{array}{r} 3 \\ +\,4 \\ \hline 7 \end{array}$ $\begin{array}{r} 5 \\ +\,8 \\ \hline 8 \end{array}$ $\begin{array}{r} 6 \\ +\,7 \\ \hline 1 \end{array}$

$\begin{array}{r} 7 \\ +\,2 \\ \hline \end{array}$ $\begin{array}{r} 8 \\ +\,7 \\ \hline \end{array}$ $\begin{array}{r} 1 \\ +\,9 \\ \hline \end{array}$

120 = □ × □

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 ③ Addition of large number considering the number as a stack of 1000.

T ① Let the student find out that 248000 can be written as 248 thousand and 450000 can be written 450 thousand.

S Realise that 248000 + 450000 can be expressed 248 thousand + 450 thousand.

T ② How to calculate 248 thousand + 450 thousand?

S We can calculate 248 + 450 and add the word thousand after the numbers.

T ③ What is the difference of these two?

S 450 thousand - 248 thousand = 202 thousand

3 Complete the exercise.

4 ④ Addition of large numbers in vertical form.

T How to calculate 187653 + 972784 in vertical form?

S Use the same method of addition in vertical form.

5 Summarise by correcting the addition problem.

S Notice that even the digits increase the method of calculation is the same.

Sample Blackboard Plan

Date: Chapter 11: Large Numbers Topic: Addition and Subtraction Lesson Number: 2 out of 2

Main Task: Let's calculate larger numbers.

MT

3 Let's add larger numbers in various ways.

1 Mathematics Expression
248000 + 450000

248 thousand 450 thousand

Remember previously you learnt that numbers such as 248000 can be written as 248 thousand

2 Mathematics Expression
248 + 450 = 698

	2	4	8
+	4	5	0
	6	9	8

Answer: 698 thousand or 698000

3 Let's find the difference in the number of people.

Mathematics Expression
450000 − 248000

450 thousand 248 thousand

Mathematics Expression
450 −248 = 698

	4	5	10
−	2	4	8
	2	0	2

Answer: 202 thousand or 202000 .

Exercise

(1) 4760 + 7071 (3) 8693 − 3587
(5) 210000 + 370000 (6) 530000 − 180000

4 Let's add larger numbers in vertical form.

We use the same method even if there are more digits.

	1	11	18	17	16	5	3
+		9	7	2	7	8	4
	1	1	6	0	4	3	7

Summary

- To calculate easily such numbers as 450000 can be written as 450 thousand.
- When adding very large numbers, the same method is used even if there are more digits..

Unit 11

Unit: Large Numbers
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.121-p.122
Actual Lesson 082

Sub-unit Objectives

- To deepen the understanding of what they have learned in this unit.

Lesson Objectives

- To deepen the understanding of what they have learned in this unit.

Prior Knowledge

- All contents in this unit

Assessment

- Enjoy solving exercises by deepening their understanding on what they have learned. F
- Confirm if they can solve problems correctly and mastered the contents. S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

Structure of large number

1 Write the following numbers in numerals. Page 109

① The number that is the sum of 2 sets of ten thousand and 180. 20180

② The number that is the sum of 7 sets of hundred thousand, 6 sets of ten thousand and 3 sets of thousand. 763000

③ The number that is the sum of 30 sets of ten thousand and 50 sets of hundred. 305000

Series of large number.

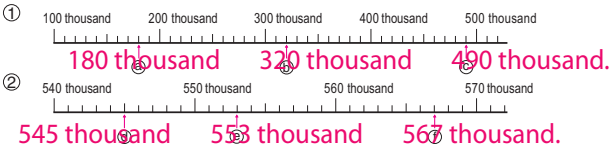
2 Fill in the ☐ with an appropriate number. Page 115

① 11000 — 11500 — 12000 — 12500 — 13000 — 13500

② 322 thousand — 324 thousand — 326 thousand — 328 thousand — 330 thousand — 332 thousand

3 Write the corresponding number in numerals to the one on the number line below. Pages 114~115

How to express numbers on the number line



Comparison of large number.

4 Fill in the ☐ with the appropriate inequality sign. Page 115

① 333300 > 34330 ② 5482941 > 5482899

Relationship between multiplied by 100 and divided by 10.

5 Multiply the following numbers by 100 and then divide by 10. Pages 117 ~ 118

① 23 230 ② 40 400 ③ 111 1110 ④ 605 6050

6 Let's calculate. Pages 119 ~ 120

① 3183 + 9897 13080 ② 6102 + 7938 14040 ③ 6997 − 5006 1991

□ + □ = 121 122 = □ − □

Problems

Structure of large number, how to write and read

1 Write the following numbers in numerals, and read them.

● Understanding the structure of large numbers and how to read them.

① The number that is the sum of 48 sets of ten thousand and 270. 480270 Four hundred, eighty thousand two hundred & seventy

② The number that is the sum of 5 sets of hundred thousand, 9 set of thousand and 2 sets of hundred. 509200 Five hundred, nine thousand two hundred

③ The number that is the sum of 2 sets of hundred thousand, 35 sets of thousand. 235000 Two hundred thirty five thousand

④ The number that is 10 sets of hundred thousand. 1000000 One million

2 Draw an arrow to the number line that corresponds to the numbers.

● Represent numbers on the number line.

① 2000 ② 18000 ③ 30000 ④ 45000

3 Fill in the ☐ with an appropriate number.

● Understanding how to arrange numbers in order.

① 19850 — 19900 — 19950 — 20000

② 19800 — 19900 — 20000 — 20100

③ 250 thousand — 200 — 150 — 100 thousand — 50 thousand

Lesson Flow

1 **① Write the numbers confirming the structure up to 100 thousand.**

T Ask to use place value chart for the students who have difficulty.

2 **② Understand the difference between 2 numbers.**

S Consider the difference of 2 numbers and find the missing numbers.

3 **③ Read and Write the numbers on the number line.**

S Consider size of one unit scale and find the number.

TN It is quite difficult for students to find the size of one unit scale so please explain to them.

4 **④ Compare numbers and express using inequality sign.**

T Confirm how to compare numbers and how to use the sign.

5 **⑤ Find numbers which are divided by 10 after multiplied by 100.**

TN Confirm following two points.

① How to find numbers which are multiplied by 100 or multiplied by 10.

② The number which are divided by 10 after multiplied by 100 is 10 times of original number.

6 **⑥ Calculate 4-digit numbers.**

7 **Problems**

S Complete ① – ③.

Large Numbers	Name:	Score

(Each question is worth 10 points)

1. Write the following numbers in numerals.

① Eighty seven thousand three hundred and thirty nine. 87339

② Fifty thousand and twenty three 50025

③ The number that is the sum of 1 set of one million, 6 sets of hundred thousand and 3 sets of ten thousand. 1630000

④ The number that is 10 times that of 5100. 51000

2. Compare the two numbers and write the appropriate inequality sign.

① 923718 < 923781 ② 104152 > 98769

3. Fill in the blanks with an appropriate number.

11000 – 11500 – 12000 – 12500 – 13000

4. Calculate the following operations.

① 3184 + 9998

$$\begin{array}{r} 3184 \\ +9998 \\ \hline 13182 \end{array}$$

② 6997 − 4003

$$\begin{array}{r} 6997 \\ -4003 \\ \hline 2994 \end{array}$$

End of Chapter Test: Chapter 11 **Date:**

Large Numbers	Name:	Score

(Each question is worth 10 points)

1. Write the following numbers in numerals.

   ① Eighty seven thousand three hundred and thirty nine. _____

   ② Fifty thousand and twenty three _____

   ③ The number that is the sum of 1 set of one million, 6 sets of hundred thousand and 3 sets of ten thousand.

   _____

   ④ The number that is 10 times that of 5100. _____

2. Compare the two numbers and write the appropriate inequality sign.

   ① 923718 _____ 923781 ② 104152 _____ 98769

3. Fill in the blanks with an appropriate number.

   11000 − _____ − 12000 − 12500 − _____

4. Calculate the following operations.

   ① 3184 + 9998 ② 6997 − 4003

Chapter 12 Length

1. Unit Objectives

- To deepen the understanding about length. (3.2.1 a)
- To know about the unit of length (kilometre). (3.2.1 b)
- To calculate length correctly (3.2.1 c and d)

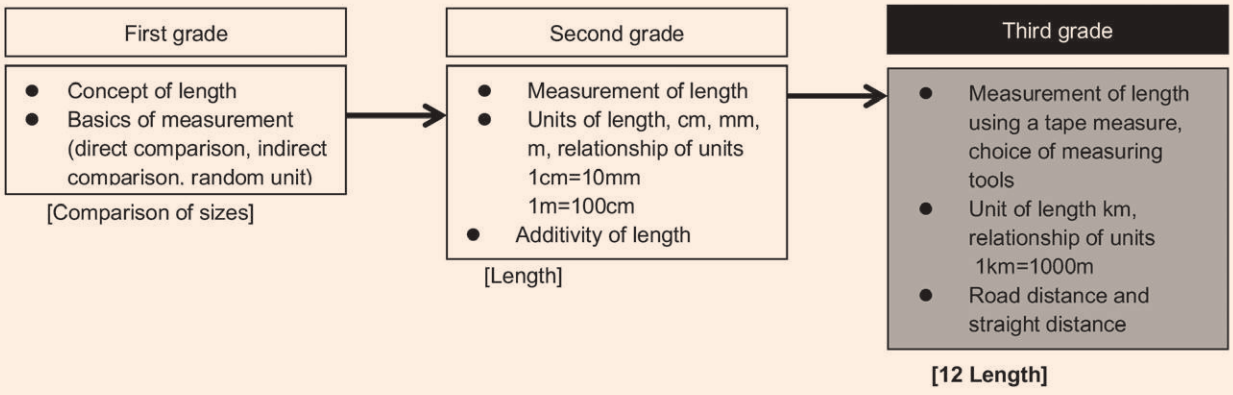
2. Teaching Overview

In the learning of quantity, it is important for learners to acquire sense of quantity. For example, students should be encouraged to be able to estimate and have a feel of how much is 1 m, 10 kg or 1 hour like. In the learning of length, several practices of estimating and measuring to confirm if the estimation is correct or not will help learners to acquire the sense of length. Students learned measuring properties with a ruler by 1 time in Grade 2. In this chapter, it will be the last chapter for students to learn about length and distance in school, so that teachers should be responsible for perfecting students' knowledge and skills on length and distance. The learning in this chapter will be the foundations of learning areas.

How to Measure : Students should find the difference of properties of rulers and measuring tapes. At the same time, students should understand that they can measure both visible lines and invisible straight lines which connects 2 points. They should find out the appropriate apparatuses for measuring through experiences and discussions.

Kilometre : It is important for students to acquire the sense of km. Discussion on distance from school to a certain place, the town centre, next town, famous cities, etc will help students to have the sense if they are in walkable distance or far compared to metres or centimetres.

3. Related Learning Contents



Unit 12

Unit: Length
Sub-unit: 1. How to Measure
Lesson 1 of 2 (Double Period)

Textbook Page : p.123-p.125
Actual Lesson 083

Sub-unit Objectives

- To understand how to use measuring tools and measure the length.
- To get the sense of length through measuring things. (how far or long the distance is)

Lesson Objectives

- To know the measuring tools for measuring long distance or length.
- To understand how to use the measuring tools.
- To understand the meaning of distance.

Prior Knowledge

- Measuring tools that measure distances less than a metre and up to a metre.
- How to use the 1 metre ruler.

Preparation

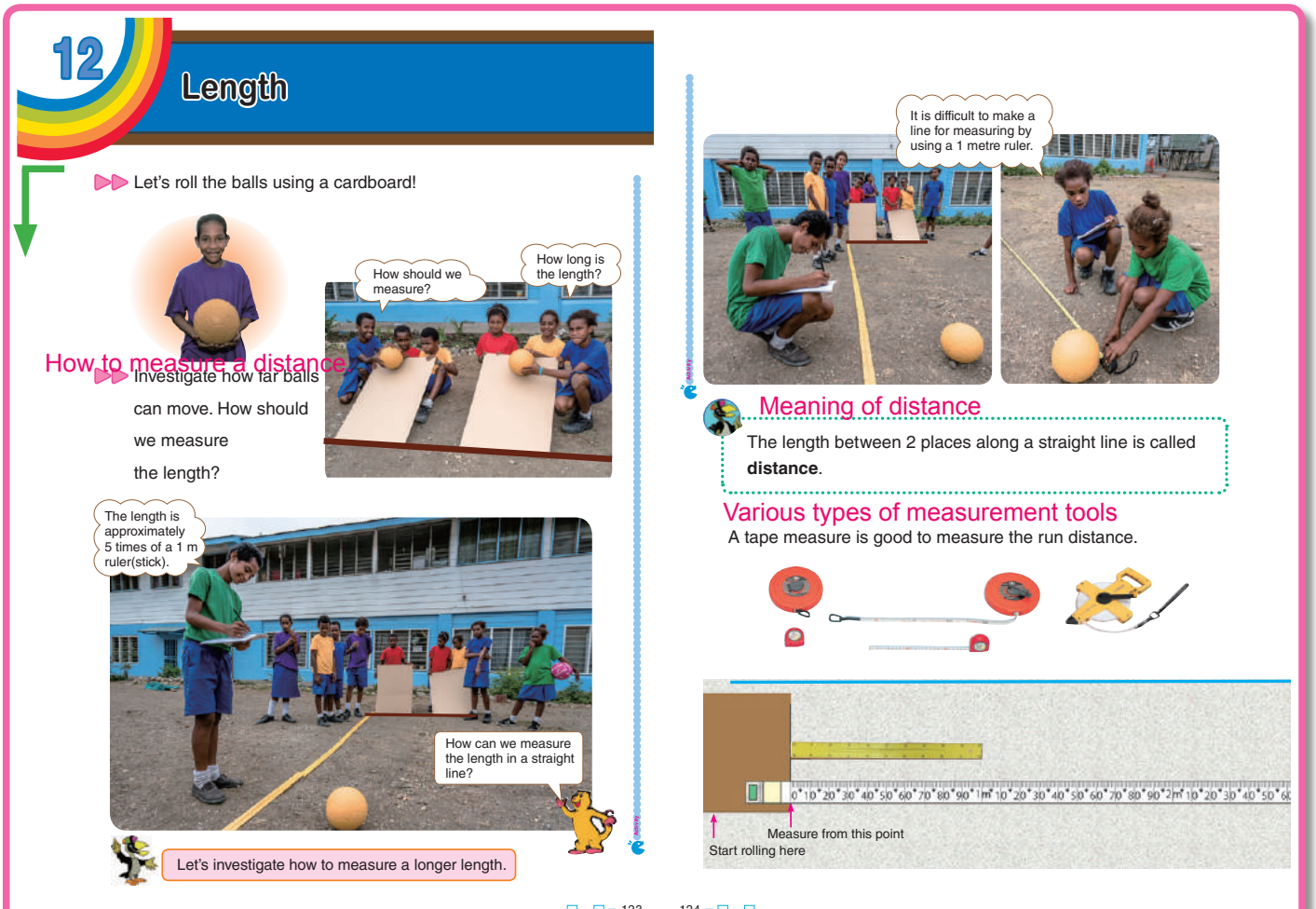
- Tape measure, 1 metre ruler.

Assessment

- Enjoy how to measure long distances accurately using measuring tools. F
- Understand the meaning of distance. S

• Teacher's Notes •

If there are any examples of different tape measure, bring into class to enhance learning.



Lesson Flow

1 Think about how to measure the distance accurately after rolling the ball.

T Make groups and each group should have a ball. Each group rolls the ball and then compares the distances.

S Try to understand the task and discuss how they can compare the distances. How far did the ball move? How long is the length of the distance? How should we measure? What kind of measuring tool can we use to measure?

T Introduce the main task.

2 1 Confirm how to use the tape measure and how to read the unit by answering activities 1 to 3.

T Have the students go through answering the questions in the text book in order to understand how to use and read off the unit shown on a tape measure.

3 Measure the distance of the ball using the tape measure.

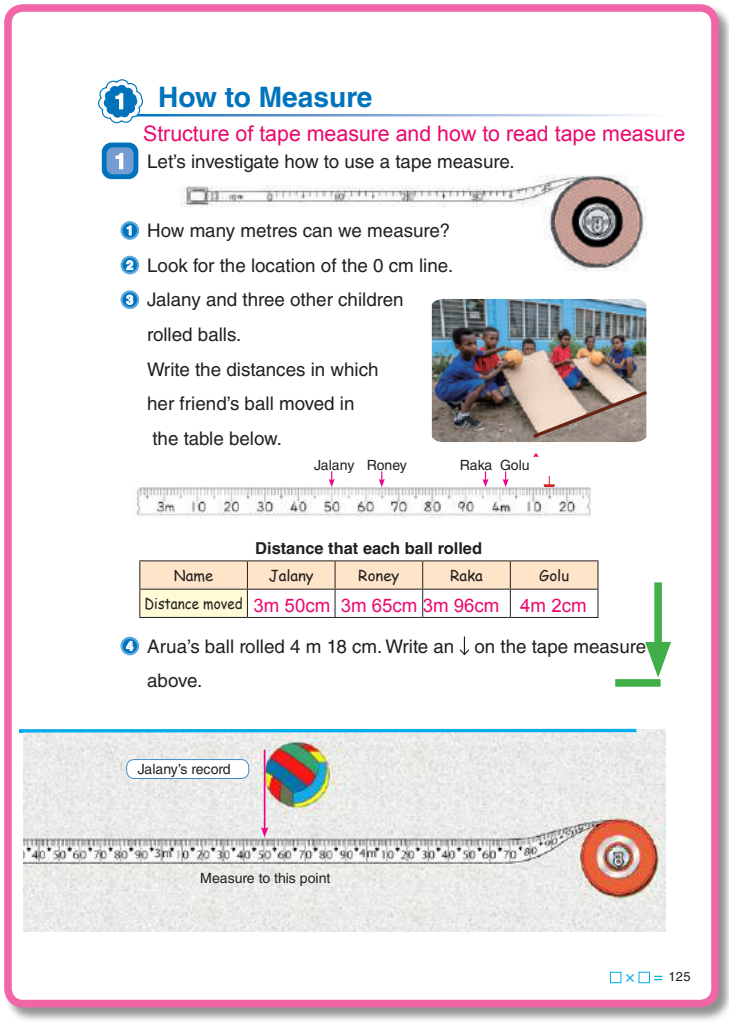
S Go out to the school ground and do the activity.

T Ask students to investigate how to measure a longer length.

S Discuss that by using a measuring tool like a 1 metre ruler and connecting the 1 metre ruler each time, we can measure a longer length.

S Realise that even when they measure using a 1 metre ruler, there is still a problem so they need another measuring tool.

T A tape measure that can measure a distance longer than one metre because a metre ruler is ok, however, you have to mark and then connect each time where it is difficult and the measurement may not be accurate as expected. A one metre ruler can only measure distances up to 1 metre or less than that.



1 How to Measure

Structure of tape measure and how to read tape measure

1 Let's investigate how to use a tape measure.

1 How many metres can we measure?

2 Look for the location of the 0 cm line.

3 Jalany and three other children rolled balls. Write the distances in which her friend's ball moved in the table below.

Jalany Roney Raka Golu

3m 10 20 30 40 50 60 70 80 90 4m 10 20

Distance that each ball rolled

Name	Jalany	Roney	Raka	Golu
Distance moved	3m 50cm	3m 65cm	3m 96cm	4m 2cm

4 Arua's ball rolled 4 m 18 cm. Write an ↓ on the tape measure above.

Jalany's record

Measure to this point

□×□= 125

Sample Blackboard Plan

Sample blackboard plan refer to page 187

Unit 12

Unit: Length
Sub-unit: 1. How to Measure
Lesson 2 of 2 (Single period)

Textbook Page : p.126
Actual Lesson 084

Lesson Objectives

- To measure the distances accurately using the tape measure.
- To understand the sense of a distance about 10 metres through walking.
- To acquire the sense of distance by predicting and measuring the distance in the surrounding area.
- To measure the distance between various things in the surrounding area accurately.

Prior Knowledge

- Measuring tools for measuring long distance or length.
- How to use the measuring tools.
- Measuring the distance accurately using ruler and tape measure.

Preparation

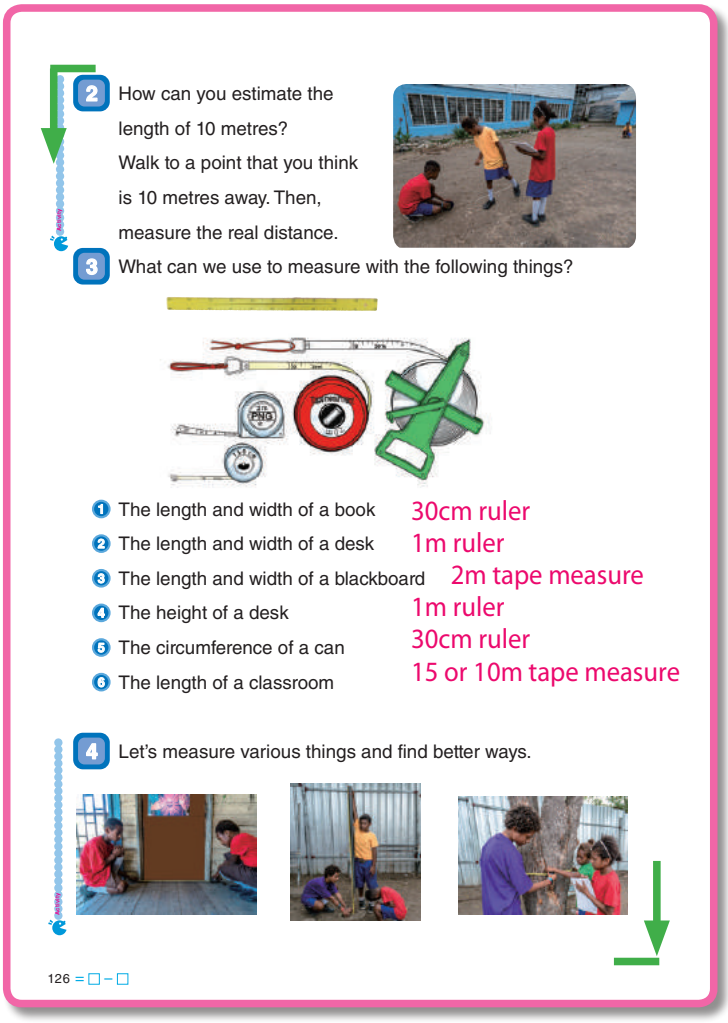
- Tape measure, 1 metre ruler

Assessment

- Enjoy measuring the distances of various things accurately using the measuring tools. F
- Think about the appropriate measuring tools depending on the length. S
- Measure the distances of various things accurately. S

• Teacher's Notes •

Prediction is an important process of learning. Assist students using the table to predict before measuring using the measuring tool. Task 2 and task 4 are outdoor activities.



2 How can you estimate the length of 10 metres? Walk to a point that you think is 10 metres away. Then, measure the real distance.

3 What can we use to measure with the following things?

1 The length and width of a book — 30cm ruler
2 The length and width of a desk — 1m ruler
3 The length and width of a blackboard — 2m tape measure
4 The height of a desk — 1m ruler
5 The circumference of a can — 30cm ruler
6 The length of a classroom — 15 or 10m tape measure

4 Let's measure various things and find better ways.

126 = □ − □

Lesson Flow

1 2 Play the game of guessing 10 metres.

S Make a group and a member of the group guess and walk a distance of 10 metres and compare the distance and measure the distance. Through the game they understand the sense of distance.

T Once students understand the 10 m distance let them walk 10 m many times for improving their sense of distance.

T Introduce the main task.

2 3 Choose the measuring tool depending on the objects to measure.

S Predict the length of each object before choosing the measuring tool.

T Let students share their ideas with reasons.

3 4 Make plan for measuring various things.

S In groups they decide 3 things to measure within their surrounding area.

S Predict the distance before measuring.

S Decide which measuring tool to use.

S In groups, they go out to measure and record the distance of 3 things.

S Share the results and findings.

S Discuss the way for measuring accurately.

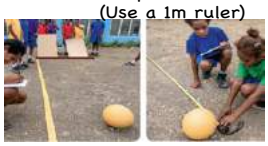
T Zero must be the starting point and should not be moved while measuring.
Measurement should be from 0 to where the measurement ends.

Sample Blackboard Plan (Lesson 83)

Date: Chapter 12: Length Topic: How to Measure Lesson Number: 1 out of 2

Main Task: Let's think about how to measure longer lengths.

Let's think about how the length is measured. Compare the distances (Use a 1m ruler)



Distance A: 4 times of a 1m ruler

Distance B: 5 times of a 1m ruler

Discover Problems
1.To connect 1m ruler may not be accurate.
2.It's difficult to make a straight line to measure.
3.They realize that they need a longer ruler or tape that can measure a length more than 1m.

Important Point

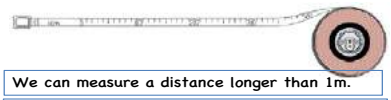
The length between 2 places along a straight line is called **distance**.

MT

4. Introduce various types of tools to measure longer length than 1m and more called **tape measures.**

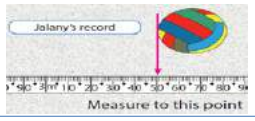
1 Go through the structure of tape and how to read the tape.

1. From where do you start rolling the tape measure.
2. From which point do you start to measure the distance and read off.



1 We can measure a distance longer than 1m.

2 Mark the location of 0cm on the line or tape measure.



3 Measured distance of balls rolled using the tape measure.

Distance that each ball rolled

Name	Jalany	Rodney	Raka	Golu
Distance moved	3m 50cm	3m 65cm	3m 96cm	4m 2cm

4 Mark with an arrow how far the ball rolled.

Arua's ball

Summary
- Measuring a distance longer than 1m with a ruler may not be accurate..
- A tape measure is needed to measure lengths longer than 1m.
- Mark the location of 0cm and start to measure the distance from that point to the measured point.

Sample Blackboard Plan (Lesson 84)

Date: Chapter 12: Length Topic: How to Measure Lesson Number: 2 out of 2

Main Task: Let's identify correct tools and measure various lengths.

Let's think about how to estimate the length of 10m.

2 1. Play the game of guessing 10m in length.

2. Each group member walk a distance of 10m and compare.
3. Measure real length using a tape.

MT

3 Choose the measurement tool depending on the object to measure.

1 The length and width of a book. (30 cm ruler)

2 The length and width of a desk. (100cm or 1m ruler)

3 The length and width of a blackboard. (2m tape measure)

4 The height of a desk.(100 cm or 1m ruler)

5 The circumference of a can. (100 cm or 1m tape measure)

6 The length of a classroom.(5m or 10m tape measure

Task: Let's make a plan for measuring various things.

4 Measure things and find better ways.

Predict the length, choose the tool and measure the real length.

Things in the surrounding area.	Predict length	Suggest measuring tool	Accurate distance
1.			
2.			
3.			

Summary
- To measure accurately 0 must be the starting point and should not be moved while measuring to where the measurement ends.
- There are proper measurement tools to use depending on the object to measure.

For example.
The length and width of a door. (2m tape measure)

Unit 12

Unit: Length
Sub-unit: 2. Kilometre
Lesson 1 of 3 (Double Period)

Textbook Page : p.127~p.128
Actual Lesson 085

Sub-unit Objectives

- To understand the meaning of distance and road distance.
- To get the sense of length through measuring things. (how far or long the distance is)
- To calculate the distance.

Lesson Objectives

- To understand the meaning of distance and road distance.
- To know about the relationship between kilometre and metre and use appropriate unit depending on the distance to measure.
- To calculate the distance accurately.

Prior Knowledge

- How to measure distance (m).

Preparation

- Chart of task 1 and 2

Assessment

- Think about how to calculate the distance and road distance using appropriate unit. F
- Understand the unit km and the relationship between kilometre and metre S.

• Teacher's Notes •

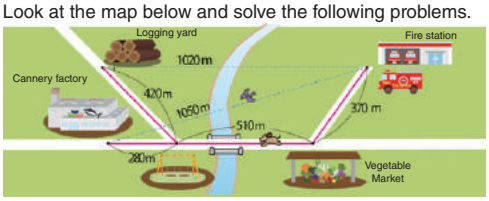
Unit of length
1000 m = 1 km

- Direct distance is measuring length in a straight line.
- Road distance is distance along the road.

2 Kilometre

The meaning of road distance and the difference between road distance and distance

1 Look at the map below and solve the following problems.



The length measured along the road is called **road distance.**

(1) How long is the road distance and the distance from the fire station to the Tuna cannery factory in metres, respectively?

Distance is the length measured in a straight line.

Road distance is 370+510+280= 1160m

Distance is 1050m

1000 m is called one kilometre and is written as 1 km.

1 km = 1000 m

(2) How many kilometres and metres are the road distance and the distance from fire station to Tuna cannery factory respectively?

Road distance 1160 m = 1 km 160 m

Distance 1050 m = 1 km 50 m

km	m
1	160
1	050

1 km 160 m is called "**one kilometre and one hundred sixty metres**".

(3) How many kilometres and metres are the road distance and the distance from the fire station to logging yard, respectively?

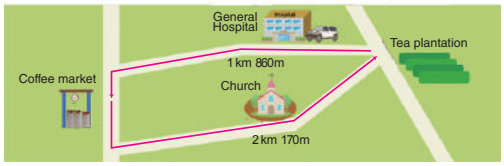
Road distance is 370 + 510 + 420 =1300m/ 1km 300m

Distance is 1020/ 1km 20m

□ + □ = 127 128 = □ − □

2 Calculation of the distance

Look at the map below and solve the following problems.



Students from Blue class visited town for the excursion.
Move from tea plantation to coffee market.

(1) How many kilometres and metres is the road distance from the tea plantation to the coffee market through the General hospital and return from the coffee market to the tea plantation through the church? Write an expression.

1 km 860 m + 2 km 170 m

Let's think about how to calculate.

Mero's idea

Kilometre
1 km + 2 km = 3 km
Meter
860 m + 170 m = 1030 m
1030 m = 1 km 30 m
Total, 4 km 30 m

Yamo's idea

1 km 860 m = 1860 m
2 km 170 m = 2170 m
So,
1860 m + 2170 m = 4030 m
4030 m = 4 km 30 m

(2) Between the tea plantation and the coffee market, which road distance is longer and by how many more?

Calculate the Length in Vertical Form

km	m
2	170
− 1	860

2km 170m − 1km 860m = 310m

Lesson Flow

1 ① Think about the ways distance is measured.

T A bird flies directly from the fire station to Cannery factory. What is it called?
S It is called direct distance.
T A dog runs along the road to Cannery factory. What is it called?
S It is called road distance.
T Emphasis the important point in the box .

2 ① Confirm the difference of the road distance and direct distance between the fire station and the Cannery factory.

T Direct distance is the measure of length in a straight line.
T Road distance is the distance along the road.
S Study the map and find the road distance and direct distance between the fire station and Cannery factory in metres only.
T Introduce the main task.

3 ② Know the unit of kilometre and think about the relationship with metre.

S Understand that 1000 m=1 km, and find the road distance and the direct distance in kilometres and metres by using a place value chart for the unit of length shown in activity 2.

4 ③ Think about how to calculate the distance.

S Study the map and calculate the road distance and direct distance between the fire station and Cannery factory.

5 ② Solve the task by comparing the two ideas.

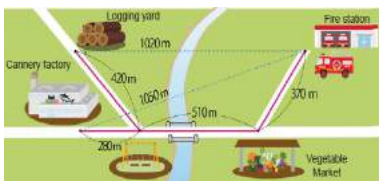
T What do we have to consider when calculating distance or road distance?
S We can use the unit 'km' if it is over 1000 m.
S For the calculation, when carrying, carry 1000 to 'km' place. When borrowing, borrow 1000 from 'km's place.
S ① ② Solve the activities.

Sample Blackboard Plan

Date: Chapter 12: Length Topic: Kilometre Lesson Number: 1 out of 3

Main Task: Let's calculate road distance and direct distance in metres and kilometres.

① Let's identify the road distance and direct distance in metres.



① The road distance and the direct distance from the fire station to the Cannery factory.
Road distance: 370+510+280=1160
Direct distance: 1050m

MT

Important Point
1000 m is called one kilometer and is written as 1 km. 1 km = 1000 m 1km

② Road distance: 1160m = 1 km 160 m
Direct distance: 1050m = 1 km 050 m

km	m
1	1 6 0
1	0 5 0

1 km 160 m is read as "1 kilometre 1 hundred sixty metres."

③ The road distance and the direct distance from the fire station to the Logging yard.
Road distance: 370+510+420=1300m
1300m = 1 km 300 m
Direct distance: 1020m
1020m= 1 km 020 m

② Task: Let's think about how to calculate the distance.

① Move from tea plantation to coffee market

Mathematics Expression
1 km 860 m – 2km 170 m

km	m
1	8 6 0
+ 2	1 7 0
4	0 3 0

② Between tea plantation and coffee market.

Mathematics Expression
2 km 170 m – 1km 860 m

km	m
2	1 7 0
– 1	8 6 0
	3 1 0

Summary

- 1000 metres is equal to 1 kilometre and written as 1km.
  1km160m is read as " 1 kilometre , 1 hundred sixty metres."
- Road distance is the distance along the road.
- Direct distance is the measure of length in a straight line.

Unit 12

Unit: Length
Sub-unit: 2. Kilometre
Lesson 2 of 3 (Double Period)

Textbook Page : p.129
Actual Lesson 086

Lesson Objectives

- To experience how long 1 kilometre is through walking 100 m distance.
- To understand how far you can go in one (1) kilometre.

Prior Knowledge

- Meaning of distance and road distance.
- Unit of kilometre and metre
- Calculation of distance

Preparation

- Mark the specific area for students to walk around including start and finish point for 100 m and 1 km.
- Identify the number of laps for 1 km around the sports field.

Assessment

- Experience and feel how long is one (1) kilometre and enjoy how to measure the distance by walking 100 m distance and counting the steps. F
- Understand the distance of (1) kilometre through the experiment. S

• Teacher's Notes •

The activity in this lesson is for enhancing their sense of length. It is important that students walk 1 km and relate the distance to their enviroment.

Teacher needs to measure 100 m and 1 km on the playground before the lesson.

Improve sense of distance

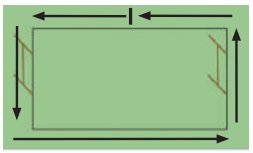
3 Let's explore the distance of 1 km around the sport field.

1 Walk for 100 m and think about how far is 1 km.

- How many of your steps did you take to walk 100 m?
- How many steps for 1 km?

2 Let's walk 1 km.

- How many minutes does it take?
- How do you feel?



3 Let's relate the distance of 1 km in our environment.

□ × □ = 129

Lesson Flow

1 (3) (1) Investigate the distance of 100 m in the school field.

T Introduce the main task.
TN The acitvity is an outdoor activity. Teacher can take students to the sports field.
T Indicate the distance of 100 m.
S Walking 100 metre by counting the number of steps.
T How many steps did you take to walk for 100 m?
S 200 steps, 215 steps, etc.
T How many steps for 1 km?
S Predict the number of steps.
1 km is 10 times of 100 m so we can multiply 10 to the number of steps for 100 m.

2 (2) Experiment, each student walks one (1) kilometre and record the result.

T Indicate how many laps for 1 km in your school field.
S Walk 1 km by measuring the time.

3 (3) Share the result in the class.

T How did you feel about walking 1 km?
S Longer than I expected.
S It was not so long for me.
T Compare their predictions and state whether it is the same as they predicted or not.
T Let's relate the distance of 1 km in our environment.
S 1 km is about the school to my house.
S From the market to my house is about 1 km.

Sample Blackboard Plan

Date: Chapter 12: Length Topic: Kilometre Lesson Number: 2 out of 3

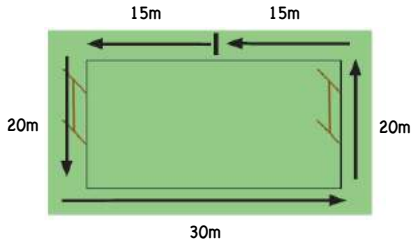
Main Task: Let's get a feel of walking a distance of 1 km.

MT

(3) Let's find the distance of a kilometre.

TN: Mark out the field to 100m before the lesson.

(1) Let's walk for 100m and and think about how far is 1km.



(2) Fill in the prediction part before experiment

Activity	Prediction	Record of result
1. Up to how many steps can you take to walk for 100m?	steps	steps
2. How long will it take to walk for 100m?	mins	mins
3. Walk a distance of 1 km, how many complete laps can we make?	laps	laps
4. How many minutes will it take to walk for 1 km?	mins	mins
5. My thought about the distance of 1km.	before	after

TN: Record how long it takes using a stop watch.

(3) Relate the distance to 1 km in our environment.

Summary
- 1 lap covers 100m.
- 10 laps covers 100 ×10 of which is 1000m
- 1000m is 1 km.
- It's a very long distance and very tiring.

Unit 12

Unit: Length
Sub-unit: 2. Kilometre
Lesson 3 of 3 (Single Period)

Textbook Page : p.130
Actual Lesson 087

Lesson Objectives

- To think about the effective route by combining the road distance and time.

Prior Knowledge

- Distance and road distance
- Unit of km and conversion between km and m

Preparation

- Worksheets, maps

Assessment

- Think about taking the effective route by combining road distance and time. F
- Find the effective route correctly by calculating road distance and time. S

• Teacher's Notes •

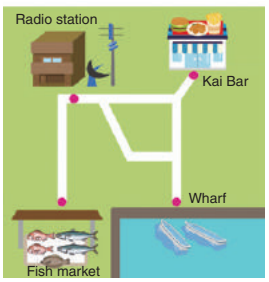
Considering distance and time, students find the fastest route.

Direct students attention to the map when explaining activites 1 to 3.

Apply the distance and time to our daily life's situations

Travelling by bicycle

4 Tanya is touring a sea side town by bicycle. She departs from the Kai Bar, visits both the Radio station and the Wharf and finally arrives at the fish market.



Road Distance and Time

	Road distance	Time
Kai bar ↔ Radio station	2 km 400 m	16 minutes
Kai bar ↔Wharf	6 km 100 m	28 minutes
Radio station ↔ Wharf	6 km 200 m	31 minutes
Radio station ↔ Fish market	19 km 100 m	48 minutes

1 The table above shows the road distance and travel time between 2 places. Which is better to go to first, is it the Radio station or the Wharf? Wharf

2 Which is the longest road distance, is it when she goes to the Radio station first or the wharf, and by how many?

3 Which takes a longer time by bicycle, and by how long?

130 = □ – □

(2) Answer
Radio station is 2km 400m + 6km 200m + 6km 200m + 19km 100m = 33km 900m
Wharf is 6km 100m + 6km 200m + 19km 100m = 31km 400m
33km900-31km400= 2km500m
To Radio station first 2km 500m more

(3) Answer
Radio station 16m + 31 + 31 + 48 = 126 minutes
Wharf 28 + 31 + 48 = 107 minutes
126 minutes - 107 minutes=19 minutes
To Radio first 19 minutes more

Lesson Flow

1 4 Read the problem and understand the task and what the map is showing.

S Discuss the situation in the problem and recognise what the map shows. Give some reasons as to why the map is useful to Tanya.

S Start travelling from the kai bar and visiting both the radio station and the wharf and finally arriving at the fish market.

T Introduce the main task.

2 Solve the problem of 1 - 3.

S Think about the road distance and travel time between each points or locations.

TN Let students discuss and come up with the closest and fastest way based on the information on the map and the table.

T Which is the closest and fastest way to go to the fish market?

S Write the road distance and the travel time on the map to help you think of the distance.

3 Summarise the lesson.

S Share their ideas in the class.

S Confirm the answer by explaining their reasons.

Sample Blackboard Plan

Date: Chapter 12: Length Topic: Kilometre Lesson Number: 3 out of 3

MT

Main Task: Let's find the shortest trip.

4 Let's think about which place is better to go to first.

1 Radio station

Math Expression

2km400m + 6km200m + 6km200m +19km100m

Vertical form

	km		m	
	2	4	0	0
	6	2	0	0
	6	2	0	0
+	21	9	1	0	0
	33		9	0	0

Ans: 33km 900m

Wharf

Math Expression

6km100m + 6km200m + 6km200m + 19km100m

Vertical form

	km		m	
	6	1	0	0
	6	2	0	0
+	21	9	1	0	0
	31		4	0	0

Ans: 31km 400m

Ans: It's better to go to the wharf first because it's a shorter road distance than the other.

2 Mathematics Expression

33 km 900 m − 31km 400 m

Vertical form

	km		m	
	33		9	0	0
−	31		4	0	0
	2		5	0	0

Ans: 2km 500m

Ans: It's longer to go to the radio station first because it's 2km 500m more in road distance.

3 Which takes a longer time by bicycle and by many?

Time in minutes

To the Radio station

Math Expression

16 + 31 + 31+ 48 = 126

Ans: 126 minutes

To the Wharf

Math Expression

28 + 31 + 48 = 107

Ans: 107 minutes

Takes longer by bicycle

Mathematics Expression

126 − 107= 19

Ans: 19 minutes more

Ans: It takes longer to go to the radio station first than the wharf because it takes 19 minutes more to get there.

Summary

- We can find the shortest and longest route using distance and time.

Unit 12

Unit: Length
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double period)

Textbook Page : p.131~p.132
Actual Lesson 088

Lesson Objectives

- To deepen the understanding of what has been learned by solving the exercises.

Prior Knowledge

- All contents in this unit

Preparation

- Evaluation sheet for the students

Assessment

- Review what has been learned by solving the exercises. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

Relationship between distance and road distance and change unit

1 Let's fill in the ☐ with a number or a word. Pages 124, 127

① Choose 2 places and measure the length in a straight line.
This is called Distance

② The distance measured along the road is called Road distance

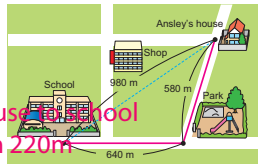
③ 1 km = 1000 m

How to read the unit of tape measure

2 How many metres and centimetres are shown by the arrows ↓ on the tape measures shown below. Page 125

Calculation of distance

3 The map below shows the road distance and the distance between Ansley's house and the school. Page 130



① How many kilometres and metres is the road distance from Ansley's house to the school through the park?

(1) Answer From Ansley's house to school 580m + 640m = 1220m/ 1km 220m

② What is the difference in metres between the road distance ① and the distance from Ansley's house to the school?

(2) Answer 1220m – 980m = 240m

Let's find time and duration. Grade 3 Do you remember?

① What time is 45 minutes after 10:40 in the morning? 11:25

② What is the duration from 11 hours and 30 minutes in the morning to 1 hour and 30 minutes in the afternoon? 11:30 to 1:30 = 2 hours

Problems

Appropriate unit of distance

1 Fill in the ☐ with a correct unit.
Using units of length correctly.

① The length of the classroom is 8 m.

② The road distance that we walk in one hour is 4 km.

③ The height of the desk is 60 cm.

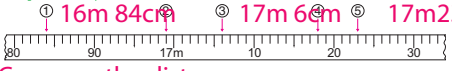
④ The height of Mt. Wilhelm is 4509 m.

How to read the tape measure

2 How many metres and centimetres are there at the arrows ↓ on the tape measure?
Reading the scale of a tape measure.

16m99cm 17m18cm

① 16m 84cm ③ 17m 6cm ⑤ 17m23cm



Compare the distance

3 Which is longer?
Understanding relationship between different units of length.

① 2 km 50 m ; 2030 m 2km50m

② 1580 m ; 1 km 59 m 1580m

③ 5 km ; 4980 m 5km

Calculation of distance

4 Let's calculate.
Calculation of addition and subtraction of length.

① 700 m + 500 m = 1200m

② 1 km 900 m + 200 m = 2km100m

③ 5 km 400 m + 680 m = 6km80m

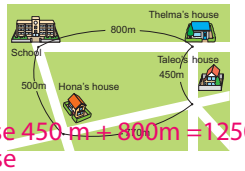
④ 1 km – 300 m = 700m

⑤ 2 km 500 m – 800 m = 1km 700m

⑥ 3 km 530 m – 540 m = 2km990m

5 Taleo can go to school through Thelma's house or Hona's house.

Which of the 2 has the longest road distance? And by how much?
Calculation of addition and subtraction of length.



From Taleo through Thelma's house 450 m + 800m = 1250m

From Taleo through Hona's house 770m + 500m = 1270m , 1270m - 1250m = 20m

Lesson Flow

1 ① **Fill in the boxes with a number or a word.**

S Recognise the relationship between the road distance and the direct distance.

2 ② **Confirm how to use the tape measure and how to read the unit by answering the questions.**

S Study how to read the tape measure and read off the measurements shown by the arrow on the tape measure.

3 ③ **Confirm the road distance and direct distance between Ansley's house and the school.**

S Study the map and identify the road distance and direct distance from Ansley's house to the school.

S Think about how to find the difference between the road distance and the direct distance.

4 ① **Fill in the boxes with a number or a word.**

Length	Name:	Score

1. Fill in the blanks with numbers or words. (6 points each)

① The length between 2 places along a straight line is called Distance.

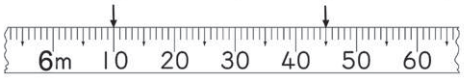
② The length measured along the road is called Road distance.

③ 1 m = 100 cm

④ 1km = 1000 m

2. How many meters and centimeters are there at the arrows ↓ on the tape measures shown below? (6 points each)

① 6m 10cm ② 6m 45cm



3. Fill in the blanks. (8 points each)

① 3 km = 3000 m ② 2km 400m = 2400 m

④ 2600 m = 2 km 600 m ④ 3400 m = 3 km 400 m

4. Calculate. (8 points each)

① 700m + 800m = 1500 m ② 1 km 700m + 200m = 1km 900m

③ 5km 500m − 800m = 4km 700m ④ 3km400m − 2km 100m = 1km 300m

S Think about the unit of distance or height around us by using the experience of measuring and the sense of distance.

5 ② **Confirm how to use the tape measure and how to read the unit by answering the questions.**

S Think about how to read the tape measure and read off the measurements shown by the arrow on the tape measure.

6 ③ **Compare the distances.**

S Compare the two distances while thinking about the relationship of the unit.

T Let students confirm to make same unit before the comparison.

7 ④ **Conduct distance calculation.**

S Conduct distance calculation.

T Let students confirm to make same unit before the calculation.

8 ⑤ **Confirm the road distance and direct distance between Thelma's house and the school.**

S Study the map and identify the road distance and direct distance from Thelma's house to the school.

S Think about how to find the difference between the road distance and the direct distance.

End of Chapter Test: Chapter 12 **Date:**

Length	Name:	Score

1. Fill in the blanks with numbers or words. (6 points each)

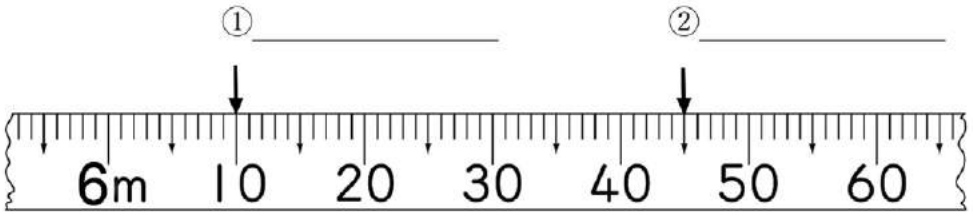
① The length between 2 places along a straight line is called _____.

② The length measured along the road is called _____.

③ 1 m = _____cm

④ 1km = _____m

2. How many meters and centimeters are there at the arrows ↓ on the tape measures shown below? (6 points each)



3. Fill in the blanks. (8 points each)

① 3 km = _____m ② 2km 400m = _____m

④ 2600 m = _____km_____ m ④ 3400 m = _____km_____m

4. Calculate. (8 points each)

① 700m + 800m = ② 1 km 700m + 200m =

③ 5km 500m − 800m = ④ 3km400m − 2km 100m =

Chapter 13 Triangles

1. Unit Objectives

- To understand the elements to make a triangle through observation or manipulation through the activity. (3.3.1a)
- To know about Isosceles and Equilateral triangles. (3.3.1b)
- To design patterns using various types of triangles. (3.3.1c)

2. Teaching Overview

Students learn shapes in intuitive ways in Grade 1. Based on the learning in Grade 1. They expand and develop the concepts of shapes with the notation of right angles by learning the concepts of rectangles, squares and right-angled triangles in Grade 2. In Grade 3, they learn isosceles triangles and equilateral triangles by focusing on the lengths of sides.

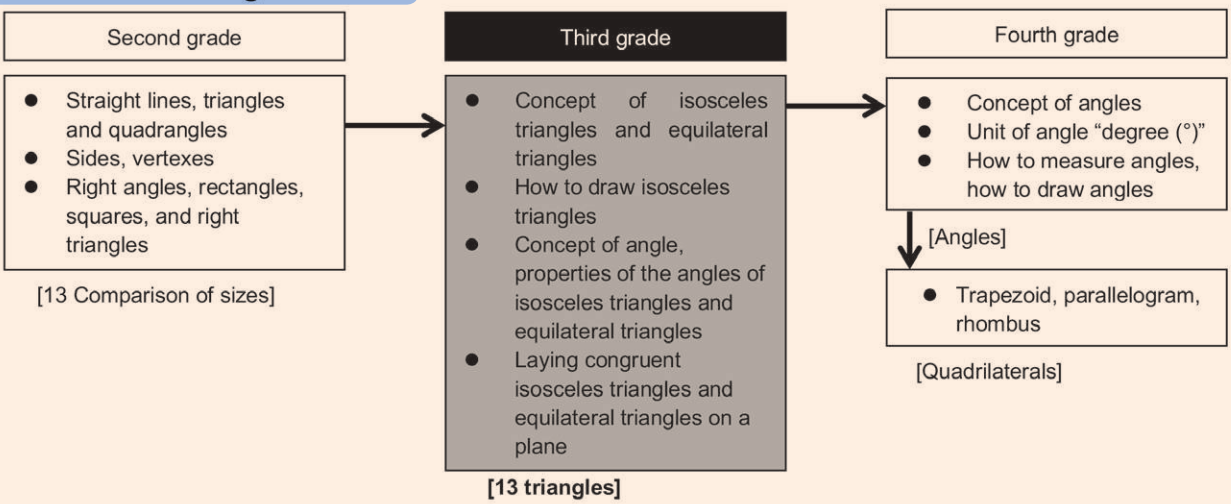
Isosceles and Equilateral Triangles : Let students discuss on the properties of each triangles made of different lengths of straws/sticks focusing on the lengths of sides. Avoid teaching definitions first.

How to Draw Triangles : The key for teaching this topic is to connect the previous topic to the way they use compasses and rulers. It means students should find that the compasses help us to draw triangles with given lengths. Then they should connect the ways of drawing triangles to the definitions of isosceles triangles.

Triangles and Angles : Students develop their concept of angles from intuitive understanding such as "pointed thing" to "the figure formed by 2 straight lines". They also should discuss on the sizes of angles by direct comparison. They can copy angles on papers and directly compare by overwrapping, so that they will be able to deepen the understanding on sizes of angles.

Designing Patterns : Students will be more familiar with triangular shapes by designing and also get friendly to triangular shapes and patterns in their daily life in this topic.

3. Related Learning Contents



Unit 13

Unit: Triangles
Sub-unit: 1. Isosceles and Equilateral Triangles
Lesson 1 of 5 (Double Period)

Textbook Page : p.133
Actual Lesson 089

Sub-unit Objectives

- To understand the Isosceles and Equilateral triangles by sorting them according to their structure.

Lesson Objectives

- To make various triangles by combining same or different lengths of sticks.

Prior Knowledge

- Properties of triangle (Elementary)

Preparation

- Students bring following materials;

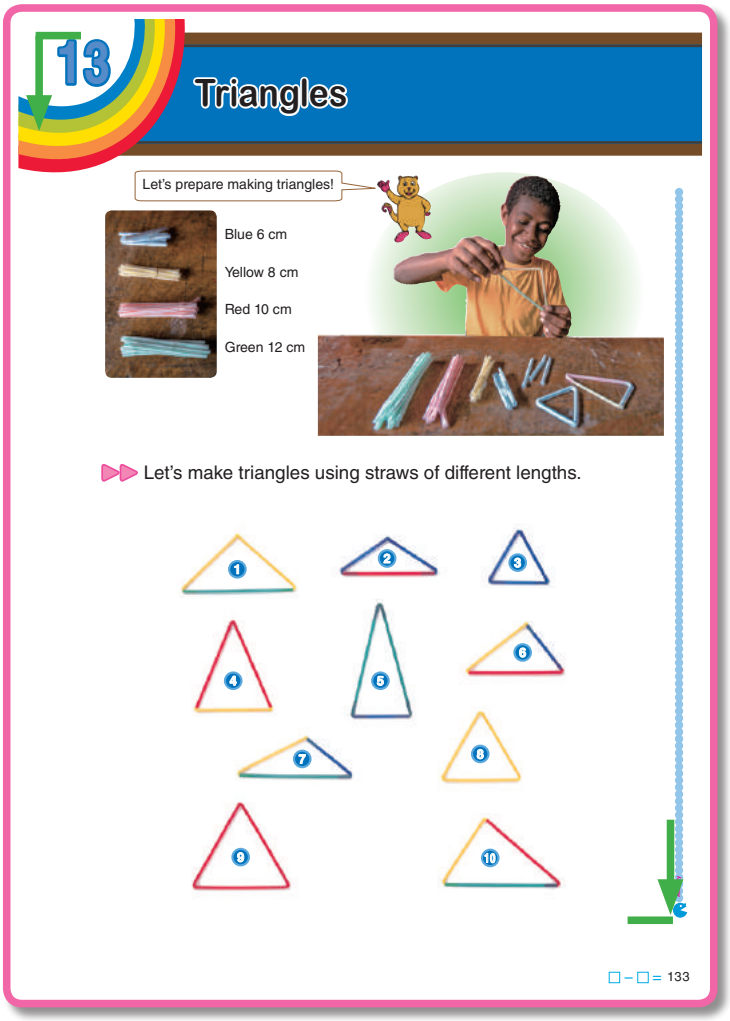
4×6 cm sticks or straws
4×8 cm sticks or straws
4×10 cm sticks or straws
4×12 cm sticks or straws
Blue Tack

Assessment

- Enjoy making various triangles using straws or sticks F
- Think about the criteria for categorising triangles. F S

• Teacher's Notes •

If straws are not available then sticks can be used instead.



