# Mathematics

## Teacher's Manual

## Grade 5

Papua New Guinea
Department of Education

From
the People of Japan

JICA

QUIS-ME
We love Mathe and Science !
Department of Education & JICA

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# Acknowledgements

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# Mathematics
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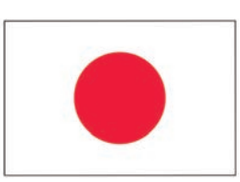


From
the People of Japan


# Table of Contents

# *Secretary's Message*

**Dear Teacher,**

The Mathematics Teacher's Manual is produced for Grade 5 teachers to guide them to plan and teach the