Lesson Flow

1 Make triangles by choosing 3 sticks/straws out of 4 different length of sticks or straws.

T Introduce the main task.

T Let's make a triangle. "How many sticks/straws do we need?"

S Three

S Pick the same size sticks/straws or combine different size sticks/straws to make as many triangles as possible.

TN It is important that students make as many different triangles as possible.

2 Think about how to make different groups.

T Let's sort out the triangle into certain groups. "What kind of criteria do we need to categorise the triangles into different groups?"

S Give their ideas.

- "Three sides equal, two sides equal or all sides different"
- "Using sizes, how big the triangle is or the colours (if straw is used)"

TN Keep the triangles for the next lesson.

Sample Blackboard Plan

Date: Chapter Name: Triangles Topic: Isosceles and Equilateral Triangles Lesson Number: 1 of 5

Main Task: Let's make triangles using sticks.

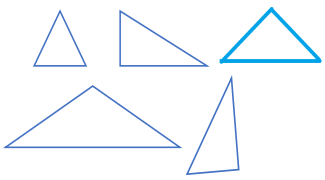
MT

Let's make Triangles by choosing 3 sticks out of 4.
□ How many sticks do we need to make a triangle? 3
□ How many triangles can you make from your sticks?
Let students to make as many triangles as they can.

Summary:

- Triangles can be made from 3 same lengths sticks or 3 different length sticks.
- They can be grouped according to their side length of sides or their sizes.

Students Ideas
Show their triangles in groups



Unit 13

Unit: Triangles
Sub-unit: 1. Isosceles and Equilateral Triangles
Lesson 2 of 5 (Double Period)

Textbook Page : p.134
Actual Lesson 090

Lesson Objectives

- To think about how to make groups focusing on their lengths or sides of triangle.

Prior Knowledge

- Making various triangles. (Previous lesson)

Preparation

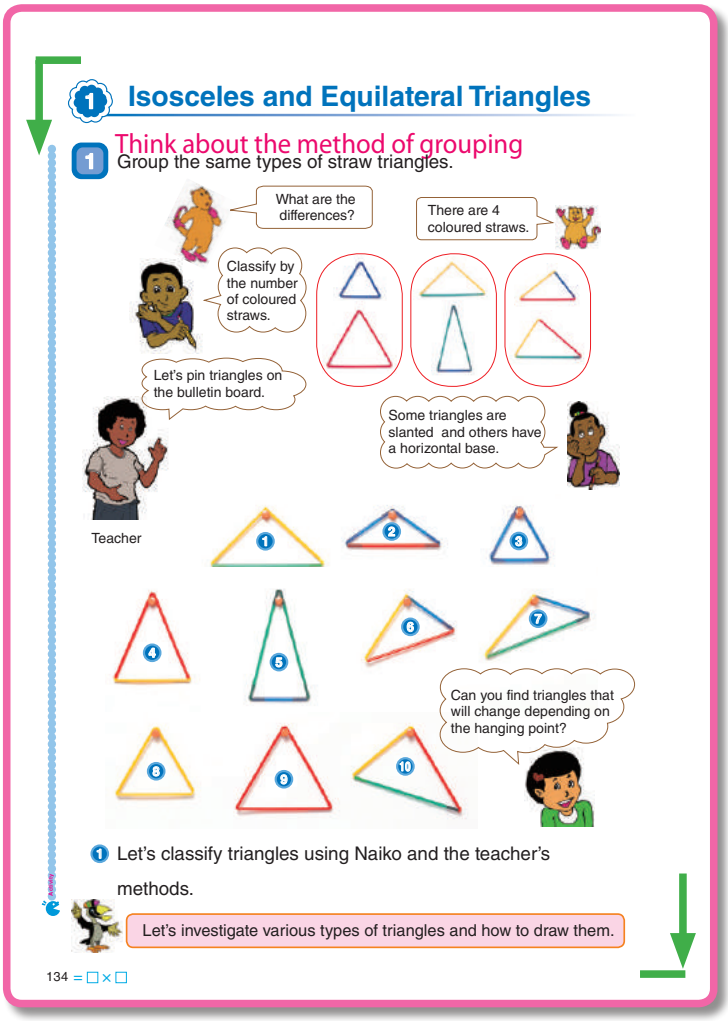
- Triangles made in previous lesson

Assessment

- Think about how to make groups focusing on their lengths or sides. F
- Categorise triangles correctly according to certain criteria. S

• Teacher's Notes •

In this lesson the students will group their triangles according to their side lengths; all sides equal, two sides equal and all sides different.



Lesson Flow

1 ❶ **Think about how to make groups of triangles.**

T There are 10 triangles. “How can we group them?”
S By shape or by size, (by colour using the textbook).
T Introduce the main task.

2 ❶ **Make a group focusing on the side of triangle. There are 3 types of triangles.**

T Let’s classify by their sides.
S Organise them as follows:
- All sides are equal
- Two sides are equal
- All three sides are different

T Select students to tack some samples on the black board.
S Tack their triangles under each sub-titles and give reasons.
S Summarise lesson.

Sample Blackboard Plan

Date: Topic: Isosceles and Equilateral Triangle Lesson Number: 2 of 5

Main Task: To think about how to group triangles

1

Let’s think about how to make different groups of Triangles.

What kind of criteria do we need to use to categorize the triangles into different groups?

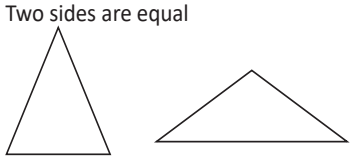
Students Ideas
Show their triangles in groups

MT

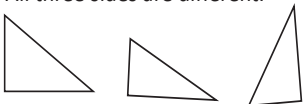
❶ How can we group them?
By shape, by size, as slanted or with horizontal base

Let’s make Groups of Triangles focusing on the sides.
- Let’s classify by their side lengths.
- Let’s organize them by hanging them

Two sides are equal



All three sides are different.



Summary:
When placing the triangles on the desk, some Triangles were slanted others have a horizontal base.
We can classify them by their sizes or by side lengths.

Unit 13

Unit: Triangles
Sub-unit: 1. Isosceles and Equilateral Triangles
Lesson 3 of 5 (Double Period)

Textbook Page : p.135
Actual Lesson 091

Lesson Objectives

- To sort out the triangles according to side length.
- To identify the properties of triangles according to the side length.

Prior Knowledge

- Categorisation of triangles by sides

Preparation

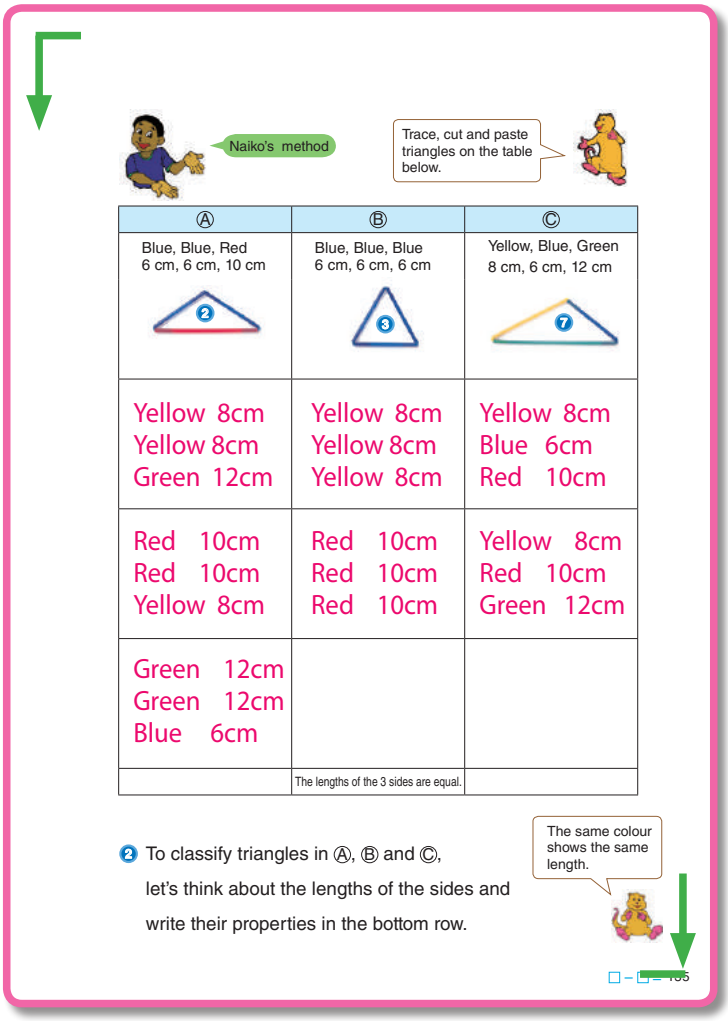
- Table with 3 categories

Assessment

- Sort out triangles according to the three criteria. F
- Understand the characteristics of each triangle. F S

• Teacher's Notes •

From the previous lesson the students had made triangles and categorised them into the three categories. In this lesson they will use the textbook.
The students will trace the triangles on page 133. Identify their lengths and group them on a table. Give emphasis on the length of sides and allow students to learn the properties of the three triangles.



Naiko's method

Trace, cut and paste triangles on the table below.

Ⓐ	Ⓑ	Ⓒ
Blue, Blue, Red 6 cm, 6 cm, 10 cm	Blue, Blue, Blue 6 cm, 6 cm, 6 cm	Yellow, Blue, Green 8 cm, 6 cm, 12 cm
Yellow 8cm Yellow 8cm Green 12cm	Yellow 8cm Yellow 8cm Yellow 8cm	Yellow 8cm Blue 6cm Red 10cm
Red 10cm Red 10cm Yellow 8cm	Red 10cm Red 10cm Red 10cm	Yellow 8cm Red 10cm Green 12cm
Green 12cm Green 12cm Blue 6cm		
	The lengths of the 3 sides are equal.	

② To classify triangles in Ⓐ, Ⓑ and Ⓒ, let's think about the lengths of the sides and write their properties in the bottom row.

The same colour shows the same length.

Lesson Flow

1 Review the previous lesson.

T How do we separate the triangles?
S Depending on the sides, all same lengths, two sides are the same, and all sides are different.
T Introduce the main task.

2 Organise the 10 triangles into the table according to their side lengths.

T Draw the table on the board and interact with students to organise the triangles.
S Trace and cut the triangles from the previous page.
S Sort out all types of triangles into three categories.
TN Give enough time for the students to think and categorise all triangles.

3 (2) Confirm the properties of the three types.

T What kind of properties does each triangle have?
S All the sides are same, two sides are the same, and all sides are different.
S Summarise the properties in their exercise book.

Sample Blackboard Plan

Date:

Topic: Isosceles and Equilateral Triangle

Lesson Number: 3 of 5

Main Task: Let's group using Lengths of sides.

Review

How do we separate the triangles?
According to their sides, all lengths same, two sides are the same, and all sides are different.

MT

1 Let's separate the 10 triangles into table according to their lengths

Students Ideas
Show their table

1

Ⓐ	Ⓑ	Ⓒ
Blue 6 cm, Blue 6 cm, Red 10 cm	Blue 6 cm, Blue 6 cm, Blue 6 cm	Yellow 8 cm, Blue 6 cm, Green 12cm
Yellow 8 cm, Yellow 8 cm, Green 12cm	Yellow 8 cm, Yellow 8 cm, Yellow 8 cm	Yellow 8 cm, Blue 6 cm, Red 10 cm
Red 10 cm, Red 10 cm, Yellow 8 cm	Red 10 cm, Red 10 cm, Red 10 cm	Yellow 8 cm, Red 10 cm, Green 12cm
Green 12cm, Green 12cm, Blue 6 cm		
Lengths of two sides are equal	Lengths of three side are equal	All sides are not equal

2 Think about the lengths of the sides and write their properties in the bottom row.

Summary:

The characteristic of triangles are defined by their sides. All sides same, two sides same and all sides different.

Unit 13

Unit: Triangles
Sub-unit: 1. Isosceles and Equilateral Triangles
Lesson 4 of 5 (Double Period)

Textbook Page : p.136
Actual Lesson 092

Lesson Objectives

- To define the triangle which has two sides equal and it is called isosceles triangle.

Prior Knowledge

- Properties of triangles

Preparation

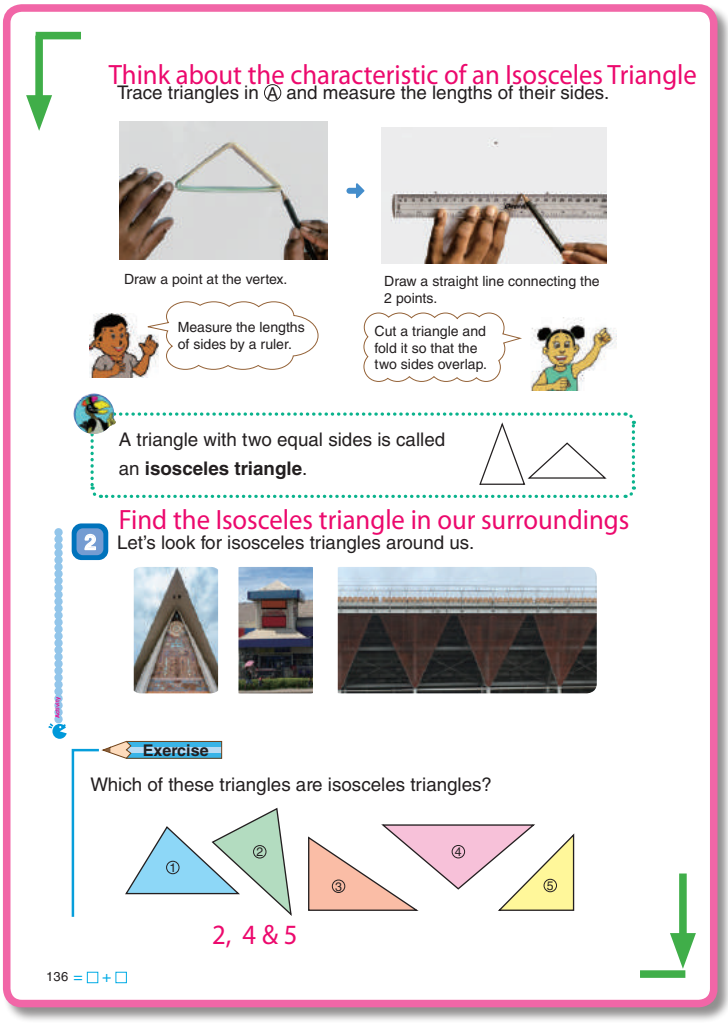
- Ruler, Tracing paper, Triangle A

Assessment

- Investigate and define the triangle with two sides being equal. F
- Do the exercises correctly. S

• Teacher's Notes •

Today's lesson focuses on Isosceles triangle when two sides are equal. Help students to avoid the mistake of focusing on the position of the triangle and direct their attention on the lengths of sides. The triangle may not be upright but its length is important. When two side lengths of a triangle are equal despite their position, we called it an isosceles triangle.



Think about the characteristic of an Isosceles Triangle

Trace triangles in Ⓐ and measure the lengths of their sides.

Draw a point at the vertex.

Draw a straight line connecting the 2 points.

Measure the lengths of sides by a ruler.

Cut a triangle and fold it so that the two sides overlap.

A triangle with two equal sides is called an **isosceles triangle**.

2 Find the Isosceles triangle in our surroundings

Let's look for isosceles triangles around us.

Exercise

Which of these triangles are isosceles triangles?

① ② ③ ④ ⑤

2, 4 & 5

136 = □ + □

Lesson Flow

1 Know the proper name of triangle A from the table.

S Trace triangle A and measure the sides.
S Share the characteristics that two sides are equal.
T Concludes: "A triangle with two equal sides is called Isosceles Triangle."
T Introduce the main task.

2 2 Find the Isosceles triangle in our surroundings.

T Ask students to think of their surroundings.
S Imagine in their daily lives and share their ideas.
TN Not all triangles will sit on their base.

3 Do the Exercises.

TN Position does not matter for deciding.

Sample Blackboard Plan

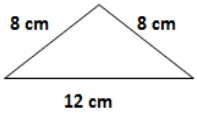
Date: Topic: Isosceles and Equilateral Triangle Lesson Number: 4 of 5

Main Task: Let's name the triangle which has two sides that are equal.

1 ❸ Trace triangle A and measure their lengths of sides.

Students Ideas
Illustrating how they draw triangle A

Important Point



MT

2 Let's find Isosceles triangles in our surroundings.
Eg: Front of the roof tops

Students Ideas
Write names of objects that are Isosceles.

Summary:
A Triangle with two sides that are equal is called Isosceles Triangle.

Exercise
Which of these triangles are isosceles triangles?
2, 4 and 5

(It may be upside down or slanted, when two sides are equal we called it an isosceles triangle.)

Unit 13

Unit: Triangles
Sub-unit: 1. Isosceles and Equilateral Triangles
Lesson 5 of 5 (Double Period)

Textbook Page : p.137
Actual Lesson 093

Lesson Objectives

- To define the triangle which has all sides equal and it is called equilateral triangle.

Prior Knowledge

- Isosceles triangle (Previous lesson)

Preparation

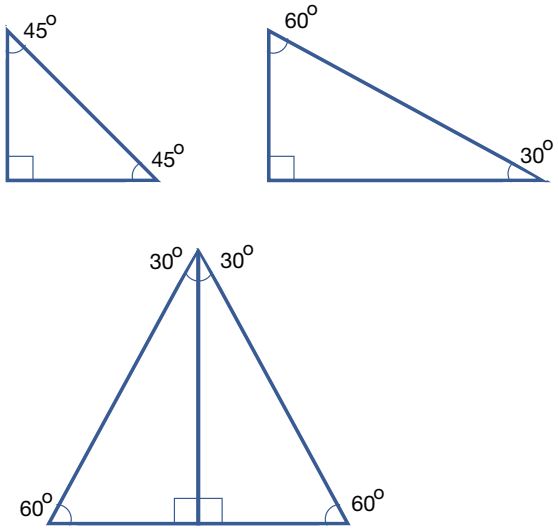
- Ruler, Tracing paper, Triangle B, Set square

Assessment

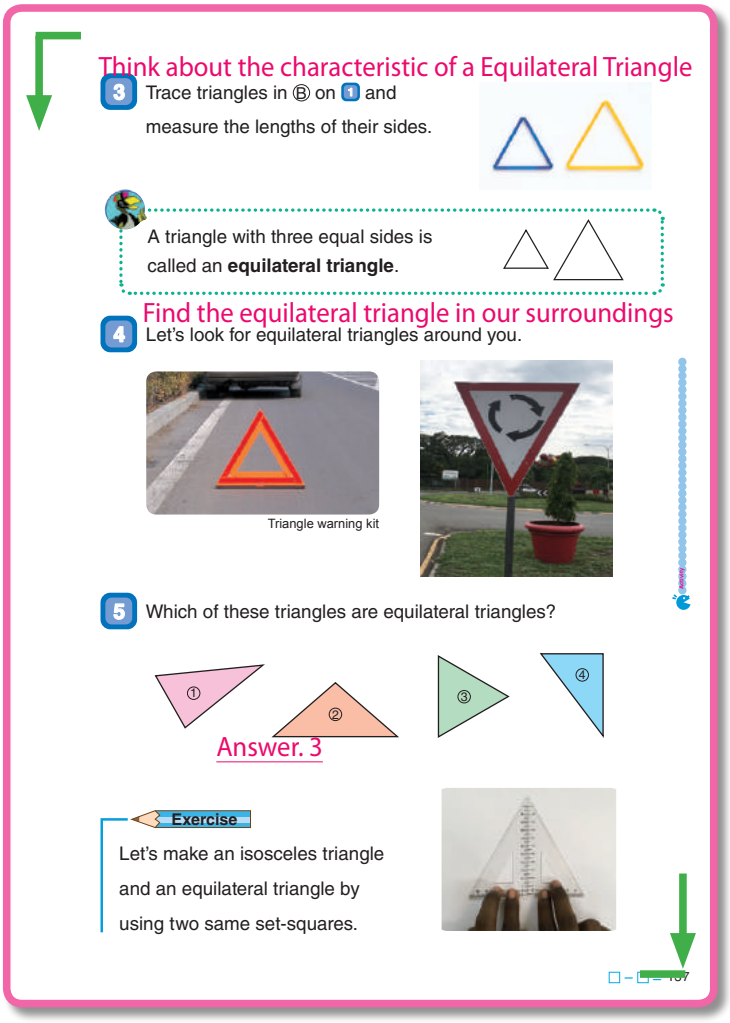
- Investigate and define the triangle which has all sides equal. F
- Do the exercises correctly. S

• Teacher's Notes •

There are two different set squares. One set square has 30°, 60° and 90° and the other has 45°, 45° and 90° set square. The exercise in this lesson requires the students to use one pair to draw their equilateral triangle and isosceles triangle. Only Isosceles can be form from the two set squares. Equilateral triangle can be formed from one of the two.



Equilateral triangle



Lesson Flow

1 3 Know the proper name of triangle B from the table.

S Trace triangle B and measure the sides.
S Share the characteristics that all sides are equal.
T Conclude that "A triangle with three equal sides is called Equilateral Triangle."
T Introduce the main task.

2 Find the Equilateral triangle in our surroundings.

S 4 Imagine in our daily lives and share their ideas.
T Confirm with students using the characteristic of an equilateral triangle.
S 5 Identify triangle ③ as an equilateral triangle.

3 Do the Exercises.

TN Refer to the Teacher's Notes

Sample Blackboard Plan

Date: Topic: Isosceles and Equilateral Triangle Lesson Number: 5 of 5

Main Task: Let's name the triangle which has all 3 sides that are equal.

Review

Name the Triangle with two sides that are equal.

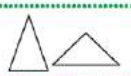
A Triangle with two sides that are equal is called Isosceles Triangle.

2 Let's look for isosceles triangles around us.

3 Trace triangle B and measure the length of sides.

Students Ideas
Display their work

A triangle with two equal sides is called an **isosceles triangle**.



MT

4 Let's find Equilateral triangles in our surroundings.

Eg: the Give Way sign on the road

Students Ideas
Write names of objects that are Equilaterals.

5 Which of these triangles are isosceles triangles?

Students Ideas
Write their Answers.

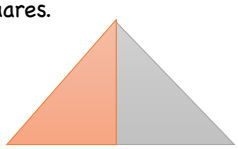
Answer: 2, 4 and 5

Summary:

A Triangle with all 3 sides that are equal is called Equilateral Triangle.

Exercise

Lets make isosceles and equilateral triangle by using two same set - squares.



Unit 13

Unit: Triangles
Sub-unit: 2. How to Draw Triangles
Lesson 1 of 2 (Double Period)

Textbook Page : p.138
Actual Lesson 094

Sub-unit Objectives

- To understand how to draw Isosceles and Equilateral triangle.

Lesson Objectives

- To draw Isosceles triangle using compass and ruler.

Prior Knowledge

- Properties of triangles

Preparation

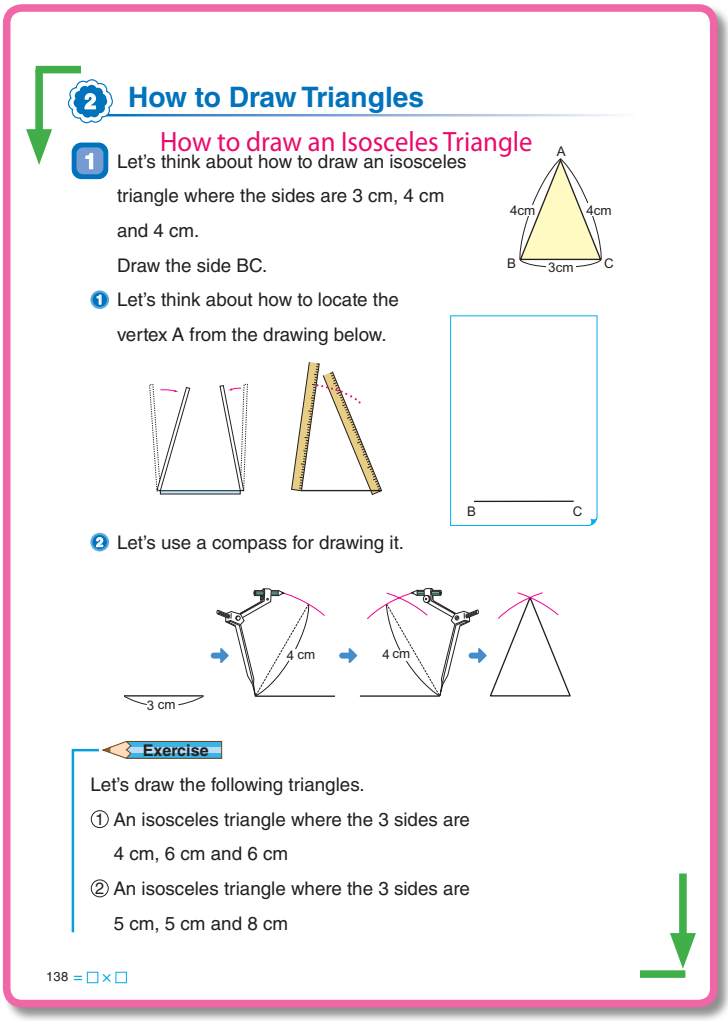
- Compass and Rulers
- Blackboard compass
- Blackboard rules

Assessment

- Draw isosceles triangle by confirming the characteristics of triangles. F
- Do the exercises correctly. S

• Teacher's Notes •

How to use a compass to draw an Isosceles triangle;
1. Extend the compass to the needed length.
2. Hold the compass from the head and do not move the legs. Make an arc from both ends of the given length.
3. The intersection of the marking will be the third vertex of the triangle.
4. Connect the lines to form an isosceles triangle. The distance should be the same from the given length to the mark formed by the arc.



2 How to Draw Triangles

How to draw an Isosceles Triangle

1 Let's think about how to draw an isosceles triangle where the sides are 3 cm, 4 cm and 4 cm.

Draw the side BC.

A
4cm
4cm
B
3cm
C

1 Let's think about how to locate the vertex A from the drawing below.

B C

2 Let's use a compass for drawing it.

4 cm
4 cm
3 cm

Exercise

Let's draw the following triangles.

① An isosceles triangle where the 3 sides are 4 cm, 6 cm and 6 cm

② An isosceles triangle where the 3 sides are 5 cm, 5 cm and 8 cm

138 = □ × □

Lesson Flow

1 (1) (1) Draw an Isosceles triangle with the sides of 3 cm, 4 cm, and 4 cm.

T Introduce the main task.
S Draw 3 cm using ruler.
T Where can we find point A?
S At the centre of 3 cm" or "in the middle"
T (2) Demonstrates the use of compass by opening the compass to 4 cm, then draw arcs from both sides to form point A.
S Draw the isosceles triangle by observing their teacher's demonstration.
TN Refer to the Teacher's Notes

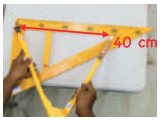
2 Do the Exercises.

TN (1) Base is 4 cm. 6 cm is drawn by compass.
(2) Base is 8 cm. 5 cm is drawn by compass.

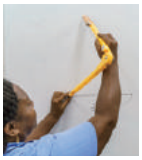
• Teacher's Notes 2 •

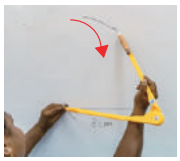
How to Draw an Isosceles Triangle with a Compass

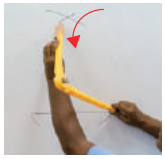
Measure 30 cm on the board and draw a line for the base of triangle.
(3 cm for students)



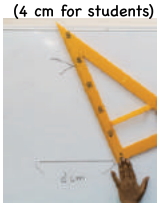
Measure the length between the tips of the Blackboard compass to 40cm for the sides.
(4 cm for students)


Hold the compass on the arms without moving the them to avoid changing the length.

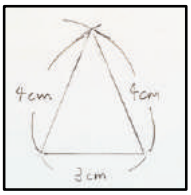

Point the tip of one arm of the compass stable onto one end of the base line and draw an arc with the other arm attached to the chalk or marker.


Do the same with the other end of the base line so that the 2 arcs intersect.

The intersection of the marked arcs is the third vertex of the triangle.


Use a ruler to draw a line from one end of the base line to the intersecting point.

Do the same for the other end of the base line to the intersecting point.



This is how the students' triangles should look like on the blackboard.

Note:
The Blackboard Triangle should have the actual side lengths of 30 cm, 40cm and 40 cm as Isosceles Triangle .

Sample Blackboard Plan

Date:
MT
1

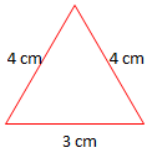
Chapter Name: Triangles
Topic: How to draw Triangles
Lesson Number: 1 of 2

Main Task: Let's think about draw Isosceles triangle.

Let's draw an Isosceles triangle of 3cm, 4cm and 4cm.

Students Ideas
Illustrate their answers

1 Draw a 3cm line and find point A using a ruler.



2 Use the compass to find point A .

How to use compass to draw Isosceles triangle;

1. Extend the compass to the needed length.
2. Hold the compass from the head and do not move the legs. Make an arc from both ends.
3. The intersection of the marking will be the third vertex of the triangle.
4. Connect the lines to form an isosceles triangle. The distance should be the same from given length to the mark formed by the arc.

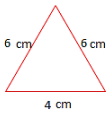
Summary:

Isosceles Triangles can be drawn by using a ruler and connect points made from the center.

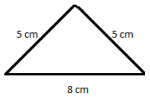
It can also be drawn using a compass, by stretching it to the required length and connect the lines to the point where the arc meet.

Exercise Lets draw the following triangles

① An isosceles triangle where the 3 sides are 4 cm, 6 cm and 6 cm.



② An isosceles triangle where the 3 sides are 5 cm, 5 cm and 8 cm



Unit 13

Unit: Triangles
Sub-unit: 2. How to Draw Triangles
Lesson 2 of 2 (Double Period)

Textbook Page : p.139
Actual Lesson 095

Lesson Objectives

- To draw an equilateral triangle using a compass and a ruler.

Prior Knowledge

- How to draw an isocseles triangle using a compass and a ruler.

Preparation

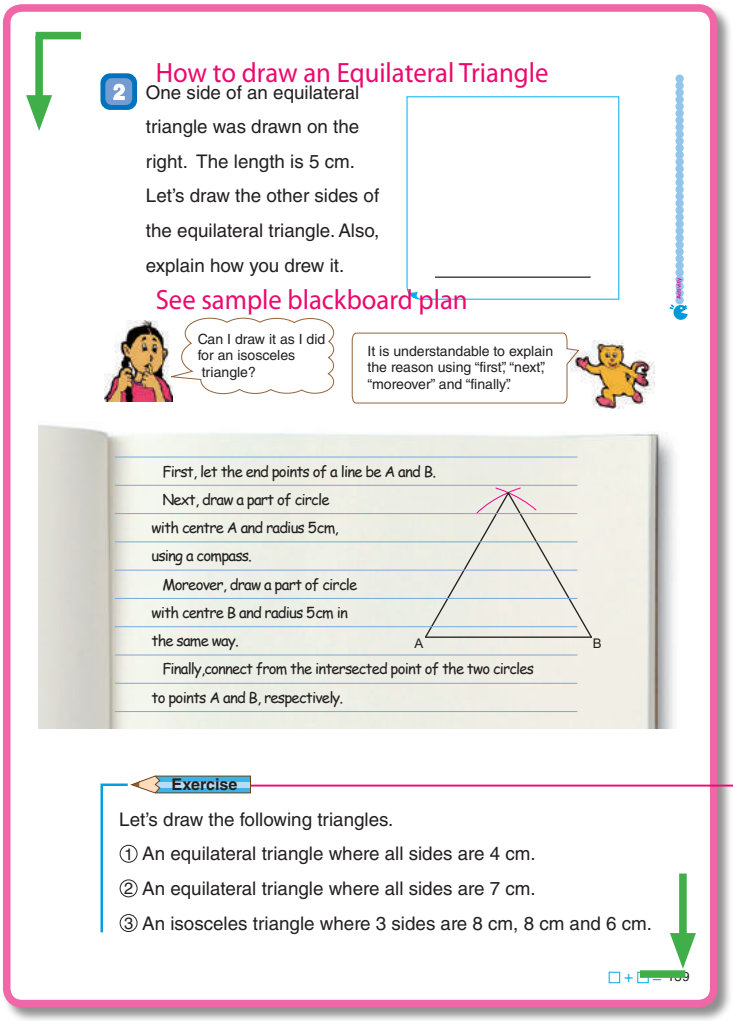
- Compass and Rulers

Assessment

- Draw an equilateral triangle by confirming the characteristics of triangles. F
- Do the exercises correctly. S

• Teacher's Notes •

The draw an equilateral triangle, we apply the same method of drawing isosceles triangle. The only difference is that the length of the bass and the sides should be the same.



2 How to draw an Equilateral Triangle

One side of an equilateral triangle was drawn on the right. The length is 5 cm. Let's draw the other sides of the equilateral triangle. Also, explain how you drew it.

See sample blackboard plan

Can I draw it as I did for an isosceles triangle?

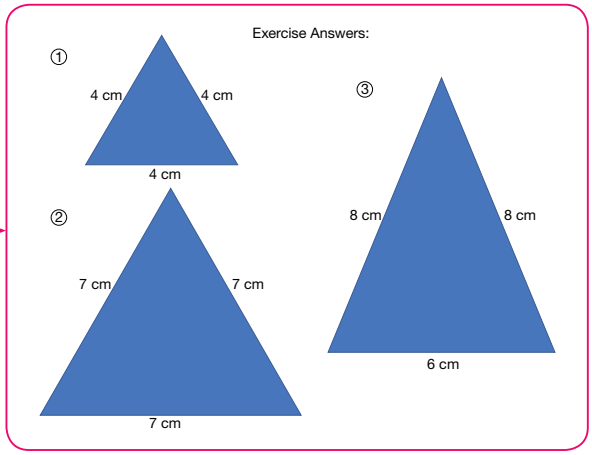
It is understandable to explain the reason using "first," "next," "moreover" and "finally."

First, let the end points of a line be A and B.
Next, draw a part of circle with centre A and radius 5cm, using a compass.
Moreover, draw a part of circle with centre B and radius 5cm in the same way.
Finally,connect from the intersected point of the two circles to points A and B, respectively.

A B

Exercise

Let's draw the following triangles.
① An equilateral triangle where all sides are 4 cm.
② An equilateral triangle where all sides are 7 cm.
③ An isosceles triangle where 3 sides are 8 cm, 8 cm and 6 cm.



Lesson Flow

1 2 Draw an Equilateral triangle of 5 cm.

T Introduce the main task.
S Draw 5 cm using a ruler.
T Where can we find the meeting point?
S From the centre of 5 cm or in the middle.
Draw using compass.
S Realise that same method as isosceles triangle can be applied to the equilateral triangle.
S Write the explanation in their exercise book.
TN In case if it is difficult to write, let them explain in words.

2 Summarise how to draw equilateral triangle in their exercise book.

3 Complete the exercise

Sample Blackboard Plan

Date: Chapter Name: Triangles Topic: How to draw Triangles Lesson Number: 2 of 2

Main Task: Let's think about how to draw Equilateral triangle.

Review

MT

What are the important points in drawing an Isosceles Triangles?

- Isosceles Triangles can be drawn by using a ruler.
- It can also be drawn using a compass, by stretching it to the required length and connect the lines to the point where the arc meet.

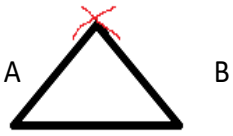
2 Let's draw an Equilateral triangle of 5cm.

Students Ideas
Illustrate their answers

- Find the center point using a ruler and compass.

Steps to draw

1. Let the end points of a line be A and B.
2. Draw a part of circle with center A and radius 5 cm, using a compass.
3. Draw a part of a circle with center B and radius 5 cm in the same way.
4. Connect from the intersected point of the two circles to points A and , respectively.



Important Point

The radii of the circle have the same length all around.
First we measure the radii.
Then we connect the points of B and C with the same length.

Summary:

Isosceles Triangles can be drawn by using a ruler and connect points made from the center.
It can also be drawn using a compass, by drawing two circles with same radius. Then connect the lines from each radii to where the circles meet.

Unit 13

Unit: Triangles
Sub-unit: 3. Triangles and Angles
Lesson 1 of 2 (Double Period)

Textbook Page : p.140
Actual Lesson 096

Sub-unit Objectives

- To understand about the angles, the name, its meaning and parts.
- To think about the structure of an Equilateral and Isosceles triangle

Lesson Objectives

- To understand the meaning of vertex, its sides and size of angle.
- To define the meaning of angles.

Prior Knowledge

- Properties of triangles

Preparation

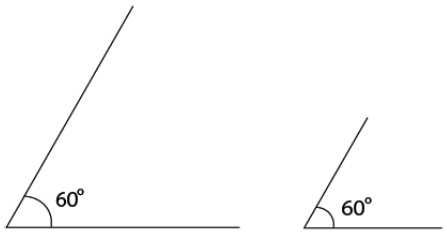
- Triangular Rulers (Set squares)

Assessment

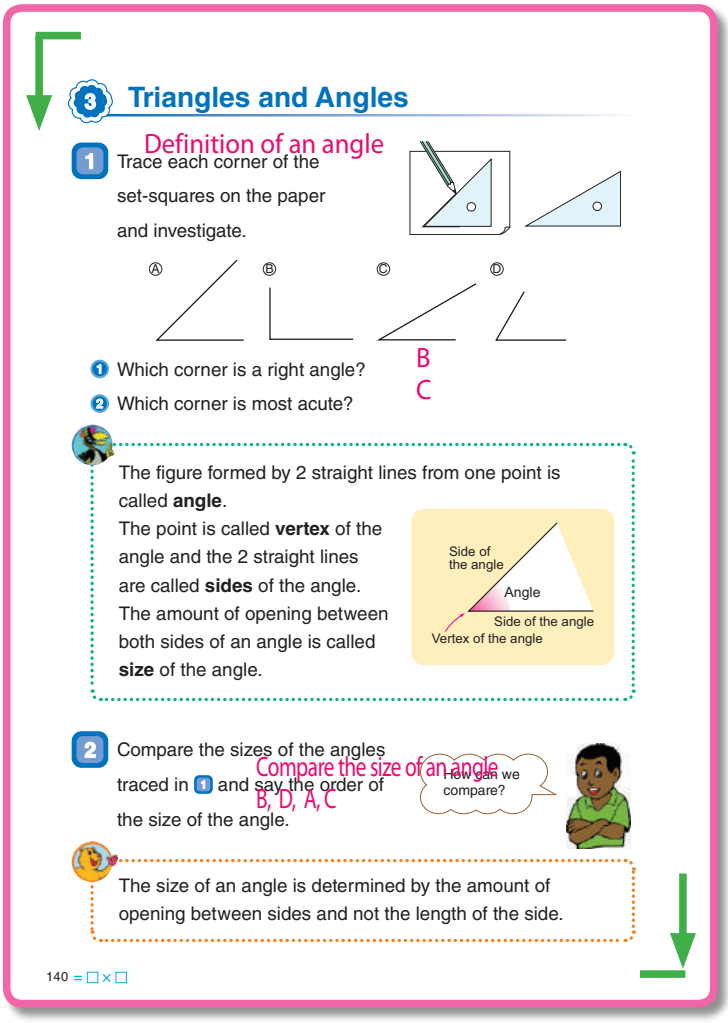
- Analyse an angle of triangle. F
- Understand the meaning of vertex, its size and sides. S

• Teacher's Notes •

Misconception of angle side and size, Teacher should emphasise to the students that the angle of a triangle is not determine by the length of the sides but the angle size.
For example:



These two angles do not have same side lengths but have same magnitude.



3 Triangles and Angles

Definition of an angle

1 Trace each corner of the set-squares on the paper and investigate.

Ⓐ Ⓑ Ⓒ Ⓓ

1 Which corner is a right angle? B
2 Which corner is most acute? C

The figure formed by 2 straight lines from one point is called **angle**.
The point is called **vertex** of the angle and the 2 straight lines are called **sides** of the angle.
The amount of opening between both sides of an angle is called **size** of the angle.

Side of the angle
Angle
Side of the angle
Vertex of the angle

2 Compare the sizes of the angles traced in 1 and say the order of the size of the angle.

Compare the size of an angle
B, D, A, C

How can we compare?

The size of an angle is determined by the amount of opening between sides and not the length of the side.

140 = □ × □

Lesson Flow

1 1 Trace the set squares and make six angles.

S Trace the set squares.
T 1 Which corner is the right angle?
S B
T 2 Which angle is most acute?
S C
T Introduce the main task.

2 Understand the definition of an angle and the elements to make an angle and its meaning.

T Draw an angle on the board and explain the important point using the diagram.

3 2 Compare the size of the angle A, B, C and D.

T Which angle comes first in the order?"
S B, D, A and C

4 Understand the important point about angles.

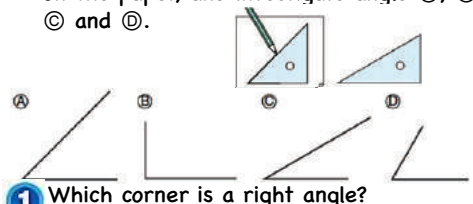
T Explain the important point in the box.
TN Refer to the teacher's note.

Sample Blackboard Plan

Date: Topic: Triangles and Angles Lesson Number: 1 of 2

Main Task: Let's Learn more about Triangles

1 Let's trace the corner of the set – square on the paper, and investigate angle Ⓐ, Ⓑ, Ⓒ and Ⓓ.



1 Which corner is a right angle?

Students Ideas
Illustrate their ideas

Answer: Ⓑ

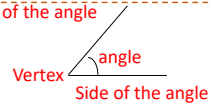
2 Which corner is most acute?

Students Ideas
Illustrate their ideas

MT

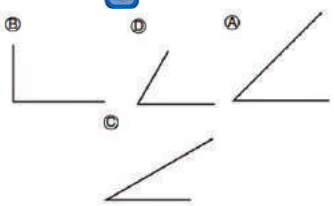
Now let's define angle

Important Point



The shape that is made by 2 straight lines from one point is called angle.
The point is called vertex of the angle, and 2 straight lines are called sides of the angle.
The amount of opening between both sides of an angle is called size of the angle.

2 Let's compare the size of Ⓐ, Ⓑ, Ⓒ and Ⓓ in 1 and say the order.



Summary:

Important Point

The size of an angle is determine by the amount of opening between sides and not the length of the side.

Unit 13

Unit: Triangles
Sub-unit: 3. Triangles and Angles
Lesson 2 of 2 (Single Period)

Textbook Page : p.141
Actual Lesson 097

Lesson Objectives

- To investigate the characteristic of angles in an Isoseceles and Equilateral triangles.

Prior Knowledge

- Definition of sides, vertex and angles of the triangle (Previous lesson)

Preparation

- Blank Paper, Scissors, Ruler, Set squares

Assessment

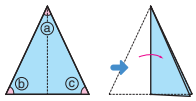
- Investigate the characteristic of angles in an Isoseceles and Equilateral triangle. F
- Do the exercise correctly. S

• Teacher's Notes •

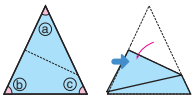
This is the summary lesson of Isosceles and Equilateral triangles. The students activity is on direct comparison where they confirm that the two angels of isosceles triangle are equal and all angles of equilateral triangles are equal.

3 Size of the angle of Isosceles

Let's draw an isosceles triangle on a sheet of paper and cut it.



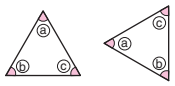
1. Compare the sizes of angle ⓑ and ⓒ. b and c are equal
2. Compare the sizes of angle ⓐ and ⓑ. a and b different



In an **isosceles triangle**, sizes of two angles are equal.

4 Size of the angles of Equilateral Triangle

Let's draw an equilateral triangle on the paper and cut it, then compare the sizes of angles ⓑ and ⓒ, and ⓐ and ⓑ, respectively.

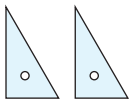


Angle b and c are equal
Angle a and c are equal

In an **equilateral triangle**, sizes of three angles are equal.

Exercise

Can we make the following figures using the set-squares as shown on the right?



rectangle, square, right triangle equilateral triangle, isosceles triangle

Yes no no
No yes

Lesson Flow

1 3 Draw an Isosceles triangle on a paper and cut then investigate the angles.

T Introduce the main task.
T Distribute paper and scissors to the students.
S Draw and cut an Isosceles triangle. Then fold in half.
T 1 How is angle b compared to c?
S They are the same when folded in half.
T 2 How about a and b?
S They are different because when folded they are different in size.
T In an isosceles triangle the size of the two angles are equal.
T Summarise the important point in the box .

2 4 Investigate the angles of an equilateral triangle.

S Fold the paper in the same way as previous activity and find out that all angles are equal.
T In an equilateral triangle the size of all three angles are equal."
T Summarise the important point in the box .

3 Do the exercise.

Sample Blackboard Plan

Date: Topic: Triangles and Angles Lesson Number: 2 of 2

Main Task: Let's compare angle in Isosceles and Equilateral triangles.

Review

MT

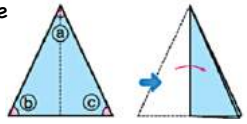
What do you know about Isosceles and Equilateral triangles?

Students Ideas
Explain their Answers

Isosceles Triangles have two sides of the three sides that are equal.
Equilateral have all three sides that are equal.

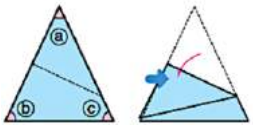
3 Let's draw an Isosceles triangle on a paper and cut and investigate angles.

1 Fold in Half then compare size of angle ⓑ and ⓒ



Answer: The angles are equal.

2 Fold corners of ⓐ and ⓑ and compare angle of ⓑ and ⓐ.



Answer: The angles are different.

In an **isosceles triangle**, sizes of two angles are equal.

In an **equilateral triangle**, sizes of three angles are equal.

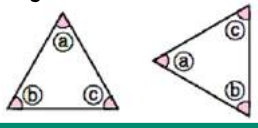
4 Now lets make Equilateral angles.

- Fold ⓑ and ⓒ

The angles are equal.

- Fold ⓐ and ⓑ

The angles are equal.



Exercise

Can you make the following figures using the set – squares?

- Rectangle (yes)
- Square (no)
- Right triangle (No)
- Equilateral triangle (No)
- Isosceles triangle (Yes)

Summary:

When folding isosceles triangles, two angles are equal.
When folding Equilateral triangles, three angles are equal.

Unit 13

Unit: Triangles
Sub-unit: 4. Designing Patterns
Lesson 1 of 1 (Double Period)

Textbook Page : p.142
Actual Lesson 098

Sub-unit Objectives

- To enjoy making or designing various patterns using Isosceles or Equilateral triangle.

Lesson Objectives

- To enjoy making or designing various patterns using Isosceles or Equilateral triangles.

Prior Knowledge

- Properties of isosceles and equilateral triangles

Preparation

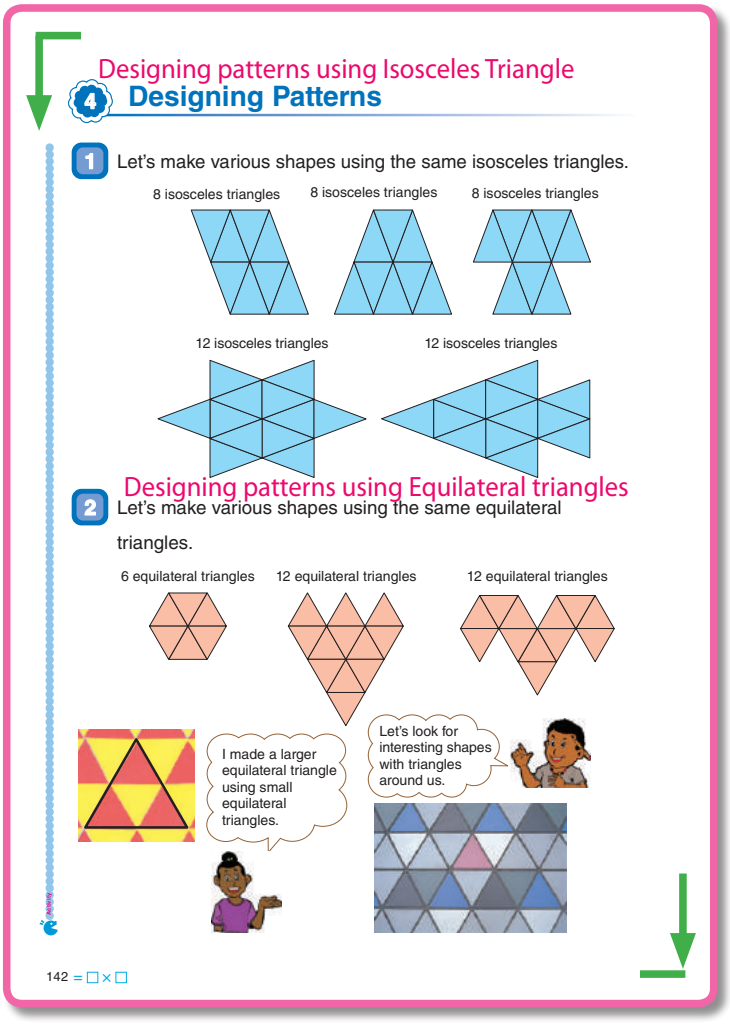
- Drawing papers, Ruler, Scissors

Assessment

- Enjoy making various patterns using isosceles or equilateral triangle. F S

• Teacher's Notes •

In this lesson, ensure that all the pieces of triangles are exactly the same in shapes and sizes.



Lesson Flow

1 **1** **Make many isosceles triangles and cut.**

T Distribute papers to the students and cut the paper to make many isosceles triangles

T Introduce the main task.

2 **Make various patterns using isosceles triangles.**

S Make patterns as shown in the textbook.

S Make their own patterns using isosceles triangle and share with their friends.

3 **2** **Make many equilateral triangles and cut.**

T Distribute papers to the students and cut the paper to make many equilateral triangles.

4 **Make various patterns using equilateral triangles.**

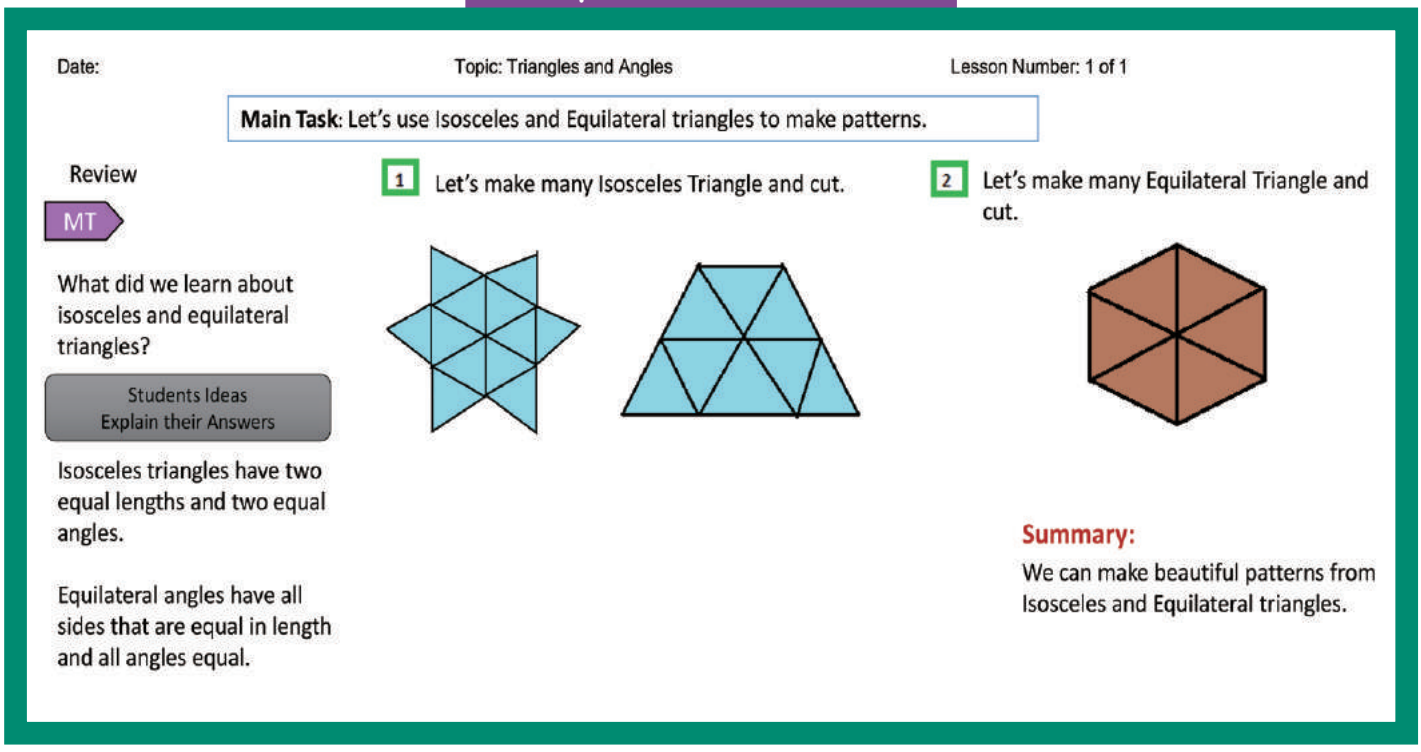
S Make patterns as shown in the textbook.

S Make their own patterns using equilateral triangles and share with their friends.

5 **Let's find the patterns by using triangles in our surroundings.**

S Look for interesting patterns with triangles within their surroundings and list them.

Sample Blackboard Plan



Unit 13

Unit: Triangles
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.143~p.144
Actual Lesson 099

Lesson Objectives

- To identify Isosceles triangles and Equilateral triangles.
- To use radius of a circle and draw triangles.
- To draw Isosceles and Equilateral Triangle from three given sides.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheet for the students

Assessment

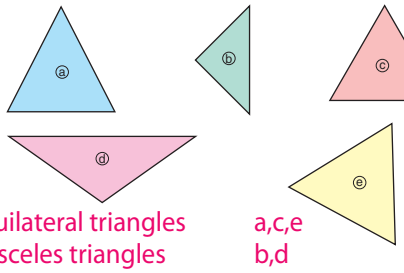
- Solve the exercises confirming what they have learned in this unit. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercise

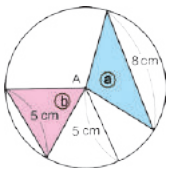
1 What kinds of triangles are these? Page 136



Equilateral triangles a,c,e
Isosceles triangles b,d

2 The radius of the circle on the right is 5 cm and its centre is point A. Page 139

① What kind of triangle is triangle ⓐ? Isosceles triangle
② What kind of triangle is triangle ⓑ? Equilateral triangle



3 Let's draw the following triangles. Pages 138 ~ 139

① An isosceles triangle where 3 sides are 7 cm, 5 cm and 5 cm.
② An equilateral triangle where all sides are 6 cm.

Grade 3 Do you remember?

Multiply the following numbers by 10 and 100 and divide them by 10.

① 20 ② 400 ③ 780 ④ 910

20x10/10= 20 400x10/10 = 400 780x10/10 = 7 80 910x 10/10 = 9 10
20x100/10=200 400x100/10 = 4000 780x100/10 = 78 00 910x100/10 = 91 00

□ + □ = 143 144 = □ + □

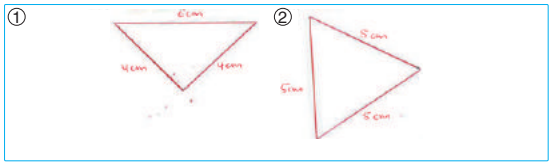
Problems

1 Let's fill in the ☐ with a number. Understanding special triangles.

① An isosceles triangle has two sides of the same length and two angles of the same size.
② An equilateral triangle has three sides of the same length and three angles of the same size.

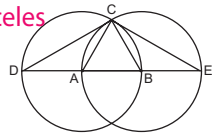
2 Let's draw the following triangles. And what kinds of triangles are these? Drawing triangles from given three sides.

① A triangle with sides of the lengths 6 cm, 4 cm and 4 cm.
② A triangle with all sides of length 5 cm.



3 The radii of the 2 circles below are both 4 cm and their centres are A and B. BD and AE are diameter of each circle. Draw the same figure, and answer the following problems. Understanding properties of triangles and circle.

① Look for isosceles triangles. If you do not know the length of the sides, measure its length. (1) DAC and CBE are isosceles triangles



② A triangle CAB is an equilateral triangle. Explain its reason. (2) CAB is formed by the radius of the two circles. They are of the same length

Lesson Flow

1 ① **Differentiate isosceles triangle and equilateral triangle.**

TN There are various ways for differentiating triangles.

- Using a ruler to measure the sides of triangles.
- Using a compass to compare the length of each side.
- Using a protractor to measure the angles of a triangle.

2 ② **Differentiate isosceles triangle and equilateral triangle by using definitions of a circle.**

TN Let students notice that sides which are the radius of circle have the same length.

3 ③ **Draw isosceles triangle and equilateral triangle.**

4 ① **Confirm the definition of isosceles triangle and equilateral triangle.**

5 ② **Draw isosceles triangle and equilateral triangle.**

6 ③ **Confirm the definition of isosceles triangle and equilateral triangle by using definition of circle.**

TN Radius of both circles are 4 cm. Confirm which sides of the triangle are the radius of circle.

Triangles	Name:	Score

1. What are the names of the following triangles? (10 points each)

① Isosceles triangle ② Equilateral triangle ③ Equilateral triangle ④ Isosceles triangle

2. Fill in the blanks. (10 points each)

The shape that is made by 2 straight lines from one point is called Angle.

The amount of opening between both sides of an angle is called Size of the angle.

3. Draw the following triangles. (20 points each)

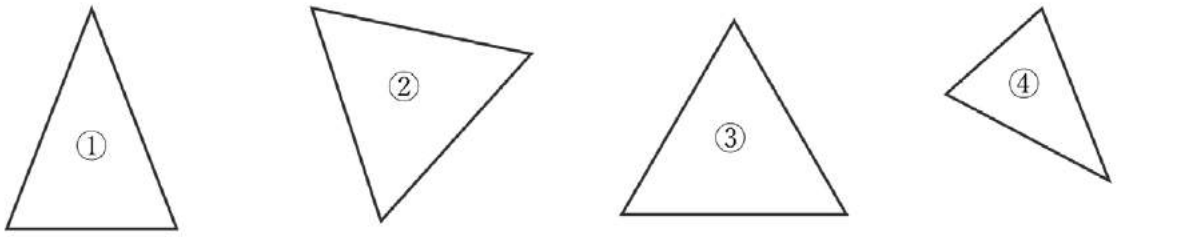
① An isosceles triangle where the 3 sides are 6cm, 5cm and 5cm

② An equilateral triangle where all sides are 4cm.

End of Chapter Test: Chapter 13 **Date:**

Triangles	Name:	Score

1. What are the names of the following triangles? (10 points each)



① _____ ② _____ ③ _____ ④ _____

2. Fill in the blanks. (10 points each)

The shape that is made by 2 straight lines from one point is called _____.

The amount of opening between both sides of an angle is called _____ of the angle.

3. Draw the following triangles. (20 points each)

① An isosceles triangle where the 3 sides are 6cm, 5cm and 5cm

② An equilateral triangle where all sides are 4cm.

Chapter 14 Tables and Graphs

1. Unit Objectives

- To arrange data and represent the data using table or graph. (3.4.3a,b and c)
- To understand how to read and write the bar graph. (3.4.3 c)

2. Teaching Overview

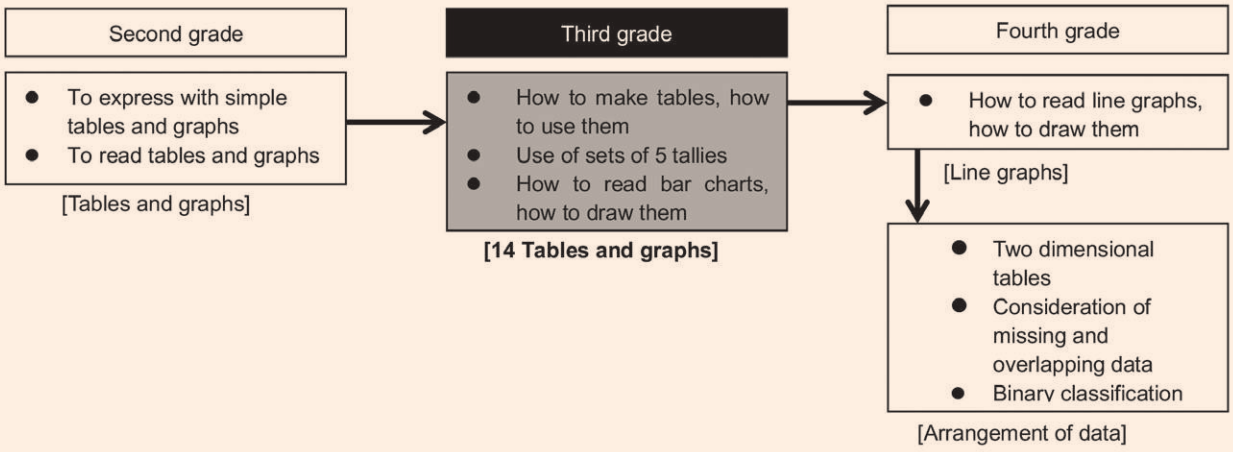
In this chapter, students marshal and coordinate information in daily life and represent in tables or graphs. They identify some perspectives for analysis based on purposes and interpret the tendency and characteristics of data for decision making or evaluation by applying the analysis. It is important for teachers to foster students' attitude to apply the skills of utilising the tables and graphs generated for decision making so that students will develop their interest and motivations.

Tables : Encourage students to find out how to marshal given information efficiently without any overlapping or omissions.

Bar Graphs : Students learn about bar graphs/charts here. Firstly they should find out what each axis represent for and unit of each measuring/scale. They also should understand the need of writing the title of a graph, marking or measuring scale and its unit to appreciate and utilise graphs. They should be able to interpret and describe characteristics of the original information or data.

Combined Tables : Here students combine tables into 1 by making 2 dimensions such as types of tools and months. It is advisable for students to feel appreciations on combined tables for them to analyse data.

3. Related Learning Contents



Unit 14

Unit: Tables and Graphs
Sub-unit: 1. Tables
Lesson 1 of 1 (Double Period)

Textbook Page : p.145~p.146
Actual Lesson 100

Sub-unit Objectives

- To collect data and understand how to represent the data by using a table.
- To read the table by thinking of the characteristics of the collected data.

Lesson Objectives

- To discuss and interpret how data is arranged and represented.
- To compare and discuss the method used to arrange the data.
- To arrange the data correctly.

Prior Knowledge

- Arrange the table from the data(Grade 2)
- Picture graph(Grade 2)

Preparation

- Charts of task 1

Assessment

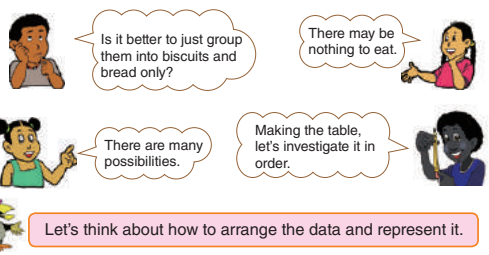
- Think about how to arrange data using a table effectively. F
- Arrange the data correctly in the table. F
- Understand how to arrange data using a table. S

• Teacher's Notes •

The purpose of this lesson is to realise the importance of arranging and sorting out data and the best way to represent it is when using tables.
There are many ways to represent data on tables such as the use of pictures, objects or symbols as learnt in earlier grades but students should now be encouraged to use tally marks as a convenient way to represent data when recording.

14 Tables and Graphs

The children in Morea's class investigated the kind of food eaten for breakfast last Sunday in Kerema town.



Let's think about how to arrange the data and represent it.

1 Tables

How to arrange the table by using tally mark.

1 The tables below are records of the kind of food children in Morea's class ate for breakfast last Sunday.

Morea's Table

Sunday's Breakfast

Kind	Number of children	
Biscuit	✓✓✓✓✓✓✓✓✓✓✓✓	12
Scone	✓✓✓✓✓✓✓✓✓✓✓✓✓✓	14
Bread	✓✓✓✓	4
Others	✓✓✓✓✓✓	6
Total		

Maia's Table

Sunday's Breakfast

Kind	Number of children	
Biscuit	𝍸 𝍸 ||	12
Scone	𝍸 𝍸 ||||	14
Bread	||||	4
Others	𝍸 |	6
Total		

1. Let's change the number of "✓" and the tally "𝍸" to numbers.

\|...1 \|\|...2 \|\|\|...3 \|\|\|\|...4 𝍸...5

2. Discuss the different ways how the 2 children made their tables. Maia's table is easy to understand because grouped by 5 tallys
3. What kind of food is eaten the most and by how many children? Scone 14 children
4. Write the total number of children surveyed. 36 children

Various Counting Methods

When we count the number of things, we use the signs 𝍸 and ✓.

□×□= 145 146 =□−□

Lesson Flow

1 ▶▶ Understand the objective of arranging data and discuss how to arrange them.

T Introduce the main task.
T Present brief instruction of the situation.
S Think about how to arrange the data of breakfast.
T How can we arrange the data?
S We can arrange the data using tally marks.
S We can arrange using a table.
T Let's think about how to arrange the data and represent it.

2 ❶❶ Think about and discuss how the data is arranged.

T Compare two tables and think about how the data is arranged.
S Morea used '✓' (Tick) to tally.
S Maia used 'I' (Stroke) to tally and grouped by 5.
T Count the number of each kind and fill the table.

3 ❷ Think about and discuss the good points in each table.

T What do you notice about each table?
S Morea's table we count 1 by 1, Maia's table we count by 5
T Which arrangement is easier to find the total?
S Maia's table because it is grouped by 5 and easy to find the total.

4 ❸❹ Read the table and answer the questions.

T What type of food was eaten the most for breakfast?
S Scone.
T What food was least eaten?
S Bread
T How many students were surveyed?
S 36 students.

Sample Blackboard Plan

Date: Chapter: Tables and Graphs Sub-chapter/Topic: Tables Lesson: 1 of 1

Task: Let's think about how to arrange a table.

MT

❶ The tables below are records of the kinds of food children in Morea's class ate last Sunday for breakfast.

Morea's Table
Sunday's Breakfast

Kind	Number of children	
Biscuit	✓✓✓✓✓✓✓✓✓✓✓✓	12
Scone	✓✓✓✓✓✓✓✓✓✓✓✓✓✓	14
Bread	✓✓✓✓	4
Other	✓✓✓✓✓✓	6
Total		36

Maia's Table
Sunday's Breakfast

Kind	Number of children	
Biscuit	𝍸 𝍸 II	12
Scone	𝍸 𝍸 IIII	14
Bread	III	4
Other	𝍸 I	6
Total		36

❶ Let's change the number of "✓" and the tally "𝍸" to numbers.

I...1 II...2 III...3 IIII...4 𝍸...5

Discussion:

❷ Discuss the different ways how the 2 children made their tables.

Maia's table is easy to understand because they are grouped by a tally of 5.

❸ What kind of food is eaten the most and by how many? Scone. 14 children

❹ Write the total number of children surveyed. 36 children

Summary

When we count the number of things, we use symbols like 𝍸 and ✓.
Tally marks are good because;
- easy to count
- fewer mistakes happen
- easy to write

Unit 14

Unit: Tables and Graphs
Sub-unit: 2. Bar Graphs
Lesson 1 of 3 (Double Period)

Textbook Page : p.147~p.148
Actual Lesson 101

Sub-unit Objectives

- To understand the relationship between a table and a graph.

Lesson Objectives

- To understand how to read a bar graph.
- To read a bar graph and understand the characteristic of the data.
- To understand the advantage of a table and a bar graph.

Prior Knowledge

- How to arrange the data using a table. (Previous lesson)

Preparation

- Table from previous lesson
- Two types of graph

Assessment

- Read a bar graph and understand the characteristic of the data. F
- Think about the advantages of tables and bar graphs. F
- Understand how to read bar graphs and the term 'bar graph'. S

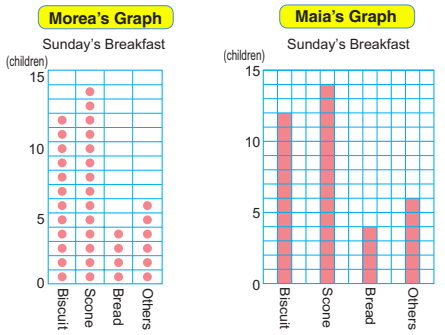
• Teacher's Notes •

A bar graph consists of a series of vertical or horizontal bars representing data.
The purpose of using bar graphs is to interpret different sizes and the difference between the size of quantities, determine maximum and minimum values and to interpret the relationships or overall characteristics of data.

2 Bar Graphs

1 How to read a bar graph

Morea and Maia made the following graphs from the tables in the previous page.



1. How did they represent the number of children?
   Morea uses circles , Maia's uses bars
2. Let's discuss the differences between Morea's graph and Maia's graph.
   Morea's graph, it is difficult when the number becomes large. Maia's graph, it is easy to see because the bar and scale are on same line.
3. Compare the tables in the previous page with the graphs above. Which one makes it the easiest to compare the number of children? Which one makes it the easiest to see the number of children?
   Graph
   Table

A graph which represents the various amounts by the length of bars is called **bar graph**.

How to read a bar graph with larger order and good points

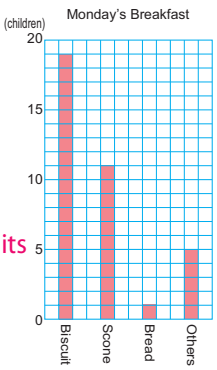
2 Keni changed Maia's graph into this one on the right.

1. How many students ate biscuit, scone, bread and others, respectively?
   Biscuit 14, Scone12, bread 4 and other 6
2. Which kind of food has the largest number of children?
   Biscuit
3. Let's discuss about Keni's graph and how it is different from Maia's graph.
   In Keni's group, items were ordered from larger except the other

In the bar graph, the bars are usually drawn in order from longest to shortest. The "other" bar is usually drawn last.

How to read bar graphs

3 This bar graph shows the number of children and the type of food children ate last Monday.



1. How is this different from the graph for last Sunday?
   Only the number of biscuits increased and the rest decreased.

□×□= 147 148 =□×□

Lesson Flow

1 ① Compare the two graphs.

T ① How did they represent the number of children?
S Morea uses circle and Maia uses bar.
T ② What is the difference of these two?
S In Morea's case, when the number increased you have to draw many circles.
S In Maia's graph, it is easy to see because the number is shown on a bar.

2 ③ Compare the table and the graph.

T Let's compare the table from the previous lesson and the graph. Which one is easy to compare the number of children? and which one is easy to see the number of children?
S Graph is easier to compare the number of children because the number is shown on a bar.
S Table is easier to see the number of children because the number is written as it is.
TN Confirm the following:
Table: It is easy to understand the total number, the number of each categories.
Graph: It is easy to compare among the categories, and understand the overall tendency.

T Introduce the main task.

3 Summarise the bar graph.

T Explain the important point in the box ⋯⋯.

4 ② Solve the problem.

T Solve activity ① ②
T ③ What is the change compared to the previous graph?
S The largest number is drawn from the left and ordered according to the number.
S 'Other' is drawn on the right.
T Explain the important point in the box ⋯⋯.

5 ③ Solve the problem.

T Let's compare two bar graphs, Sunday and Monday. What did you find?
T Give enough time for students to think.
S Arranged from the largest to the least.
S On Sunday, scones is the largest number but on Monday, biscuit is the largest.

Sample Blackboard Plan

Date: Chapter: Tables and Graphs Sub-chapter/Topic: Bar Graphs Lesson: 1 of 3

Task: Let's think about the characteristics of bar graphs.

Review

① Morea and Maia made the following graphs from the tables in the previous lesson.

Morea's Graph
Sunday's Breakfast
(children)
15
10
5
Biscuit Scone Bread Other

Maia's Graph
Sunday's Breakfast
(n)
5
0
5
0
Biscuit Scone Bread Other

Maia's Table
Sunday's Breakfast

Kind	Number of children
Biscuit	12
Scone	14
Bread	4
Other	6
Total	36

Answers:
① Morea uses circles and Maia uses bars.
② Morea's graph is difficult to read when the number becomes large. Maia's graph is easy to see because the bar and scale are on the same line.

③ Graph makes it easier to compare the number of children.
Table makes it easier to identify the number of children.

MT
A graph which represents the various amounts by the length of bars is called bar graph.

② Keni changed Maia's graph into the one below.

Sunday's Breakfast
(children)
15
10
5
0
Scone Biscuit Bread Other

Answers:
① Biscuit 14, Scone 12, bread 4 and others 6.
② Biscuits.
③ In Keni's group, items were ordered from the largest except for others.

In the bar graph, the bars are usually drawn in order from longest to shortest. The "other" bar is usually drawn last.

③ Discuss ①

Monday's Breakfast
(children)
20
15
10
5
0
Biscuit Scone Bread Other

Answer:
Only the number of biscuits increased and the rest decreased.

Summary

Unit 14

Unit: Tables and Graphs
Sub-unit: 2. Bar Graphs
Lesson 2 of 3 (Single Period)

Textbook Page : p.149
Actual Lesson 102

Lesson Objectives

- To read a bar graph and understand the characteristics of the data.
- To understand that the items are ordered not by amount but by the characteristics of items itself.

Prior Knowledge

- Relationship of the table and a bar graph. (Previous lesson)

Preparation

- A bar graph for task 4

Assessment

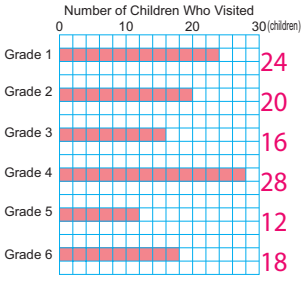
- Read a bar graph and understand the characteristics of the data. F
- Think about 1 scale unit represents how many children. F
- Understand how to read a bar graph concerning the scale unit. S

• Teacher's Notes •

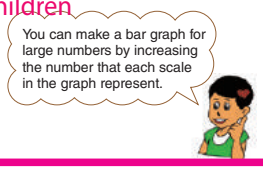
A bar graph is a graph that consists of a series of vertical or horizontal bars representing a data.
To read a bar graph, students need to consider the representation of data according to the bars against the vertical or horizontal units and interpret the scale axis.

How to read a bar graph and its characteristics and good points.

4 Dorah's group recorded the number of children who visited the school nurse. They recorded the number of children in each grade and made a bar graph.



1. How many children are in 1 scale unit of the bar graph? 2 children
2. Let's read the number of children who visited school nurse in each grade.
3. What can we conclude from this bar graph?



When a bar graph shows amounts with given order like grades, the bars are drawn in that order.

5 In the graphs below, let's read how much is each unit.

1. (cm) 60, 40, 20, 0 — 1 unit = 10 cm, 50 cm
2. (L) 30, 20, 10, 0 — 1 unit =5 L, 15 L
3. (Kina) 500, 0 — 1 unit =100 kina, 400 kina

③ Answers:
Grade 4 has the largest number
Grade 5 has the smallest number
Grades are ordered from Grade 1 to Grade 6

Lesson Flow

1 Review the previous lessons.

T What did we learn in the previous lessons?
TN Let the students present freely what they have learned.
S Relationship between a bar graph and a table. Characteristics of a bar graph.
T Introduce the main task.

2 4 Observe and discuss the difference compared to the previous bar graph.

T 1 Let's observe the bar graph and discuss the difference compared to the previous one.
S Bar is drawn horizontally.
S 1 unit scale does not show 1 child.
T 1 unit scale shows how many children and why?
S 1 unit scale shows 2 children because the scale division between 0 and 10 is 5 units.
T 2 How many children visited the school nurse in each grade?
S Read the graph and respond.
T 3 What can you notice from the graph?
S The items are not ordered by the amount of children but by the grade.
TN The items are ordered by grades but not by amount. When there is an order such as grade, it is easier to see by ordering (from 1st to 6th).
S Explain the data.
T Explain the important point in the box .

3 5 Practice how to read the graph.

S Read the graph by being aware of the amount of each scale unit.

4 Summarise the lesson.

T When you change the amount of a unit scale, you can show any amount as a bar graph.
T Normally, the items are ordered by the amount but when the items have a given order like grades the bars are drawn in the order.

Sample Blackboard Plan

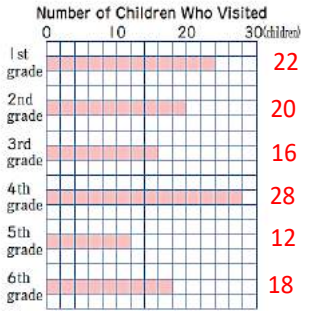
Date: Chapter: Tables and Graphs Sub-chapter/Topic: Bar Graphs Lesson: 2 of 3

Task: Let's read and understand bar graphs.

Review

MT

4 Dora's group recorded the number of children who visited the school nurse. They recorded the number of children in each grade and made a bar graph.



Discuss these questions.

1 How many children are in 1 scale unit of the bar graph?
2 children

2 Read the number of children who visited the school nurse in each grade
Refer to the Graph

3 What can we conclude from this bar graph?
Grades are ordered from Grade 1 to 6
Grade 4 has the largest number
Grade 5 has the smallest number

When a bar graph shows amounts with given order like grades, the bars are drawn in the order.

5 In the graphs below, let's read how much is each unit.

1 (cm) 60 40 20 0
1 unit = 10cm
50cm

2 (L) 30 20 10 0
1 unit= 5L
15 L

3 (kina) 500 0
1 unit = 100 kina
400 kina

Summary

Unit 14

Unit: Tables and Graphs
Sub-unit: 2. Bar Graphs
Lesson 3 of 3 (Double Period)

Textbook Page : p.150~p.151
Actual Lesson 103

Lesson Objectives

- To understand how to draw a bar graph.
- To know the terminologies and their meaning related to bar graph.
- To draw a bar graph considering the scale of 1 unit.

Prior Knowledge

- Arranging data in tables and bar graph.

Preparation

- Graph papers

Assessment

- Practice to draw a bar graph accurately for various data. F
- Draw a bar graph correctly. S

• Teacher's Notes •

Important points when drawing a bar graph

Confirm what we write in horizontal and vertical axis.
We have to decide the scale of each unit considering the largest number.

How to draw a bar graph

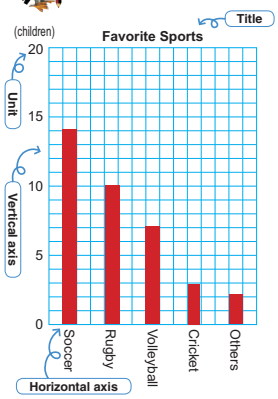
How to Draw a Bar Graph

6 The table on the right shows the favourite sports of 3rd grade children in class one. Let's draw a bar graph.

Favourite Sports

Sports	Number of children
Soccer	14
Rugby	10
Volleyball	7
Cricket	3
Others	2
Total	36

How to Draw a Bar Graph



① Write each sport on the **horizontal axis**.

② Write the number of children on the **vertical axis**.

③ Write the **title** and **unit** of the vertical axis.

④ Draw bars according to the number of students.

Draw a bar graph

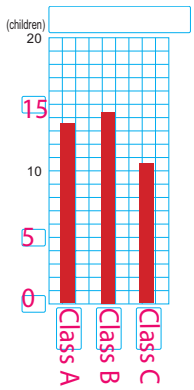
7 We investigated the number of third graders in each class who said their favourite sport was soccer.

Let's draw a bar graph.

Number of Children Who Like Soccer

Class	Number of children
A	14
B	15
C	11
Total	40

Number of children who like soccer



How to draw a bar graph

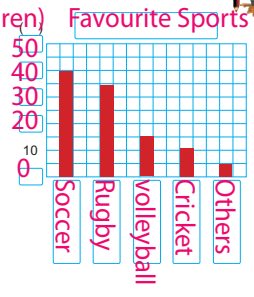
8 We investigated the favourite sports of all the third graders.

Let's draw a bar graph.

Favourite Sports

Sports	Number of children
Soccer	40
Rugby	35
Volleyball	15
Cricket	10
Others	5
Total	105

How many children should the unit scale of the bar graph be?



150 = □ × □

□ − □ = 151

Lesson Flow

1 6 Read the problem and understand the situation.

T What does the table show?
S The table shows the favorite sports in a class.
S Think about how to draw a bar graph.
T Introduce the main task.

2 Discuss how to draw a bar graph.

T What do we have to write in the horizontal axis?
S Items (Name of the sports)
T What do we have to write in the vertical axis?
S Number of children.
T In this case, 1 unit shows how many children?
S 1 child.
T We have to write a title on the top.
T Draw a bar with each item.

3 Discuss the important points when drawing a bar graph.

TN Refer the to teacher's note and the Textbook.

4 7 Draw a bar graph.

T Let students draw a bar graph by confirming each step.
T In horizontal axis, are items ordered by the largest to smallest number or by the class.
S By the class
T In vertical axis, 1 unit shows how many students?
S One student.
T Let's fill in the blanks and draw a bar graph.

5 8 Draw a bar graph.

S Discuss the following points and draw a bar graph.
- The number of children for one unit.
  There are 2 units for evey 10 children so one unit is 5 children.
- The order of items in horizontal axis.
  It is easy to understand when items are ordered from the largest to the smallest number.

Sample Blackboard Plan

Date: Chapter: Tables and Graphs Sub-chapter/Topic: Bar Graphs Lesson: 3 of 3

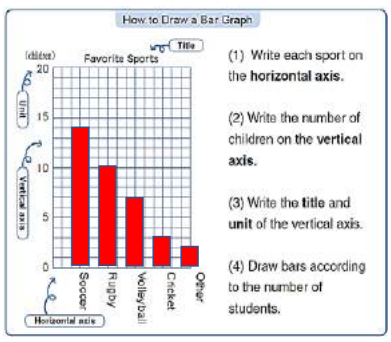
Task: Let's think about how to draw bar graphs.

Review

6 The table shows the favorite sports of 3rd grade children in class. Draw a bar graph.

Favorite Sports

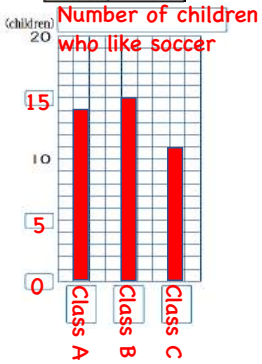
Sports	Number of children
Soccer	14
Rugby	10
Volleyball	7
Cricket	3
Other	2
Total	36



MT

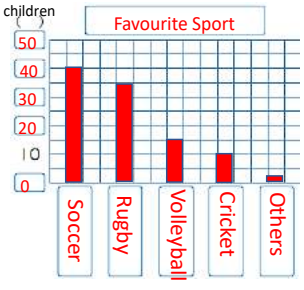
7 Number of children who like soccer.

Class	Number of children
A	14
B	15
C	11
Total	40



8 Favourite Sports

Sports	Number of children
Soccer	40
Rugby	35
Volleyball	15
Cricket	10
Other	5
Total	105



Summary

Unit 14

Unit: Tables and Graphs
Sub-unit: 3. Combining Tables
Lesson 1 of 1 (Double Period)

Textbook Page : p.152~p.153
Actual Lesson 104

Sub-unit Objectives

- To understand how to combine some tables together.

Lesson Objectives

- To combine two tables together for comparing the data.
- To understand the meaning of combined tables and to read it correctly.

Prior Knowledge

- Steps to arrange the data using a table.

Preparation

- Tables for task1

Assessment

- Think about how to combine tables for better understanding of information. F
- Do the exercises correctly. S

• Teacher's Notes •

Students should realise in this lesson that, a set of tables can be combined when the same type of items are being compared on different occasions. In this case, the Item Type remains the same while the data is recorded according to the various times, dates or occasions.

3 Combining Tables

1 How to read a combine table

The following tables show the types of tools and the number of tools that the grade 3 students borrowed in April, May and June.

Tools Borrowed in April

Type of tools	Number of tools
Rake	15
Knife	6
Spade	8
Others	5
Total	34

Tools Borrowed in May

Type of tools	Number of tools
Rake	21
Knife	19
Spade	24
Others	8
Total	72

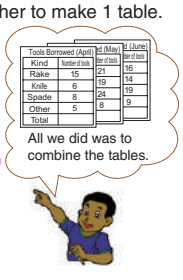
Tools Borrowed in June

Type of tools	Number of tools
Rake	16
Knife	14
Spade	19
Others	9
Total	58

1. What is the total number of tools that were borrowed in each month? April 34 tools, May 72 tools, June 58 tools
2. Which type of tool was borrowed the most in April, May and June? April-Rakes, May-Spade, June-Spade
3. Combine the tables for each month together to make 1 table.

Number of tools Borrowed

Type \ Month	April	May	June	Total
Rake	15	21	16	52
Knife	6	19	14	Ⓓ39
Spade	8	24	19	Ⓔ51
Others	5	8	9	Ⓕ22
Total	Ⓐ	Ⓑ	Ⓒ	Ⓖ
	34	72	58	164



4. How many rakes were borrowed from April to June? 52 Rakes
5. How many tools are in boxes Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ and Ⓕ? A34, B 72 , C58 , D 39, E 51, F22, G 164
6. What is the meaning of the number in Ⓖ? Total number of tools which were borrowed by Grade 3 students from April to June
7. Which kind of tools was borrowed the most from April to June? Rakes

Exercise

The following table is a record in hospital of the number of children who got sick in April, May and June, and the types of sickness.

① How many children were sick in each month? April 80 children, May 98 children, June 55 children

② What type of illnesses happened the most from April to June? Pneumonia

Records of Sickness

Type \ Month	April	May	June	Total
Malaria	29	27	13	69
Pneumonia	21	46	30	97
Diarrhoea	13	7	4	24
Sore eyes	7	4	2	13
Others	10	14	6	30
Total	80	98	55	233

152 = □ × □

□ + □ = 153

Lesson Flow

1 ① Read and understand the situation.

T There are 3 tables. What does each table show?
S The kind of tools borrowed by 3rd graders in April, May and June.
T ① What is the total number of tools in each month?
S April is 34, May is 72 and June is 58.
T ② What is the largest number of tool borrowed in each month?
S April is Rake, May is Spade and June is Spade.
T Introduce the main task.

2 ③ Think about how to combine three tables for the purpose of showing the data effectively.

T How shall we combine 3 tables together?
TN Allow students to discuss with their small groups and present their ideas.
S Items are same in all tables so we can put the month together horizontally.
T Let's fill in the blank.
TN Let the students fill the number in the combined table by corresponding the numbers in the table of each month.

3 Discuss about the advantages of a combined table.

T What is the advantages of a combined table?
S It is easy to read and compare the number in each month.
S It is easy to understand the total number in each month.

4 Solve the problem ④ to ⑦.

S Solve problems ④ to ⑦ by reading the combined table.

5 Do the exercise.

S Complete the table and answer the questions.

Sample Blackboard Plan

Date: Chapter: Tables and Graphs Sub-chapter/Topic: Combining Tables Lesson: 1 of 1

Task: Let's think about how to read combined tables.

① The tables show tools borrowed in April, May and June .

Tools Borrowed in April

Type of tools	Number of tools
Rake	15
Knife	6
Spade	8
Others	5
Total	34

Tools Borrowed in May

Type of tools	Number of tools
Rake	21
Knife	19
Spade	24
Others	8
Total	72

Tools Borrowed in June

Type of tools	Number of tools
Rake	16
Knife	14
Spade	19
Others	9
Total	58

① Total number of tools borrowed each month.
April-34 tools, May-72 tools, June-58 tools
② Tools borrowed the most for each month.
April-rakes, May-spades, June-spades

MT

③ Combine the tables for each month together to make 1 table

Number of tools Borrowed

Type \ Month	April	May	June	Total
Rake	15	21	16	52
Knife	6	19	14	Ⓓ 39
Spade	8	24	19	Ⓔ 51
Others	5	8	9	Ⓕ 22
Total	Ⓐ 34	Ⓑ 72	Ⓒ 58	Ⓖ 164

④ Rakes borrowed from April to June. 52 rakes
⑤ Number of tools in Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ and Ⓖ.
Refer to answers in the table above.
⑥ Meaning of the number in Ⓖ?
Total number of tools borrowed by Grade 3 students from April to June.
⑦ The tool borrowed the most from April to June. Rakes

Exercise

Summary

Unit 14

Unit: Tables and Graphs
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.154~p.156
Actual Lesson 105

Lesson Objectives

- To deepen an understanding of the things learned already.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheets for students

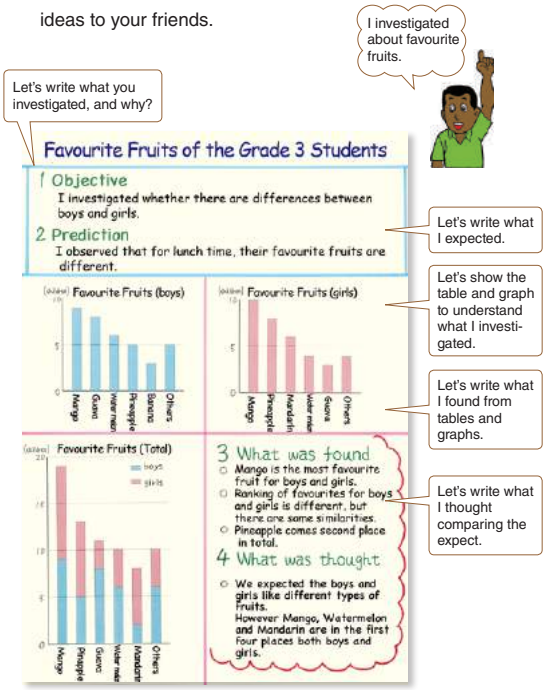
Assessment

- Solve the exercises confirming what they have learned in this unit. F S

For students reading

Report and Present Your Discovery

Compile your report to present your ideas to your friends.



What did you investigate? Let's explain what you investigated using tables and graphs.

154 = □ − □

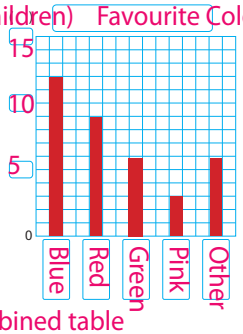
Exercise

1 The following table shows favourite colours of children in Miriam's class. Let's draw a bar graph.

Pages 150 ~ 154

Favourite Colours (Children)

Colour	Number of children
Blue	12
Red	9
Green	6
Pink	3
Other	6
Total	36



How to express combined table

2 The following table shows the number of children who hurt themselves in June at Nathan's school and the type of injuries. Write the correct numbers in the boxes from Ⓐ to Ⓗ .

Pages 152 ~ 153

Records of Injuries (June)

Type \ Grade	1	2	3	4	5	6	Total
Scratch	3	4Ⓑ	2	5	3	4	21
Cut	1Ⓐ	2	2	3	4Ⓔ	3	15Ⓖ
Bruise	1	1	3Ⓒ	2	2	4Ⓕ	13
Other	2	3	1	1	0	2	9
Total	7	10	8	11Ⓓ	9	13	58Ⓗ

□ + □ = 155

Lesson Flow

1 ① Draw a bar graph using table data.

T What shall we write in the horizontal axis?
S Favourite colour.
T How about vertical axis?
S The number of students.
T How many children does 1 unit show?
S The maximum number is 12 so the maximum unit should be 15. Therefore, 1 unit will be 1 child.
TN After drawing the graph, let students confirm the graph with their classmates.

2 ② Complete the table.

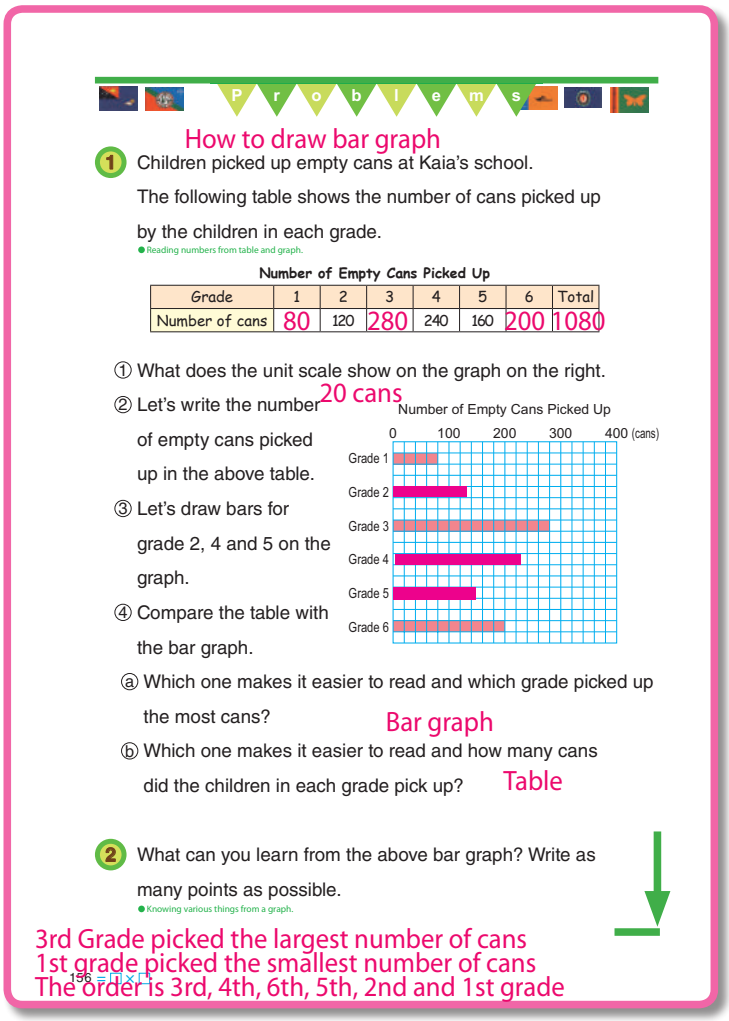
T Add all numbers then subtract from the total for each grade to find the missing numbers.
T When adding up the total number horizontally or vertically, we can find the total number of students.

1 ① Think about what you can know from the table and graph.

TN ①: 100 is separated into 5 unit so 1 unit is 20 cans.
②: Read the number on the bar graph and complete the table.
③ · ④: Draw a bar graph by finding the number in the table and compare.
ⓐ: Bar graph has advantages to compare the amount of each item.
ⓑ: Table is better to find the number itself.

2 ② Read the bar graph.

S Discuss what they can know from the bar graph.
T Let the students focus on the minimum and maximum number and the overall tendency.



Problems

How to draw bar graph

1 Children picked up empty cans at Kaia's school.
The following table shows the number of cans picked up by the children in each grade.

● Reading numbers from table and graph.

Number of Empty Cans Picked Up

Grade	1	2	3	4	5	6	Total
Number of cans	80	120	280	240	160	200	1080

① What does the unit scale show on the graph on the right.
② Let's write the number of empty cans picked up in the above table. 20 cans
③ Let's draw bars for grade 2, 4 and 5 on the graph.
④ Compare the table with the bar graph.

Number of Empty Cans Picked Up
0 100 200 300 400 (cans)
Grade 1
Grade 2
Grade 3
Grade 4
Grade 5
Grade 6

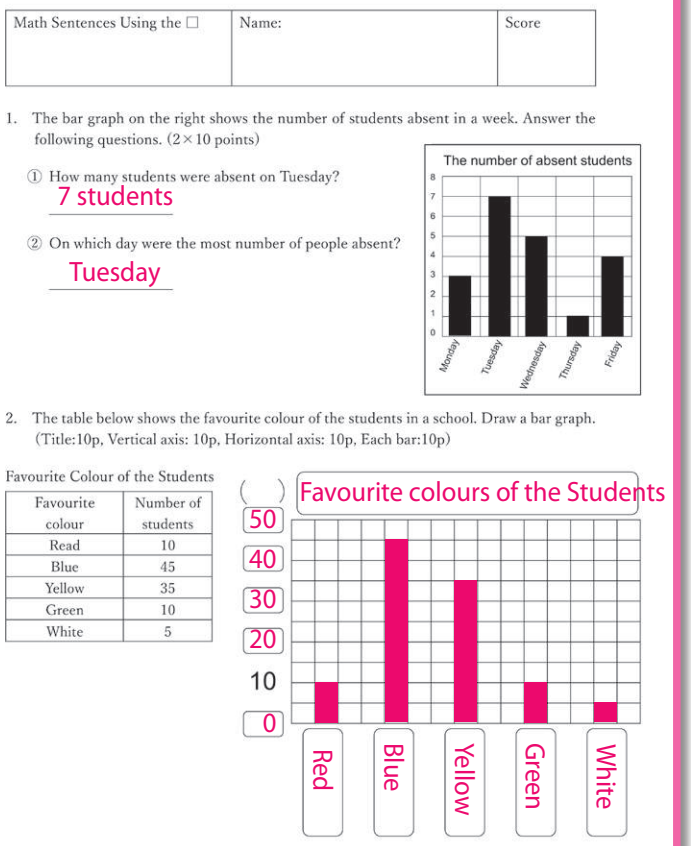
ⓐ Which one makes it easier to read and which grade picked up the most cans? Bar graph
ⓑ Which one makes it easier to read and how many cans did the children in each grade pick up? Table

2 What can you learn from the above bar graph? Write as many points as possible.

● Knowing various things from a graph.

3rd Grade picked the largest number of cans
1st grade picked the smallest number of cans
The order is 3rd, 4th, 6th, 5th, 2nd and 1st grade

156 ≡□×□



Math Sentences Using the □ | Name: | Score

1. The bar graph on the right shows the number of students absent in a week. Answer the following questions. (2×10 points)

① How many students were absent on Tuesday?
7 students

② On which day were the most number of people absent?
Tuesday

The number of absent students
Monday Tuesday Wednesday Thursday Friday

2. The table below shows the favourite colour of the students in a school. Draw a bar graph. (Title:10p, Vertical axis: 10p, Horizontal axis: 10p, Each bar:10p)

Favourite Colour of the Students

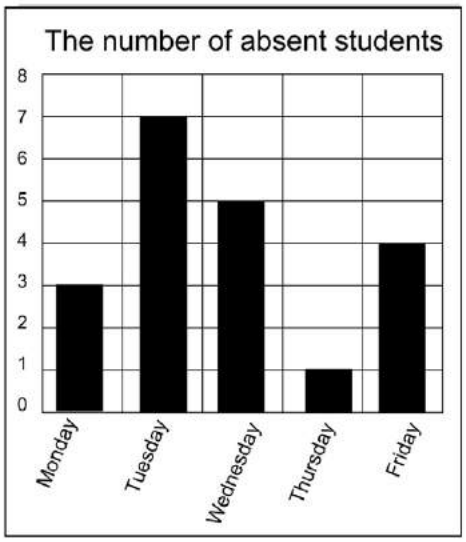
Favourite colour	Number of students
Read	10
Blue	45
Yellow	35
Green	10
White	5

Favourite colours of the Students
50 40 30 20 10 0
Red Blue Yellow Green White

End of Chapter Test: Chapter 14 **Date:**

Math Sentences Using the □	Name:	Score

1. The bar graph on the right shows the number of students absent in a week. Answer the following questions. (2×10 points)



① How many students were absent on Tuesday?

_____

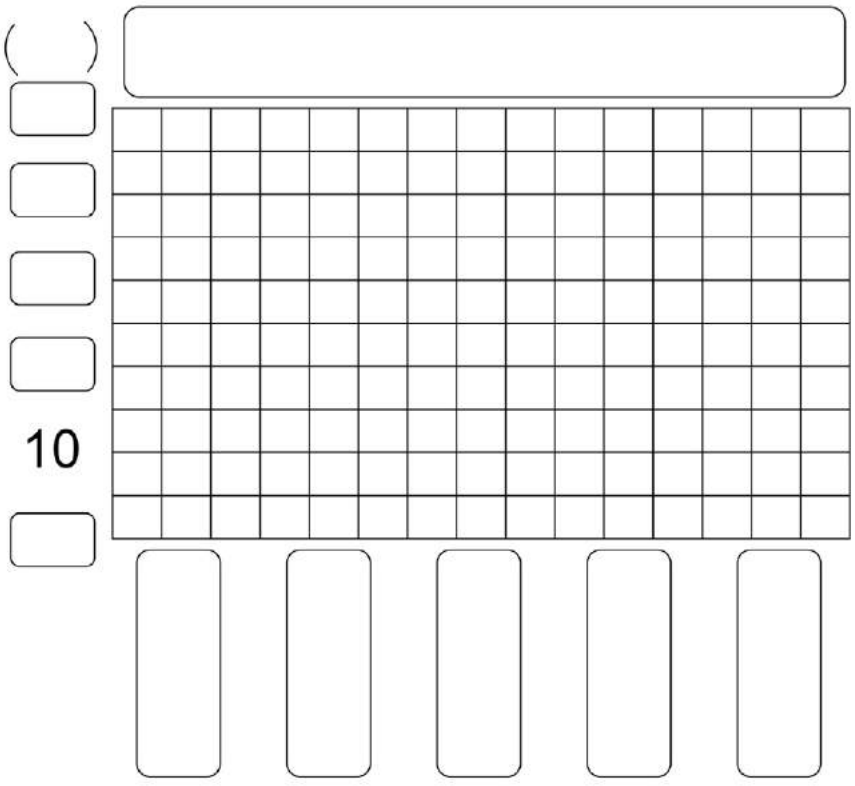
② On which day were the most number of people absent?

_____

2. The table below shows the favourite colour of the students in a school. Draw a bar graph. (Title:10p, Vertical axis: 10p, Horizontal axis: 10p, Each bar:10p)

Favourite Colour of the Students

Favourite colour	Number of students
Read	10
Blue	45
Yellow	35
Green	10
White	5



Chapter 15 Multiplication of 2-digit Numbers

1. Unit Objectives

- To deepen understanding of multiplication and apply the knowledge correctly. (3.1.3a)
- To think about how to calculate (2-digit×(2-digit) and understand that those calculations can be solved by using multiplication table. (3.1.4 c)
- To think about how to calculate (3-digit)×(2-digit). (3.1.4 d)

2. Teaching Overview

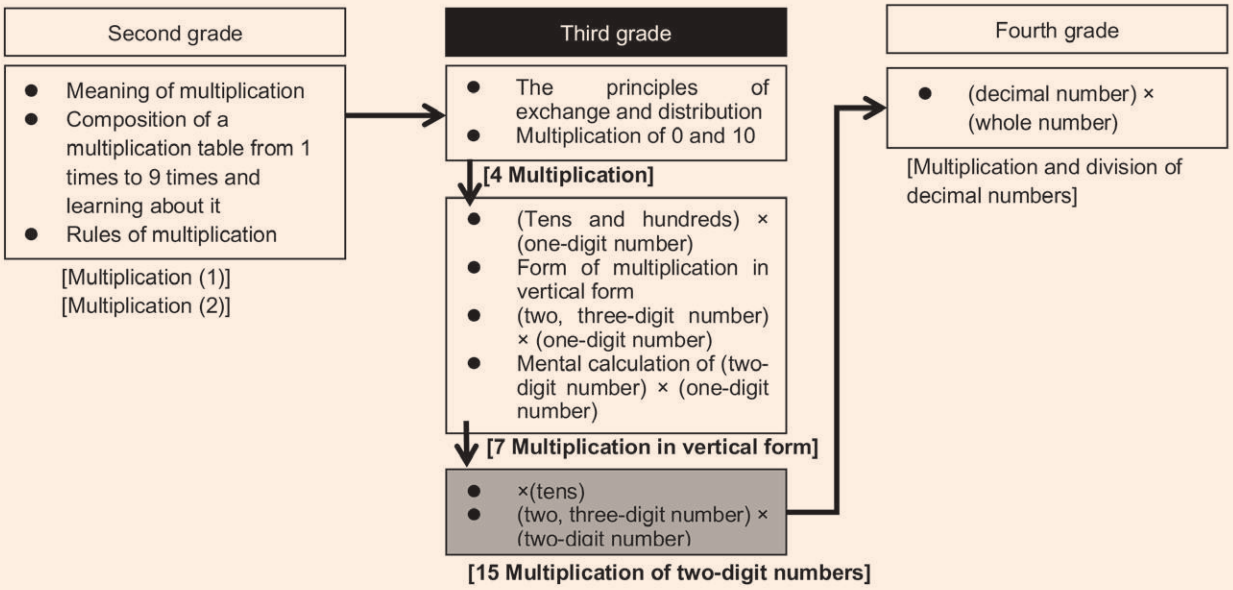
This chapter is the last one for student to learn multiplication of whole numbers so that teachers should be responsible to consolidate students' skills and understanding on it. Based on the understanding, they will learn multiplications and divisions of decimals and fractions in the further grades.

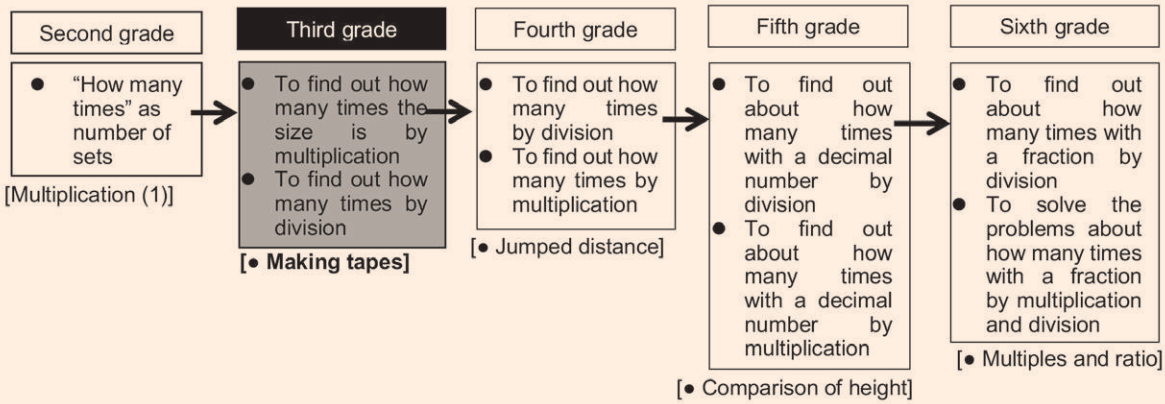
Multiplication by 10s : Students should find that they can apply rules of multiplications for decomposing given multiplications so that they can apply multiplication tables to be memorised.

How to Calculate (2 and 3-digit number) × (2-digit number) : Relate to previous learning.

Making Tapes : Relate to the meaning of multiplication such as (How many sets) × (Number in each set)

3. Related Learning Contents





Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 1. Multiplication by 20, 30, ….., 90
Lesson 1 of 1 (Double Period)

Textbook Page : p.157~p.158
Actual Lesson 106

Sub-unit Objectives

- To think about how to calculate (1-digit)×(10, 20, …90) and find the product.

Lesson Objectives

- To understand the meaning of (1-digit)×(10, 20, …90) and make mathematical expression.
- To think about how to calculate (10, 20, …90)×(10, 20, …90) based on (1-digit)×(10, 20, …90).

Prior Knowledge

- Multiplication table (Grade 2).
- (2-digit)×(1-digit) in vertical form

Preparation

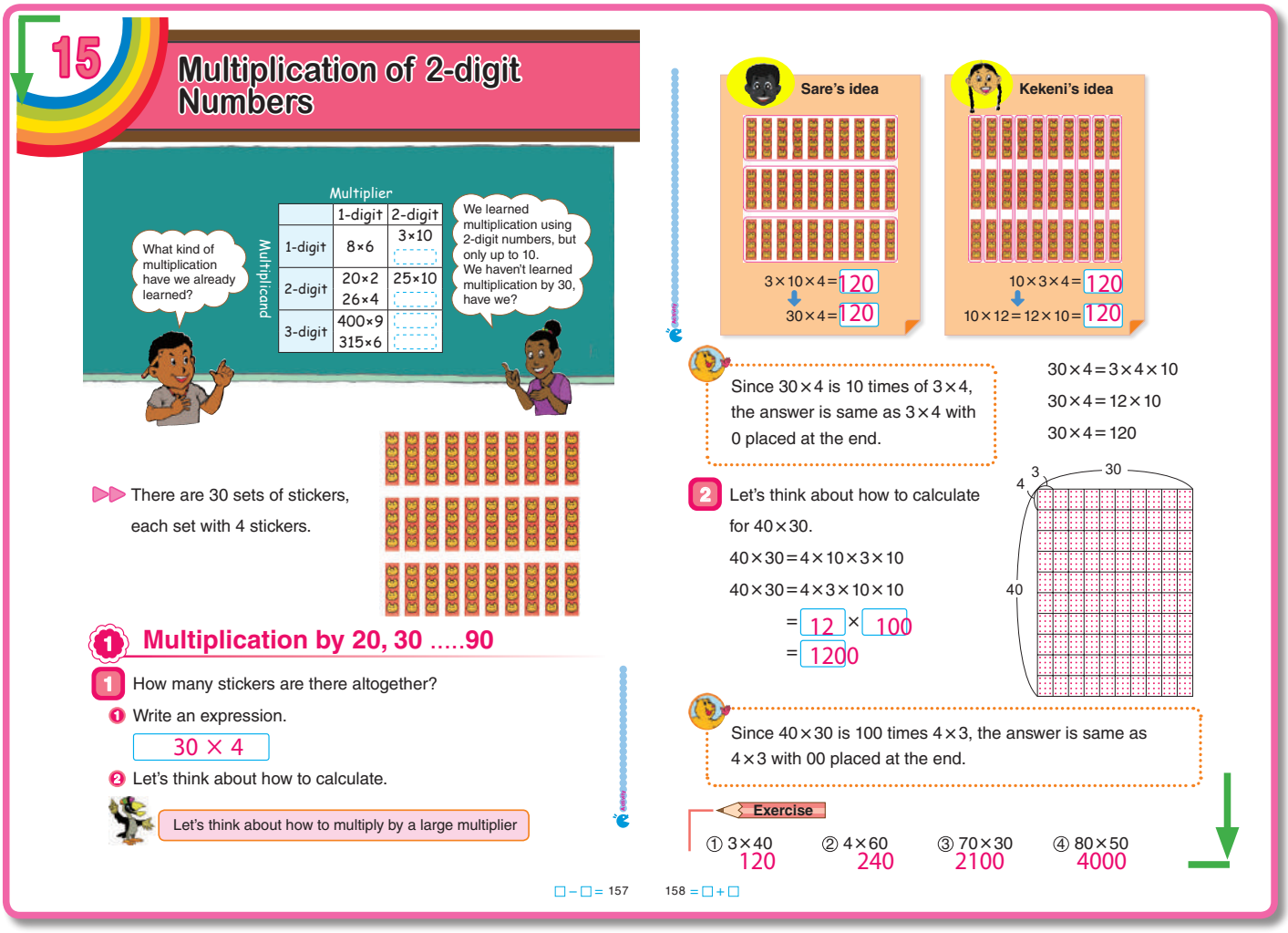
- Chart of Task 1 and 2

Assessment

- Think about how to calculate (10, 20, …90)×(10, 20, …90) based on (1-digit)×(10, 20, …90). F
- Do the exercises correctly. S

• Teacher's Notes •

Mental Calculation was discussed in unit 5. The calculation starts from the superior place value to the ones. In this lesson the mental calculation is expanded to 2-digit by 2-digit, encourage the students to apply their prior knowledge in this lesson.



Lesson Flow

1 ① Read the given problem and understand the situation.

T Read the word problem and think of what we have to find.
T What do we have to find?
S Total number of stickers.

2 ① Make mathematical expression to find total number of stickers.

T What is the mathematical expression to find total number of stickers?
S 30×4

3 ② Think about how to calculate 30×4.

T Explain Sare's idea.
S He finds the number of sticker by row.
T What about Kekeni's idea?
S She finds the number of sticker by column.
T Introduce the main task.

4 Summarise how to calculate 4×30.

T Summarise the 4×30 by using the explanation in the box ( ).
T Let the students notice the common point of Sare and Kekeni is multiplying by 10.
S Understand that the answer is 10 times of 4×3.

5 ④ Think about how to calculate 40×30.

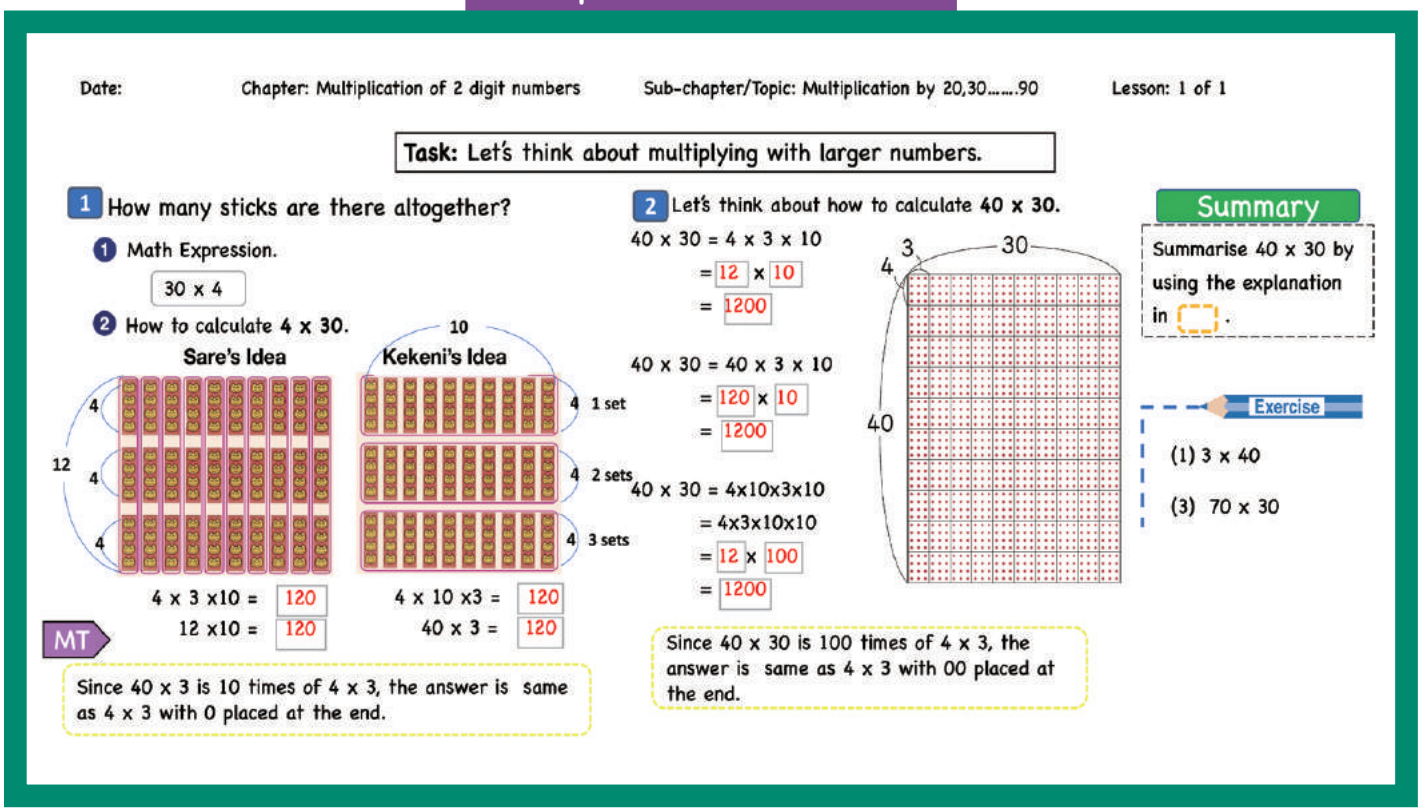
T What is the difference between 4×30 and 40×30?
S 40×30 is 2-digit×2-digit.
T Let the students recognise that calculating 4×3 first and adding two zeros.

6 Summarise how to calculate 40×30.

T Explain the important point in the box ( ).

7 Do the exercise.

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 2. How to Calculate(2-digit numbers)×(2-digit numbers)
Lesson 1 of 3 (Double Period)

Textbook Page : p.159
Actual Lesson 107

Sub-unit Objectives

- To find how to calculate (2-digit)×(2-digit) by separating in place value.
- To think about how to calculate (2-digit)×(2-digit) in vertical form.
- To calculate (2-digit)×(2-digit) in vertical form correctly.

Lesson Objectives

- To calculate (2-digit)×(2-digit) by separating in place value.

Prior Knowledge

- Multiplication table (Grade 2)
- (2-digit)×(1-digit) in vertical form
- (10, 20, …90)×(10, 20, …90) (Previous lesson)

Assessment

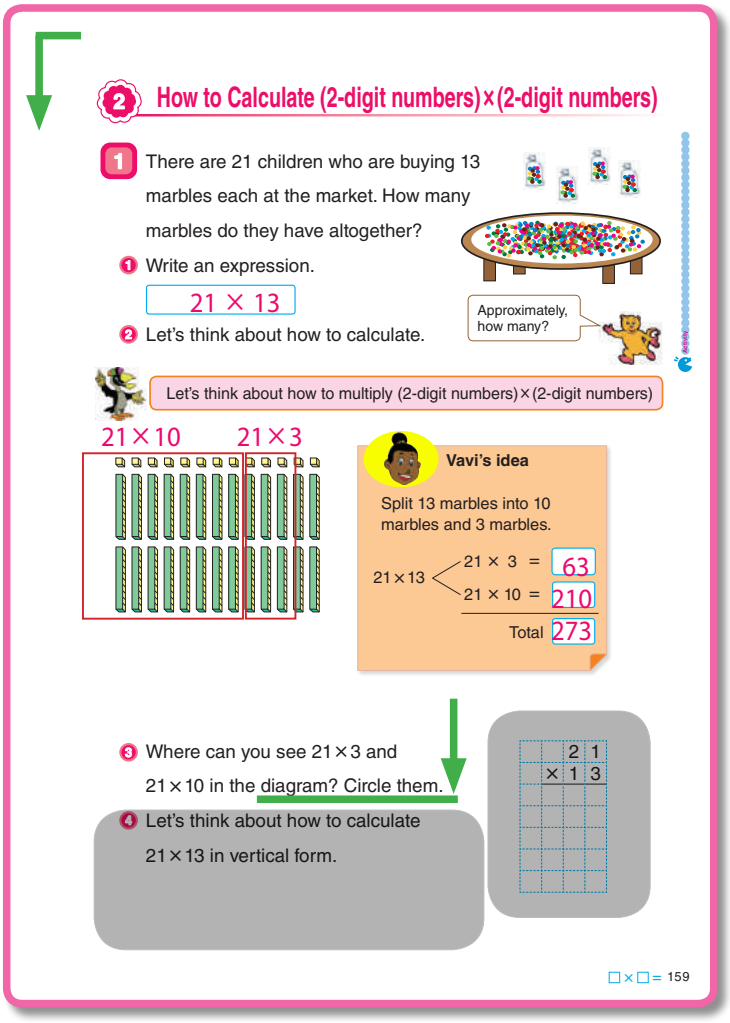
- Think about how to calculate (2-digit)×(2-digit) by separating in place value. F
- Understand how to calculate (2-digit)×(2-digit) by separating in place value. S

Preparation

- Diagram of blocks which is shown in the textbook. (Improvise if necessary) for Black Board

• Teacher's Notes •

Let's think about how to multiply (2-digit)×(2-digit) using the blocks.
Line 13 sets of 21 blocks as shown on the textbook on the board. Allow for students to group the blocks and apply their prior knowledge on multiplication of (2-digit)×(1-digit) to calculate their answer. Guide them to realise that by splitting the blocks into 10 and 3, the calculation does not only become easier, it guides them to use the place values.



Lesson Flow

1 ① ❶ Read the given problem and understand the situation.

T Read the word problem and think of what we have to find.
T What do we have to find?
S Total number of marbles.
T Let's make a math expression.
S 21 × 13
T Let's estimate the answer.
S This is about 20 × 10 so it is around 200.
T Let's think about how to calculate 21 × 13
T Introduce the main task.

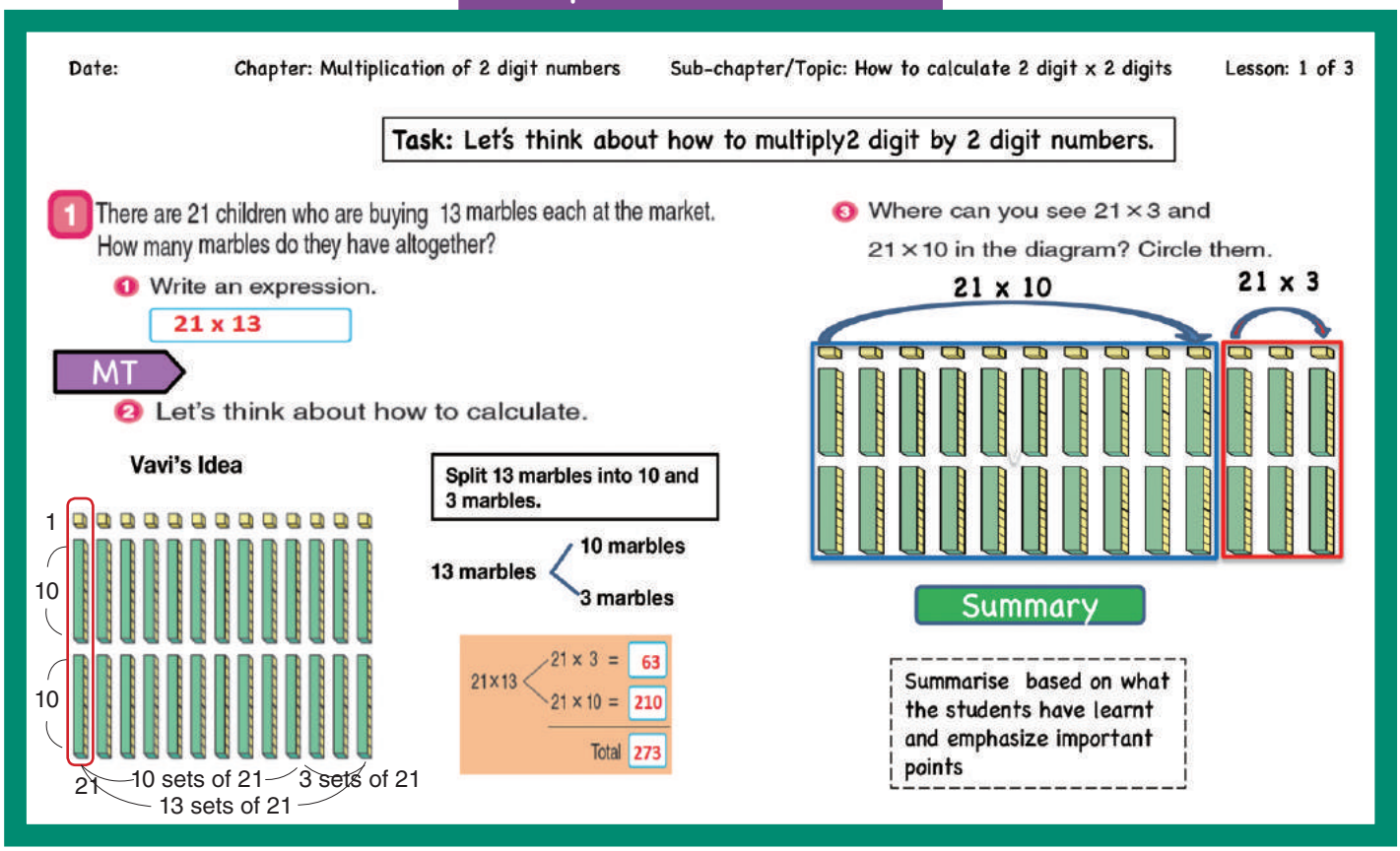
2 ❷ Think about how to calculate 21 × 13.

T Let's consider Vavi's idea. What did she do?
S She separates 13 marbles to 10 and 3. She calculate 21 × 3 and 21 × 10, and add up both answer.

3 ❸ Circle the diagram by 21 × 3 and 21 × 10.

T Let's circle the diagram by 21 × 3 and 21 × 10.
T How many blocks are there in each column?
S 21 blocks.
T How many columns should we circle for 21 × 3?
S 3 columns.
T How many columns should we circle for 21 × 10?
S 10 columns
T 3 column from the right will be 21 × 3 and next 10 rows will be 21 × 10.

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 2. How to Calculate(2-digit numbers)×(2-digit numbers)
Lesson 2 of 3 (Single period)

Textbook Page : p.159-160
Actual Lesson 108

Lesson Objectives

- To think about how to calculate (2-digit)×(2-digit) in vertical form.

Prior Knowledge

- How to calculate (2-digit)×(2-digit) (Previous lesson)

Preparation

- Diagram of blocks which is shown in the textbook.
- Use blocks if available.

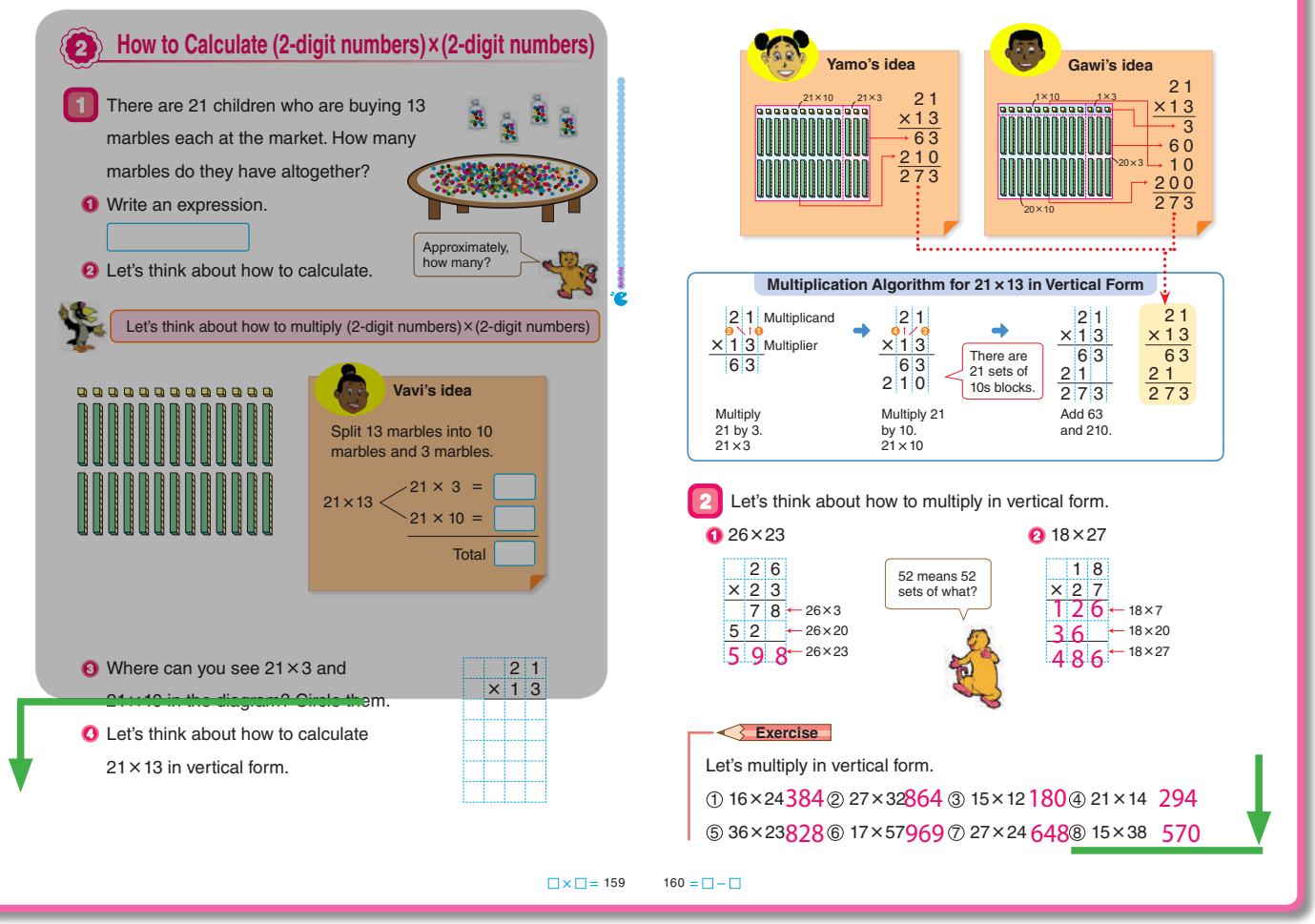
Assessment

- Think about how to calculate (2-digit)×(2-digit) in vertical form. F
- Understand the steps of how to calculate (2-digit)×(2-digit) in vertical form. S

• Teacher's Notes •

How to multiply in vertical form:
1. Keep the numbers in their place values.
2. Multiply from ones to the superior place values.
3. Few students may forget to add the zero to the ones place when multiplying with the sets of ten.
4. The product of (2-digit)×(2-digit) will always be in hundreds.

Example ① 21×13, is 21×3=63 and 21×10=210. ② 26×23, is 26×3=78 and 26×20=520



Lesson Flow

1 Review the previous lesson and understand the today's objective.

T What did we learn in last lesson?
S We learned how to calculate (2-digit)×(2-digit).
T How do we calculate(2-digit)×(2-digit)?
S Separating multiplier by place value, multiply each and add both answers.
T Let's think about how to calculate (2-digit)×(2-digit) in vertical form.
T Introduce the main task.

2 Think about how to calculate 21×13 in vertical form.

T Let's compare Yamo's idea and Gawi's idea.
S Yamo calculates 21×3 and 21×10 and writes in two lines.
S Gawi calculates 21×3 and writes the answer in two lines, and 21×10 and write the answer in two lines.

3 Summarise how to calculate 21×13 in vertical form.

S Explain how to calculate 21×13 step by step following the summary in the textbook.
S Write the summary of the calculation in their exercise books.
S Calculate 21×13 again by themselves in their exercise books.

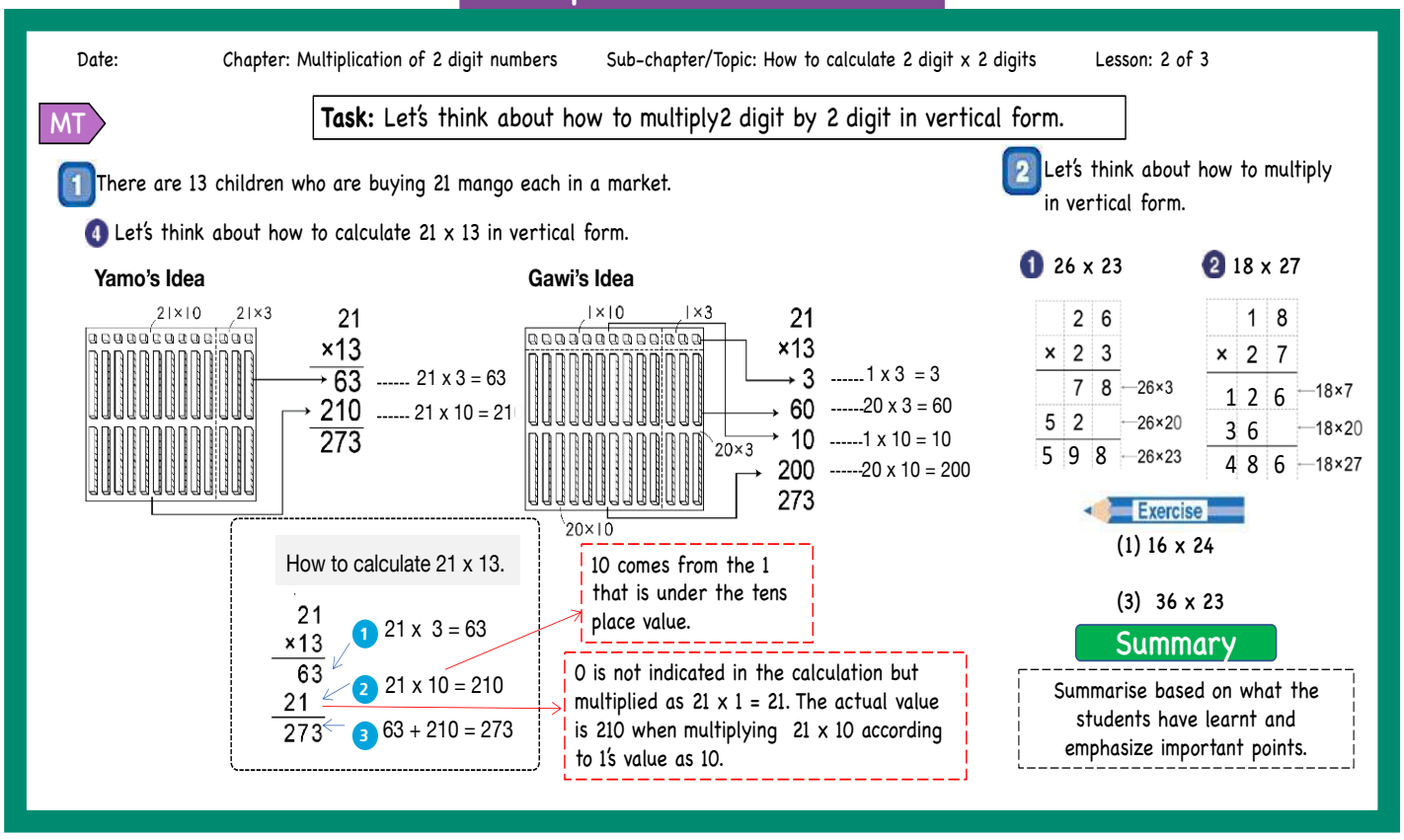
4 ② Calculate 26×23 and 18×27

T Let's calculate 26×23 and 18×27 in vertical form.
S Do the exercises ① and ②.
TN Give some time to students to think individually.
S Present ideas with explanation.
TN Confirm that 52 means 52 sets of 10 which is 520.

5 Complete the exercise.

There are 8 exercises. Ask students who finish early to do more. The rest can be given as a home work.

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 3. How to Calculate(2-digit numbers)×(2-digit numbers)
Lesson 3 of 3 (Double period)

Textbook Page : p.161
Actual Lesson 109

Lesson Objectives

- To practice and master the calculation of (2-digit)×(2-digit) in vertical form.

Prior Knowledge

- How to calculate (2-digit)×(2-digit) in vertical form. (Previous lesson)

Preparation

- Refer to the blackboard Plan.

Assessment

- Practice the calculation of (2-digit)×(2-digit) in vertical form. F
- Do the exercise correctly. S

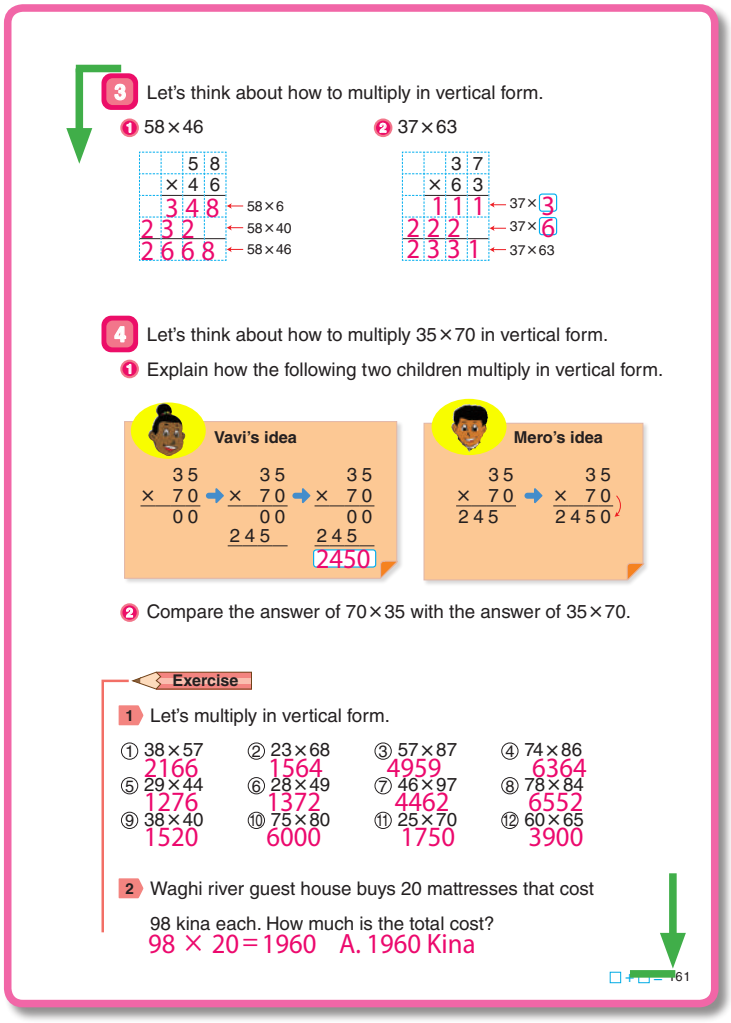
• Teacher's Notes •

Exercise

①~④: Product of Multiplication in ones place becomes 3-digit.

⑤~⑧: Partial multiplication has carrying over.

①~⑫: Ones place of multiplicand is 0.



3 Let's think about how to multiply in vertical form.

① 58×46

	5	8	
×	4	6	
	3	4	8 ← 58×6
2	3	2	← 58×40
2	6	6	8 ← 58×46

② 37×63

	3	7	
×	6	3	
	1	1	1 ← 37×3
2	2	2	← 37×6
2	3	3	1 ← 37×63

4 Let's think about how to multiply 35×70 in vertical form.

① Explain how the following two children multiply in vertical form.

Vavi's idea

35	35	35
× 70 →	× 70 →	× 70
00	00	00
	245	245
		2450

Mero's idea

35	35
× 70 →	× 70
245	2450

② Compare the answer of 70×35 with the answer of 35×70.

Exercise

1 Let's multiply in vertical form.

① 38×57 = 2166
② 23×68 = 1564
③ 57×87 = 4959
④ 74×86 = 6364
⑤ 29×44 = 1276
⑥ 28×49 = 1372
⑦ 46×97 = 4462
⑧ 78×84 = 6552
⑨ 38×40 = 1520
⑩ 75×80 = 6000
⑪ 25×70 = 1750
⑫ 60×65 = 3900

2 Waghi river guest house buys 20 mattresses that cost 98 kina each. How much is the total cost?

98 × 20 = 1960 A. 1960 Kina

□+□=161

Lesson Flow

1 ③ Calculate 58×23 and 37×63.

T Introduce the main task.
T ①-② Let's calculate 58×46 and 37×63 in vertical form.
TN Give some time to students to think individually.
TN Product of each place value becomes 3-digit.
T Confirm the answer together.

2 ④ Think about how to calculate 35×70.

T ① Let's compare Vavi's idea and Mero's idea.
S Vavi calculated as we learned so she wrote the answer of 5×0 and 3×0 but Mero abbreviated the calculation of 35×0 because answer becomes 0.
T Mero's idea is easier but we must not forget to put 0 in the ones place.

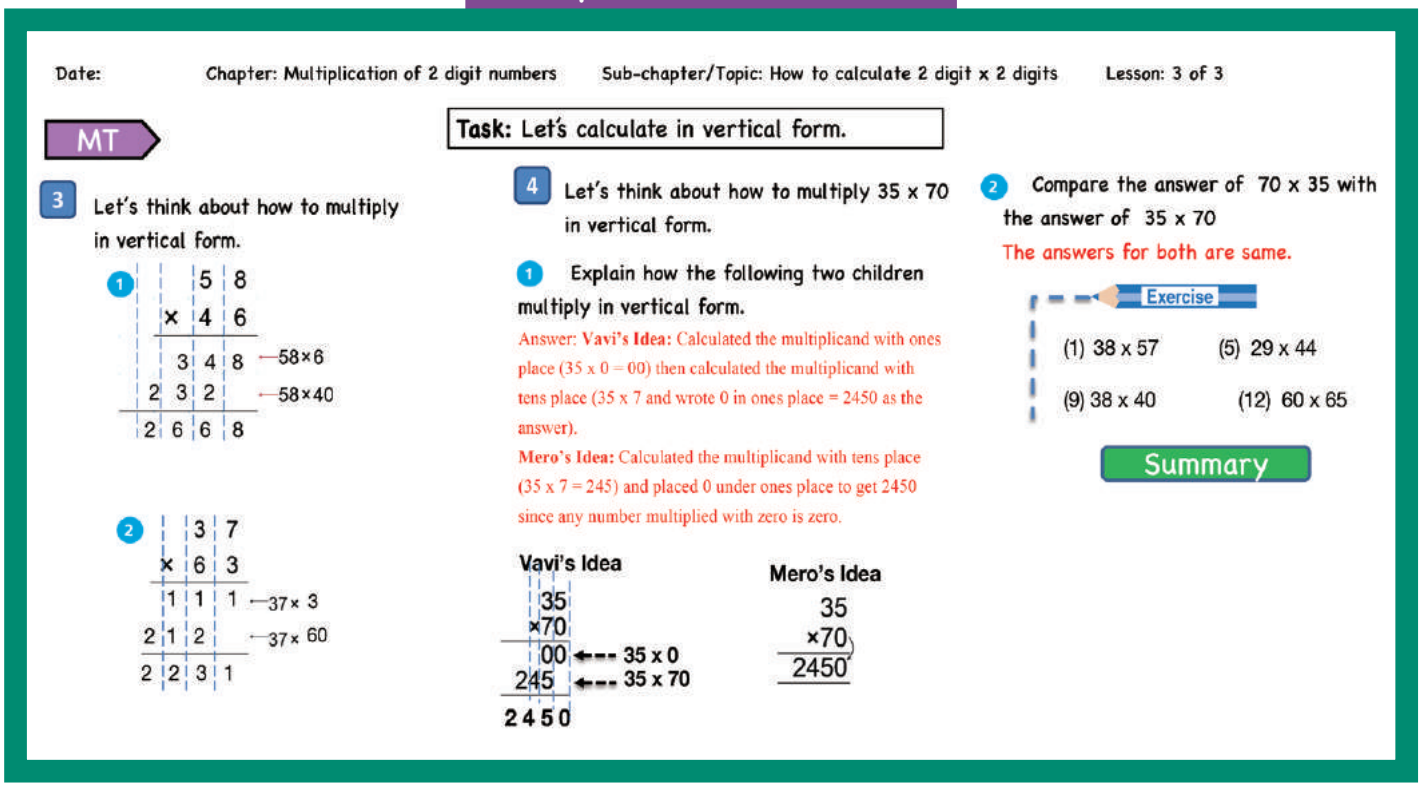
3 ② Compare the answer of 35×70 and 70×35.

S Calculate 35×70 and 70×35 in their exercise book.
T What is the answer?
S Both are 2450.

4 Do the exercise.

T Do the exercises ①, ⑤ and ⑨
TN There are 12 exercises. Ask students who finish early to do more. The rest can be given as a home work.

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 3. How to Calculate(2-digit numbers)×(2-digit numbers)
Lesson 1 of 2 lessons (Single period)

Textbook Page : p.162
Actual Lesson 110

Sub-unit Objectives

- To find method of calculation (3-digit)×(2-digit) based on (2-digit)×(2-digit).
- To calculate (3-digit)×(2-digit) in vertical form.
- To do mental calculation of (2-digit)×(1-digit).

Lesson Objectives

- To calculate (3-digit)×(2-digit) separating into place value.
- To calculate (3-digit)×(2-digit) in vertical form.

Prior Knowledge

- How to calculate (2-digit)×(2-digit) in vertical form.

Preparation

- Refer to blackboard plan.

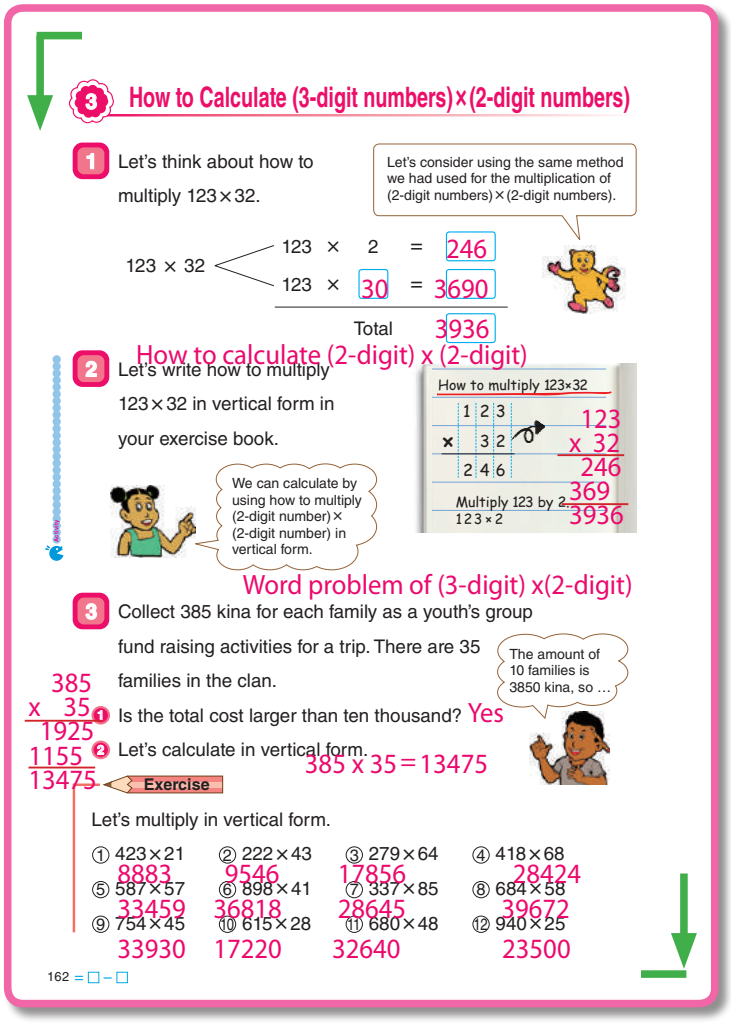
Assessment

- Think about how to calculate (3-digit)×(2-digit) in vertical form. F
- Do exercise correctly. S

• Teacher's Notes •

Exercises

①and②: Product becomes 4-digit.
③~⑧: Product becomes 5-digit
⑨and⑫: Ones place of product becomes 0.
⑪and⑫: Ones place of multiplier is 0



3 How to Calculate (3-digit numbers)×(2-digit numbers)

1 Let's think about how to multiply 123×32.

Let's consider using the same method we had used for the multiplication of (2-digit numbers)×(2-digit numbers).

123 × 32
123 × 2 = 246
123 × 30 = 3690
Total 3936

How to calculate (2-digit) x (2-digit)

2 Let's write how to multiply 123×32 in vertical form in your exercise book.

How to multiply 123×32
1 2 3
× 3 2 0
2 4 6
Multiply 123 by 2
1 2 3 × 2
123 x 32 246 369 3936

We can calculate by using how to multiply (2-digit number)×(2-digit number) in vertical form.

Word problem of (3-digit) x(2-digit)

3 Collect 385 kina for each family as a youth's group fund raising activities for a trip. There are 35 families in the clan.

The amount of 10 families is 3850 kina, so …

385 x 35
1 Is the total cost larger than ten thousand? Yes
1925
1155
2 Let's calculate in vertical form.
13475
385 x 35 = 13475

Exercise

Let's multiply in vertical form.

① 423×21 8883
② 222×43 9546
③ 279×64 17856
④ 418×68 28424
⑤ 587×57 33459
⑥ 898×41 36818
⑦ 337×85 28645
⑧ 684×58 39672
⑨ 754×45 33930
⑩ 615×28 17220
⑪ 680×48 32640
⑫ 940×25 23500

162 = □ − □

Lesson Flow

1 ① Think about how to calculate 123×32.

T How should we calculate when multiplier is 3-digit.
S It is the same as (2-digit)×(2-digit). We calculate 123×2 and 123×30 and add up both products.
TN Emphasise the value of 3.
3 represent 30 since it is in the tens place value. The product should be written with 0 in the ones place.
T Introduce the main task.

2 ② Summarise how to calculate 123×32.

T Let's summarise how to calculate 123×32 in your exercise book referring to the textbook.
S Calculate in their exercise book and confirm the steps by themselves.

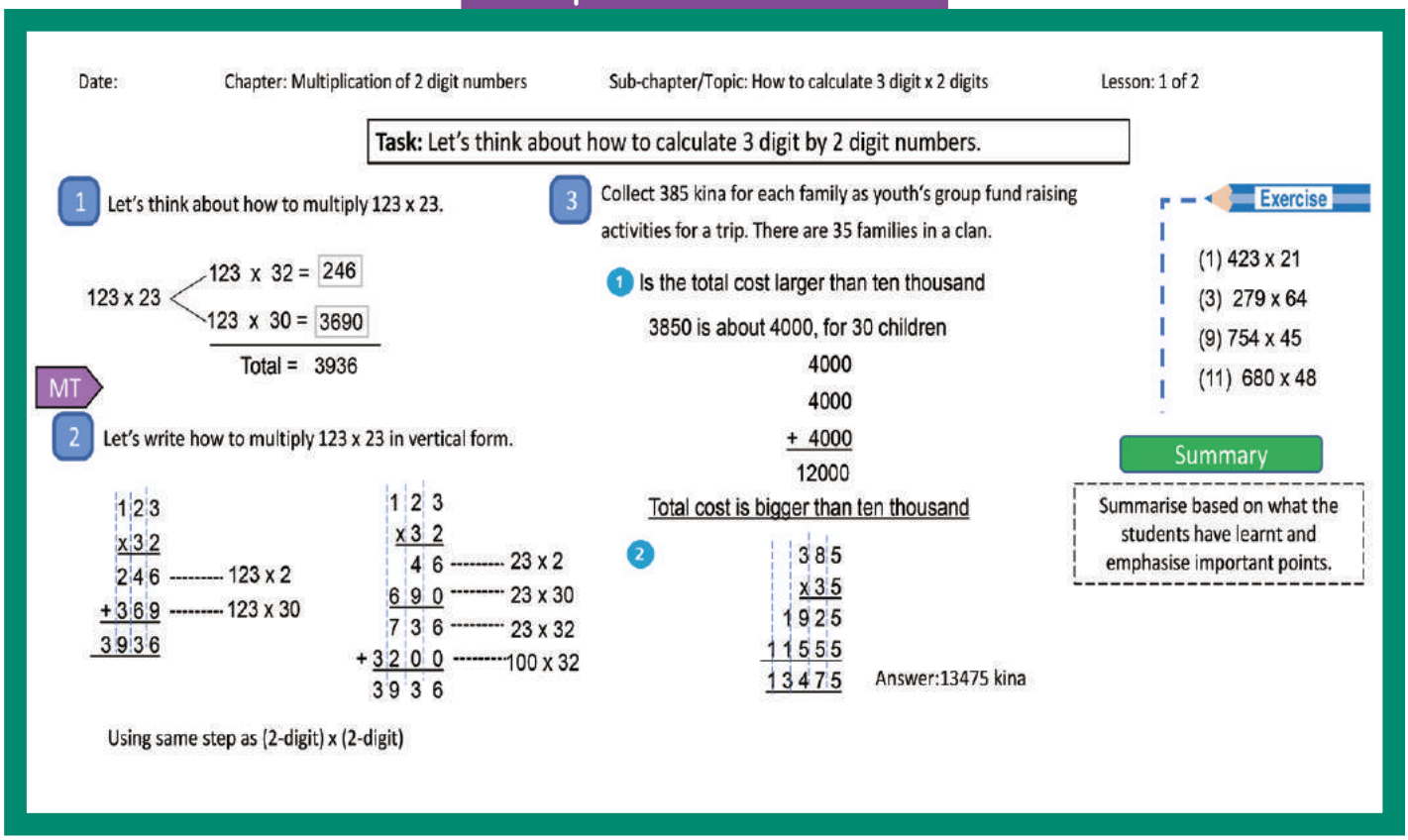
3 ③ Solve the word problem.

S Read and understand the situation.
T What is the mathematical expression?
S 385×35
T Is the answer larger than 10 000?
S Estimate the digit of answer for improving their number sense.
S 385 is around 400. 35 is around 30 or 40. So when multiplying 2 numbers, the answer will be over 10000
S Calculate and find the answer in your exercise book.

4 Do the exercise at the end of the lesson.

S Do the exercise ①, ③, ⑨ and ⑪.
TN There are 12 exercises. Ask students who finish early to do more. The rest can be given as a home work.

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: 3. How to Calculate(2-digit numbers)×(2-digit numbers)
Lesson 2 of 2 (Single period)

Textbook Page : p.163
Actual Lesson 111

Lesson Objectives

- To calculate (3-digit)×(2-digit) with 0.
- To do mental calculation of (2-digit)×(1-digit).

Prior Knowledge

- How to calculate (3-digit)×(2-digit) in vertical form. (Previous lesson)

Preparation

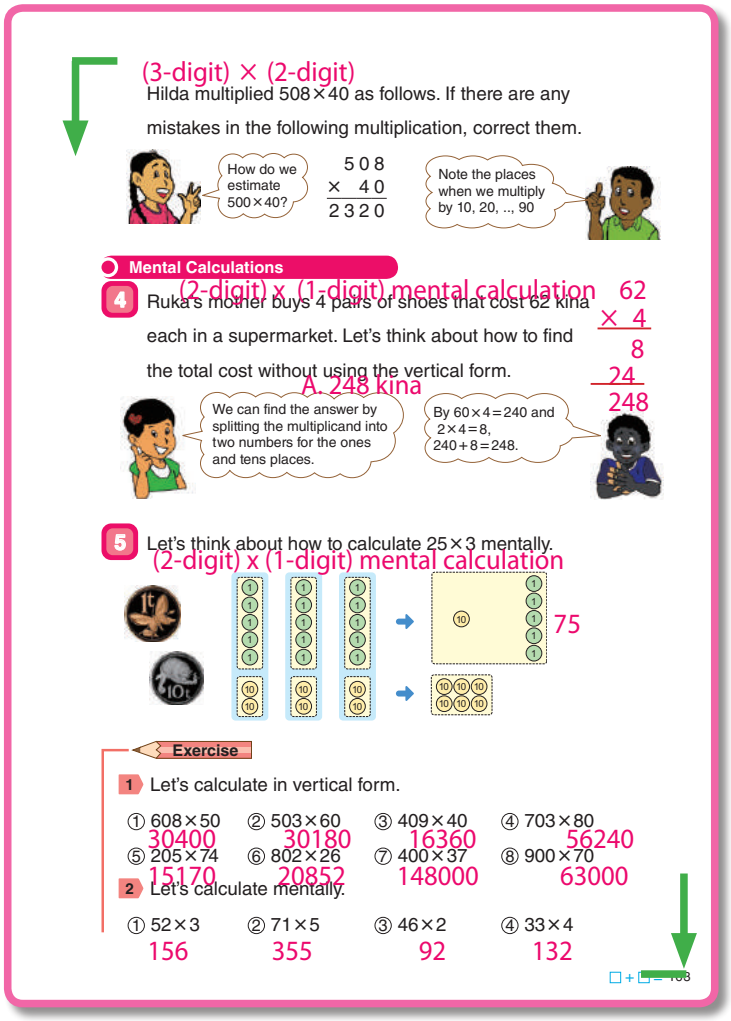
- Refer to the blackboard Plan.

Assessment

- Calculate (3-digit)×(2-digit) with 0. F
- Think about how to do mental calculation of (2-digit)×(1-digit). F
- Do exercise correctly. S

• Teacher's Notes •

Mental calculation is necessary for students to apply when dealing with situations in their daily lives. Encourage students to expand their skill from (2-digit)×(1-digit) by using the splitting method and multiply 0.



Lesson Flow

1 ④ Think about how to calculate 508×40.

T Introduce the main task.
T Let's calculate 508×40 being aware of 0.
T The answer will be how many digit ?
S Because it is about 500×40 so answer will be 5-digit.
T Get the students to calculate and find the answer.
S 20320
T What is wrong with Hilda's answer?
S I think she forgot to put 0 after 2.

2 ⑤ Think about how to do mental calculation of 62×4.

T Let students think about 60×4 and 2×4 seperately, then add up both answers.
S 60×4=240 and 2×4=8 so the 240+8=248.
T Get the students to notice that if we separate multiplicand into 2 numbers we can calculate easily by only using the knowledge of the multiplication table.

3 ⑥ Think about how to do mental calculation of 25×3.

T Observe the diagram and think about how it is calculated.
S 25 is separated into 5 and 20. Calculating 5×3=15 and 20×3=60. Adding up both answers.

4 Do the exercise at the end of the lesson.

S Do exercises ❶ ①, ⑤, ⑦ and ⑧.
Do exercise ❷ ① and ②.
TN Ask students who finish early to do more. The rest can be given as a home work.

Sample Blackboard Plan

Date: Chapter: Multiplication of 2 digit numbers Sub-chapter, Topic: How to calculate 3 digit x 2 digits Lesson: 2 of 2

MT

Task: Let's calculate in vertical form.

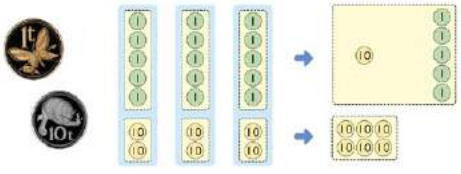
Hilda multiplied 508 x 40 as follows. If there are any mistakes in the following multiplication, correct it..

- When we estimate as 500 x 40 answer is 2000

508
x 40
20320

Calculate being aware of 0

5 Let's think about how to calculate 25 x 3 mentally.



Refer to Textbook utilize the diagram.

- Separate 25 into 20 and 5

5 x 3 = 15
20 x 3 = 60
Total 75

Exercise

(1) 608 x 50 (5) 205 x 74
(7) 400 x 37 (8) 900 x 70

4 Ruka's mother buys 4 pairs of shoes that cost 62 kina each in a supermarket. Let's think about how to find the total cost without using the vertical form.

- Separate 62 into 60 and 2

2 x 4 = 8
60 x 4 = 120
Total 128

Summary

Summarise based on what the students have learnt and emphasise important points.

Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: Exercise and Evaluation
Lesson 1 of 1(Double Period)

Textbook Page : p.164- p.165
Actual Lesson 112

Lesson Objectives

- To deepen understanding of what they learned in this unit.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheets for the students.

Assessment

- Enjoy solving exercises deepening understanding of what they learned. F
- Confirm whether they can solve problems correctly and master the concepts. S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

Exercises

Pages 158 ~ 159

1 Let's calculate.

① 5×20 100	② 60×30 1800	③ 40×50 2000
④ 22×14 308	⑤ 19×31 589	⑥ 27×28 756
⑦ 36×43 1548	⑧ 67×58 3886	⑨ 73×47 3431
⑩ 25×84 2100	⑪ 48×60 2880	⑫ 30×92 2760

Page 162

2 There are 34 children in Rataera's class. Each child studies 75 minutes after school. How many minutes did they study altogether? 75 × 34 = 2550
A. 2550 minutes

3 Let's make problems by filling in the □ with a number.

Page 162

①
$$\begin{array}{r} 321 \\ \times\ 23 \\ \hline 963 \\ 642 \\ \hline 7383 \end{array}$$

②
$$\begin{array}{r} 986 \\ \times\ 54 \\ \hline 3944 \\ 4930 \\ \hline 53244 \end{array}$$

Problems

1 Summarise how to multiply 45×63.
● Understanding how to calculate in vertical form.
① Add the answers of 45×3 and of 45×60.
② ⓐ is from the multiplication of 45 × 3.
③ ⓑ is from the multiplication of 45 × 60,
and it means 270 sets of 10.

$$\begin{array}{r} 45 \\ \times\ 63 \\ \hline 135 \\ 270 \\ \hline 2835 \end{array}$$
ⓐ ⓑ

2 Are the following calculation in vertical form correct?
If there are any mistakes in the following multiplications, correct them.
● Multiplying in appropriate ways.

①
$$\begin{array}{r} 54 \\ \times\ 94 \\ \hline 206 \\ 4560 \\ \hline 4766 \end{array}$$
$$\begin{array}{r} 54 \\ \times\ 94 \\ \hline 216 \\ 486 \\ \hline 5076 \end{array}$$

②
$$\begin{array}{r} 408 \\ \times\ 65 \\ \hline 240 \\ 288 \\ \hline 3120 \end{array}$$
$$\begin{array}{r} 408 \\ \times\ 65 \\ \hline 2040 \\ 2448 \\ \hline 26520 \end{array}$$

3 You need 43 sheets of papers to make each collection of work. You made 38 collections of work. How many sheets of paper are there altogether?
● Express a problem as an expression and finding the answer.
43 x 38 = 1634 A. 1634 papers

4 Let's write numbers in the spaces below.
● Understanding the structure of multiplication and solving problem.

①
$$\begin{array}{r} 35 \\ \times\ 41 \\ \hline 35 \\ 140 \\ \hline 1435 \end{array}$$

②
$$\begin{array}{r} 96 \\ \times\ 36 \\ \hline 576 \\ 288 \\ \hline 3456 \end{array}$$

Lesson Flow

1 ① Practice of multiplication (1-digit)×(2-digit), (2 or 3-digit)×(2-digit)

TN ①: (1-digit)×(several tens)
②and ③: (several tens)×(several tens)
④: There is no carrying over in partial multiplication.
⑤ and ⑥: There is carrying over in partial multiplication.
⑦~⑩:Partial multiplication becomes 4-digit.
⑪ and ⑫: (2-digit)×(several tens) and (several tens)×(2-digit).

TN Choose the questions to let students solve in the class. The rest can be homework.

2 ② Solve a word problem.

TN Let students read and understand the situation appropriately before making mathematical expression.

3 ③ Make multiplication in vertical form by inserting number in □.

Multiplication of 2-digit Numbers	Name:	Score

1. Calculate in vertical form. (10 points×6)

① 2 × 60

```
  60
×  2
 120
```

② 16 × 24

```
  16
× 24
  64
 32
384
```

③ 21 × 14

```
  21
× 14
  84
 21
294
```

④ 28 × 49

```
  28
× 49
 252
112
1372
```

⑤ 423 × 23

```
 423
×  23
1269
846
9729
```

⑥ 409 × 25

```
 409
×  25
2045
818
10225
```

2. There are 39 children in class A. Each child used 12 papers for writing. How many papers did class A students use? (10 points×2)

Mathematical sentence: 39 x 12=468 Answer: 468 papers

3. There are 24 groups of 345 people. How many people are there in total? (10 points×2)

Mathematical sentence: 345x 24=8280 Answer: 8280 people

TN ①: (3-digit)×(2-digit), both partial multiplication become 3-digit.
②(3-digit)×(2-digit), both partial multiplication become 4-digit.

4 ① Confirm the steps of 45×63.

TN Calculate by separating place value.
45×3=135
45×60=2700
135+2700=2835

5 ② Correct mistakes of calculation.

S Find the mistakes after calculating the operation.

6 ③ Solve a world problem.

TN Let students read the problem and understand the situation correctly before making mathematical expression.

7 ④ Fill in the blank.

TN It is difficult for some students to find the numbers. Explain how to think about the number by focusing on the structure of multiplication in vertical form. For example, concerning A and B, when we look at the product, it is 5, so A becomes automatically 1 and B is 5.

Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: Making Tapes
Lesson 1 of 2 (Single Period)

Textbook Page : p.166
Actual Lesson 113

Sub-unit Objectives

- To deepen understanding of multiplication.
- To understand the multiplication concerning 'times'
- To deepen understanding of division.
- To understand the division concerning 'times'.

Lesson Objectives

- To know about the term 'times' by making a tape.

Prior Knowledge

- Multiplication table (Grade 2)
- Measurement (cm, dL)

Preparation

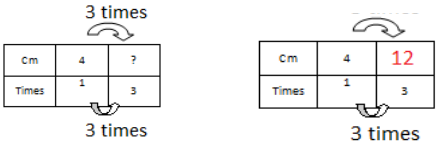
- Ruler and paper tape

Assessment

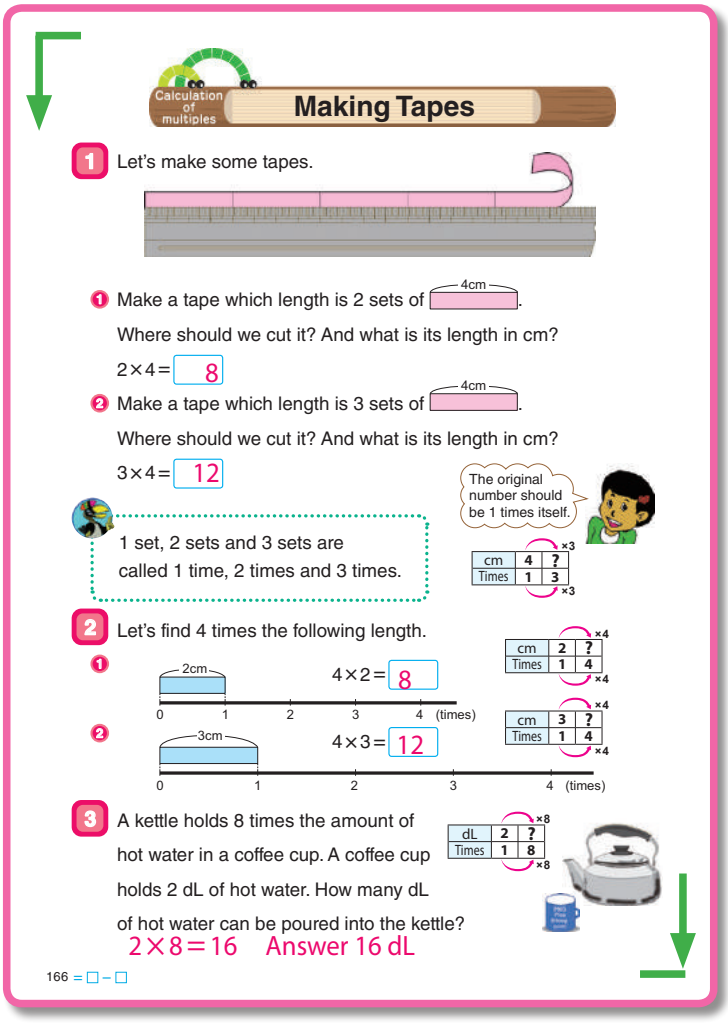
- Think about the meaning of how to calculate number of times correctly. F
- Calculate the number of times correctly S .

• Teacher's Notes •

The tape diagram and the tables are used in the activity to assist the students to see the relationship. The table shows the relationship between two quantities. It is important that the students understand the relationship and apply it. This kind of table will be used in other situations as the students advance.
If 1 unit is 4 cm, how long is 3 units?



Using the table the unit of quantity is in the first column. We base the calculation on 1 unit. When we know 1 unit is 4 cm and 3 units is 1×3 then the length for 3 units is simply 4×3.



Lesson Flow

1 ❶ Read the problem and find the length of 2 sets and 3 sets of a tape.

T Introduce the main task.
T ❶ How long will be 2 sets of 4 cm?
S 2×4=8 8 cm
T ❷ How about 3 sets of 4 cm?
S 3×4=12 12 cm
T Use the paper tapes for the explanation on the board.
T Explain the relationship by using the table (Refer to teacher's note.)

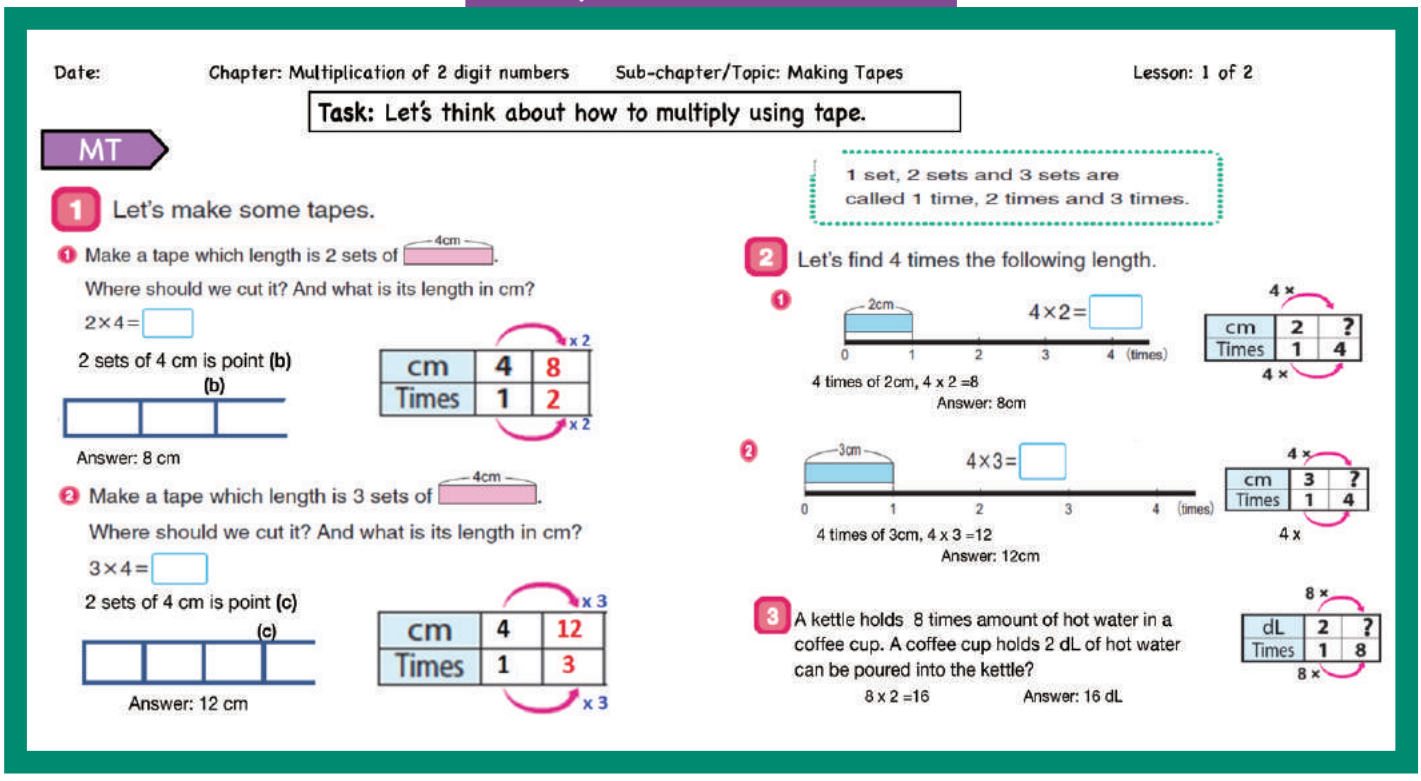
2 ❷ Read the problem, make mathematical expression and find the answer.

TN Use the table to explain.
T ❶ What is 4 multiplied by 2 cm?
S 2×4=8 8cm
T ❷ What is 4 multiplied by 3 cm?
S 3×4=12 12 cm
T Get the students to explain why the answers are different even when both are 4 times.
S Because the base number is different, activity ❶ is 2 cm and activity ❷ is 3 cm.

3 ❸ Read the problem and find the answer by drawing tape diagram and mathematical sentence.

T Let's draw a tape diagram to show the relation of 2 numbers.
T What is the mathematical expression to find the answer?
S 8×2
T Calculate the expression and find the answer.
S 8×2=16 16 dL

Sample Blackboard Plan



Unit 15

Unit: Multiplication of 2-digit Numbers
Sub-unit: Making Tapes
Lesson 2 of 2 (Single Period)

Textbook Page : p.167
Actual Lesson 114

Lesson Objectives

- To solve a situation problem of quotative division by using 'times'.
- To understand the relationship of 2 quantities.

Prior Knowledge

- Meaning of 'times'
- Multiplication table
- Measurement (cm)

Preparation

- Paper tape

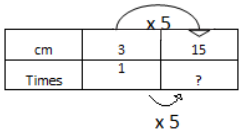
Assessment

- Think about how to solve the situation of quotative division by using times. F
- Solve the problems correctly. S

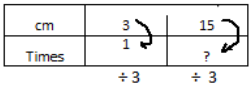
• Teacher's Notes •

The relationship of the table in this lesson is focusing on division based on times.

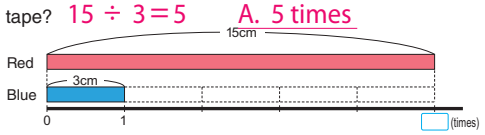
① In this example 3 cm is 1 unit therefore to know how many times 15 is, we can think of a number that we times with 3 to get 15. The same number we multiply with 1.



② In division we think of a number we divide with 3 to get 1. The same number we divide with 15 to get missing number



4 Kila has 15 cm of red tape and 3 cm of blue tape. How many times the length of the blue tape is equal to the length of the red tape? 15 ÷ 3 = 5 A. 5 times

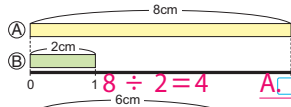


If 3 cm is regarded as 1 unit, 15 cm is 5 units of 3 cm.
This is called "15 cm is 5 times 3 cm".
To obtain the number of units 3 cm is equal to 15 cm, calculate 15 ÷ 3.

cm	3	15	÷3
Times	1	?	

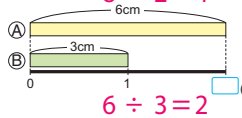
To make 3 to 1, what number should we divide 3 with.

5 How many times of tape Ⓑ is equal to tape Ⓐ ?



cm	2	8	÷2
Times	1	?	

8 ÷ 2 = 4 A. 4 times



cm	3	6	÷3
Times	1	?	

6 ÷ 3 = 2 A. 2 times

6 The big cooking oil container for Rose's aunty holds 24 L of cooking oil. The container for Angi's aunty holds 6 L of cooking oil. How many times the cooking oil for Angi's aunty's container can be held in Rose's aunty's container?

L	6	24	÷6
Times	1	?	

24 ÷ 6 = 4 A. 4 times

Lesson Flow

1 4 Think about the length of Red tape and how many times of the length of Blue.

T Introduce the main task.
T Observe the tape diagram. The length of red tape is how many times of the length of blue tape?
S 5 times
T Explain the relationship of 2 numbers by using the table.
TN Use the important points in the box to explain the relationship.

① ×5

cm	3	15
times	1	?

×5

②

cm	3	15
times	1	?
	÷3	÷3

T What is the mathematical expression to find the answer?
S 15÷3

2 5 Read the problem, make mathematical expression and find the answer.

T Which will be the base amount, A or B?
S B
T Make mathematical expressions and find the answer.
S ① 18÷2=4 4 times
② 6÷3=2 2 times
T Explain the relation of 2 numbers by using 4 cells table.

3 6 Read the problem, make mathematical expression and find the answer.

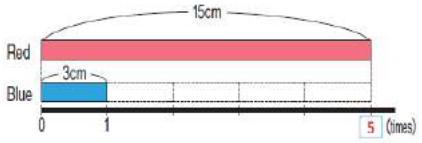
S Read the problem and write a mathematical expression.
T What is the base number?
S 6 L
T What is the mathematical sentence and answer?
S 24÷6=4 4 times
TN Let the students notice that even the length changes to volume, the way of thinking does not change.

Sample Blackboard Plan

Date: Chapter: Multiplication of 2 digit numbers Sub-chapter/Topic: Making Tapes Lesson: 2 of 2

MT

4 Kila has 15 cm of red tape and 3 cm of blue tape.
How many times the length of the blue tape

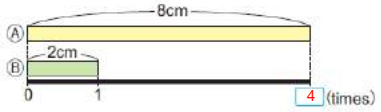


cm	3	15
Times	1	?

15 ÷ 3 = 5
Answer: 5 times

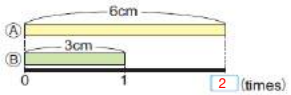
If 3 cm is regarded as 1 unit, 15 cm is 5 units of 3 cm.
This is called "15 cm is 5 times 3 cm.
To obtain the number of units 3 cm
is equal to 15 cm, calculate 15÷3.

5 How many times of tape B is equal to tape A?



cm	2	8
Times	1	?

8 ÷ 2 = 4 Answer: 4 times



cm	3	6
Times	1	?

6 ÷ 3 = 2 Answer: 2 times

6

L	6	24
Times	1	?

24 ÷ 6 = 4
Answer: 4 times

End of Chapter Test: Chapter 15 **Date:**

Multiplication of 2-digit Numbers	Name:	Score

1. Calculate in vertical form. (10 points × 6)

① 2 × 60 ② 16 × 24 ③ 21 × 14

④ 28 × 49 ⑤ 423 × 23 ⑥ 409 × 25

2. There are 39 children in class A. Each child used 12 papers for writing. How many papers did class A students use? (10 points × 2)

Mathematical sentence: _____ Answer: _____

3. There are 24 groups of 345 people. How many people are there in total? (10 points × 2)

Mathematical sentence: _____ Answer: _____

Chapter 16 Weight

1. Unit Objectives

- Explore how to compare weights through direct comparison, indirect comparison and arbitrary unit. (3.2.2a)
- To understand the meaning of unit weight. (3.2.2b)
- To measure the weight. (3.2.2b)
- To know the unit of gram, kilogram and tonne. (3.2.2b)
- To measure the weight appropriately by choosing their scale. (3.2.2c)
- To calculate weight using appropriate unit (3.2.2c)

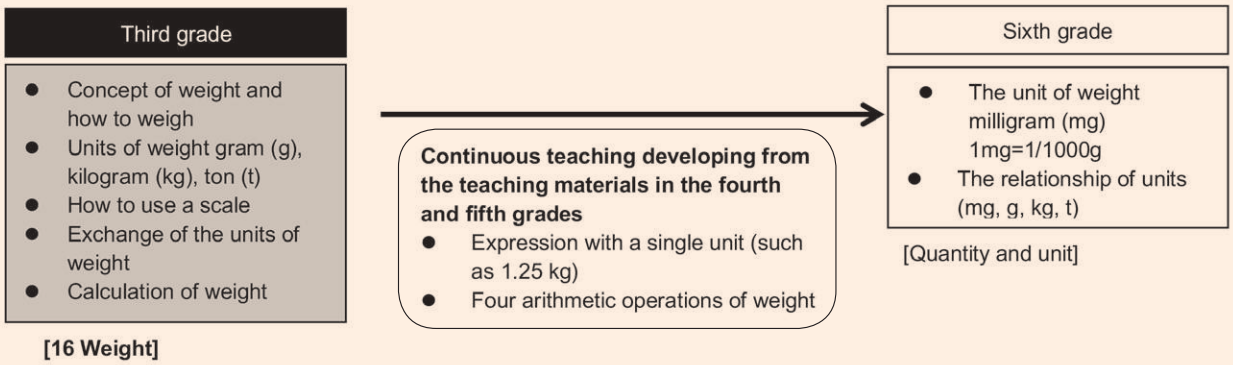
2. Teaching Overview

Students learnt length, volume and time already. Weight is slightly complicated for students since it is invisible, meaning that large things are not necessarily heavy, but in proportional relationship with volume such that bigger things are always heavy in case they are all made of the same material. Therefore, they firstly study the difference between weight and volume. The textbook intends that students will focus on relationship between weight and shapes, its size and materials. In the learning of quantities, the common ways of teaching/learning is; 1. Direct Comparison, 2. Indirect Comparison, 3. Measuring using certain (non-universal) units and 4. Universal units. Students should also feel and understand the conservation of mass despite of shapes and additional properties. They should learn these things through experiences without being imparted.

How to Represent Weight : Students measure 1 kg using several things such as 20 toea coins or any other things found in daily life. As they weigh several things of 1 kg repeatedly, they will gradually obtain the sense of 1 kg.

Calculation of Weight : Some students may have original misconception that addition of weight does not work out. The additional property of weight works out under the conservation of mass, meaning that weight does not change even if they change shapes or locations. Students are advised to understand it through experiences.

3. Related Learning Contents



Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 1 of 7 (Double Period)

Textbook Page : p.168~p.169
Actual Lesson 115

Sub-unit Objectives

- To understand the concept of weight.
- To understand the unit of gram, kilogram and tonne.
- To measure the weight of things by using appropriate instruments.

Lesson Objectives

- To think about how to measure different things.
- To compare the weight of different things by using balance.

Prior Knowledge

- Measurements of lengths.

Preparation

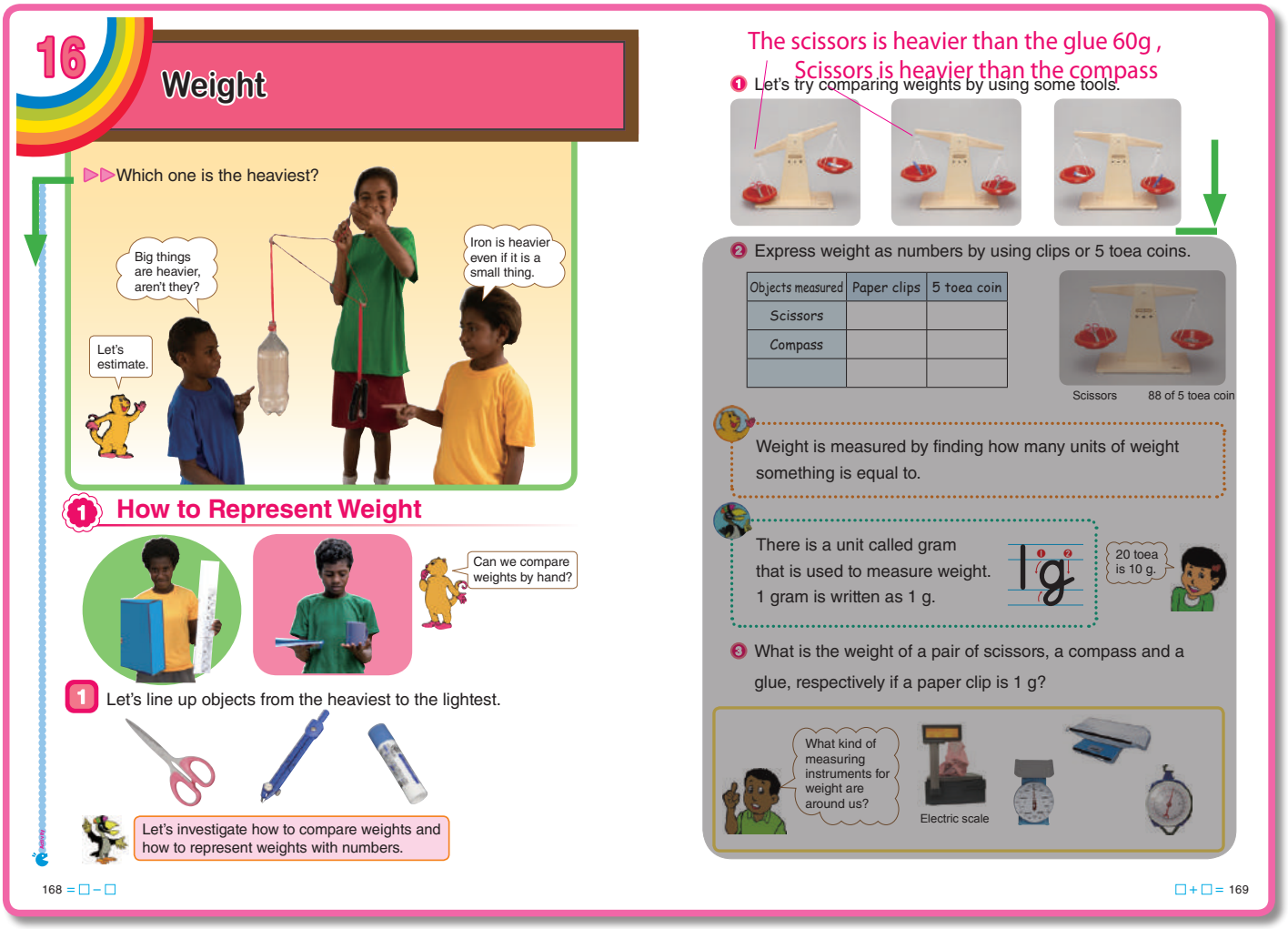
- Prepare balance
- Any available objects for comparison (eg. Scissors, glue stick, stones etc.)

Assessment

- Think about how to compare weights of different objects. F
- Understand that we can weigh objects using a Balance S

• Teacher's Notes •

Teacher may use either of the balance below or improvise for the lesson.
Hanger can be used as balance, simply tie two strings to each end of the hanger and let it hang on the door handle where students can come and tie their objects to the bands to compare.
Teacher can use the balance if available or use the pictures in the textbook.



Lesson Flow

1 Compare weight of various objects using a balance (Direct Comparison).

T Introduce the main task.
T Present various objects.
S Compare various objects using their hands and compare with other students.
T What can you say about the comparisons of objects?
S They are not exact/same weights.

2 1 Think about how to compare the weights of different things correctly with the balance.

T How can we compare exactly?
S We can use the balance to compare exactly.
TN Demonstrate how to use the balance.

3 Compare weight of materials using balance.

S Compare weight of scissors and glue stick, scissors and compass. Then compass with glue stick.
TN Use any available objects.
S Summarise which is heavier.
TN Ask students about what they have learned.
T How can we compare, if we cannot compare two things directly?

Sample Blackboard Plan

Date: Chapter Name: Weight Topic: How to represent weight Lesson Number: 1 of 7

Main Task: Let's think about how to compare weight of various objects.

MT

1 Let's compare the weight of different things using hands.
- Stones
- Eraser
- Pencil case
- Pencil
- Books
- Others

Students Ideas
Share their experience of comparing.

1 Let's compare using prepared balance
- Scissors and Compass
- Compass and Glue Stick
- Scissors and Glue Stick

Which is Heavier?	Heavier Object
Scissors or Compass	Compass
Compass or Glue Stick	Compass
Scissors or Glue Stick	Glue stick

Summary:
- Weight is how heavy an object is.
- We can compare weight by comparing using hands or by using balance.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 2 of 7 (Double Period)

Textbook Page : p.169
Actual Lesson 116

Lesson Objectives

- To know that there is a standard unit for weight.
- To understand how to write and read the unit (1g) gram.

Prior Knowledge

- Measuring lengths
- Using a Balance to compare weight.

Preparation

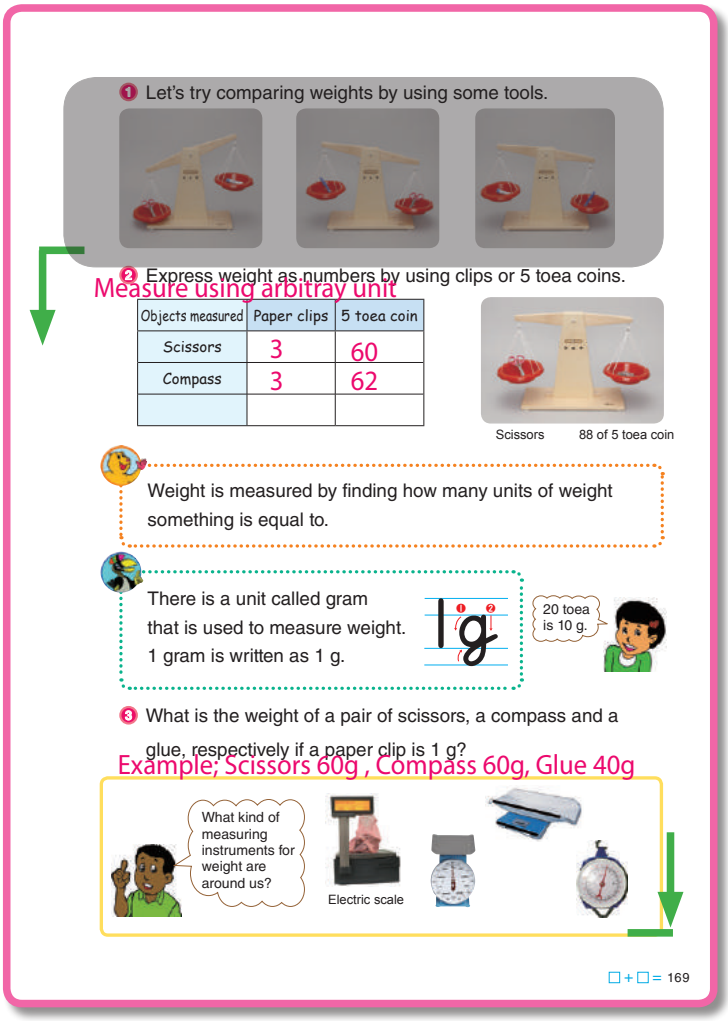
- Balance
- Scissors, glue stick and compass.
- Paper clips
- 5 toea coins

Assessment

- Compare weights of different objects with paper clips. F
- Understand that we can read and write weights using same unit (gram). S

• Teacher's Notes •

The metal paper clips or 5 toea coins that weigh have the weight close to 1 gram and can be used in this lesson.
The number of paper clips that balance the scissors, compass or glue stick gives the weight of the object respectively.



Lesson Flow

1 ❷ Let's think about how to show the weight of things.

T Introduce the main task.
T If we cannot compare two things directly, how can we compare?
S We need the same unit to show weight.
T What kind of unit can we use?"
T Direct students attention to the use of paper clips or 5 toea coins to measure weights of scissors, compass and glue stick.
TN Any object of the same weight can be used as on arbitrary unit.
Example: paper clips only.
S We need the same thing so we need paper clips or 5 toea coins to show each weight.
T Demonstrates how to use paper clips or 5 toea coins to measure the weight of a pair of scissors, compass and glue stick.
S Investigate the weight of materials using paper clips or 5 toea coins. Write the number of paper clips or 5 toea coins into the table.
S Understand that when using an object like paper clip weight of each object can be measured.
T Explain the important point in the box .

2 Know about the unit of gram.

T Explain the important point in the box .

3 ❸ Show the weight of scissors, compass and glue using grams.

S Change the 'paper clip' as a unit to 'gram'.
TN Assume that paper clip is 1 g.

Sample Blackboard Plan

Date:

Topic: How to represent weight

Lesson Number: 2 of 7

Main Task: To think about how to represent weight of objects.

MT

Review

Which is Heavier?	Heavier Object
Scissors or Compass	Compass
Compass or Glue Stick	Compass
Scissors or Glue Stick	Glue stick

❷ Let's think about how to show weight of things.

Students Ideas
Illustrate the answer

Objects measured	paper clips or 5 toeas
Scissors	
Compass	
Glue	
Stapler	

Important Point

There is a universal unit called gram that is used to measure weight.
1 gram is written as 1 g.

❸ If the paper clip is 1 g. What will be the weight in grams?

Objects measured	paper clip	In gram
Scissors	60	60
Compass	62	62
Glue	45	45
Stapler	220	220

Summary:

There is a unit called gram that is used to measure weight.
1 gram is written as 1 g.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 3 of 7 (Single Period)

Textbook Page : p.170
Actual Lesson 117

Lesson Objectives

- To know that there is a standard measuring tool for measuring weight.
- To measure various things using a measuring tool.

Prior Knowledge

- Using Balance to compare weight.
- Measuring weight scale (1 g). (Previous lesson)

Preparation

- Scale (If available)

Assessment

- Compare weights of different objects using the scale. F
- Understand how to read the scales in gram. S

• Teacher's Notes •

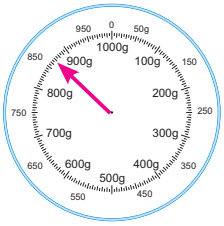
The scale can be borrowed from the clinic. Teacher can use the textbook image if the scale is not available.

2 How to read the scale

A scale is used to measure weight.

Measure the weight of the following objects by using the scale.

1. Up to how many grams can we measure on the above scale? 1000 g
2. How many grams does the smallest unit express? 5 g
3. How many grams is the weight of the pencil case? And how many grams is the weight of the book? 270 g
4. The weight of the plate of avocados is 875 g.
   Draw a needle on the scale shown on the right of this weight.



170 = □ − □

Lesson Flow

1 Review previous lesson.

T Introduce the main task.

2 ❷ Observe a measuring tool.

T Show students a measuring tool and ask, “What is this?”
S It is something used to measure objects.
T Use different objects to measure weights. Allow for investigation.
T Asks following questions as guide;
❶ “Up to how many g can we measure on the above scale?”
❷ “How many g does the smallest unit express?”
❸ “How many g is the weight of a pencil case? And how many g is the weight of a book?”
S Investigate by placing objects on the measuring tool and give the readings.
S Present their answers to activity ❶ - ❸

3 ❹ Find the weight of avocado.

T Demonstrate weight of avocado’s case and show weight on the board by drawing the needle on the scale as shown in the textbook.
S Draw an arrow to show the weight of avocado.

Sample Blackboard Plan

Date: Topic: How to represent weight Lesson Number: 3 of 7

Main Task: Let’s think about how to read the scale.

Review
What tool did we use to compare weight?

Students Ideas

Answer: Balance
What other measuring tools can we use?

Students Ideas

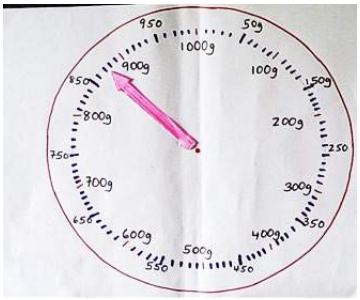
Answer: Scale.

MT

2 Let’s use a scale to measure weight of objects.
Work on ❶ - ❹

Students Ideas
Explain their answers for ❶ - ❹

Answers
❶ 1000g
❷ 5g
❸ 270



❹ The weight of the plate of avocados is 875g.

Summary:
We read the scale the same way as we read the clock.
The small scales add up to give the bigger scales.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 4 of 7 (Double Period)

Textbook Page : p.171
Actual Lesson 118

Lesson Objectives

- To know the unit of kilogram and tonne as a unit of measurement.
- To measure the weight using kilogram.

Prior Knowledge

- Measurements unit (1 g)

Preparation

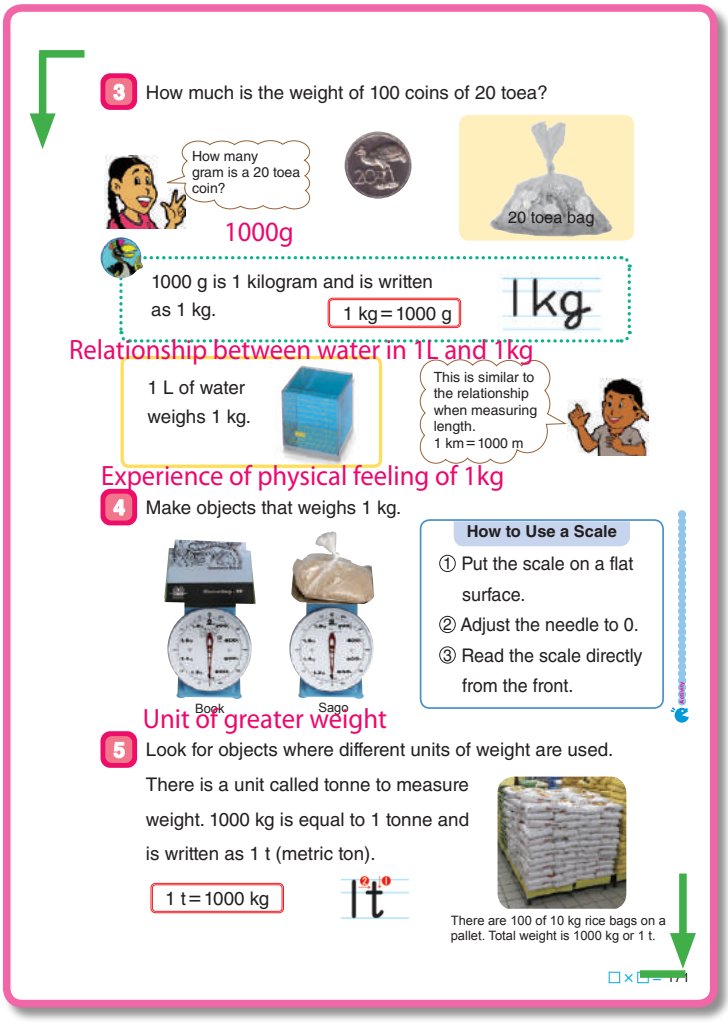
- Scale
- Objects weighing 1 kg or more than 1 kg.
- 1 L of water
- Picture of an object that weighs 1 t, eg; car, ship or 100 bags of 10 kg rice on pallet.

Assessment

- Compare weights of different objects around their classroom that weighs more than 1 kg and weigh them. F
- Understand the unit of kilogram (1 kg) and tonne (1 t). S

• Teacher's Notes •

Teacher should provide items of 1 kg for the task 4.
Example: 1 L Coke, 2 bottles of 500 mL, 1 kg rice or sugar, ets.



Lesson Flow

1 3 Identify the unit of kilogram.

T Introduce the main task.
T The weight of the 20 toea coin is 10 g. How much is the weight of 100 coins of 20 toea?
S 1000 g. Because 10 × 100 = 1000.
T Explain the important point in the box .

2 4 Think about how to measure 1 kg objects using the scale.

T Confirm how to use the scale with class.
S Measure materials around the classroom and find 1 kg materials.
S Hold the 1 kg material by hand and feel the weight of the objects.

3 5 Identify the unit of tonne.

T Show students example or pictures of a ship, a car or 100 rice bags weighing 10 kg to understand that 1000 kg = 1 tonne.
S Name other objects around their surroundings that weigh more than 1 tonne.
Example: PMV bus, Truck, Big rock, Tree, 4 bags of 250 kg coffee and a pallet of 20 kg rice bags etc.

Sample Blackboard Plan

Date:

Topic: How to represent weight

Lesson Number: 4 of 7

Main Task: Let's think about units greater than gram.

MT

The weight of a 20 toea coin is 10 grams.

3 How much is the weight of 100 coins of 20 toea?

100 (coins) x 10 (g) = 1000
Answer: 1 000 grams.

1000 g is called 1 kilogram.
written as 1 kg 1kg = 1000 g

4 Make objects that weights 1 Kg.
How to use the scale.
1. Put the scale on a flat surface.
2. Adjust the needle to 0.
3. Read the scale from the front directly.

1kg rice, 1 kg sugar, 1L Coke,
2 bottles of 500ml and so on.

5 There is a unit called tonne to measure weight.
1000 kg is equal to 1 tonne and is written as 1 t (metric ton)

1t = 1000 kg

There are 100 of 10kg rice bags on a pallet. Total weight is 1000kg or 1t.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 5 of 7 (Double Period)

Textbook Page : p.172
Actual Lesson 119

Lesson Objectives

- To understand the structure of a kg scale and read the scale accurately.

Preparation

- Scale (If possible)

Prior Knowledge

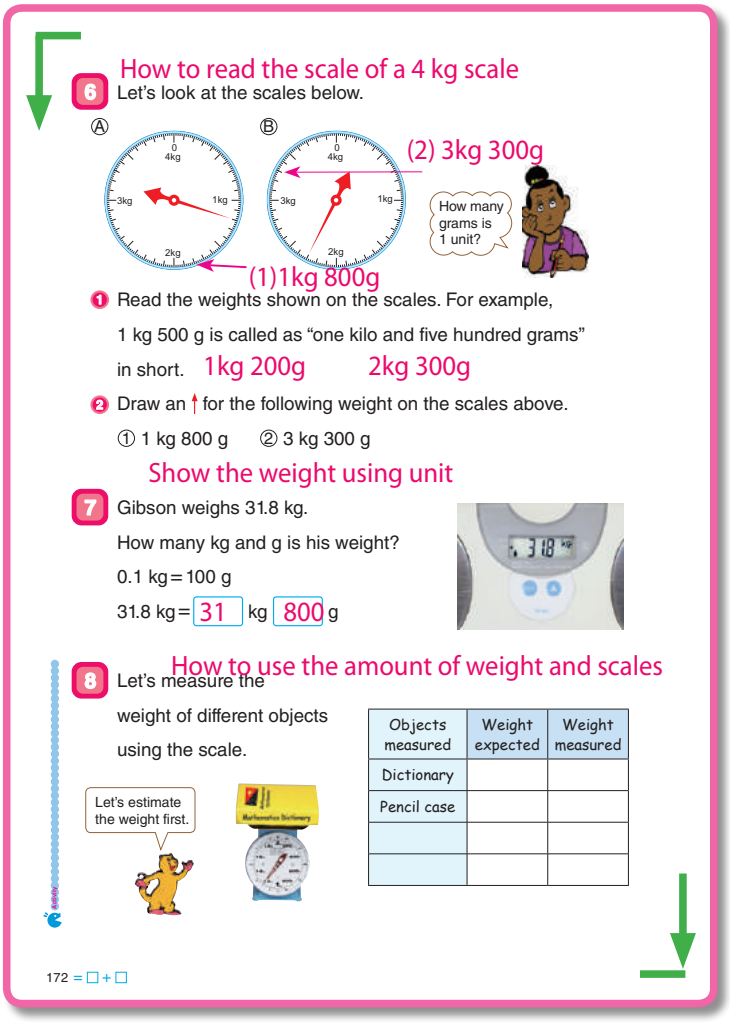
- Measurement units 1 g, 1 kg and 1 t

Assessment

- Measure various things using scale. F
- Read scale unit of kilogram and gram correctly. S

• Teacher's Notes •

When reading the scale;
Firstly find out the unit scale by dividing the gram by scale division. For example, 100 g divide by 5 scale division is 20 g. Therefore, 1 unit scale is 20 g.
Then notice where the needle stops, read the scale.



How to read the scale of a 4 kg scale

6 Let's look at the scales below.

Ⓐ Ⓑ

(2) 3kg 300g

How many grams is 1 unit?

(1)1kg 800g

1 Read the weights shown on the scales. For example, 1 kg 500 g is called as "one kilo and five hundred grams" in short. 1kg 200g 2kg 300g

2 Draw an ↑ for the following weight on the scales above.
① 1 kg 800 g ② 3 kg 300 g

Show the weight using unit

7 Gibson weighs 31.8 kg.
How many kg and g is his weight?
0.1 kg = 100 g
31.8 kg = 31 kg 800 g

How to use the amount of weight and scales

8 Let's measure the weight of different objects using the scale.

Let's estimate the weight first.

Objects measured	Weight expected	Weight measured
Dictionary		
Pencil case		

172 = □ + □

Lesson Flow

1 6 Read the scale in the textbook.

T Introduce the main task.
T Ask students to read the intervals on the scale. “How many unit of interval is represented by the scale?”
S 20 g and 100 g
TN Assist students on how to find a unit scale (Refer to TN)
S Solve activity 1 and 2.

2 7 Read the scale 31.8 kg.

S Convert the scale to kilogram and gram.
T Confirm that 1 kg = 1000 g, so 0.1 kg = 100 g
S Share answers with friends.

3 8 Measure the weight of various objects using scale.

T Allow students to predict the weight before measuring.
TN Predicting the weight improves students’ knowledge and sense of weight.
S Measure the weight and write the result in the table.
S Share the result.
TN If the scale is available then this task can be conducted.

Sample Blackboard Plan

Date:

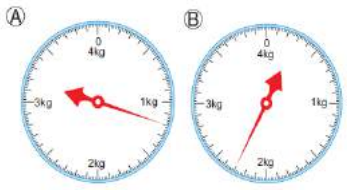
Topic: How to represent weight

Lesson Number: 5 of 7

Main Task : Let’s read and measure weight using a scale.

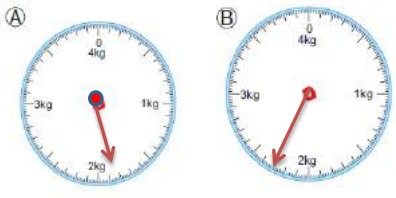
MT

6 Let’s look at the scale below.



1 Read the weights shown on the scale.
A. One kilo and two hundred grams.
B. Two kilo and three hundred grams.

2 Draw an arrow for the following weight on the scales above. 1kg 800 g and 2 kg 300 g



1kg 800 g 2kg 300 g

7 Gibson weighs 31.8 kg How many kg and g is his weight?
0.1 kg = 100 g

31.8 kg = 31 kg 800 g

Answer: 31 kilo and 800 grams.

8 Let’s measure weight of different objects using the scale.

Objects	Estimated Weight.	Weight measured
Dictionary		
Purse		
Pencil case		

Students Ideas
Fill in the Table
Predict first then measure

Summary:
When reading the scale:
Firstly find the unit scale
Then read the scale by intervals.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 6 of 7 (Double Period)

Textbook Page : p.173
Actual Lesson 120

Lesson Objectives

- To predict the weight of objects.
- To choose scale when measuring in terms of lengths, weight and volume. Finding the common relationship compared to other unit of measurements.

Prior Knowledge

- Measurements unit 1 g, 1 kg and 1 t

Preparation

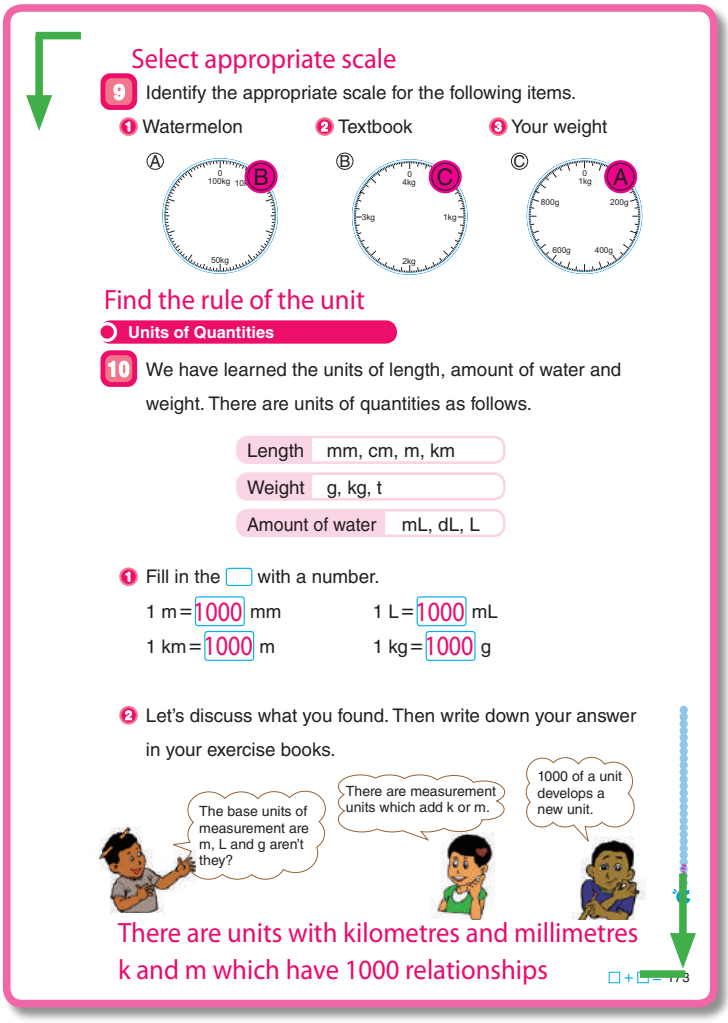
- Scale (If possible)

Assessment

- Differentiate unit of measurements to measure depending on the predicted weight. F
- Think about the relationship in lengths, weight and volume. F
- Understand the relationship in lengths, weight and volume. S

• Teacher's Notes •

There are various types of scales used to measure different weights. For example;
A. Small digital scale measures up to 200 g
B. Kitchen scales measures up to 1 kg.
C. Bathroom scale measures up to 100 kg.



Select appropriate scale

9 Identify the appropriate scale for the following items.

1 Watermelon 2 Textbook 3 Your weight

Ⓐ Ⓑ Ⓒ

Find the rule of the unit

Units of Quantities

10 We have learned the units of length, amount of water and weight. There are units of quantities as follows.

Length	mm, cm, m, km
Weight	g, kg, t
Amount of water	mL, dL, L

1 Fill in the ☐ with a number.

1 m = 1000 mm 1 L = 1000 mL

1 km = 1000 m 1 kg = 1000 g

2 Let's discuss what you found. Then write down your answer in your exercise books.

The base units of measurement are m, L and g aren't they?

There are measurement units which add k or m.

1000 of a unit develops a new unit.

There are units with kilometres and millimetres k and m which have 1000 relationships

Lesson Flow

1 9 Predict the weight of items and choose the scale to measure.

T Introduce main task.
S Choose the appropriate scale to measure the items in the textbook.
T About how many kilograms is the watermelon, a textbook and your weight?
T Which unit of scale can be used for each item?
S Choose appropriate scale for each item.
TN Weights measured differ depending on the type of scale used (Refer to TN)

2 10 Confirm the relationship of weight with other units.

S 1 Solve the activity.
S 2 Notice and discuss the relationship of the units.
T How many metres are there in 1 kilometre?
S 1000 m.
T How many kilograms are there in 1 tonne?
S 1000 kg
T How many millilitres are there in 1 litre?
S 1000 ml
T What do you notice about the units?
S The relationship between the unit is:
- The base units of measurement are m, L, and g
- There are measurement units which add k or m
- 1000 of a unit develops a new unit.

Sample Blackboard Plan

Date: Topic: How to represent weight Lesson Number: 6 of 7

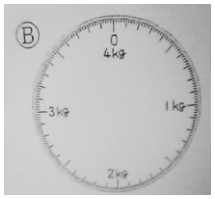
Main Task: Let's identify the correct scale.

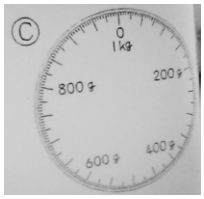
MT

Review:
1. What unit of scale is used to measure a pen? Answer: Gram
2. What unit of scale is used to measure a vehicle?
Answer: tonne

9 Match the items to the scale.

Students Ideas
Discuss their answer





Your weight Watermelon Textbook

10 Let's study the units of quantities.

Length:	mm	cm	m	km
Weight:	g	kg	t	
Amount of water:	mm	dl	L	

1 1 km = 1000m 1 kg = 1000g
1 m = 1000mm 1 L = 1000ml

2

Students Ideas
Discuss their answer

- K (Kilo) , m (metre) are new units develop from 1000.
- m, L and g are the base unit.

Summary:

The weights measured differ depending on types of scale.

Unit 16

Unit: Weight
Sub-unit: 1. How to Represent Weight
Lesson 7 of 7 (Double Period)

Textbook Page : p.174
Actual Lesson 121

Lesson Objectives

- To understand that an object may have the same volume but different weight.
- To understand that the weight remains the same even when the shape of the object changes.

Prior Knowledge

- Relationship in Measurements (Previous lesson)

Preparation

- Weighing scales (If available)
- Block of timber, rubber, iron or aluminum with same size. (Two of these materials can do for the investigation purpose).

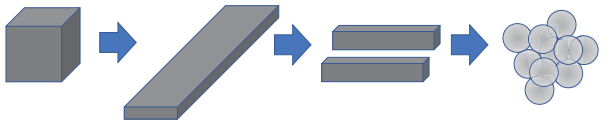
Assessment

- Compare the weight of different material of blocks. F
- Compare the weight changing its shape. F
- Conclude the findings. S

• Teacher's Notes •

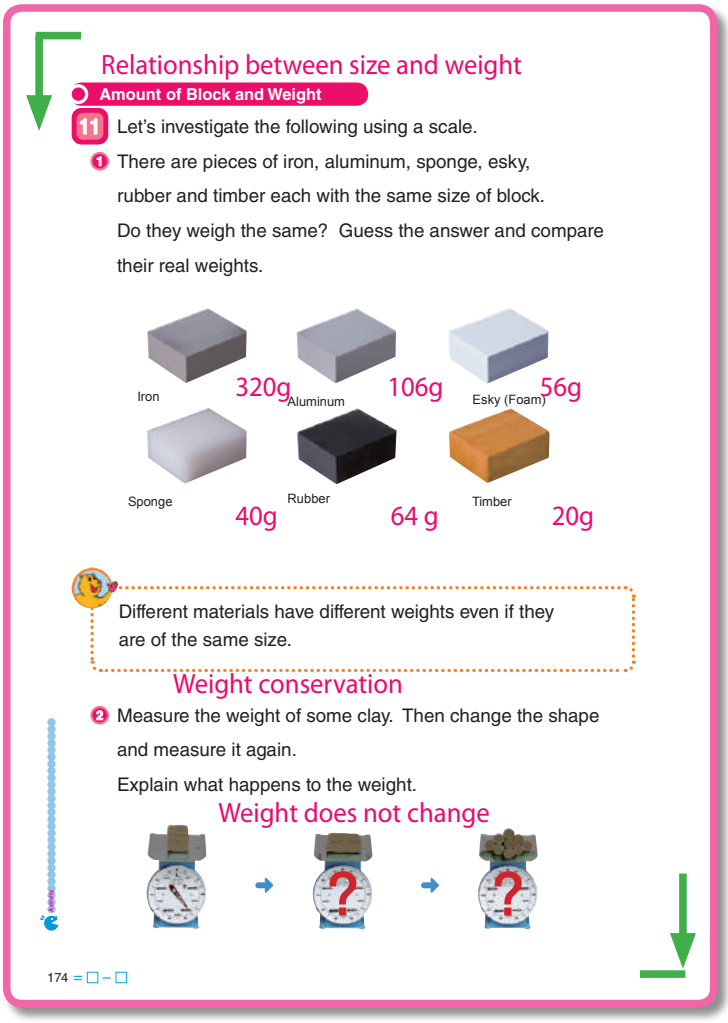
For activity 2 Use the same amount of clay and measure to get the weight.
Change the shape of the clay and weigh. The first shape as flat square shape, the second shape as 2 long solid stripes and the third shape as small round shapes.

Example



400g 400g 400g 400g

Weigh the shapes and let students to observe to discover for themselves the weights they have.
The important point is the shape changes however the **weight does not change**.



Relationship between size and weight

Amount of Block and Weight

11 Let's investigate the following using a scale.

1 There are pieces of iron, aluminum, sponge, esky, rubber and timber each with the same size of block.
Do they weigh the same? Guess the answer and compare their real weights.

Iron 320g
Aluminum 106g
Esky (Foam) 56g
Sponge 40g
Rubber 64 g
Timber 20g

Different materials have different weights even if they are of the same size.

Weight conservation

2 Measure the weight of some clay. Then change the shape and measure it again.
Explain what happens to the weight.

Weight does not change

174 = □ – □

Lesson Flow

1 11 ❶ Investigate the weight of materials with different weight and same volume.

T Introduce the main task.
T Ask the students to observe the pictures of the different materials and discuss the question “Do they have the same weight?”
S Discuss and share their opinion.
T Give weight of the objects to the students to see if they are correct with their answers.
S Understand that weight is different depending on the material even though the volume is the same.
T Explain the summary box.

2 ❷ Compare the weight of clay when changing the shapes.

TN (Refer to TN)
S Predict the weight when shapes are change before weighing it.
S Share their opinions and reasons.
T Weigh the clay after changing its shape.
S Conclude that even when shapes are changed, the weight remains the same.

Sample Blackboard Plan

Date:

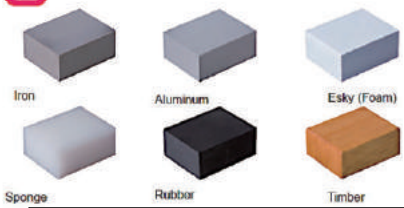
Topic: How to represent weight

Lesson Number: 7 of 7

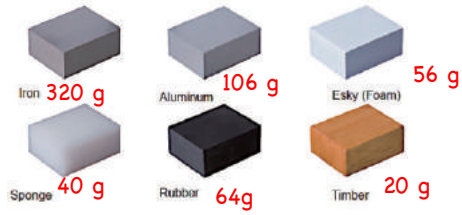
Main Task: Let’s find out the relationship between size and weight.

MT

11 ❶ Do they have the same weight?



Students Ideas. Discuss their answer for ❶



Important Point

❷ Measure the weight of some clay and change the shape and measure it again. What happens to the weight?

Shape of the clay.	Estimated Weight	Weight Weighed.
1. Flat square shape.	420g / 430g	400g
2. 2 rectangle stripe solid shape.	410g / 415g	400g
3. Small round shape.	380g / 390g	400g

Summary:

When the shape of an object changes the weight remains the same.

We may sit, stand or bend knees on scale but our weight will remain the same.

Unit 16

Unit: Weight
Sub-unit: 2. Calculation of Weight
Lesson 1 of 1 (Double Period)

Textbook Page : p.175
Actual Lesson 122

Sub-unit Objectives
- To add and subtract weight considering the situation.

Lesson Objectives
- To add and subtract weight according to the situation.

Prior Knowledge
- Relationship in Measurements.

Preparation
- Refer to the blackboard plan.

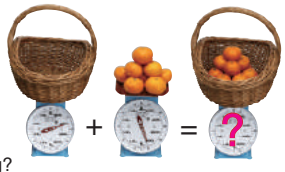
Assessment
- Add and subtract weights. F
- Do the exercise Correctly. S

• Teacher's Notes •
The focus of this lesson is for the students to understand that weight can be added or subtracted depending on different situations. When there are two items put together their weight can be added, when one item is removed from another their weight can be subtracted.

2 Calculation of Weight

Addition of weight

1 There are 900 g of oranges in a basket that weighs 400 g.



(1) What is the total weight in g?

400 g + 900 g = 1300 g

(2) What is the value in kg and g? 1 kg 300g

Subtraction of weight

2 The bag weighs 900 g and the total weight of bag with first aid kits is 3 kg 200 g.
What is the value in kg and g of the first aid kits?

3kg200g − 900g=3200g − 900g = 2300g
A 2300g or 2kg 300g

Exercise

1 Tom weighs 24 kg and George weighs 26 kg. If Tom stands on a scale while carrying George on his back, how many kg will the needle of the scale show?

24kg +26kg=50kg A 50 kg

2 Junior weighs 3200 g at birth and weighs 9100 g on his in 1st birthday. By how many g has the weight increased during the 1 year?

9100g − 3200g = 5900g A. 5900g

Lesson Flow

1 ① Solve the task.

T Introduce the main task.
S ① Make mathematical expression and solve it.
S ② Convert the gram to kilogram.
TN Confirm that 1 kg = 1000 g

2 ② Solve the task.

T Confirm that 'Total weight − Weight of bag = Weight of the content'.
S Make mathematical expression and solve it.
T Adjust the unit for the calculation.

3 Do the exercise.

Sample Blackboard Plan

Date: Topic: Calculation of weight Lesson Number: 1 of 1

Main Task: Let's Calculate Weight.

MT

1 There are 900 g of oranges in a basket that weighs 400 g.

① Total weight

400 + 900 = 1 300

weights bag oranges

Answer: The total weight of the basket and the oranges is 1 300 g.

② What is the value in kg and g?
Answer: 1kg 300 g

2 The bag weighs 900g and the total weight of bag with first aid kit is 3kg 200g. What is the value in kg and g of the bag and the first aid kit?

3 kg 200 g − 900 g

$$\begin{array}{r} 3\ 200 \\ -\ \ 900 \\ \hline 2\ \ 300 \end{array}$$

2 kg 300 g

Answer: The value of the first aid kit is 2 kg 300 g

Summary:

We can add weight and subtract weight.

Exercise:

1. Tom + George = Total weight.
   26 + 24 = 50

Total weight: 50 kg

2. 9 100 − 3 200 = 5 900

Increased weight: 5 900 g

Unit 16

Unit: Weight
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.176
Actual Lesson 123

Lesson Objectives

- To deepen the understanding of things learned already.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheet for the students

Assessment

- Solve the exercises correctly. F S.

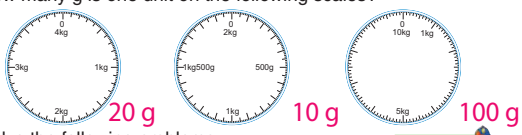
Exercise

1 Solve the following problems. Pages 173,175

① When we add 1 kg of sand and 2 kg of sand, how many kg are there altogether? And how many g are there?
3 kg or 3000 grams

② When we add 2 L of water and 3 L of water, how many L are there altogether? And how many kg are there? 5 L and 5 kg

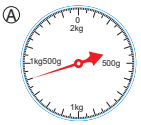
2 How many g is one unit on the following scales? Page 173



20 g 10 g 100 g

3 Solve the following problems. Page 172

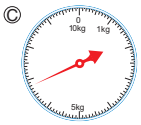
① How many g and kg does each of the following scales Ⓐ ~ Ⓒ show? How many kg are there?

Ⓐ 

1 kg 400 g
1400 g

Ⓑ

2 kg 700 g
2700 g

Ⓒ 

6 kg 800 g
6800 g

② On the number line, mark ↓ where Ⓐ, Ⓑ and Ⓒ are.

Let's calculate. Grade 3 Do you remember?

① 84×65 5460 ② 56×90 5040 ③ 457×42 19194 ④ 209×70 14630

176 = □ + □

Weight	Name:	Score

1. Fill in the blanks. (5 points×6)

① 1 kg = 1000 g ② 1 t = 1000 kg ③ 3000 g = 3 kg

④ 5000 kg = 5 t ⑤ 3 t = 3000 kg ⑥ 10 kg = 100000 g

2. Read the scale. (5 points ×2)

540 g

410 g

3. Fill in the missing units (5 points×2)

① Vavi's weight : 28 kg

② Weight of a heavy truck : 10 t

4. Calculate. (5 points×6)

① 500 g + 400 g = 900 g ② 1kg800g + 200 g = 2 kg ③ 1kg 800g + 300g = 2 kg 100 g

④ 700 g - 200 g = 500 g ⑤ 1kg − 600g = 400 g ⑥ 1kg200g − 500g = 700 g

5. A 200 g pencil case was placed into a bag and the weight was measured at 1kg 500g. What is the weight of the bag alone? (10 points×2)

Mathematical sentence: 1 kg 500 g − 200 g = 1 kg 300 g Answer: 1 kg 300 g

Lesson Flow

1 ① Confirm the relationship among unit.

S ① Confirm that 1 kg is equal to 1000 g.
S ② 1 L of water is equal to 1 kg.

2 ② Confirm one unit of each scale.

S Think of one unit of each scale considering certain units is divided by how many unit.

3 ③ Confirm how to read a scale.

TN Let students notice that each scale has a different unit.
S Confirm that 1000 g is equal to 1 kg.

End of Chapter Test: Chapter 16 **Date:**

Weight	Name:	Score

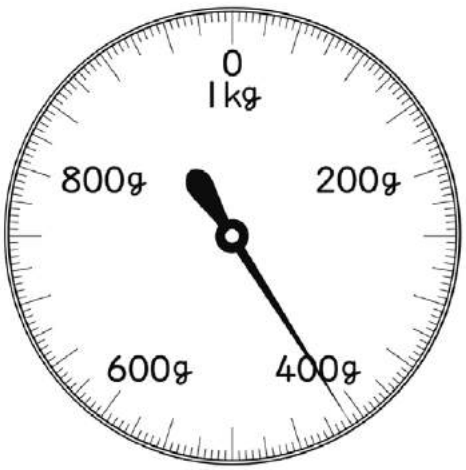
1. Fill in the blanks. (5 points × 6)

① 1 kg = _____ g ② 1 t = _____ kg ③ 3000 g = _____ kg

④ 5000 kg = _____ t ⑤ 3 t = _____ kg ⑥ 10 kg = _____ g

2. Read the scale. (5 points ×2)

_____ g



_____ g

3. Fill in the missing units (5 points × 2)

① Vavi's weight : 28 _____

② Weight of a heavy truck : 10 _____

4. Calculate. (5 points × 6)

① 500 g + 400 g ② 1kg800g + 200 g ③ 1kg 800g + 300g

④ 700 g - 200 g ⑤ 1kg − 600g ⑥ 1kg200g - 500g

5. A 200 g pencil case was placed into a bag and the weight was measured at 1kg 500g. What is the weight of the bag alone? (10 points × 2)

Mathematical sentence: _____ Answer: _____

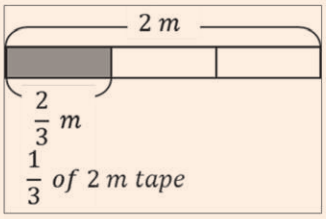
Chapter 17 Fractions

1. Unit Objectives

- To understand, explain and represent the meaning of fractions using the idea of unit fraction. (3.1.7a)
- Use fraction to show remaining part or one part of a whole. (3.1.7b)
- To know that fraction consists of sum of unit fraction and explain the structure of fraction in size and relationship. (3.1.7b)
- To calculate addition and subtraction of fractions. (3.1.8 a, b, c and d)
- To represent 0.1 or 1/10 on the number line. (3.1.7c)

2. Teaching Overview

There may be some confusions of teaching and learning fractions for both teachers and students. One of the common confusions is the confusion between fractions as quantities and ratio to whole part (see the diagram). Therefore, it is advisable for students to discuss a lot about the meaning of fractions with diagrams such as number lines, diagrams of liquid in containers, or tape diagrams so that they will help students to understand addition or size of fractions and the meanings.



Fractions : Fractions are introduced as "odd sum" for students to start thinking about the necessity of expressing and comparing the amounts. Fractions are made of a number of unit fractions such that $\frac{3}{4}$ are made up with 3 of $\frac{1}{4}$. Note that they should understand that a unit fraction is a part of whole divided into equal portions. This is why 4 of $\frac{1}{4}$ do not make 1.

The Structure of Fractions : Students should understand sizes of fractions in relation to number lines. This will be the foundation of understanding the relationship among whole numbers, fractions and decimals.

Addition and Subtraction of Fractions : Note that teachers should avoid imparting how to calculate only, but students should understand why they add or subtract numerators only with the same denominators. Students should be encouraged to explain by themselves by drawing diagrams and explain verbally.

3. Related Learning Contents

Second grade

- Simple fractions such as 1/2 and 1/4

[Fractions]

Third grade

- Meaning of fractions and how to express them
- Comparison of the sizes of fractions
- Addition and subtraction of simple fractions

[17 Fractions]

Fourth grade

- Meaning of decimal numbers and how to express them
- The structure of decimal numbers and its sizes
- Expression using a single unit
- Addition and subtraction of decimal numbers

[Decimal numbers]

- Proper fractions, mixed numbers, improper fractions
- Sizes of fractions
- Addition and subtraction of fractions with same denominators (including mixed numbers)

[Fractions]

Unit 17

Unit: Fractions
Sub-unit: 1. Fractions
Lesson 1 of 3 (Double Period)

Textbook Page : p.177~p.178
Actual Lesson 124

Sub-unit Objectives

- To think about how to express the remaining part and show it using the unit fraction idea.
- To understand the remaining part can be expressed using unit fraction.
- To understand the terms numerator and the denominator in fraction.

Lesson Objectives

- To identify how to represent the given quantities in fractions.
- To represent the size of objects less than 1 and the remaining part.
- To show representation of meaning of unit fraction.

Prior Knowledge

- Learned representing parts of whole fractions in the fractions $\frac{1}{2}$ and $\frac{1}{4}$. (Elementary)

Preparation

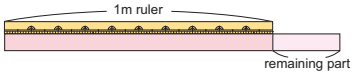
- 1 m tape or ruler, 1 m paper strip, A paper strip equivalent to the height of the board, markers, Scissors.

Assessment

- Think about ways on how to express a remaining part. F
- Appreciate and participate actively in measuring the sizes less than 1 using unit fractions. F
- Explain ways of measuring sizes of objects less than 1 metre using the idea of unit fraction. S
- Do the exercises correctly. S

17 Fractions

There is a 1 m tape. Let's measure the lengths of different objects by using the 1 m tape.
The length is 1 m and a remaining part. How can we represent the remaining part in metres?

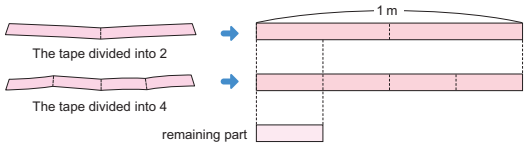


The length of the remaining part is less than 1 m, isn't it?

1 Fractions

How to represent the remaining part

1 Divide a 1 m tape into 2 and 4 equal parts respectively.



Let's compare the lengths of the divided parts respectively with the length of the remaining part.

Let's think about how to represent the given quantities in fractions.

The length of remaining part is equal to one part that is made by dividing 1 m into 4 equal parts.

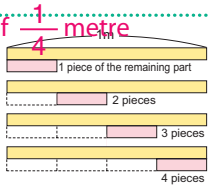
We learned that one part of a thing that is divided into 4 equal parts is expressed as $\frac{1}{4}$ of a thing in grade 2.

The length of one part made by dividing 1 m into 4 equal parts is called "one fourth of a metre" or "one quarter metre" and is written as $\frac{1}{4}$ m.

$\frac{1}{4}$ ③ ① ②

The meaning of 2 pieces of $\frac{1}{4}$ metre

2 How many pieces of the remaining part are equal to 1 m?

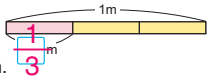


4 pieces of the length of the remaining part are equal to 1 m. The length of one part is obtained by dividing 1 m into 4 equal parts. The length of the remaining part is $\frac{1}{4}$ m.

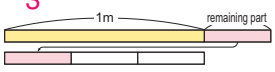
Exercise

How many metres are there?

① The length of one part is made by dividing 1 m into 3 equal parts is $\frac{1}{3}$ m.



② The length of the remaining part for which 3 pieces are equal to 1 m is $\frac{1}{3}$ m.



③ The length of one part that is made by dividing 1 m into 5 equal parts is $\frac{1}{5}$ m.

④ The length of the remaining part for which 2 pieces are equal to 1 m is $\frac{1}{5}$ m.

□ × □ = 177 178 = □ − □

Lesson Flow

1 Measure the left height of the black board with 1 m strip of paper.

T Ask the students to work in groups to measure the left height of the black board.

S Measure the height with a metre strip paper and try to think of how to represent the remaining part.

TN Purpose of this exercise is that students realise that there is a remaining part.

2 1 Divide 1 m tape into 2 and 4 equal parts respectively.

S Compare the length of each divided part to the remaining part and make connections using the unit fraction idea to determine the length of the remaining part.

TN Confirm the idea by letting the children divide a 1m tape into 2 and 4 parts equally.

S 1 part of 4 parts is equal to the remaining part, so the remaning part can be represented $\frac{1}{4}$ m

TN Confirm the answer and express it in words and also in figures. (eg. $\frac{1}{4}$ is one fourth metre.)

T Read and explain the important point to the class

T Introduce the main task.

3 2 Representation of how many pieces of the remaining part is equal to the length of 1m.

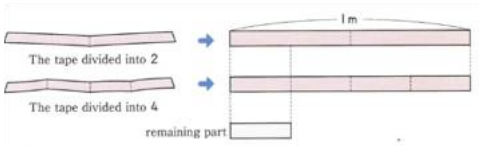
S Find out the number of pieces of the remaining part that make 1 m using the paper strip.

T Confirm the students answer.

4 Do the exercise.

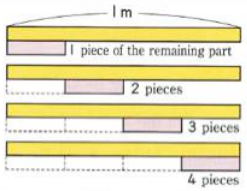
S Complete the exercises and summarise what they learned.

• Teacher's Notes •



The remaining part does not fit exactly into the tape that is divided into 2 equal parts. It fits exactly into the tape that is divided into 4 equal parts.

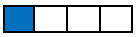
The length of the remaining part is $\frac{1}{4}$ m. $\frac{1}{4}$m is the fraction unit for the whole of $\frac{4}{4}$m.

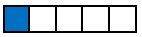


Four pieces of the remaining parts is equal to the length of 1 m.

The fraction unit for the whole of 2/2m is 1/2m.

The fraction unit for the whole of 3/3m is 1/3m.


The fraction unit for the whole of 4/4m is 1/4m.

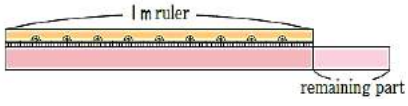

The fraction unit for the whole of 5/5m is 1/5m.

Sample Blackboard Plan

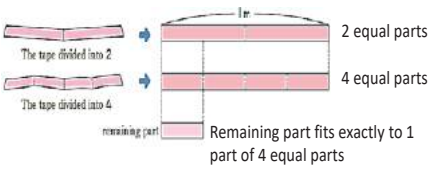
Date: Chapter: Fractions Sub-chapter/Topic: Fractions Lesson: 1 of 3

Task: Let's think about how to represent quantities as fractions.

Height of the Blackboard



1 Let's divide a 1m tape into 2 and 4 equal parts.



2 equal parts

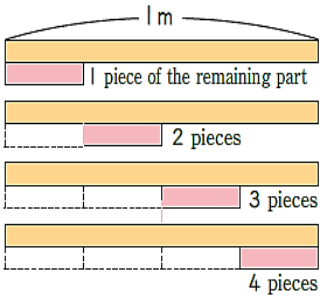
4 equal parts

Remaining part fits exactly to 1 part of 4 equal parts

MT

The length of one part made by dividing 1m into 4 equal parts is called "one fourth of a meter" or "one quarter meter" and is written as $\frac{1}{4}$ m.

2



4 pieces of the length of the remaining part are equal to 1m. The length of 1 part is obtained by dividing 1m into 4 equal parts. The length of the remaining part is $\frac{1}{4}$

The fraction unit of $\frac{4}{4}$m is $\frac{1}{4}$m

Exercise

(Refer to TM for Questions and Answers)

Summary

Unit 17

Unit: Fractions
Sub-unit: 1. Fractions
Lesson 2 of 3 (Single Period)

Textbook Page : p.179~p.180
Actual Lesson 125

Lesson Objectives

- To identify and undersand how fractions are represented.

Prior Knowledge

- How to represent remaining part using fraction. (Previous lesson)

Preparation

- Beaker, colour strips, ruler, markers

Assessment

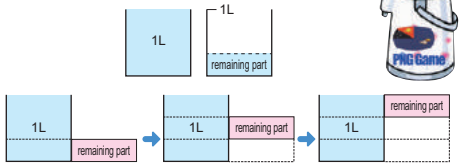
- Undersand how fractions are represented. F S
- Use the idea of unit fraction to identify and locate fractions. F

• Teacher's Notes •

Use other clear containers if there is no beaker. Make sure the container is transparent, divided equally into 3 parts and labelled in thirds.

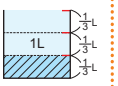
Expression of volume by fraction

3 The amount of water in the thermos bottle is 1 L and more.
How much more in L?



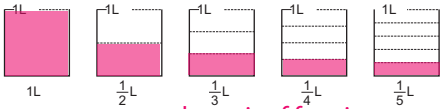
3 remaining parts make 1 L.

The amount for which 3 remaining parts are equal to 1 L is equal to the amount of one part. The amount is obtained by dividing 1 L into 3 equal parts. The amount is $\frac{1}{3}$ L.



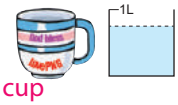
The size of the unit fraction

4 Colour in the portion of the amounts.

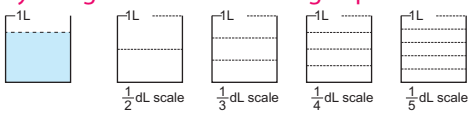


How to represent the unit of fraction

5 How many dL is the amount of water in the cup? Which measuring cup should we use to find?

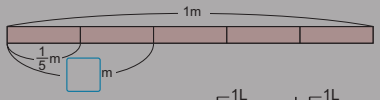


$\frac{4}{5}$ dL by using the third measuring cup

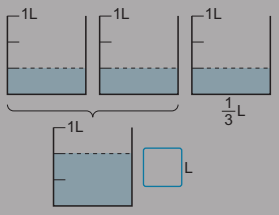


The amount of 3 sets of $\frac{1}{4}$ dL is called "three fourth of a decilitre" and is written as "$\frac{3}{4}$ dL."

6 When a 1 m tape is divided into 5 equal parts, how many metres are the length of 2 parts?



7 When a 1 L of milk is divided among 3 children equally, how many litres are there for 2 children?



Numbers such as $\frac{1}{3}$, $\frac{3}{4}$ and $\frac{2}{5}$ are called fractions. **The number below the bar** is called **denominator** and **the number above the bar** is called **numerator**.

$\frac{3}{4}$ ···numerator
···denominator

The denominator represents the number of equal parts of the original quantities, such as 1 m and 1 L, and the numerator represents the number of the collected parts.

□ + □ = 179　　180 = □ × □

Lesson Flow

1 **Review the previous lesson.**

2 **3** **Discuss and find how many more L is equal to 1L of water in the thermos bottle.**

T How much of the remaining parts are equal to 1L?
S Discuss the question and share their ideas.
T Confirm their ideas by referring to the text book and explain the important point in the [ ]
T Introduce the main task.

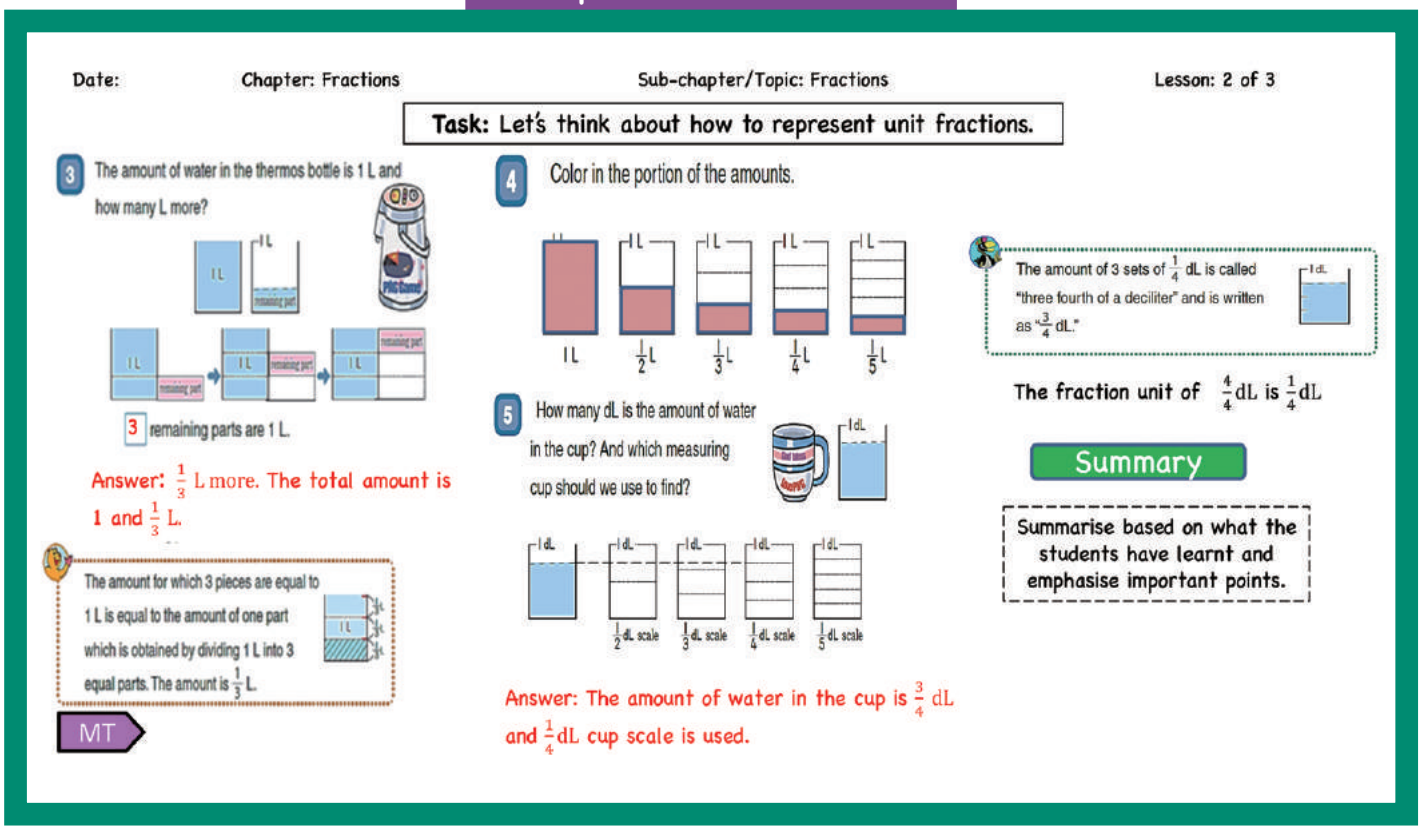
3 **4** **Colour in the portion of the amounts.**

T Explain to the student that the amount of portion will be coloured is the size of the unit fraction in Litres.
S Use the prior knowledge of the unit fraction in meters to colour the portion of the size of the unit fraction in Litres.

4 **5** **How to represent the unit of fraction.**

T Ask students to read question **5** to express their ideas and opinions.
S Answer the question and share their ideas and opinions to their friends.
T Confirms the students' ideas and opinions by using a ruler and place it horizontally from the 1dL shaded in blue right across to $\frac{1}{2}$ dL scale to $\frac{1}{5}$ dL. Draw a light line across to see which unit fraction aligns or fits exactly. Then it becomes the measuring cup.
S Identify $\frac{1}{4}$ dL is the measuring cup to be used as confirmed by the teacher.
T Read the important point in the [ ] with explanation.

Sample Blackboard Plan



Unit 17

Unit: Fractions
Sub-unit: 1. Fractions
Lesson 3 of 3 (Single Periods)

Textbook Page : p.180-p.181
Actual Lesson 126

Lesson Objectives

- To define and identify the position of the numerator and the denominator.
- To express how many times of the unit faction in length.

Prior Knowledge

- Concept of unit fraction (Previous lesson)

Preparation

- Charts and diagrams

Assessment

- Identify and locate denominator and numerator. F
- Do the exercise correctly. S

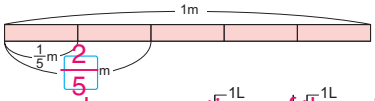
• Teacher's Notes •

- Use other clear containers if there is no beaker. Make sure the container is transparent, divided equally into 3 parts and labelled in thirds.

The amount of 3 sets of $\frac{1}{4}$ dL is called "three fourth of a decilitre" and is written as "$\frac{3}{4}$ dL."

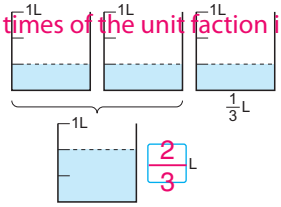
6 When a 1 m tape is divided into 5 equal parts, how many metres are the length of 2 parts?

To express how many times of the unit faction in length



7 When a 1 L of milk is divided among 3 children equally, how many litres are there for 2 children?

To express how many times of the unit faction in volume



Numbers such as $\frac{1}{3}$, $\frac{3}{4}$ and $\frac{2}{5}$ are called fractions. **The number below the bar** is called **denominator** and **the number above the bar** is called **numerator**.

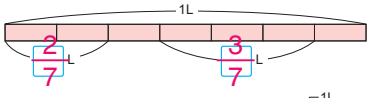
$\frac{3}{4}$ ···numerator
···denominator

The denominator represents the number of equal parts of the original quantities, such as 1 m and 1 L, and the numerator represents the number of the collected parts.

180 = □ × □

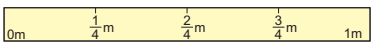
Exercise

1 Let's represent fractions.



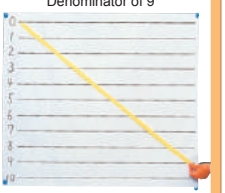
2 Let's colour in the portion of $\frac{4}{5}$ dL.

Measuring Different Things Using Fractions



① Let's make a ruler to measure fractions by dividing a 1 m tape into equal sections. Make a ruler to measure fractions with denominators of 3, 5, 6, 7, 9 and 10 and then measure the lengths of different objects.

How to Make a Ruler with Denominator of 9



② Let's make a 1 L measuring cup to measure fractions by constructing a scale of fractions.

How to Construct a Fraction Scale of Which the Denominator Is 7

□ + □ = 181

Lesson Flow

1 Review of previous lesson.

T Introduce the main task.

2 6 Express how many times of the unit fraction in length.

S Express how many metres in 1 m tape is being divided into 5 equal parts when the length is 2 parts in unit fraction.

3 7 Express how many times of the unit fraction in volume.

S Express how many litres are there for 2 children when 1 L of milk is divided among 3 children in unit fraction.

T Explain to the students what a numerator and a denominator is in the main important points in [ ] and [ ].

4 Complete the exercise.

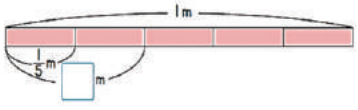
Sample Blackboard Plan

Date: Chapter: Fractions Sub-chapter/Topic: Fractions Lesson: 3 of 3

Task: Let's express fractions in length and volume.

MT

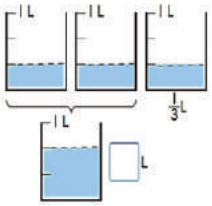
6 When a 1 m tape is divided into 5 equal parts, how many meters are the length of 2 parts?



Amount is 1 and 1/3 L

Answer: 2/5 m

7 When a 1 L of milk is divided among 3 children equally, how many liters are there for 2 children?



Numbers such as $\frac{1}{3}$, $\frac{3}{4}$ and $\frac{2}{5}$ are called fractions. The number below the bar is called denominator and the number above the bar is called numerator.

$\frac{3}{4}$ ...numerator ...denominator

The denominator represents the number of equal parts of the original quantities, such as 1 m and 1 L, and the numerator represents the number of the collected parts.

Exercise

(Refer to TM for Question and Answers)

Summary

Summarise based on what the students have learnt and emphasise important points.

Unit 17

Unit: Fractions
Sub-unit: 2. Structure of Fractions
Lesson 1 of 1 (Double Period)

Textbook Page : p.182
Actual Lesson 127

Sub-unit Objectives

- To understand the structures of the fractions based on the unit fractions.
- To understand the relationship between fractions and decimals.

Lesson Objectives

- To understand the structure of fraction based on unit fraction.
- To compare the size of the fractions.

Prior Knowledge

- Colour the size of the fraction unit with the given portion.
- The sets of fraction unit.
- Definition and position of the words numerator and denominator with fraction examples.

Preparation

- Refer to the blackboard plan.

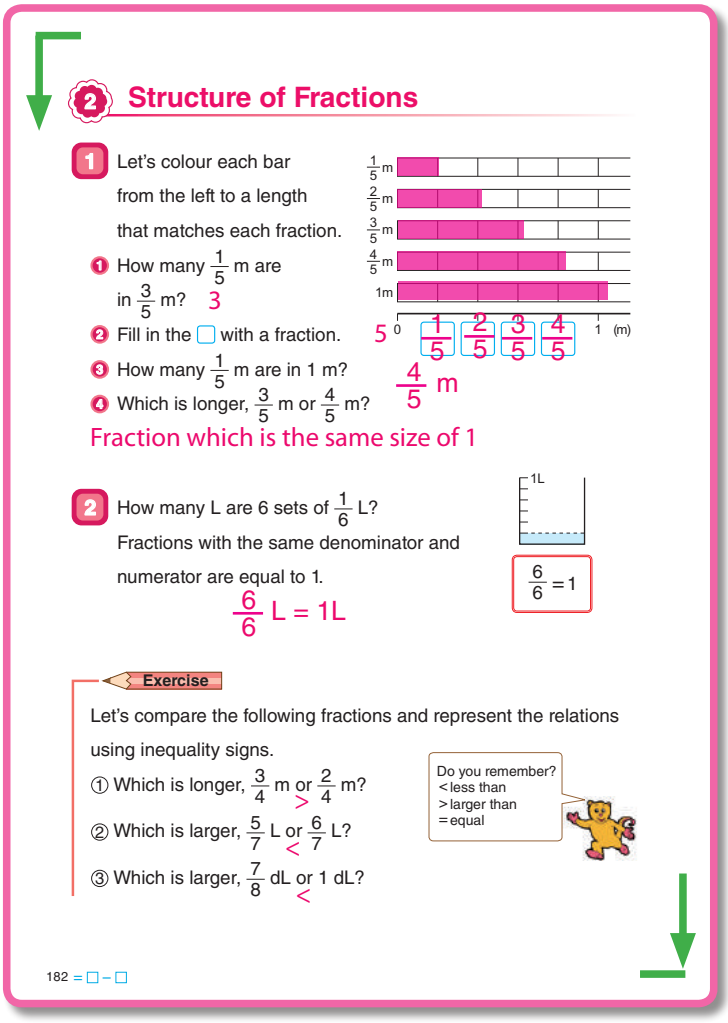
Assessment

- Know how to compare and find relationship among fractions with same denominators. F
- Be eager to compare and find relationship among fractions with the same denominator. F
- Compare and find relationship with fractions less than 1 using unit idea. F
- Do the exercises correctly. S

• Teacher's Notes •

Fractions whose numerators are 1, such as $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$ are unit fractions. Fractions can be thought of as multiples of the unit fractions. For example, $\frac{2}{3}$ is twice the size of $\frac{1}{3}$ and smaller than 1.

3 times the unit fraction of $\frac{1}{3}$ is $\frac{3}{3}$ which is also equal 1.



2 Structure of Fractions

1 Let's colour each bar from the left to a length that matches each fraction.

① How many $\frac{1}{5}$ m are in $\frac{3}{5}$ m? 3

② Fill in the □ with a fraction. $\frac{4}{5}$ m

③ How many $\frac{1}{5}$ m are in 1 m? 5

④ Which is longer, $\frac{3}{5}$ m or $\frac{4}{5}$ m?

Fraction which is the same size of 1

2 How many L are 6 sets of $\frac{1}{6}$ L?

Fractions with the same denominator and numerator are equal to 1.

$\frac{6}{6}$ L = 1L

$\frac{6}{6} = 1$

Exercise

Let's compare the following fractions and represent the relations using inequality signs.

① Which is longer, $\frac{3}{4}$ m or $\frac{2}{4}$ m? >

② Which is larger, $\frac{5}{7}$ L or $\frac{6}{7}$ L? <

③ Which is larger, $\frac{7}{8}$ dL or 1 dL? <

Do you remember?
< less than
> larger than
= equal

182 = □ − □

Lesson Flow

1 ① Use the diagram to colour the given lengths that matches each fraction.

T Ask the students to use the diagram to show given lengths by colouring each fraction. Advice the students to colour only and not to write or fill in the ☐ at the bottom of the diagram.
S Colour the given lengths in fraction using the diagram.
T Introduce the main task.

2 ① Read and write the answers.

TN ① ② ③ Explain to the students that idea of unit fraction is used.
④ Comparison of the size of the fraction

3 ② Fraction which is the same size of 1.

T How many litres are coloured?
S $\frac{1}{6}$ L
T What is the unit fraction?
S $\frac{1}{6}$ L
S Use the diagram to explain their ideas or answers to the question" How many L are 6 sets of $\frac{1}{6}$ L?
T Confirm the students' ideas and answers by giving the explanation: Fractions whose numerators and denominators are the same are equal to 1.

4 Do the exercise.

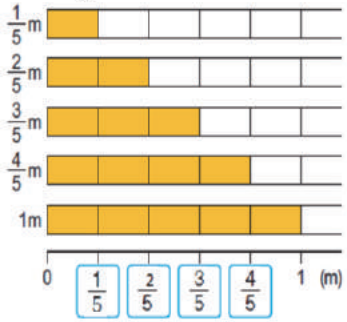
TN Refer to TN

Sample Blackboard Plan

Date: Chapter: Fractions Sub-chapter/Topic: Structure of Fractions Lesson: 1 of 1

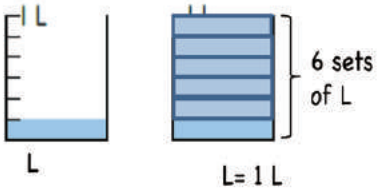
Task: Let's compare fractions and represent them.

1 Colour each bar from the left to a length that matches each fraction.



MT
① How many $\frac{1}{5}$ m are in $\frac{3}{5}$ m ? Answer: 3
② Fill the ☐ with a fraction.
③ How many $\frac{1}{5}$ m are in 1 m? Answer: 5
④ Which is longer, $\frac{3}{5}$ m or $\frac{4}{5}$ m ? $\frac{4}{5}$

2 How many L are 6 sets of $\frac{1}{6}$ L?



Answer: 1 L

Fractions with the same denominator and numerator are equal to 1.

$\frac{6}{6} = 1$

Exercise

Let's compare the following fractions and represent the relations using inequality signs.
① Which is longer, $\frac{3}{4}$ m or $\frac{2}{4}$ m?
② Which is larger, $\frac{5}{7}$ L or $\frac{6}{7}$ L?
③ Which is larger, $\frac{7}{8}$ dL or 1 dL?

(1) $\frac{3}{4} > \frac{2}{4}$
(2) $\frac{5}{7} < \frac{6}{7}$
(3) $1 = \frac{8}{8}$ $\frac{7}{8} < \frac{8}{8}$

Summary

When comparing fractions with the same denominator. Compare the numerator, the Faction with the large number is greater or more.

Unit 17

Unit: Fractions
Sub-unit: 3. Addition and Subtraction of Fractions
Lesson 1 of 1 (Single Period)

Textbook Page : p.183
Actual Lesson 128

Sub-unit Objectives

- To understand simple calculation of addition and subtraction of proper fractions (less than 1) with the same denominators.

Lesson Objectives

- To explain addition and subtraction of fractions using the idea of unit fraction.
- To calculate simple addition and subtraction of fractions with the same denominator.

Prior Knowledge

- The size and the unit of fraction by colouring the portion of the given fractions.
- How to represent the fraction unit. Eg. 2 sets of $\frac{1}{5}$ L is $\frac{1}{5}$ L.
- The structure of fraction.

Preparation

- Diagrams of 1 and 2

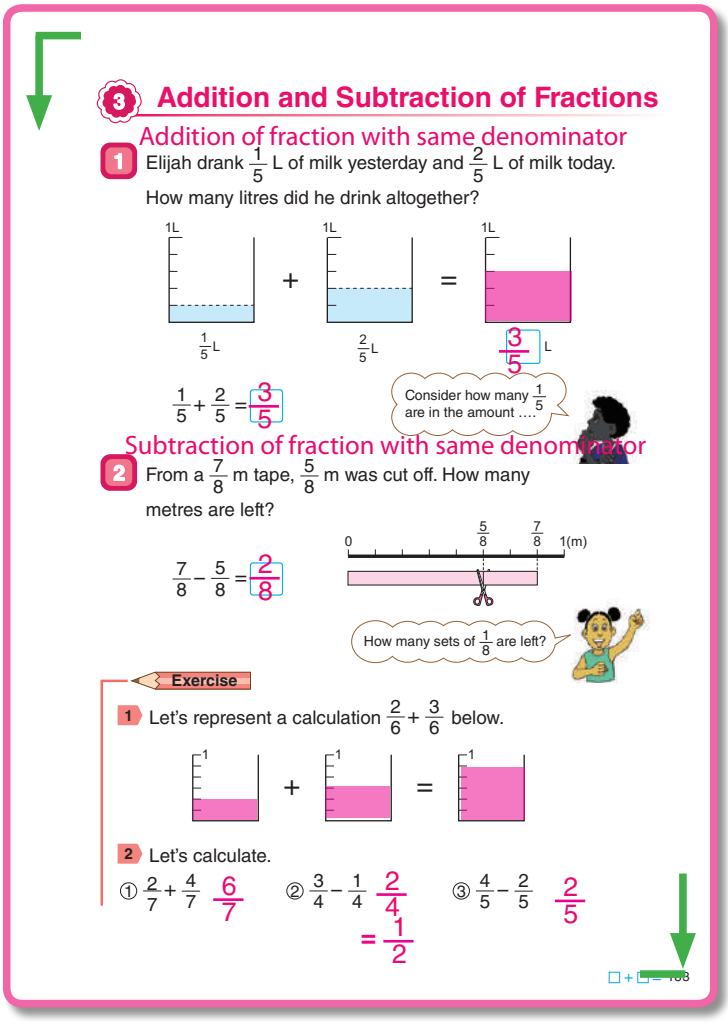
Assessment

- Add and subtract simple fractions whose denominators are same. F
- Do the exercises correctly. S

• Teacher's Notes •

Pose following questions to confirm important point.

1. What is observed or noticed from the denominators in addition and subtraction of the fractions?
2. What is done with the **numerators** in **addition** of fraction when the denominators are same?
3. What is done with the numerators in subtraction of fraction when the denominators are same?
4. In addition and subtraction of fractions when the denominators are same keep the denominator and add or subtract the numerators.



3 Addition and Subtraction of Fractions

Addition of fraction with same denominator

1 Elijah drank $\frac{1}{5}$ L of milk yesterday and $\frac{2}{5}$ L of milk today.
How many litres did he drink altogether?

1L 1L 1L
+ =
$\frac{1}{5}$L $\frac{2}{5}$L $\frac{3}{5}$ L

$\frac{1}{5}+\frac{2}{5}=\frac{3}{5}$

Consider how many $\frac{1}{5}$ are in the amount ....

Subtraction of fraction with same denominator

2 From a $\frac{7}{8}$ m tape, $\frac{5}{8}$ m was cut off. How many metres are left?

$\frac{7}{8}-\frac{5}{8}=\frac{2}{8}$

0 $\frac{5}{8}$ $\frac{7}{8}$ 1(m)

How many sets of $\frac{1}{8}$ are left?

Exercise

1 Let's represent a calculation $\frac{2}{6}+\frac{3}{6}$ below.

1 1 1
+ =

2 Let's calculate.

① $\frac{2}{7}+\frac{4}{7}$ $\frac{6}{7}$ ② $\frac{3}{4}-\frac{1}{4}$ $\frac{2}{4}=\frac{1}{2}$ ③ $\frac{4}{5}-\frac{2}{5}$ $\frac{2}{5}$

Lesson Flow

1 ① Read and understand the addition problem.

T Ask the students to observe the diagram and solve the mathematical expression.
S Explain the situation using diagram.
S Colour the answer and fill in the box.
TN Students realise that when adding fractions with the same denominators, add the numerators and keep the denominators.
T Introduce the main task.

2 ② Read and understand the subtraction problem.

T Ask the students to observe the diagram and solve the mathematical expression.
S Explain the situation using diagram.
S Find the answer and fill in the box.
TN Students realise that when subtracting fractions with same denominators, subtract the numerators and keep the denominators.

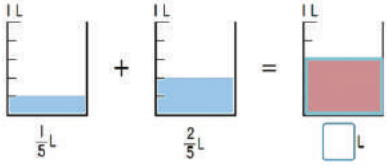
3 Do the exercise.

Sample Blackboard Plan

Date: Chapter: Fractions Sub-chapter/Topic: Addition and Subtraction of Fractions Lesson: 1 of 1

Task: Let's think about adding and subtracting fractions.

1 Elijah drank $\frac{1}{5}$ L of milk yesterday and $\frac{2}{5}$ L of milk today. How many liters did he drink altogether?



How many are in the amount?

1/5 + 2/5 = 3/5

1/5 is 1 set of 1/5
2/5 is 2 sets of 1/5
1 + 2 is 3
3 sets of 1/5 is 3/5

MT

2 From a $\frac{7}{8}$ m tape, $\frac{5}{8}$ m was cut off. How many meters are left.

7/8 - 5/8 = 2/8

7/8 is 7 sets of 1/8
5/8 is 5 sets of 1/8
7 - 5 is 2
2 sets of 1/8 is 2/8
Which is 1/4 by dividing numerator and denominator with 2

Exercise

(Refer to TM for Question and Answers)

Summary

When the denominators are same in the addition and subtraction of fractions keep the denominators and add or subtract the numerators.

Unit 17

Unit: Fractions
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.184~p.185
Actual Lesson 129

Lesson Objectives

- To deepen the understanding of what they learned in this unit.

Prior Knowledge

- Whole contents of the unit.

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.

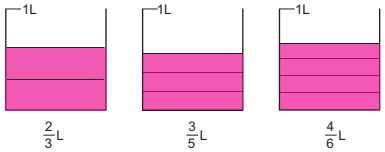
Exercise

1 Fill in the ☐ with a number. Page 182

① $\frac{3}{5}$ dL is [3] sets of $\frac{1}{5}$ dL. ② [$\frac{5}{6}$] m is 5 sets of $\frac{1}{6}$ m.

③ [3] sets of $\frac{1}{8}$ L is $\frac{3}{8}$ L. ④ 5 sets of $\frac{1}{5}$ cm is [1] cm.

2 Let's colour the portion for the following numbers. Pages 179 ~ 181



3 Which is bigger? Fill in the ☐ with inequality signs. Page 182

① $\frac{2}{3}$ [>] $\frac{1}{3}$ ② $\frac{5}{8}$ [<] $\frac{7}{8}$ ③ 1 [>] $\frac{3}{4}$

4 Let's calculate. Page 183

① $\frac{1}{4}+\frac{3}{4}$ 1 ② $\frac{2}{8}+\frac{4}{8}$ $\frac{6}{8}$ ③ $\frac{5}{6}-\frac{4}{6}$ $\frac{1}{6}$ ④ $1-\frac{1}{3}$ $\frac{2}{3}$

Let's calculate. Grade 3 Do you remember?

① 24÷6 4 ② 35÷7 5 ③ 9÷1 9 ④ 0÷7 0

⑤ 12÷5 2 r 2 ⑥ 40÷9 4 r 4 ⑦ 31÷4 7 r 3 ⑧ 66÷8 8 r 2

Problems

1 A 1 m tape was divided into 6 equal parts, and we took 4 pieces of those parts. Let's represent the section that was taken by fractions.
● Understanding means of fractions. $\frac{4}{6}$ $\frac{2}{3}$

2 Fill in the ☐ with a number.
● Understanding the system of fractions.

① 3 sets of $\frac{1}{4}$ m is [$\frac{3}{4}$] m. ② [4] sets of $\frac{1}{7}$ L is $\frac{4}{7}$ L.

③ 4 sets of [$\frac{1}{10}$] m is $\frac{4}{10}$ m. ④ [4] sets of $\frac{1}{4}$ dL is 1dL.

3 Let's make an expression of the answer $\frac{7}{8}$ by filling in the ☐ with number.
● Understanding the addition of fractions.

[$\frac{5}{8}$] + [$\frac{2}{8}$] = $\frac{7}{8}$

4 There are 5 cards from 1 to 5 as shown below.
Let's make fractions with the denominator 5 using these cards as numerator.
● Understanding the size and the structure of fractions.

[1] [2] [3] [4] [5] $\frac{\square}{5}$

① Make a fraction for which 3 sets are equal to $\frac{3}{5}$. $\frac{1}{5}$

② Make a fraction that is equal to 1. $\frac{5}{5}$

③ Make fractions that are smaller than $\frac{4}{5}$. $\frac{3}{5}$, $\frac{2}{5}$, $\frac{1}{5}$

④ Make fractions that are larger than $\frac{3}{5}$ and smaller than 1. $\frac{4}{5}$

184 = ☐ − ☐ ☐ × ☐ = 185

Lesson Flow

1 ① **Understand the structure of the fraction.**

2 ② **Colour the portion with the numbers.**

TN Confirm the meaning of denominator and numerator before colouring.

3 ③ **Compare the fractions using inequality signs.**

TN Let students compare considering each pair of fraction.

4 ④ **Calculate addition and subtraction of fractions.**

TN Not only confirming the answer but the meaning of calculation by drawing picture.

5 ① **Understand the meaning of fraction.**

TN Let students draw a tape diagram to understand the meaning.

6 ② **Understand the structure of fraction.**

TN Assist students who do not understand by drawing figure or number line.

7 ③ **Understand the structure of addition and subtraction of fraction.**

TN Let students understand that in addition of fractions when the denominators are same keep the denominator and add the numerators.

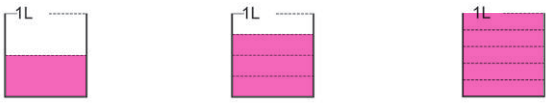
8 ④ **Understand the size and structure of fraction.**

TN Let students explain the reason in each question using tape diagaram.

Fractions	Name:	Score

1. Colour in the portion of the amounts. (5 points×3)

① $\frac{1}{2}$ L ② $\frac{3}{4}$ L ③ 1 L



2. Fill the blanks with a number. (5 points ×4)

① $\frac{3}{5}$ L is 3 sets of $\frac{1}{5}$ L. ② 4 sets of $\frac{1}{4}$ cm is 1 cm.

③ 3 sets of $\frac{1}{8}$ L is $\frac{3}{8}$ L. ④ $\frac{3}{7}$ m is 3 sets of $\frac{1}{7}$ m.

3. Which is bigger? Fill in the blanks with inequality signs. (5points ×3)

① $\frac{3}{5} > \frac{1}{5}$ ② $\frac{2}{6} < \frac{3}{6}$ ③ $1 > \frac{1}{3}$

4. Calculate. (5points ×8)

① $\frac{2}{7}+\frac{3}{7}=\frac{5}{7}$ ② $\frac{2}{6}+\frac{3}{6}=\frac{5}{6}$ ③ $\frac{1}{3}+\frac{1}{3}=\frac{2}{3}$ ④ $\frac{2}{5}+\frac{1}{5}=\frac{3}{5}$

⑤ $\frac{3}{4}-\frac{2}{4}=\frac{1}{4}$ ⑥ $\frac{4}{5}-\frac{3}{5}=\frac{1}{5}$ ⑦ $\frac{5}{6}-\frac{3}{6}=\frac{1}{3}$ ⑧ $\frac{7}{9}-\frac{5}{9}=\frac{2}{9}$

5. From a $\frac{3}{5}$ m tape, $\frac{2}{5}$ was cut off. How many meters are left ? (5points×2)

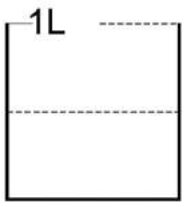
① Mathematical sentence: $\frac{3}{5}-\frac{2}{5}=\frac{1}{5}$ ② Answer: $\frac{1}{5}$

End of Chapter Test: Chapter 17 **Date:**

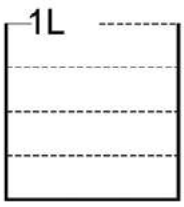
Fractions	Name:	Score

1. Colour in the portion of the amounts. (5 points×3)

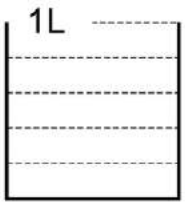
① $\frac{1}{2}$ L



② $\frac{3}{4}$ L



③ 1 L



2. Fill the blanks with a number. (5 points ×4)

① $\frac{3}{5}$ L is ____ sets of $\frac{1}{5}$ L.

② 4 sets of $\frac{1}{4}$ cm is ____ cm.

③ ____ sets of $\frac{1}{8}$ L is $\frac{3}{8}$ L.

④ ____ m is 3 sets of $\frac{1}{7}$ m.

3. Which is bigger? Fill in the blanks with inequality signs. (5points ×3)

① $\frac{3}{5}$ ____ $\frac{1}{5}$

② $\frac{2}{6}$ ____ $\frac{3}{6}$

③ 1 ____ $\frac{1}{3}$

4. Calculate. (5points ×8)

① $\frac{2}{7} + \frac{3}{7}$

② $\frac{2}{6} + \frac{3}{6}$

③ $\frac{1}{3} + \frac{1}{3}$

④ $\frac{2}{5} + \frac{1}{5}$

⑤ $\frac{3}{4} - \frac{2}{4}$

⑥ $\frac{4}{5} - \frac{3}{5}$

⑦ $\frac{5}{6} - \frac{3}{6}$

⑧ $\frac{7}{9} - \frac{5}{9}$

5. From a $\frac{3}{5}$ m tape, $\frac{2}{5}$ was cut off. How many meters are left ? (5points×2)

① Mathematical sentence:

② Answer:_____

Chapter 18 Math Sentences Using the □

1. Unit Objectives

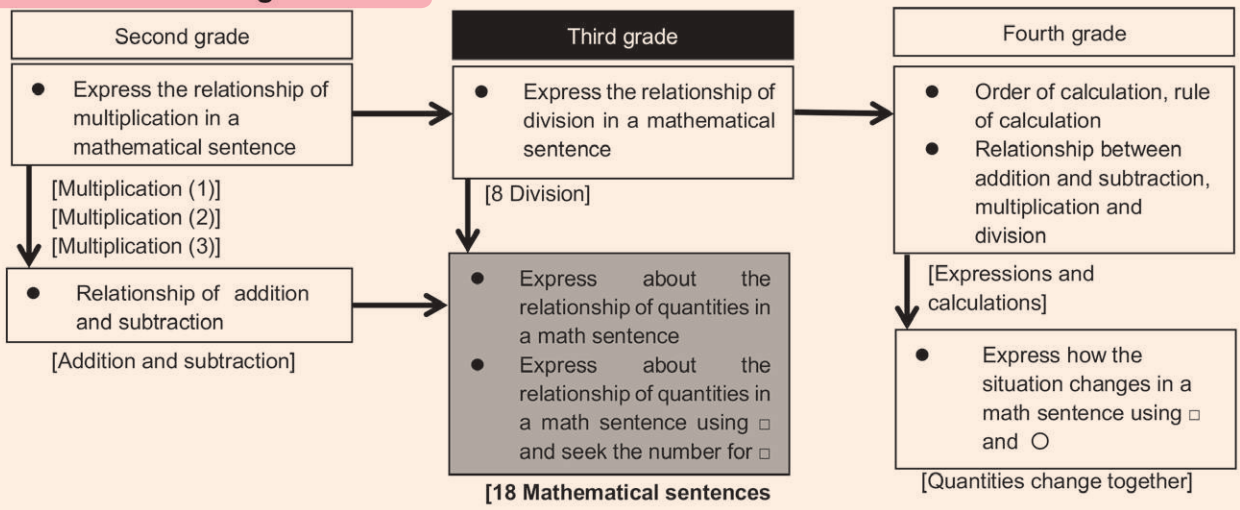
- To understand math sentences which represent mathematical relations. (3.4.1a)
- To make math sentences to represent mathematical relations. (3.4.1a)
- To make math sentence using □ and find the number which enters in □. (3.4.1b and c)

2. Teaching Overview

Students often forget the operations after getting the answer. It may result that the meaning of operations or relations of numbers making the answer could be forgotten. In this unit, students think about meanings and relations of numbers through mathematical sentences. In earlier learning of mathematics, students have thought of meaning of mathematical sentences with concrete numbers. Here, they think about the meaning and number relations represented as mathematical sentences with □ or ○ which are not concrete numbers but generalised. It helps students to understand the meaning of structure or composition of mathematical sentences.

Maths Sentences of Addition and Multiplication : Students are to come up with a mathematical sentence with words based on a given situation. They change the mathematical sentence with □ or ○. They should also understand that □ or ○ represents any numbers, and also they could be a only number if there are more given conditions or numbers.

3. Related Learning Contents



Unit 18

Unit: Math Sentences Using the □
Sub-unit: 1. Math Sentences of Addition
Lesson 1 of 2 lessons (Double Period)

Textbook Page : p.186~p.187
Actual Lesson 130

Sub-unit Objectives

- To make math sentence with words.
- To make math sentence using □ and find the number which enters in □.

Lesson Objectives

- To make math sentence of addition or multiplication using given information.

Prior Knowledge

- Multiplication (Grade 2 and 3)
- Addition and subtraction (Grade 2 and 3)

Preparation

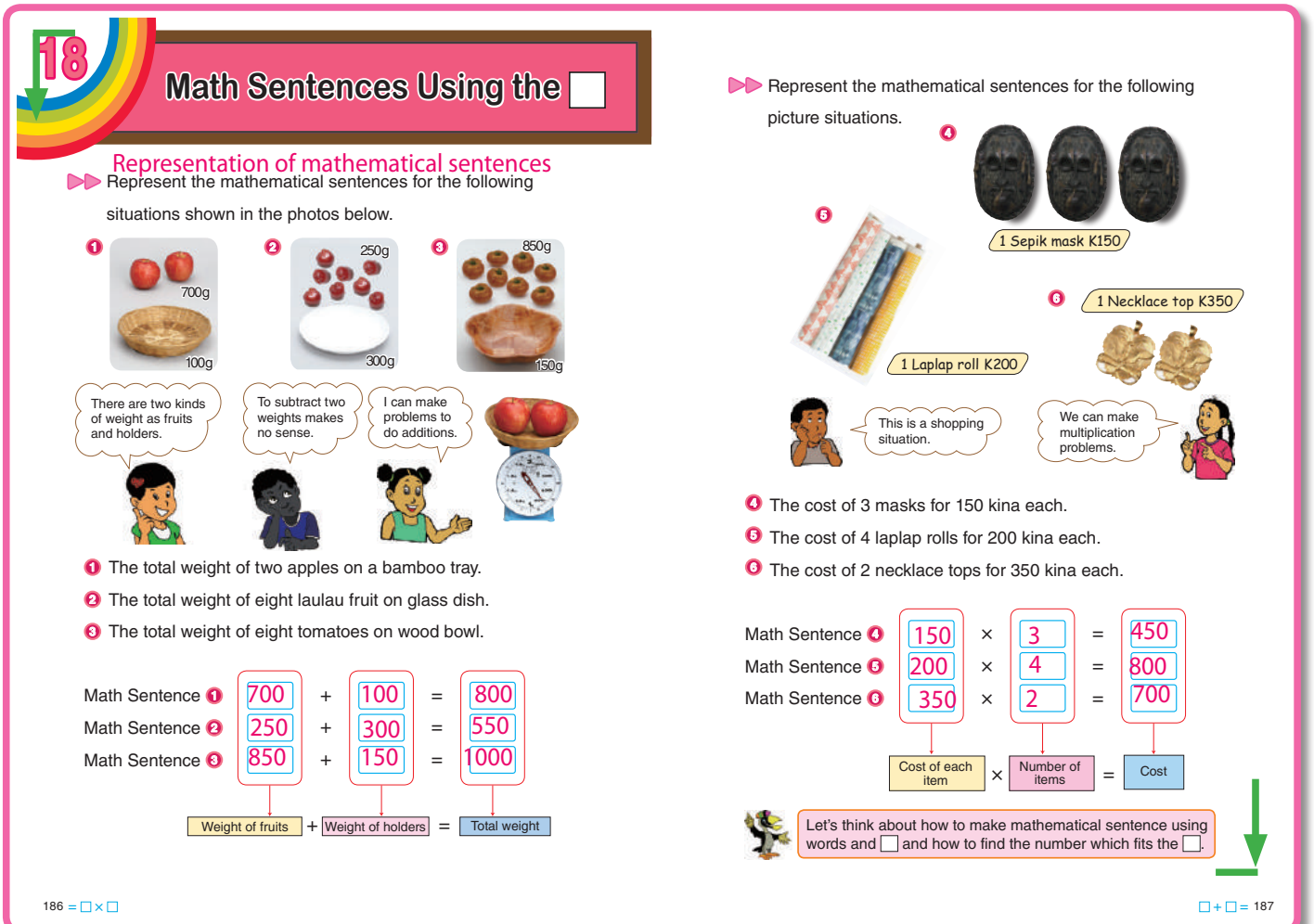
- Board Preparation

Assessment

- Make math sentence using a given information. F
- Understand how to make math sentence using given information. S

• Teacher's Notes •

Students had been working with math expression with numbers to find their answers. This time they will think about what numbers to fill in the □ in order to represent the mathematics problems.



Lesson Flow

1 ▶▶ Think about how to make mathematical sentence of addition using photos.

T Introduce the main task.
T Let students observe photo ❶ and make a mathematical sentence.
T What kind of math sentence can you make?
S The total weight of 2 apples in the bamboo tray. 700 + 100 = 800
T What about ❷ and ❸?
S ❷ The total weight of eight laulaus on the glass dish. 250 + 300 = 550
❸ The total weight of eight tomatoes on the wooden bowl. 850 + 150 = 1000

2 Compare the three situations.

T What is common among all three mathematical sentences?
S Adding weight of fruits and weight of case.
S When representing mathematical sentence, it is going to be 'weight of fruits' + 'weight of holder' = 'total weight'.

3 Think about how to make mathematical sentence of multiplication using pictures.

T Let students observe drawing ❹ and make a mathematical sentence.
T What kind of mathematical sentence can you make?
S The cost of 3 sepik mask for 150 kina each. 3 × 150 = 450
T Let students think about the other two drawings in ❺ and ❻.

4 Compare the three situations.

T What is common among all three mathematical sentences?
S Multiplying cost of each material by the number of materials.
T When representing in mathematical sentence, it is going to be 'cost of each item' + 'number of items' = 'total cost'

Sample Blackboard Plan

Date: Chapter: Math Sentences Sub-chapter/Topic: Math sentence of addition Lesson: 1 of 2

Task: Let's represent mathematical sentences.

MT

Represent the mathematical sentences for each situation

❶

❷

❸

❶ The total weight of two apples with the bamboo tray.
❷ The total weight of eight laulau fruit on the glass plate.
❸ The total weight of eight tomatoes in the wooden bowl.

Math Sentence ❶	700	+	100	=	800
Math Sentence ❷	250	+	300	=	550
Math Sentence ❸	850	+	150	=	1000
	Weight of fruits	+	Weight of case	=	Total weight

1

Represent the mathematical sentences for the following picture situations.

❹
1 Sepik mask K150

❺
1 Laplap roll K200

❻
1 Necklace top K350

❹ The cost of 3 masks for 150 kina each.
❺ The cost of 4 lalap rolls for 200 kina each.
❻ The cost of 2 necklace tops for 350 kina each.

Math Sentence ❹	150	×	3	=	450
Math Sentence ❺	200	×	4	=	800
Math Sentence ❻	350	×	2	=	700
	Cost of each thing	×	Number of things	=	Cost

Summary

Summarise based on what the students have learnt and emphasise important points.

Unit 18

Unit: Math Sentences Using the □
Sub-unit: 1. Math Sentences of Addition
Lesson 2 of 2 (Double Period)

Textbook Page : p.188~p.189
Actual Lesson 131

Lesson Objectives

- To make math sentence of addition using □ for the unknown number.
- To understand how to find the unknown number that fits in the □.

Prior Knowledge

- Making math sentences to represent mathematical relations(Previous lesson).

Preparation

- Refer to the blackboard plan for diagram.

Assessment

- Make math sentence using □ and think about how to find the unknown number for the □. F
- Do the exercise correctly. S

• Teacher's Notes •

Using diagram representation and mathematical sentence with words makes it easier to identify what is unknown and what is known before they find the missing number for the □.

1 Math Sentences of Addition

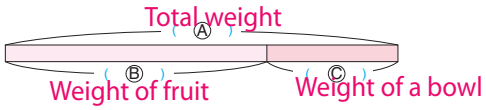
1 Mathematical sentences involving addition

1 Let's think about the following problem.

There are 900 g of mandarins in a bowl. The bowl weighs 300 g. What is the weight of mandarins in g?

1 Let's complete the diagram below by filling in the ( ) with words.

Weight of mandarins | Weight of a bowl | Total weight



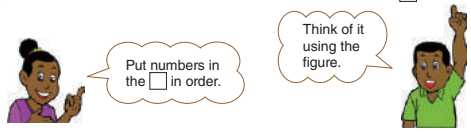
2 Let's complete the mathematical sentence with words from the diagram 1.

Weight of fruit + Weight of bowl = Total weight

3 Let's represent the unknown number in the mathematical sentence by using □.

□ + 300 = 900

4 Let's think about how to find the number in the □.



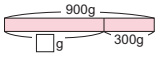
Kekeni's idea

To find the number which fits □ + 300 = 900, put numbers, 100, 200, … into □.

100 + 300 < 900
200 + 300 < 900
⋮
600 + 300 = 900

Naiko's idea

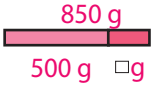
Consider how to use the diagram.



□ + 300 = 900
□ = 900 − 300
= 600

2 Solving unknown in mathematical sentences involving addition

2 The weight of a 500 g avocado on the plate is 850 g. What is the weight of the plate in g ? Let's draw the diagram or write a mathematical sentence for the weight of the plate by using □ g and find □.



500 + □ = 850
□ = 850 − 500
□ = 350
Answer: 350 g

Exercise

The weight of 400 g bananas in the basket is 600 g. What is the weight of the basket in g? Let's draw the diagram or write mathematical sentence for the weight of the basket by using □ g and find □.

Answer: 200 g

188 = □ − □

□ × □ = 189

Lesson Flow

1 ❶ ❶ ❷ Make mathematical sentence using words.

T ❶ Let students complete the diagram by filling in the word in A, B and C

TN Explain the relation of weight of fruit, weight of bowl and total weight by using the tape diagram.

T ❷ Let's make a math sentence based on the information of tape diagram.

S Weight of mandarins + Weight of bowl = Total weight.

T Introduce the main task.

2 ❸ Making mathematical sentence using □ for unknown number.

T Which one is unknown?

S Weight of Mandarins

T Let's make mathematical sentence using □ for unknown number.

S □ + 300 = 900

3 ❸ ❹ Think about how to find the □.

T How can we find the number which should be in □?

S Inserting the number 100, 200,300 …. one by one, and when we write 600 the answer becomes 900 (Kekeni's idea) .

S When observing the tape diagram, total weight is 900 g. A number which subtract 300 from 900 will be □. (Naiko's idea)

TN Let students think about how to find □ by observing the tape diagram. Naiko's idea will be the basis for next steps.

4 ❷ Draw a tape diagram, make mathematical sentence using □ and find the number which can go in □.

T Ask students, total weight, weight of fruit and unknown weight.

S Total weight is 850 g, weight of avocado is 500 g but the weight of bowl is unknown.

T Let's draw a tape diagram and write a math sentence.

S Solve mathematical sentence.

S Understand that the Total weight – weight of avocado = weight of bowl.

5 Do the exercise.

TN
- Confirm that it is easy to make math sentence when you draw a tape diagram correctly.
- When the mathematical sentence is addition, you have to do subtraction to find the answer.
- When the mathematical sentence is subtraction, you have to do addition to find the answer.

Sample Blackboard Plan

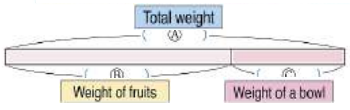
Date: Chapter: Math Sentences Sub-chapter/Topic: Math sentence of addition Lesson: 2 of 2

Task: Let's find the unknown in an addition sentence.

1

There are 900g of mandarins in a bowl that weighs 300g. What is the weight of mandarins in g ?

❶ Let's complete the diagram below by filling the ( ) with words.



❷ Let's complete the mathematical sentence with words from the diagram ❶.

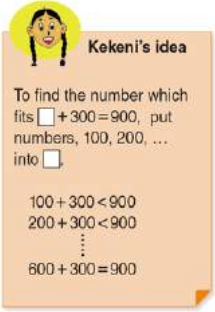
Weight of fruits + Weight of a bowl = Total weight

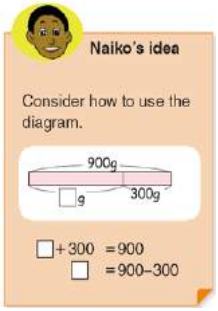
MT

❸ Let's represent the unknown number in the mathematical sentence by using □.

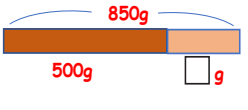
□ + 300 = 900

❹ Let's think about how to find the number in the □.





2 The weight of a 500g avocado on the plate is 850g. What is the weight of the plate in g ? Let's draw the diagram or write mathematical sentence for the weight of the plate by using □ g and find □.



500 + □ = 850
□ = 850 − 500
□ = 350
Answer: 350g

Exercise

(Refer to TM for Question and Answers)

Summary

Unit 18

Unit: Math Sentences Using the □
Sub-unit: 2. Math Sentences of Multiplication
Lesson 1 of 1(Double Period)

Textbook Page : p.190~p.191
Actual Lesson 132

Sub-unit Objectives

- To make math sentence with words.
- To make math sentence of multiplication using □ and find the number for the □.

Lesson Objectives

- To make math sentence of multiplication using □ for the unknown number.
- To understand how to find the unknown number for the □.

Prior Knowledge

- Mathematical relations (First lesson of the unit).

Preparation

- Diagrams according to board plan

Assessment

- Make mathematical sentence using □ and think about how to find the number which enters in □. F
- Do the exercise correctly. S

• Teacher's Notes •

It may be difficult for some students to find the unknown or □. Ambai's idea may be comfortable for them. However, Sare's idea is the basis for next steps for finding the unknown □.

2 Math Sentences of Multiplication

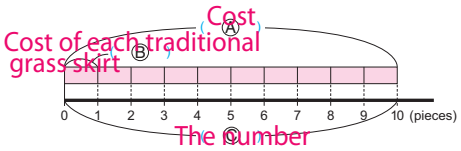
1 Mathematical sentences involving multiplication

Let's think about how to solve the following problem.

We bought 10 traditional grass skirts and paid 500 kina.
What is the cost of one traditional grass skirt?

1 Let's complete the diagram below by filling in the ( ) with words.

Cost of each traditional grass skirt
The number
Cost



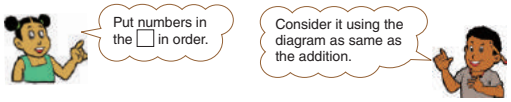
2 Let's complete the mathematical sentence with words from the diagram.

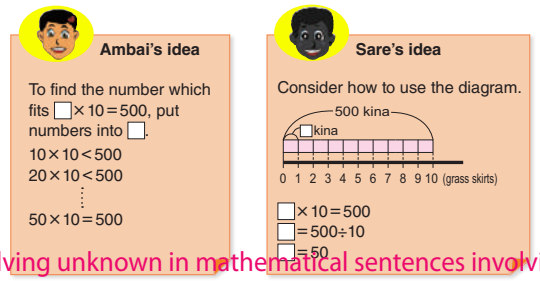
The number × Cost of each grass skirt = Cost

3 Let's represent the unknown number in a mathematical sentence by using □.

10 × 50 = 500

4 Let's think about how to find the number in the □.

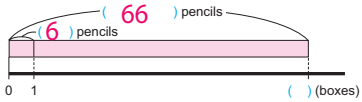




Solving unknown in mathematical sentences involving multiplication

2 You divide 66 pencils into 6 pencils to each box.
How many boxes of 6 pencils can you fill?

1 Let's draw the diagram by representing the unknown number by using □.



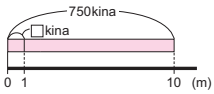
2 Let's make mathematical sentences with words and by using □.

11 × Number of pencils in each box = 66
11 × 6 = 66

3 Let's find the number which fits the □ by using various ways.

Exercise

The cost of 10 m tug rope for ship is 750 kina. Write a mathematical sentence by using □ to find the cost of 1 m tug rope.



Answer. K75

190 = □ × □

□ + □ = 19

Lesson Flow

1 ❶❶❷ Make mathematical sentence using words.

T ❶ Let students complete the diagram by filling the word in A, B and C

TN Explain the relation of three things by using tape diagram.

T ❷ Let students make math sentence based on the information of tape diagram.

S The number of grass skirts × Cost of each grass skirts = Total cost.

T Introduce the main task.

2 ❸ Making mathematical sentence using □ for unknown number.

T Which one is unknown?

S Cost of each grass skirts

T Let's make mathematical sentence using □ for unknown number.

S 10 × □ = 500

3 ❸❹ Think about how to find the □.

T How should we find the number which fits in □?

S Inserting the number 10, 20,30 …. one by one, and when we insert 50 the answer become 500 (Ambai's idea) .

T When observing the tape diagram, total cost is 500 kina. A number which they bought is 10, so a number which 500 is divided by 10 will be □. (Sare's idea)

TN Let students think about how to find □ by observing tape diagram. Sare's idea will be the basis for next steps.

4 ❷ Draw a tape diagram, make mathematical sentence using □ and find the number which can go in □.

T ❶ Ask students about the total number of pencils, the number of pencils in each box and the unknown number.

S Total number of pencil is 66, 6 pencils in each box but we do not know how many boxes.

T ❷ Let's draw a tape diagram and write a mathematical sentence.

S □ × 6 = 66

T Solve math sentence.

□ = 66 ÷ 6 = 11

T ❸ Let students understand that the number of boxes × the number of pencils in each box = total number of pencils

S □ × 6 =

5 Do the exercise.

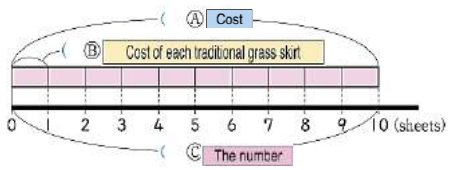
Sample Blackboard Plan

Date: Chapter: Mathematical Sentences Sub-chapter/Topic: Math sentence of Multiplication Lesson: 1 of 1

Task: Let's find the unknown in a multiplication sentence.

1 We bought 10 traditional grass skirts, and paid 500 kina. What is the cost of one traditional grass skirt ?

❶ Let's complete the diagram below by filling the ( ) with words.



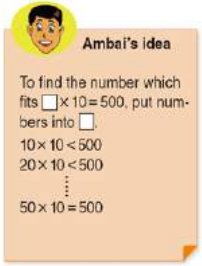
❷ Let's complete the mathematical sentence with words from the diagram.

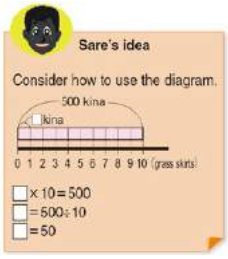
Number × Cost of each = Cost

❸ Let's represent the unknown number in mathematical sentence by using □.

10 × ? = 500

❹ Let's think about how to find the number in the □.





2 You divide 66 pencils into 6 pencils to each box. How many boxes of 6 pencils can you fill?

❶ Let's draw the diagram by representing the unknown number by using □.

❷ Let's make mathematical sentences with words and by using □.

11 × (Number of pencils in each box) = 66

11 × 6 = 66

❸ Let's find the number which fits the □ by using various ways.

Exercise

(Refer to TM for Question and Answers)

MT

Summary

Unit 18

Unit: Math Sentences Using the □
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.192
Actual Lesson 133

Sub-unit Objectives

- To deepen the understanding what they learned in the unit.
- To master the skill for solving problems of math sentence using □.

Lesson Objectives

- To deepen the understanding what they learned in the unit.
- To master the skills for solving problems of math sentence using □.

Prior Knowledge

- All the contents in this unit

Preparation

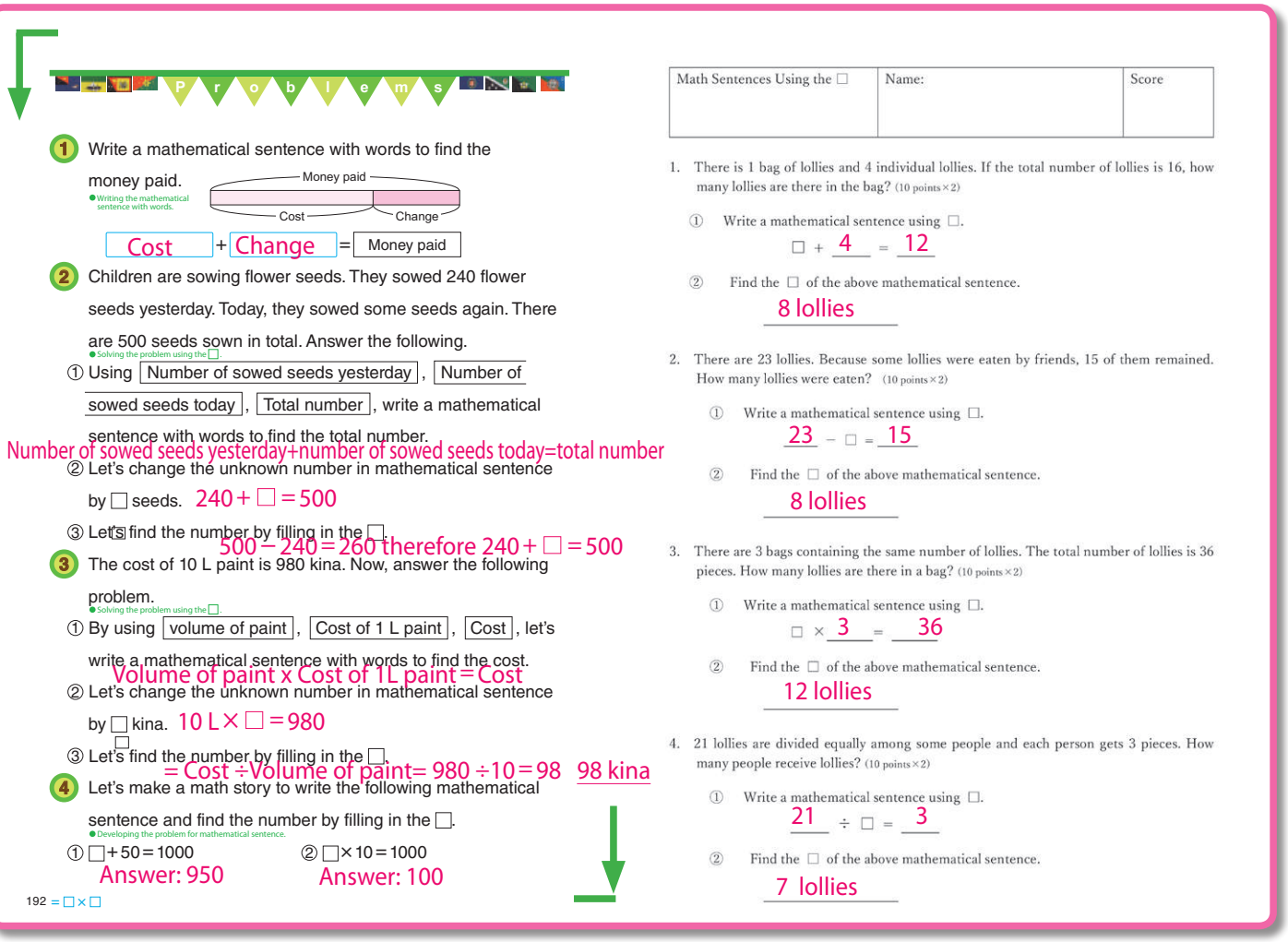
- Evaluation sheet for the students

Assessment

- Solve the problems correctly confirming what they learned in the unit. F S

• Teacher's Notes •

Use 30 minutes for the exercise and give the evaluation test after that.



Problems

1. Write a mathematical sentence with words to find the money paid.
Writing the mathematical sentence with words.

Cost + Change = Money paid

2. Children are sowing flower seeds. They sowed 240 flower seeds yesterday. Today, they sowed some seeds again. There are 500 seeds sown in total. Answer the following.
Solving the problem using the □.

① Using Number of sowed seeds yesterday, Number of sowed seeds today, Total number, write a mathematical sentence with words to find the total number.
Number of sowed seeds yesterday+number of sowed seeds today=total number

② Let's change the unknown number in mathematical sentence by □ seeds. 240 + □ = 500

③ Let's find the number by filling in the □.
500 − 240 = 260 therefore 240 + □ = 500

3. The cost of 10 L paint is 980 kina. Now, answer the following problem.
Solving the problem using the □.

① By using volume of paint, Cost of 1 L paint, Cost, let's write a mathematical sentence with words to find the cost.
Volume of paint x Cost of 1L paint = Cost

② Let's change the unknown number in mathematical sentence by □ kina. 10 L × □ = 980

③ Let's find the number by filling in the □.
= Cost ÷ Volume of paint = 980 ÷ 10 = 98 98 kina

4. Let's make a math story to write the following mathematical sentence and find the number by filling in the □.
Developing the problem for mathematical sentence.

① □ + 50 = 1000
Answer: 950

② □ × 10 = 1000
Answer: 100

192 = □ × □

Math Sentences Using the □	Name:	Score

1. There is 1 bag of lollies and 4 individual lollies. If the total number of lollies is 16, how many lollies are there in the bag? (10 points × 2)

① Write a mathematical sentence using □.
□ + 4 = 12

② Find the □ of the above mathematical sentence.
8 lollies

2. There are 23 lollies. Because some lollies were eaten by friends, 15 of them remained. How many lollies were eaten? (10 points × 2)

① Write a mathematical sentence using □.
23 − □ = 15

② Find the □ of the above mathematical sentence.
8 lollies

3. There are 3 bags containing the same number of lollies. The total number of lollies is 36 pieces. How many lollies are there in a bag? (10 points × 2)

① Write a mathematical sentence using □.
□ × 3 = 36

② Find the □ of the above mathematical sentence.
12 lollies

4. 21 lollies are divided equally among some people and each person gets 3 pieces. How many people receive lollies? (10 points × 2)

① Write a mathematical sentence using □.
21 ÷ □ = 3

② Find the □ of the above mathematical sentence.
7 lollies

Lesson Flow

1 **① Make mathematical sentence by words.**

T Let students make mathematical sentence by filling the word in boxes.

2 **② Make mathematical sentence using □ for unknown number and find the number which can go in □.**

T ① Let's make mathematical sentence using words.
S Number of seeds sowed yesterday + Number of seeds sowed today = Total number
TN Let students draw tape diagram to understand mathematical relations.
TN ② ③Let students make mathematical sentence and find the answer.

3 **③ Make mathematical sentence using □ for unknown number and find the number which can go in □.**

T ① Let's make mathematical sentence using words.
S Volume of paint × Cost of 1 L paint = Total cost.
TN Let students draw tape diagram to understand mathematical relations.
TN ② ③Let students make mathematical sentence and find the answer.

4 **④ Make word problem for the mathematical sentence.**

TN Let students work individually or in pairs and assist the students who face difficulties.
T Let students share with friends and solve together.
S Write word problem.

End of Chapter Test: Chapter 18 **Date:**

Math Sentences Using the □	Name:	Score

1. There is 1 bag of lollies and 4 individual lollies. If the total number of lollies is 16, how many lollies are there in the bag? (10 points × 2)

   ① Write a mathematical sentence using □.

   □ + _____ = _____

   ② Find the □ of the above mathematical sentence.

   _____

2. There are 23 lollies. Because some lollies were eaten by friends, 15 of them remained. How many lollies were eaten? (10 points × 2)

   ① Write a mathematical sentence using □.

   _____ − □ = _____

   ② Find the □ of the above mathematical sentence.

   _____

3. There are 3 bags containing the same number of lollies. The total number of lollies is 36 pieces. How many lollies are there in a bag? (10 points × 2)

   ① Write a mathematical sentence using □.

   □ × _____ = _____

   ② Find the □ of the above mathematical sentence.

   _____

4. 21 lollies are divided equally among some people and each person gets 3 pieces. How many people receive lollies? (10 points × 2)

   ① Write a mathematical sentence using □.

   _____ ÷ □ = _____

   ② Find the □ of the above mathematical sentence.

   _____

Chapter 19 Using Money in Our Life

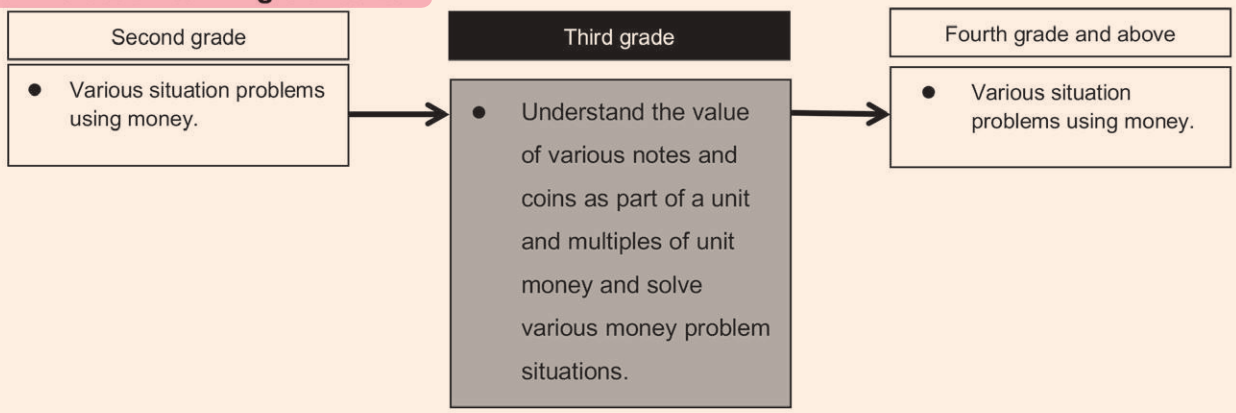
1. Unit Objectives

- Understand the value of various notes and coins as part of a unit and multiples of unit money.(3.2.4 a and c)
- Solve various money problem situations.(3.2.4 b, d and e)

2. Teaching Overview

In Papua New Guinea the currency for money is kina and toea. Everyone uses kina and toea for survival to sustain their daily needs and wants. In this unit, students will realise and understand the importance of the value of money in various notes and coins as part of a unit and further expressed in multiples of a unit money. It helps the students to appreciate and utilise money to solve many problems or situations daily with respect to their cultural heritage.

3. Related Learning Contents



Unit 19

Unit: Using Money in Our Life
Sub-unit: 1. Price and Coins
Lesson 1 of 2 (Double Period)

Textbook Page :
P.193-p.195
Actual Lesson 134

Sub-unit Objectives

- Explain the value of one Kina coin by using various other coins.
- Compare various prices of items.
- Solve various situation problems.

Prior Knowledge

- 4 basic mathematics operations.
- Basic knowledge about money(Elementary)

Lesson Objectives

- Represent the value of one Kina coin by using various other coins.
- Compare various prices of items.
- Solve various situation problems using 4 basic mathematics operations.

Preparation

- Picture of coins, real coins(if possible)

Assessment

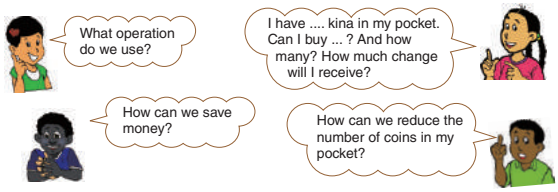
- Enjoy thinking about various situation of using money. F
- Solve various problems considering different ways. S

• Teacher's Notes •

When introducing PNG coins, explain to students that our coins value begins with 5 toea. That 5 toea has its value to buy and sell goods.

19 Using Money in Our Life

Let's ask questions with friends.



1 Price and Coins

1 Price and Coins

How to read the prices using kina and toea.

Let's read the following prices.

1 kina is written as K1.00 for the price. The price K3.95 is read as three-kina and ninety-five toea. The price 50 t is read just 50 toea. 1 kina is equal to 100 toea. Therefore, 3.95 kina is equal to 395 toea.

How to read the prices.

2 Let's read orally and fill in the box.

1 The price of one small coffee packet is 50t. It is [50] toea.
It is one 50 toea coin. It is [2] coins of 20 toea and [1] coin of 10 toea.
The price of two mini coffee packets is [100] toea.
It is 1 kina.

2 The price of a bottle of water is K1.50. It is [150] toea.

3 The price of a dozen for pencils is K3.99. It is [399] toea.

Exercise

Read the following price and arrange them in order.

① Ice cream K2.00, Apple K1.50, Orange K2.60,
Chocolate K1.99 and Juice K2.95.

1. Arrange them from the highest price to the lowest.
Juice, Orange, Ice cream, Chocolate and Apple
2. Arrange them from the lowest price to the highest.
Apple, Chocolate, Ice cream, Orange and Juice

② Arrange the following from lowest price.
Lolly 30 toea, Milk 2 kina, Chocolate 95 toea,
Snack 1 kina and Bubble Gum 5 toea.
Gum, Lolly, Chocolate, Snack, Milk

Papua New Guinea Coins

There are 5 types of coins in Papua New Guinea. Discuss what kind of characteristics each coin has.
Example: 1 kina coin has a hole. The size is getting bigger while the value increases.

□ − □ = 193 194 = □ + □

Lesson Flow

1 ① Read the price of various materials.

T Introduce the main task.
S Read the prices shown in the texbook.
T Confirm especially how to read K15.95 and K3.99
T Ask students the meaning of 15 and 95.
S 15 means 15 kina and 95 means 95 toea.
T Read and explain ＿＿＿＿＿＿.

2 ② Solve the problems.

S Solve activities ① ② ③
T Confirm that 1 kina is equal to 100 toea

3 Complete the excercise.

S Complete (1). (2) can be given as homework.

4 ③ Solve the problem.

S ① Explain and understand 4 ideas in the textbook.
S ② Discuss which idea students prefer and the reason why.
S Understand there are various conbination of coins to make certain toea.
T/S Summarise the important point in the box ＿＿＿＿＿＿.

Sample Blackboard Plan

Due to limited space, Sample blackboard plan is placed on page 305.

Which Coin Do you use

3 James saved his money in the box for one year. Now, he has a number of every coin in his box and goes shopping.
① For paying a small coffee packet of 50 toea, which coins should he use for paying and explain why?
② Whose idea do you prefer?

Gawi's idea
Count by five
5, 10, 15, 20, 25, 30, 35, 40, 45, 50
10 coins of 5 toea

Ambai's idea
＿＿ coins of 10 toea are 5×10
10 20 30 40 50 toea

Mero's idea
If we only use 20 toea coins, I use 3 coins of 20 toea and receive the change by 10 toea.
3×20=60

Yamo's idea
If I pay by a 1 kina coin,50 toea subtract from 1 kina.
The change is 50 toea.
It is 2 coins of 20 toea and a 10 toea coin.

Vavi's idea
＿＿ coins of 5 toeas are 10×5.

Which operation do you prefer?

To know the value of a number of the same currency, we use multiplication such as: 20 coins of five toea is 20×5=100 toea.
Its value is 1 kina. Five toea coin used as a unit for counting.
(Number of the Coin)×(Value of the Coin)=(Total Value)

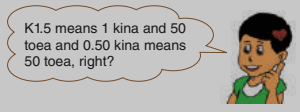
For using coins, we use the several conversions such as:
2 coins of 5 toea convert to a 10 toea coin.
4 coins of 5 toea convert to a 20 toea coin.
20 coins of 5 toea convert to a 1 kina coin.

How Much in Total

4 At a market, you find the prices in the table below.
① Fill in the table.
② When you buy a bottle of water and a coffee packet each, how much in total?

Item	Price	In Kina	In Toea
Bottle of water	K1.50	1.5 kina	
Coffee Packet	K0.50		
Dozen Pencil	K3.99		

1.50+0.50?
How can we add?



□×□=195　196=□×□

Unit 19

Unit: Using Money in Our Life
Sub-unit: 1. Price and Coins
Lesson 2 of 2 (Double Period)

Textbook Page : p.196 - p.198
Actual Lesson 135

Lesson Objectives

- To understand how to add the prices.
- To understand the relationship among price, given money and change.

Prior Knowledge

- Types of coins
- Combination of coins to make certain amount.

Preparation

- Picture of coins.

Assessment

- Think about how to find the total price by adding. F
- Think about the relationship among price, given money and change. F
- Enjoy solving various tasks correctly. F S

• Teacher's Notes •

Students may wonder about the price that have 99 toea but cannot give the change of it. In this case explain to them that 1 toea does not have value in our money system.

To know the value of a number of the same currency, we use multiplication such as: 20 coins of five toea is 20 × 5 = 100 toea.
Its value is 1 kina. Five toea coin used as a unit for counting.
(Number of the Coin) × (Value of the Coin) = (Total Value)

For using coins, we use the several conversions such as:
2 coins of 5 toea convert to a 10 toea coin.
4 coins of 5 toea convert to a 20 toea coin.
20 coins of 5 toea convert to a 1 kina coin.

How Much in Total

Find the total price of more than 2 materials.

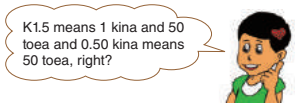
4 At a market, you find the prices in the table below.

1. Fill in the table.
2. When you buy a bottle of water and a coffee packet each, how much in total?

Item	Price	In Kina	In Toea
Bottle of water	K1.50	1.5 kina	150 toea
Coffee Packet	K0.50	0.5 kina	50 toea
Dozen Pencil	K3.99	3.99 kina	399 toea

1.50 + 0.50?

How can we add?



Kekeni's idea

I calculated using vertical form.

1.5 + 0.5 = 2

$$\begin{array}{r} 1.5 \\ +\ 0.5 \\ \hline 2.0 \end{array}$$

2 kina

Gawi's idea

If we represent them in toea:
K 1.5 is 150 toea
K 0.5 is 50 toea

$$\begin{array}{r} 1\,5\,0 \\ +\ \ 5\,0 \\ \hline 2\,0\,0 \end{array}$$

200 toea is 2 kina.

5 In 4, when you buy all three items, how much in total?

1. Let's find the total price in vertical form.
2. Which coins should you use and how much will be the change?

Six 1- kina coins

For using calculator, we write as follows.

$$\begin{array}{r} {}^{K}1.5\,0\,{}^{t} \\ 0.5\,0 \\ +\ 3.9\,9 \\ \hline \end{array}$$

How do you type it in your calculator?

In shopping, we write the price in vertical form and find the total price by calculator. For payment, we usually show the money as for the same value of total price or more at first. When it is the same value, there is no change. When it is more, we must receive the change, exactly.

To know the value of change we use subtraction:
(Given money) − (Price) = (Change)
For Confirmation: **(Price) + (Change) = (Given money)**

196 = □ × □

□ + □ = 197

Lesson Flow

1 4 Read and understand the given situtation.

S ❶ Think about the given situation and fill in the table.
T Confirm that 1 kina is equal to 100 Toea.
S ❷ Make a mathematical expression and think about how to calculate.
S Understand Kekeni and Gawi's idea.
T Introduce the main task.

2 5 Think about how to find the total price of the materials.

S ❶ Make a mathematical expression to find the total price of 3 items and solve in vertical form.
S Think about various conbination for K5.99.

❻ How much in total? Write the prices in vertical form and find the answer. K8.09
Coke K2.00, Biscuit K1.50, Cream bun K2.60 and Chocolate K1.99.

❼ I bought a bottle of water for 1.59 kina and I gave two coins of one kina, and received 3 coins of 20 toea as for change. Is it correct? Explain with reason.
2-1.59=.41
I should receive 2 coins of 20 toea.

K1.59

In our country, some shops set the price which does not correspond to our money system. The price such as K0.99 cannot be paid by coins.

S 6 coins of 1 kina, 5 coins of 1 kina and 5 coins of 20 toea, and so on.

3 Understand the relationship among price, given money and change.

S Think about the relationship among price, given money and change.
T Explain the important point in the box ( ).

4 6 Calculate the total price.

S Make a mathemathical expression and find the total price.

5 7 Think about the situation.

S Read the problem, make mathematical sentence and find the answer.
T How much is the change?
S 1 toea.
T Does 1 toea coin exist?
S No.
T Explain the important point in the box ( ).

Sample Blackboard Plan

Date: Chapter 19: Money Topic: Price and Coins Lesson Number: 2 out of 2

Task: Let's think about how to find the total price of 2 items.

MT: Introduce main task here.

4 Let's write the prices using kina and toea.
❶ Fill in the table below.

Items	Price	In kina	In toea
1. Bottle of water	K1.50	1.5 kina	150 toea
2. Coffee Packet	K0.50	0.5 kina	50 toea
3. Dozen Pencil	K3.99	3.99 kina	399 toea

❷ Find how much in total for the 2 items.

1.50 + .50
How can we add?

(1) K1.50 means 1.5 kina or 1 kina and 50 toea
(2) K0.50 means 0.5 kina or 50 toea.

1. Bottle of water	K1.50	1.5 kina	150 toea
2. Coffee Packet	K0.50	0.5 kina	50 toea
Total	**K2.00**	**2.0 kina**	**200 toea**

5 ❶ Let's find the total price in vertical form.
(1) K1.50 + K0.50 + K3.99
(2) 1.5 kina + 0.5 kina + 3.99 kina
(3) 150 toea + 50 toea + 399 toea

1. Bottle of water	K1.50	1.5 kina	150 toea
2. Coffee Packet	K0.50	0.5 kina	50 toea
3. Dozen Pencil	K3.99	3.99 kina	399 toea
Total	**K5.99**	**5.99 kina**	**599 toea**

❷ Which coins shall you use and how much change?

6 × 1 = 6
Answer: K6.00

Take note that 1 toea is the change however it's outdated so no change

To know the value of change we use subtraction:
(Given money) − (Price) = (Change)
For Confirmation: (Price) + (Change) = (Given money)

Summary
- Prices of goods such as K3.99 where 1 toea coin is the change is outdated therefore no change.
- 1.5 kina is written as K1.50 and is equal to 150 toeas.
- For knowing the value of change, we use subtraction:

Given money - Price = Change
•For confirmation
Price + Change = Given money

Home work
1. Practice task 6 and 7

Unit 19

Unit: Using Money in Our Life
Sub-unit: 2. Unit for Currency
Lesson 1 of 2 (Single Period)

Textbook Page : p.199-p.200
Actual Lesson 136

Sub-unit Objectives

- To understand the types of notes for currency.
- To choose coins and notes to show simplest way to make certain amount.

Lesson Objectives

- To understand the types of notes for currency.
- To understand how to pay effectively by combining coins and notes.

Prior Knowledge

- Types of coins
- Combination of coins to make certain amount.

Preparation

- Picture of coins and notes

Assessment

- Think about how to pay effectively by combining notes and coins. F
- Appriciate the advantage of notes as currency. F

• Teacher's Notes •

In this lesson the students may be introduced to, the term currency for the first time. Help them to understand that currency defines the national money for a country. For PNG our unit of currency is kina and toea.

2 Unit for Currency

When we are not comfortable to pay by coins, we use notes as the currency. They are not heavy.

1 Price of one hand cream bottle is K5.50.

1 How many coins do we need for buying one bottle?

If 5 toea coin only: 110

If 10 toea coin only: 55

If 20 toea coin only: 28

If 1 kina coin only: 6

Which one will receive change? 1 kina coin

2 How much is the cost for 50 bottles? Can we pay by coins?

It is difficult to pay by coins only.

2 In 1, 1 if you use the following notes, below.

1 How would you pay and what will be the change?

Types of notes

A two-kina note is;
2 coins of 1 kina or
4 coins of 50 toea or
10 coins of 20 toea or
20 coins of 10 toea.
A five-kina note is; 5 coins of 1 kina, or 2 two-kina notes and one kina coin.
A five-kina note is 10 coins of 50 toea.
A ten-kina note is 10 coins of 1 kina coin.
A ten-kina note is 20 coins of 50 t or 2 notes of five-kina, or five notes of two-kina .

Naiko's idea

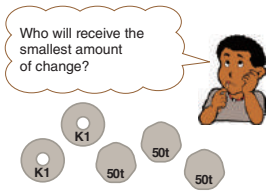
I only use two-kina notes as follows:
Two, four, six. 5.5 is larger than 4 and less than 6. Thus, pay 6 kina by three of two-kina note.
6 − 5.5 = 0.5
0.5 kina is fifty toea.

Yamo's idea

I use a ten-kina note because it is larger than 5.5 kina. The change is 10 − 5.5 = 4.5.
4.5 kina is 4 kina and 50 toea.
It is 2 two-kina notes and one coin of 50 toea.

Sare's idea

I use a 5-kina note and 2-kina note. The change is
7 − 5.5 = 1.5
1.5 kina is 1 kina and 50 toea.
It is one coin of one kina and 50 toea.



2 In 1 2, if you use the notes, how would you pay and what will be the change? Three 100 kina notes, change 20 kina and 5 kina notes.

Have you ever seen the following notes

Types of note

A twenty-kina note is 20 coins of 1 kina,or 2 notes of ten-kina, or 4 notes of five-kina, or 10 notes of two-kina.
A fifty-kina note is 2 notes of twenty-kina and a ten-kina note.
A hundred-kina note is 100 coins of 1 kina, or 5 notes of twenty-kina, or 10 notes of ten-kina, or 20 notes of five-kina, or 50 notes of two-kina.

□ − □ = 199 200 = □ × □

Lesson Flow

1 ① Think about how many coins are used for K5.50.

T Introduce the main task.

S ① Think about how many coins are needed to pay K5.50.

S ② ③ Realise that it is diffcult to pay by coins only when the amount increase.

2 ② Think about how to pay K5.50 by using coins and notes.

T Explain the types of notes in the box

S Think about how to pay K5.50 using notes.

S Share their idea with their friends.

3 Think about Naiko, Yamo and Sare's ideas.

TN Naiko's idea

He uses three 2 kina note and receives 0.5 kina change.

Yamo's idea

She uses a 10 kina note and receives 4.5 kina change.

Sare's idea

He uses a 5 kina note and 2 kina note and receives 1.5 kina change.

T Summarise that there are various ways of paying by using notes.

4 ② Think about how to pay 50 bottles of hand cream with notes.

S Use three 100 kina notes and receive a 20 kina and 5 kina notes as change.

S I use two 100 kina notes, one 50 kina note and three 10 kina notes and I receive one 5 kina note as change.

Sample Blackboard Plan (Lesson 134)

Date: Chapter 19: Money Topic: Price and Coins Lesson Number: 1 out of 2

Main Task: Let's think about how to read and represent the prices.

MT

① Let's read the prices

1 kina

50 toea

15 kina, 95 toea

3 kina , 99 toea

② Let's fill in the box.

① 50t is ☐ toea.

One 50 toea coin is made up of ☐ 20 toea coins and ☐ 10 toea coin.

Two mini coffee packet is ☐ toea.

② K1.50 is ☐ toea.

③ K3.99 is ☐ toea.

Exercise

① Let's arrange the prices from the highest to the lowest amount.

1. K2.95 Juice
2. K2.60 Orange
3. K2.00 Ice cream
4. K1.90 Chocolate
5. K1.50 Apple

② Here arrange from the lowest price to the highest price.

1. 5 toea	→ Bubble Gum
2. 30 toea	→ Lolly
3.95 toea	→ Chocolate
4. 1 kina	→ Snack
5. K 2.00	→ Milk

③ ① Pay using a 50t coin if any in the purse or wallet.
1.It is the exact amount.
2.There is no need to worry about change.

② Ambai's idea preferred.
1. Reducing the number of coins in the purse.
2.Know the value of a 10t coin and multiply by 5 to give a total value of 50t.

Important Point

- To give the amount of the total value, know the value of a coin and multiply by a number coins of the same value.

(Number of the Coin) × (Value of the Coin) = (Total Value)

Summary

- In our daily life, when using coins , we normally use several conversions such as : 2 coins of 5t is converted to 10t, 4 coins of 5t is 20t and 20 coins of 5t is 1 kina.
- 1 kina is written as K1.00 and is equal to 100 toeas.
- To give the amount of the total value, know the value of a coin and multiply by a number coins of the same value.

Sample Blackboard Plan (Lesson 136)

Date: Chapter 19: Money Topic: Unit for Currency Lesson Number: 1 out of 2

Task: Let's think about how to pay the price for an item.

MT

① Let's pay the price of K5.50

① How many coins do we need?

5 toea coin only	110
10 toea coin only	55
20 toea coin only	23
1 kina coin only	6

Which of these coins receives change?

20 toea and 1 kina

② Cost for all bottles. Can we pay by coins?

50 × 5.50 = 27.50

Answer: It is difficult to pay by coins only.

Important Point

A two kina note is 2 coins of 1 kina coin.
A two kina note is 4 coins of 50 toea.
A two kina note is 10 coins of 20 toea.
A two kina note is 20 coins of 5 toea.

A ten-kina note is 10 coins of 1 kina coin.
A ten-kina note is five notes of 2kina or 2 notes of five kina

A five-kina note is 5 coins of 1 kina coin.
Two 2 kina notes and one 1 kina coin.
A five kina note is 10 coins of 50 toea

② Let's think about how to pay for one hand cream bottle?

① If I use notes, how do I pay for one hand cream bottle?

Naiko's idea

Pay

Change

Sare's idea

Pay

Change

Yamo's idea

Pay

Change

Take note that students relate these with how to calculate.

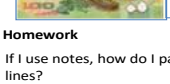
② Who receives the smallest amount of change?

Answer: Naiko

Important Point

A twenty- kina note is 20 coins of 1 kina or 2 notes of ten-kina or 4 notes of five kina, or 10 notes of two-kina.

A fifty-kina note is 2 notes of twenty kina and a ten-kina note.



A hundred-kina note is 100 coins of 1kina or 5 notes of twenty-kina or 10 notes of ten-kina or 20 notes of five kina or 50 notes of two-kina.

Homework

If I use notes, how do I pay for all bottles in the dotted lines?

Summary

- To give the amount of the total value, know the value of a notes and coin s and multiply by a number notes and coins of the same value.
- It is easy to pay for all bottles in the dotted lines using notes.

Unit 19

Unit: Using Money in Our Life
Sub-unit: 2. Unit for Currency
Lesson 2 of 2 (Single Period)

Textbook Page : p.201-p.202
Actual Lesson 137

Lesson Objectives

- To solve various problems about converting coins to notes or vice versa.
- To calculate changes when using different notes for payment.

Prior Knowledge

- Types of coins and notes
- Combination of coins and notes to make certain amount of money.

Preparation

- Blocks,

Assessment

- Think about how to make payment effectively when you buy something. F S

• Teacher's Notes •

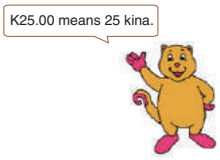
Help the students to understand that there are different ways we can combine notes to buy certain goods and services.

3 Fill in number in the boxes.

1. A two-kina note converts to [10] coins of 20 toea.
2. A fifty-kina note is 2 notes of twenty-kina and [1] note of ten-kina.
3. 50 kina is [1] note of twenty-kina and [60] notes of five-kina.
4. 84 kina is a fifty-kina note, a [20] -kina note, a [10] -kina note and two notes of two-kina.

4 When you buy one of the items in the photo below, how much is the change?

1. When you have a 100 kina note.
   A: 100-25=75 Answer: 75 kina change
   B: 100-20=80 Answer:80kina change
   C: 100-39=61 Answer: 61 kina change
2. When you have 2 notes of 20 kina, 3 notes of 10 kina and 3 notes of 2 kina.
   20+10-25=5 5kina change
   20-20=0 No change



Exercise

Solve the following mathematics expression.

① 1.5 kina + 2.5 kina 4 kina ② 2 kina + 50 toea 2kina 50toea

③ 50 toea + 90 toea ④ 2.5 kina + 50 toea

1kina 40 toea or 140 toea 3 kina or 300 toea

□ + □ = 201 202 = □ × □

Price Survey Project at Local Market

Prices of selling food at the local market changes depending on time in a day, season, and seller and so on. For price down, we do some negotiation.
Visit your local market with your parents and learn the price.

Name of foods	Price	Location

① Write the price of every food on the table in your local market and report it in the class.

② Choose the best survey in ① and develop shopping-calculation questions for using notes and coins and write it on a big chart to show it to your friends.

③ Present the questions and select the interesting questions as for the shopping.

Lesson Flow

Using Money	Name:	Score

1. Fill in the blanks. (10 points × 6)

① A two-kina note converts to 5 coins of 50 toea.

② 100 kina is 4 notes of twenty-kina and 4 notes of five-kina.

③ 19 kina is a ten-kina note, and a Five kina note, and two notes of 2 kina

④ The price of two mini coffee packets is 160 toea. It is 1kina and 60 toea.

⑤ The price of a bottle of water is K1.00 It is 100 toea.

⑥ The price of a dozen for pencils is K3.99 It is 399 toeas.

2. Coke K2.00, Biscuit K1.30 and Cream bun K1.60. How much in total?
(10 points × 2)

Mathematical sentence: K2.00 + K1.30 + K1.60= K4.9 Answer: K4.90 or 4 kina 90 toea

4. Karolyn bought a packet of rice for 3.50 kina and tinned fish for 3 kina. She received a change of 3 kina and 50 toea. How much did she pay? (10 points)
(10 points × 2)

Mathematical sentence: 3.50 kina+ 3 kina + 3kina 50 toea= 10 kina Answer: 10 kina

1 ③ Convert coins to notes or vice versa thinking about value of currency.

T Introduce the main task.

T Confirm types of coins and notes in Papua New Guinea and also confirm that 1 kina is equal to 100 toea.

S Solve the exercises individually and confirm the answers together for ①-④.

2 ④ Think about how to use notes for paying effectively.

S ① Calculate the change in terms of 3 materials.

A: 100 − 25 = 75 Answer: 75 kina change

B: 100 − 20 = 80 Answer:80 kina change

C: 100 − 39 = 61 Answer: 61 kina change

T ② Ask students to think various ways of paying.

S Write their idea in their exercise book.

S Share the ideas:

Examples: - When I pay for A, I use 20 kina note and 3 of 2 kina note, and I'll receive 1 kina coin as the change.

- When I buy C, I use one 20 kina note and one 10 kina note and I'll receive 1 kina coin as the change.

3 Complete the exercise.

S Complete 1 - 4.

Sample Blackboard Plan

Date: Chapter 19: Money Topic: Unit for Currency Lesson Number: 2 out of 2

Task: Let's review our understanding on notes and coins.

MT: Introduce main task here.

3 Let's review our understanding about money.

1 two kina

10

2 fifty kina

1

3 50 kina

6 notes 1 note

4 84 kina

20 kina 10 kina

4 How much is the change when you buy one item?

1 1. 100 – 25 =75 Answer: 75 kina

2. 100 – 20 =80 Answer: 80 kina

3. 100 – 39 =61 Answer: 61 kina

4. 100 – 89 =11 Answer: 11 kina

2 1. 26 – 25 =1 Answer: 1 kina

2. 20 – 20 =0 Ans: No change

3. 40 – 39 =1 Answer: 1 kina

4. 86 – 85 =1 Answer: 1 kina

K89.00 means 89 kina

Summary

- Use easier way through mental calculation:

1.To find the total value of goods.

2. To find the change of items bought with a given amount.

- If you were given a certain amount to spend on 2 items for example K100, combine the prices of 2 possible items that may add up to K100.

Exercise

① 1.5 kina + 2.5 kina ② 2 kina + 50 toea

③ 50toea + 90 toea ④ 1.5 kina + 50 toea

End of Chapter Test: Chapter 19 **Date:**

Using Money	Name:	Score

1. Fill in the blanks. (10 points × 6)

① A two-kina note converts to _____ coins of 50 toea.

② 100 kina is 4 notes of twenty-kina and _____ notes of five-kina.

③ 19 kina is a ten-kina note, and a _____kina note, and two notes of _____ kina

④ The price of two mini coffee packets is _____ toea. It is 1kina and 60 toea.

⑤ The price of a bottle of water is K1.00 It is_____ toea.

⑥ The price of a dozen for pencils is K3.99 It is _____ toeas.

2. Coke K2.00, Biscuit K1.30 and Cream bun K1.60. How much in total?
(10 points × 2)

Mathematical sentence: _____ Answer: _____

4. Karolyn bought a packet of rice for 3.50 kina and tinned fish for 3 kina. She received a change of 3 kina and 50 toea. How much did she pay? (10 points)
(10 points × 2)

Mathematical sentence: _____ Answer: _____

Chapter 20 Summary of the Grade 3

This chapter is a summary of all the contents in Grade 3.
It is important for the students to acquire a procedural fluency in mathematics. That is not just understanding facts or procedures but using various procedures depending on the situation.
Various problems learnt in Grade 3 are included in this chapter, so please give sufficient time to students to solve all the problems.

Unit 20

Unit: Summary of Grade 3

Lesson 1 of 4 (Single Period)

Textbook Page : p.203~p.204
Actual Lesson 138

Sub-unit Objectives

- To review and confirm what students learned in Grade 3.

Lesson Objectives

- To review and confirm about number and calculation in Grade 3.

Prior Knowledge

- Number and calculation (Grade 2 and 3)

Preparation

- Place value chart of fraction and decimal number.

Assessment

- Solve the problems remembering what they learned in Grade 3. F
- Solve the exercise correctly. S

20 Summary of Grade 3

1 Numbers and Calculations

1 Fill in the ☐ with a number or numeral. ⑨⑫⑯

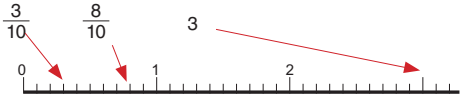
① The numeral in the hundred thousand place of 580000 is [5].

② 10 times 4300 equals [43000] and divide 4300 by 10 equals [430].

③ 4 sets of $\frac{1}{7}$ is [$\frac{4}{7}$].

2 Let's represent the following numbers by ↓ on the number line. ⑫⑯

Express the numbers on number line



3 Let's fill in the ☐ with the equality or inequality sign. ⑨⑫⑯

① 32419 [<] 319972 ② 301201 [>] 300498

③ $\frac{2}{7}$ [<] $\frac{6}{7}$ ④ $\frac{3}{5}$ [>] $\frac{2}{5}$

4 Let's calculate. ①⑥⑦⑫⑭⑯

① 7584+6439 14023 ② 8204−3427 4777 ③ 8125+650+350 9125

④ 30×70 2100 ⑤ 67×48 3216 ⑥ 870×32 27840 ⑦ 508×50 25400

□+□=203 204=□×□

⑧ 24÷3 8 ⑨ 56÷8 7 ⑩ 44÷7 6r2 ⑪ 39÷5 7r4

⑫ $\frac{1}{7}+\frac{2}{7}$ $\frac{3}{7}$ ⑬ $\frac{2}{3}-\frac{1}{3}$ $\frac{1}{3}$ ⑭ $\frac{1}{5}+\frac{3}{5}$ $\frac{4}{5}$ ⑮ $\frac{7}{9}-\frac{2}{9}$ $\frac{7}{9}$

5 There are 24 children who are going to receive 15 sheets of coloured paper each, how many sheets of coloured paper are needed? ⑭

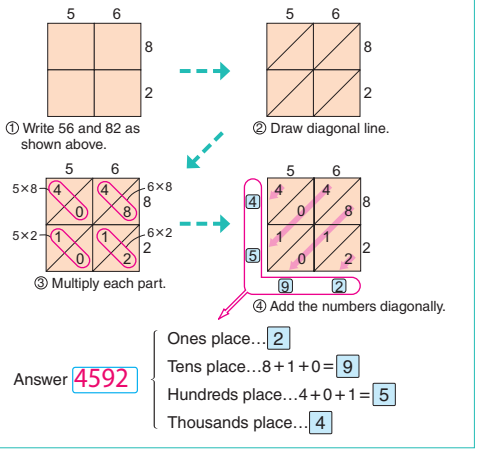
15 × 24=360 A. 360 sheets

6 Express the following problem using a multiplication with ☐ and find the answer. ⑰

☐ × 8 =64, ☐ =64 ÷ 8, ☐ =8

There are 64 mangoes that are divided equally into 8 boxes. How many mangoes can be put in each box?

Multiplication Using Squares 56 × 82



Answer 4592
Ones place…2
Tens place…8+1+0=9
Hundreds place…4+0+1=5
Thousands place…4

Lesson Flow

1 ① Summarise the structure of whole number, decimal number and fraction.

T Introduce the summary unit.

TN Decimal number and fraction can show the remaining part of whole number.The difference between decimal number and fraction is that decimal number divides 1 into 10 but fraction divides 1 into the number of denominator.

S Solve the task.

2 ② Express the numbers on the number line.

T What is the scale unit of the number line?

S 0.1 or $\frac{1}{10}$

TN Confirm that 0.1 is equal to $\frac{1}{10}$.

S Solve the task.

3 ③ Compare the numbers.

T When comparing numbers, from which place value do we have to compare, larger or smaller?

S Larger place value.

T When it is difficult to compare, use number line to compare.

S Solve the task.

4 ④ Calculate whole numbers, decimal numbers and fraction.

S Calculate the operations correctly.

5 ⑤ Solve the word problem.

S Read and understand the problem.

TN Let students understand the situation and meaning of each number correctly.

T What operation can we use?

S Multiplication

T Ask students to make a math expression.

S 15×24

S Solve the expression.

6 ⑥ Solve the problem and make an expression with □.

S Read the problem.

T What does the □ represent?

S The number of mangoes in each box.

T What will be the mathematical sentence?

S $\square \times 8 = 64$

T Ask students to fill in □.

TN Ask students to read the 'Multiplication square' as a homework.

Sample Blackboard Plan

Date: Chapter 20: Summary of Gr 3 Topic: Summary of Grade 3 Lesson Number: 1 out of 4

Main Task: Let's think about how to calculate and solve.

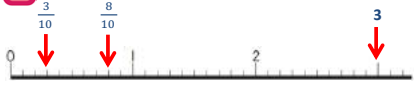
MT: Introduce main task here.

① Numbers and Calculations

1 Let's fill the ☐ with a number or numeral.

1. 580000 is ☐
2. 10 times 4300 is ☐
3. Divide 4300 by 10 equals ☐
4. 4 sets of $\frac{1}{7}$ is $\frac{\square}{7}$

2 Let's express numbers on the number line.



3 Let's fill the ☐ with equality and inequality signs.

1. 32419 < 319972
2. 301201 > 300498
3. $\frac{2}{7} < \frac{6}{7}$
4. $\frac{3}{5} > \frac{2}{5}$

4 Let's calculate.

1. 7584 + 6439
2. 8204 –3427
3. 8125 + 650 + 350
4. 30 × 70
5. 67 × 48
6. 870 ×32
7. 508 ×50
8. 24 ÷ 3
9. 56 ÷ 8
10. 44 ÷ 7
11. 39 ÷ 7
12. $\frac{1}{7}+\frac{2}{7}$
13. $\frac{2}{3}+\frac{1}{3}$
14. $\frac{1}{5}+\frac{3}{5}$
15. $\frac{7}{9}+\frac{2}{9}$

5 Let's think about how many sheets of coloured paper are needed?

1. Children : 24
2. Coloured sheets to be received by each child: 15
3. How many needed? unknown

Math Expression
24 × 15
Math Sentence
24 × 15 = 360

$$\begin{array}{r} 24 \\ \times\ 15 \\ \hline 120 \\ 24 \\ \hline 360 \end{array}$$

Answer: 360 sheets of coloured paper

6 Let's think about how to express the problem using a multiplication with ☐ and find answer.

Math Sentence
8 × ☐ = 64

$8 \times \square = 64$
$8 \times X = 64$
$8X = 64$
$\frac{8X}{8} = \frac{64}{8}$
$X = 8$

Answer: 8 mangoes are put in each box.

Exercise

1. Try out the 'multiplication squares' as homework.

Unit 20

Unit: Summary of Grade 3

Lesson 2 of 4 (Single Period)

Textbook Page : p.205-p.206
Actual Lesson 139

Lesson Objectives

- To review and confirm quantity and measurement in Grade 3.

Prior Knowledge

- Measurement in grade 3
- Geometry in grade 3

Preparation

- Prepare according to the black board plan.

Assessment

- Solve the problems remembering what they learned in Grade 3. F
- Solve the exercise correctly. S

2 How to Measure

1 Let's fill in the ☐ with a number. 4 10 15

1. 1 km = 1000 m
2. 2450 m = 2 km 450 m
3. 1 minute = 60 seconds
4. 1 kg = 1000 g
5. 148 seconds = 2 minute 28 seconds
6. 3040 g = 3 kg 40 g

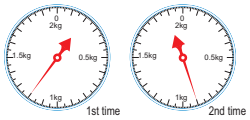
4

2 Let's find the duration of time.

1. What is the duration from 7:40 to 11:00 in the morning?
   11:00-7:40=3 hours 20 minutes
2. What is the time that is 1 hour and 30 minutes after 10:20 in the morning?
   10:20 + 1:30 = 11:50
3. I enjoyed myself at the park for 1 hour and 10 minutes in the morning and later enjoyed 30 minutes in the afternoon. Let's find the total time I enjoyed and the difference.
   1hour 10 minutes + 30 minutes = 1 hour 40 minutes
   1hour 10 minutes − 30 minutes = 40 minutes
   15

3 Measure the weight of two oranges.

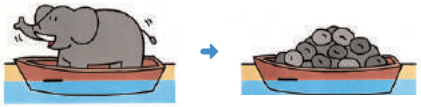
What is the weight altogether?



1kg200g + 900g = 2kg 100g

Measure the Weight of an Elephant

In the old days, how did they measure the weight of an elephant?



Firstly, they put an elephant in the boat and drew a line to show how far the boat went down in the water.

Next, they put stones in the boat until it went down to the line. Then they measured the weight of stones to calculate the total weight.

3 Shape

1 What kind of shapes are the following figures? Name of circle, sphere and traingle 9 11

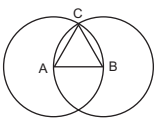
1. A round figure that is the same length from one point. Circle
2. An object that looks a circle from any direction and like a ball. Sphere
3. A triangle with three equal sides. Equilateral triangle
4. A triangle with two equal sides. Isosceles triangle

2 Let's draw the following triangles. What kind of triangles is drawn? 11

1. A triangle where 3 sides are 8 cm, 5 cm and 8 cm. Isosceles triangle
2. A triangle where 3 sides are 9 cm, 9 cm and 9 cm. Equilateral triangle

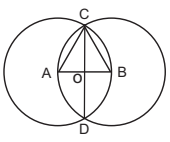
3 Let's draw two circle with a radius 4 cm and the centre points A and B. 8 11

1. What kind of triangles is a triangle ABC? Equilateral triangle
2. How many centimetres are the sides of a triangle ABC? 4 cm



How to Make a Right Angle

Draw the line CD, and measure the angle COB. This is the way to draw the right angle. Let's apply this method using a rope for drawing a right angle on the land.



□ × □ = 205 206 = □ × □

Lesson Flow

1 ① Review the relationship of basic units.

TN 1 km = 1000 m, 1 minute = 60 seconds, 1 kg = 1000 g

S Solve the task.

2 ② Calculate time and duration.

TN There are many students who have difficulty of calculation of time and duration. When it is difficult, use number line to think about and solve the exercise.

S Solve the task.

3 ③ Think about how to find the ☐.

TN Confirm how many kg is the smallest unit.

T How many kg does the smallest unit express?

S 0.01 kg.

T 0.01 kg is how many g?

S 10 g.

T The left side scale shows how many kg and g?

S 1 kg and 1 kg 200 g.

T The right side scale shows how many g?

S 900g.

T What is the total?

S 1 kg 200 g + 900 g = 2 kg 100 g.

4 ① Name the shape described.

TN Review the characteristics of circle, sphere, isosceles triangle and equilateral triangle

S Solve the task.

5 ② Draw various triangles using compass and ruler.

T Confirm the steps to draw a triangle.

TN In case many students have difficulty go back to the related page of the text book and confirm the steps accordingly.

S Solve activity ① and ②.

6 ③ Draw the figure and answer the question.

TN When drawing figures confirm that an arc of a circle goes through a centre of the other circle.

S Solve the activity ① and ②

T Confirm the meaning of radius in question ②.

Sample Blackboard Plan

Date: Chapter 20: Summary of Gr 3 Topic: Summary of Grade 3 Lesson Number: 2 out of 4

MT: Introduce main task here.

Main Task: Let's think about how to calculate and solve.

② How to measure

① Let's fill the ☐ with a number or numeral.

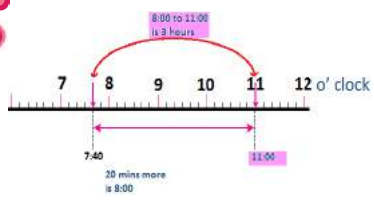
① 1km ☐ = m ② 2450 m = ☐km ☐m

③ 1 minute = ☐ seconds ④ 1kg = ☐g

⑤ 148 seconds = ☐minute ☐seconds

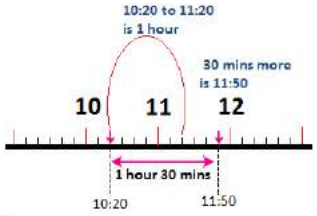
⑥ 3040 = ☐kg ☐g

② Let's find the duration of time.

① 

Answer : 3 hours and 20 minutes

② Let's find out about the time.



③ Let's find the total time enjoyed.

Morning 1hour 30 mins
Afternoon 30mins

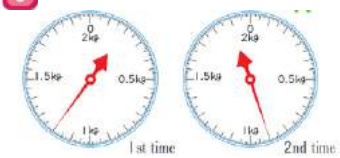
Total time		
hr		m
1	1	0
+	3	0
1	4	0

Answer : 1 40 minutes or 1 hour 40 mins

Difference		
hr		m
1	1	0
−	3	0
	4	0

Answer: 40 minutes

③ Let's measure the total weight.



1st orange is 1.2kg
2nd orange is 0.9kg
Math sentence
1.2 + 0.9 = 2.1
Answer: 2.1kg

kg		
	1	2
+	0	9
	2	1

Answer: 2.1 kg

③ Shapes ① -- ③

① Let's name the shape described

① Circle ② Sphere ③ Equilateral triangle ④ Isosceles triangle

Exercise

1. Try to complete task 2 and 3 of shapes as homework.

Unit 20

Unit: Summary of Grade 3

Lesson 3 of 4 (Single Period)

Textbook Page : p.207
Actual Lesson 140

Lesson Objectives

- To review and confirm data and mathematical relations in Grade 3.

Prior Knowledge

- Table and graph in Grade 3

Preparation

- Grid papers

Assessment

- Solve the problems remembering what they learned in Grade 3. F
- Solve the exercises correctly. S

4 Tables and Graphs

1 The table below shows the grades of children who were absent from school during the 5 days from March 1 to March 5.

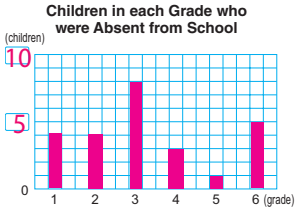
1 day	2 day	3 day	4 day	5 day
Grade 6	Grade 2	Grade 2	Grade 6	Grade 1
Grade 3	Grade 3	Grade 6	Grade 6	Grade 1
Grade 1	Grade 1	Grade 3	Grade 3	Grade 4
Grade 2	Grade 3	Grade 4	Grade 5	Grade 2
Grade 3	Grade 6	Grade 3		Grade 3
	Grade 4			

❶ Let's write the number of children in each grade in the table below.

Children in each Grade who were Absent from School

Grade		1	2	3	4	5	6
Number of children	Using tally marks	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸
	Using number	4	4	8	3	1	5

❷ Draw a bar graph using the table.



❸ What can you notice about the graph?

□ – □ = 207

Lesson Flow

1 ① ① Make a table of the number of students in each grade who were absent from school.

T Let students count the number of students in each grade.
TN Let students use tally marks to count to prevent miscounting.

2 ② Draw a bar graph using the table.

T What does horizontal axis show?
S Grade.
T What does vertical axis show?
S The number of children.
T The smallest scale should show how many students?
S One.
T Put the numbers on vertical axis and draw a graph.

3 ③ Discuss the findings from the bar graph.

T What did you find from the graph?
S Grade 3 is the highest number and grade 5 is the lowest.
S Grade 1 and 2 are the same number.
S The difference between the highest and the lowest is 7.
TN Let the students notice various things from the graph and deepen their understanding on how to read the graph.

Sample Blackboard Plan

Date: Chapter 20: Summary of Gr 3 Topic: Summary of Grade 3 Lesson Number: 3 out of 4

Main Task: Let's review how to arrange and represent data.

④ **Tables and Graphs**

① The table below shows 5 days absenteeism of children.

1 day	2 days	3 days	4 days	5 days
Grade 6	Grade 2	Grade 2	Grade 6	Grade 1
Grade 3	Grade 3	Grade 6	Grade 6	Grade 1
Grade 1	Grade 1	Grade 3	Grade 3	Grade 4
Grade 2	Grade 3	Grade 4	Grade 5	Grade 2
Grade 3	Grade 6	Grade 3		Grade 3
	Grade 4			

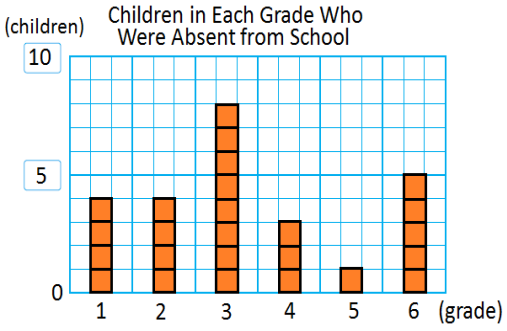
MT: Introduce main task here.

① Let's tally and number the absent children from each grade.

Children in Each Grade Who were Absent from School

Grade		1	2	3	4	5	6
Number of children	Using tally marks	𝍸	𝍸	𝍸 III	III	I	𝍸
	Using number	4	4	8	3	1	5

② Let's draw a bar graph using the table.



③ Let's share what we notice about the graph.

Grade 3 has the highest number of absenteeism .
Grade 5 has the lowest number of absenteeism.
The difference between highest and lowest is 7.
Grade 1 and 2 have the same number of children absent.

Summary

- Using tally mark prevents miscounting.
- The horizontal axis shows the grade and the vertical axis shows the number of children.
- The smallest scale shows the number of children

Exercise

1. Try to come up with your own task that requires you to arrange data and represent it using a bar graph.

Unit 20

Unit: Summary of Grade 3

Lesson 4 of 4 (Single Period)

Textbook Page : p.208~p.209
Actual Lesson 141

Lesson Objectives

- To review and confirm money in Grade 3.

Prior Knowledge

- Money in Grade 3

Preparation

- Plan according to the blackboard plan.

Assessment

- Solve the problems remembering what they learned in Grade 3. F
- Solve the exercise correctly. S

5 Using money

1 Let's read orally and fill in the box. 8 19

The price of one small coffee packet is 70 t. It is [70] toea.

1. The change is one 1 kina and 30 toea. It is [5] coins of 20 toea and [3] coin of 10 toea.
2. The price of two mini coffee packets is [3] toea. It is 1 kina and 40 toea.
3. The price of a bottle of water is K1.00. It is [100] toea.
4. The price of a dozen for pencils is K2.99. It is [299] toea.

19

2 At the super market, you find the prices in the table below.

1. Fill in the table.
2. When you buy a water bottle and coffee packet, how much in total?

	Price	In Kina	In Toea
Bottle of water	K1.00	1.00 kina	100 toea
Coffee Packet	K1.20	1.20 kina	120 toea
Dozen Pencil	K2.99	2.99 kina	299 toea

3 Let's convert! 19

1. A two-kina note converts to [ ] coins of 50 toea.
2. A fifty-kina note is 3 notes of ten-kina and [10] notes of two-kina.
3. 100 kina is [4] notes of twenty-kina and [4] notes of five-kina.
4. 100 kina is [5] notes of ten-kina and [1] note of fifty-kina.
5. 19 kina is a ten-kina note and a [5] -kina note and two note of [2] -kina.
6. 89 kina is a fifty-kina note and a [20]-kina note and a [10] -kina note and a [5] -kina note and two notes of two-kina.

4 Sam bought a tray of chicken for 15.95 kina and received 4 kina and 5 toea as change. How much did he pay? 19

15 kina 95 toea + 4kina 5 toea = 20 kina A. 20 kina

5 Lucial bought a packet of rice for 4.50 kina and tinned fish for 2 kina. She received a change of 4 kina. How much did she pay? 19

4 kina 50 toea + 2kina + 4 kina = 10 kina 50 toea

A. 20 kina

208 = □ × □

□ − □ = 209

Lesson Flow

1 ① Convert the unit of currency.

T Let students convert the unit of currency.

TN Let students understand that 1 kina is equal to 100 toea.

2 ② Fill in the table.

T Ask students to fill in the table.

S Fill in the table considering the relationship between Kina and Toea.

3 ③ Think about the combination of notes.

S Think about the combination of notes to prepare certain amount of money.

TN Remind students about the types of currencies in Papua New Guinea.

4 ④ Solve word problems.

S Read and understand the situation.

S Make mathematical expressions and solve them.

TN Remind students how to add or subtract currency.

S Complete task 4 and 5 for homework.

Sample Blackboard Plan

Date: Chapter 20: Summary of Gr 3 Topic: Summary of Grade 3 Lesson Number: 4 out of 4

Main Task: Let's review our understanding about money.

MT: Introduce main task here.

5 Utilising money

1 Let's read orally and fill the ☐.

1 70t is 70 toea

2 1 kina coin and 30 toea

5 coins of 20t 3 coins of 10t

3 2 pkt coffee is 140 toeas

4 K1.00 is 100 toeas

5 K2.99 is 299 toeas

2 The table below shows prices at the supermarket.

1 Fill in the table.

Items	Price	In kina	In toea
1. Bottle of water	K1.00	1.00 kina	100 toea
2. Coffee Packet	K1.20	1.20 kina	120 toea
3. Dozen Pencil	K2.99	2.99 kina	299 toea

2 Let's find how much in total for 2 items.

Items	Price	In kina	In toea
1. Bottle of water	K1.00	1.00 kina	100 toea
2. Coffee Packet	K1.20	1.20 kina	120 toea
Total	K2.20	2.20 kina	200 toea

3 Let's convert

1

2 kina note 4 coins of 50 toea

2

fifty kina note 3 notes of 10 kina

10 notes of 2 kina

3

100 kina

4 notes of 20 kina

4 notes of 5 kina

4 100 kina

4 notes of 10 kina

6 notes of 5 kina

5 19 kina

Ans: one 5 kina note and two 2 kina notes

6 89 kina is

Ans: one 20 kina, one 10 kina note and one 5 kina note

Summary

- To give the amount of the total value, know the value of notes and coins and multiply by a number notes and coins of the same value.

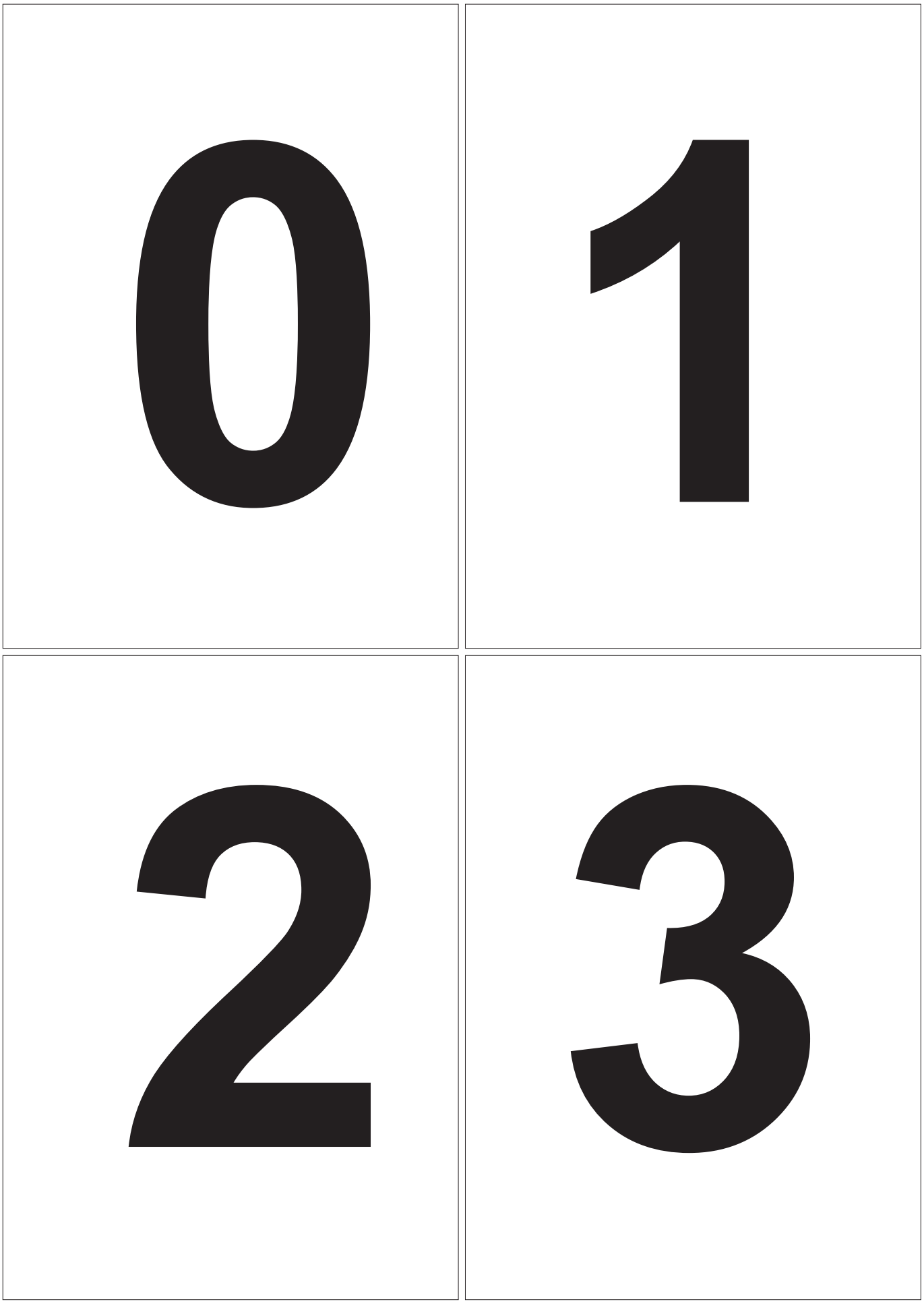
Exercise

1. Complete task 4 and 5

Let’s think about the multiplication table!

Multiplier \ Multiplicand	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81
10	10	20	30	40	50	60	70	80	90
11	11	22	33	44	55	66	77	88	99
12	12	24	36	48	60	72	84	96	108

Let’s have fun for improving Math skills!
Number cards sample, 0 - 9 (Refer to page XIV)

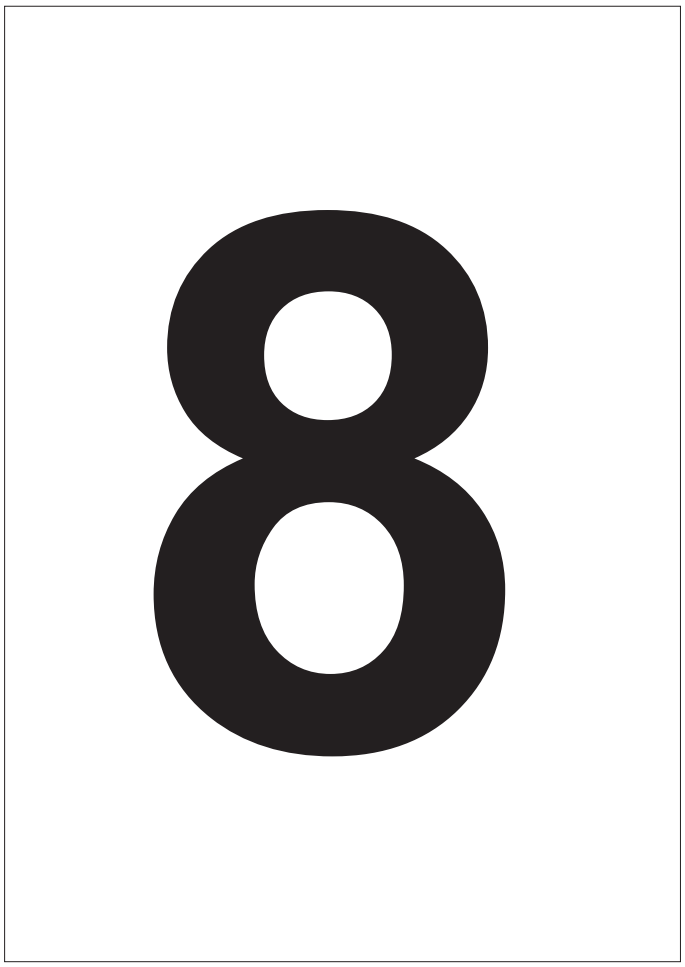


4

5

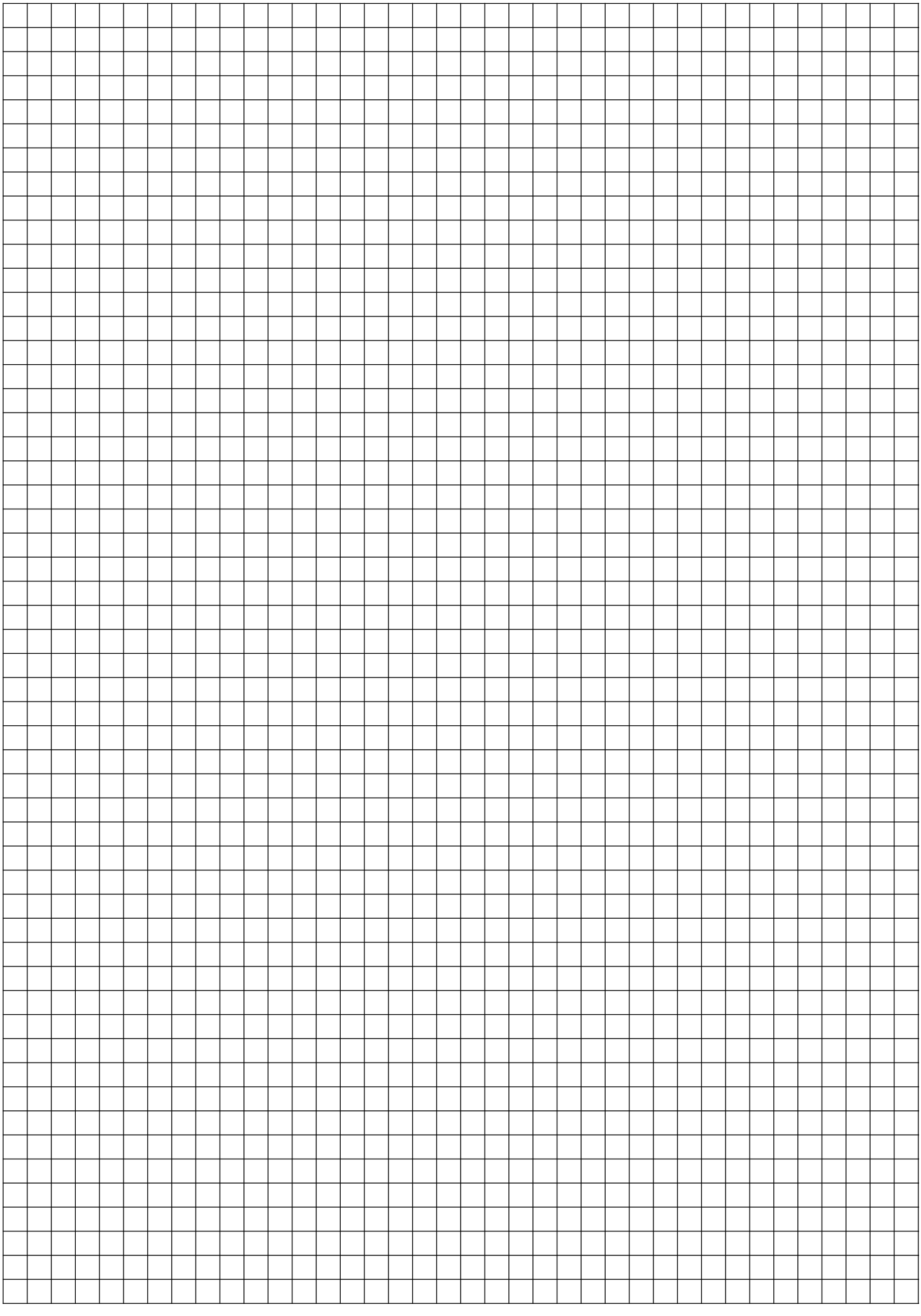
6

7


8

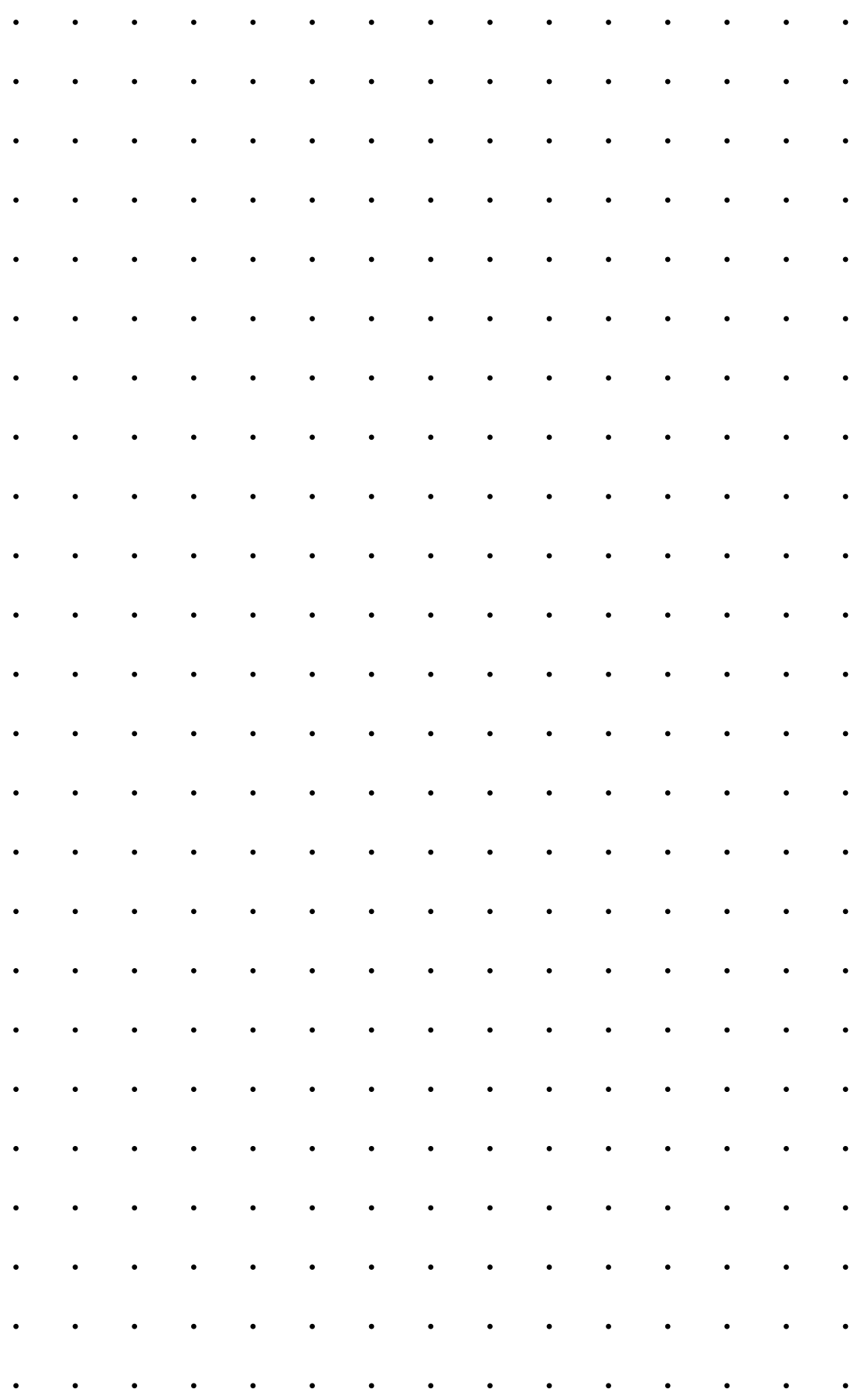
9

5mm^2 grid

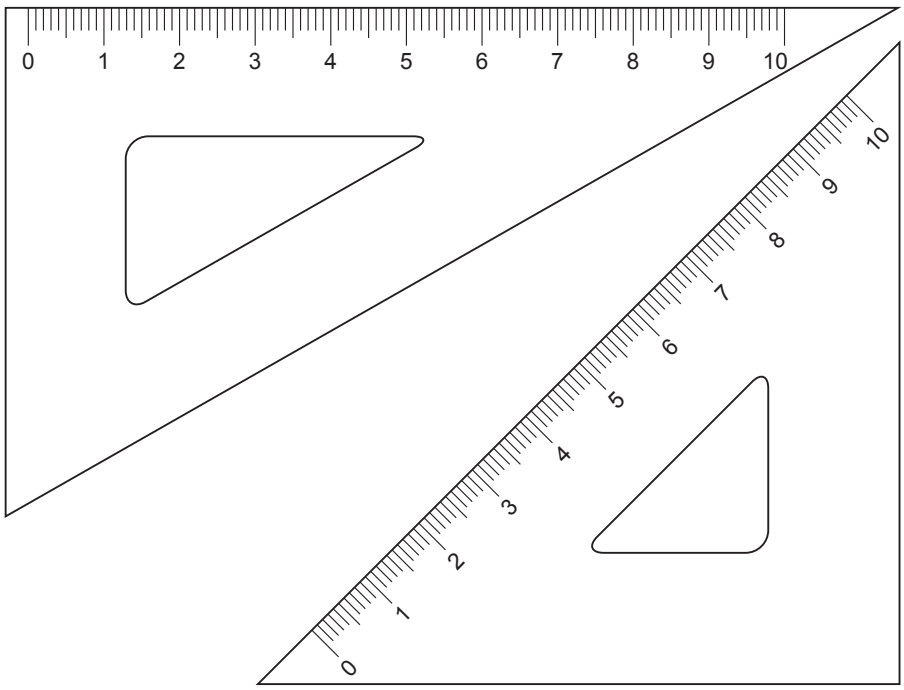


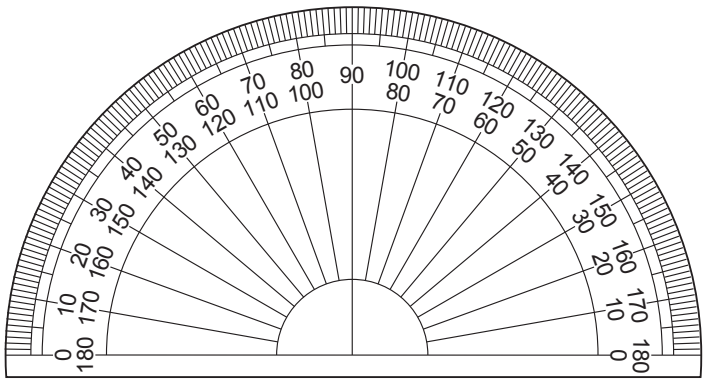
1cm^2 grid

1cm^2 dotted grid



Triangle rulers and protractor





Structure of learning contents in Mathematics from Elementary Prep to Grade 8
Number and Operation

Elementary Prep - Elementary 2

Elementary Prep

+ Natural numbers up to 120

+ Additions and subtractions of one digit numbers
+ Additions and subtractions of simple 2 digit numbers

Elementary 1

+ Natural numbers up to 1000

+ Simple fractions

+ Additions and subtractions of 2 digit numbers
+ Additions and subtractions of simple 3 digit numbers

Elementary 2

+ Natural numbers up to 10000

+ Meaning of multiplication
+ Multiplication table.
+ Multiplication of simple 2 digit numbers

Grade3 - Grade4

Grade 3

+ Natural numbers less than 100 000
+ Addition and subtraction of natural numbers (with carrying & borrowing)
+ Multiplication of natural numbers
+ Meaning of division
+ Division in the simple case where divisors are 1 digit numbers

+The meaning and the representations of decimal numbers
+ Addition and subtraction of decimal numbers (the tenths place)
+The meaning and the representation of fractions
+ Simple addition and subtraction of fractions with same denominator less than 1

Grade 4

+ Natural numbers less than billion
+ Round numbers, round up and round down
+ Division in the case where divisors are 2 digit numbers
+ Acquisition and utilization of 4 operations of natural numbers

+ Addition and subtraction of decimal numbers (the tenths and the hundredths places)
+ Multiplication and division of decimals by whole numbers
+ Addition and subtraction of fractions with same denominators(proper fraction, mixed numbers)

Grade5 - Grade6

Grade 5

+ Even and odd numbers, prime numbers,multiples and divisors
+ Numeration system for decimals, fraction and whole numbers

+ Multiplications and divisions by decimals (tenths and hundredths place, etc)
+ Addition and subtraction of fractions with different denominators

Grade 6

+ Multiplication and division of fractions
+ Calculations that involve both fractions and decimals
+ Consolidation and utilization of the 4 basic operations of decimals and

Grade7 - Grade 8

Grade 7

Positive numbers, negative numbers
+ Necessity and meaning of positive and negative numbers (set of numbers and the 4 fundamental operations)
+ Four basic operations with positive and negative numbers

Algebraic expressions using letters
+ Necessity and meaning of using letters
+ How to express multiplication and division
+ Addition and subtraction with linear expressions
+ Representing with algebraic expressions with letters (representations in inequality)

Linear equations with one unknown
+ Meaning of equations and their solutions
+ Property of equality and how to solve equations
+ Solving and using linear equations (proportional expressions)

Grade 8

Calculations of 4 basic operations with expressions using letters
+ Calculations of addition and subtractions with simple polynomials, as well as multiplication and division with monomials

Simultaneous linear equations with two unknowns
+ Necessity and meaning of simultaneous linear equations with two unknowns and the meaning of their solutions
+ Meaning of simultaneous equations and their solutions
+ Solving simultaneous equations and applying them

Quantities and Measurements

Elementary Prep - Elementary 2

Elementary Prep

+ Comparing amount of length, area, volume (arbitrary)

+ Telling clock times (O'clocks)

Elementary 1

+Unit of length (cm, mm, m)

+ Reading times

Elementary 2

+Unit of volume(L, dL, mL)

+Unit of time (day, hour, minute, second)

Grade3 - Grade4

Grade 3

+Unit of length (km)
+Unit of weight (g, kg, t)

+Calculations with time

Grade 4

+Unit of area (square cm, square m, square km, a, ha)
+Finding area of rectangle and square
+Unit of angle (degree)

Grade5 - Grade6

Grade 5

+Area of triangles, rectangles, parallelograms, trapeziums and rhombi
+Unit of volume (cubic cm, cubic m, mL, kL)
+Volume of cuboids and cubes

+Mean of measurements
+Per unit quantity

Grade 6

+Area of approximate shape
+Area of a circle
+Volume of prisms

+Metric system

+Speed

Grade7 - Grade 8

Grade 7

+Volume cylinders

Geometrical figure

Elementary Prep - Elementary 2

ELementary Prep

+Observing and composing the shapes of planer figures and solid figures

Elementary 1

+Triangles, quadrilaterals, rectangles, squares, right triangles

+shape of a box

Elementary 2

+Circle, sphere

Grade3 - Grade4

Grade 3

+Isosceles triangle, equilateral triangle
+Angle

Grade 4

+Perpendicular and parallel
+Parallelogram, rhombus, trapezium

+Cube, cuboid

Grade5 - Grade6

Grade 5

+Polygons and regular polygons,(irregular polygons)
+Congruence of triangles and quadrilaterals
+Circular constant

+Prisms, cylinders, sketches, nets

Grade 6

+Line symmetry, point symmetry
+Enlarged and reduced figures

Grade7 - Grade 8

Grade 7

Plane figures
+Fundamental methods for constructing of figures and their applications
+Moving figures (parallel translation, symmetric transformation, rotation)

Space figures
+Positional relationship between straight lines and planes
+Structure of space figures and their representation on the plane (sketches, nets, projection drawings)
+Length of arc of a sector and area of the sector
+Surface area and volume of prisms, cones and spheres

Grade 8

Basic plane figures and properties of parallel lines
#Properties of parallel lines and angles
#Properties of angles of polygons

Congruence of plane figures
+Congruence of plane figures and conditions of congruence of triangles
+Necessity, meaning and methods of proof
+Basic properties of triangles and parallelograms

Mathematical relations

Elementary Prep - Elementary 2

Elementary Prep

+Representing the number of objects using pictures and figures

Elementary 1

+Relationship between addition and subtraction

+Basic table and graphs

Elementary 2

+Representing situations where multiplication is used

+Tables and bar graphs in pictorial /symbols

Grade3 - Grade4

Grade 3

+Representing the situations where divisions are used by using algebraic expressions
+Making connections between algebraic expressions and diagrams. Algebraic expressions that use empty boxes

+Tables and graphs(Bar +Columus) in numerical representation

Grade 4

+Algebraic expressions that contain some of the 4 basic operations and
expressions with brackets and formulas.
+Expressions with empty boxes and empty triangles

+Relationship between two numbers/quantities as they vary simultaneously

+Points, broken line graphs

Grade5 - Grade6

Grade 5

+ Simple proportional relations
+Relations of two quantities that are expressed by simple algebraic relations

+Percentage, pie charts

Grade 6

+Algebraic expressions using letters such as x or a

+Proportional relationship

+Proportion and inverse proportion

+The Average of data, frequency distribution, histgram

Grade7 - Grade 8

Grade 7

Direct proportion and Inverse proportion
+Meaning of functional relationship
+Application of direct proportion and inverse proportion
Dispersion of data and representative value of data
+ Necessity and meaning of histogram and representative values
+ Applying histogram and representative values

Grade 8

Linear functions
+ Phenomena and linear functions
+ Tables, algebraic expressions and graphs of linear functions
+ Linear equations with two unknowns and functions
+ Using linear functions

Probability
+ Necessary and meaning of probability and finding the probability

Mathematics Grade 3 Teacher's Manual Development Committee

The Mathematics Teacher's Manual was developed by Curriculum Development Division (CDD), Department of Education in partnership with Japan International Cooperation Agency (JICA) through the Project for Improving the Quality of Mathematics and Science Education (QUIS-ME Project). The following stakeholders have contributed to manage, write, validate and make quality assurance for developing quality Textbook and Teacher's Manual for students and teachers of Papua New Guinea.

Joint Coordinating Committee members for QUIS-ME Project

Dr. Uke Kombra, Secretary for Education - Chairperson, Mr. Walipe Wingi, Deputy Secretary - Deputy Chairperson, Mr. Baran Sori, Mr. Samson Wangihomie, Mr. Titus Romano Hatagen, Dr. Eliakim Apelis, Mr. Godfrey Yerua, Mrs. Annemarie Kona, Mr. Camilus Kanau, Mr. Joseph Moide, Mr. Peter Kants, Mr. Maxton Essy, Mr. Steven Tandale, Ms. Hatsie Mirou, Mr. Paul Ainui, Mr. Packiam Arulappan, Mr. Allen Jim, Mr. Nopa Raki, Mr. Gandhi Lavaki, Mr. John Kakas, Ms. Philippa Darius, Mr. Alex Magun, Ms. Mary Norrie, Mr. James Namari, Ms. Kila Tau, Mr. Moses Hatagen Koran, Ms. Colette Modagai, Ms. Dorothy Marang, Mr. Dan Lyanda, Representatives from Embassy of Japan and JICA PNG Office, Mr. Akinori Ito, MPS, Mr. Chiko Yamaoka and other Project Experts

Steering Committee members for QUIS-ME Project

Mrs. Annemarie Kona, First Assistant Secretary - Chairperson, Mr. Steven Tandale - Assistant Secretary, CDD - Deputy, Chairperson, Ms. Hatsie Mirou, Mr. Paul Ainui, Mr. Gandhi Lavaki, Mr. John Kakas, Ms. Philippa Darius, Mr. Alex Magun, Ms. Mary Norrie, Mr. James Namari, Ms. Kila Tau, Mr. Moses Hatagen Koran, Ms. Mary Phillips, Mr. Nopa Raki, Mr. Geoff Gibaru, Ms. Jean Taviri, Mr. Akinori Ito, MPS, Mr. Chiko Yamaoka, Mr. Satoshi Kusaka, Mr. Ryuihi Sugiyama, Mr. Kenichi Jibutsu, Ms. Masako Tsuzuki, Dr. Kotaro Kijima, Ms. Kyoko Yamada and Representatives from Textbook writers and JICA PNG Office

Curriculum Panel

Mr. Steven Tandale, Mr. Gandhi Lavaki, Ms. Philippa Darius, Mr. Alex Magun, Mr. John Kakas, Ms. Mirou Avosa, Ms. Mary Norrie, Mr. Gilbert Ikupu, Mr. John Wek, Betty Bannah, Mr. Vitus Witnes, Ms. Clemencia Dimain and Ms. Celine Vavetaovi

Editorial Supervisors

Prof / Dr. Masami Isoda, Mr. Satoshi Kusaka, Mr. Katsuaki Serizawa and Mr. Akinori Ito, MPS

Content Supervisors

Ms. Kyoko Yamada, Prof. Hiroki Ishizaka, Prof. Yoichi Maeda and Prof. Takeshi Sakai

Writers & Proofreaders (Curriculum Officers & Textbook writers - Math working Group)

Ms. Mary Norrie - Math Working Group Leader, Mr. James Namari, Ms. Kila Tau, Mr. Anda Apule, Ms. Pisah Thomas, Ms. Michelle Pala, Ms. Ileen Palan, Ms. Hilda Tapungu, Mr. Armstrong Rupa and Mr. Gibson Jack

Chief Proofreader, Illustrators, Photos & Desktop Publishing

Mr. Alex Magun (Chief Proofreader), Mr. Micheal John (Illustrator), Mr. David Gerega, Mr. Vitus Witnes (Graphic designers), Mr. Armstrong Rupa, Mr. Gibson Jack, Ms. Yoshiko Osawa, Ms. Michiyo Ueda (Desktop Publishing), Mr. Chiko Yamaoka (Photographer) and Gakko Tosho Co.,Ltd. (Photos and illustrations)

Validation Team (Math working group & Teachers from pilot schools)

Ms. Aiva Koia, Ms. Aloisia Charles, Ms. Anne Auhava, Ms. Glenda Blasius, Ms. Idau Rea, Ms. Jacklyn Kerowa, Mrs. Johanne Wambriwari, Mr. John Otai, Ms. Lee Kalinoe, Ms. Linda Wami, Ms. Marcia Pau, Ms. Serah Robinson, Ms. Sheila Sabarei, Ms.Susie Pet, Ms. Sussie Kipak and Mrs. Theresa Paisoi

Cooperation

Japan International Cooperation Agency (JICA), Department of National Planning & Monitoring (DNPM), Bank of Papua New Guinea, Centre for Research on International Cooperation in Education Development (CRICED) - University of Tsukuba, Naruto University of Education, Gakko Tosho Co.,Ltd. , Gaire Primary School, Iobuna Kouba Primary School, Koki Primary School, Koiari Park Primary School, St. John Primary School, St. Peter Primary School, St. Therese Primary School, Sogeri Primary School, Tubuseria Primary School and Wardstrip Primary School.

Department of Education

From the People of Japan

JICA

筑波大学 University of Tsukuba

国立大学法人 鳴門教育大学 Naruto University of Education

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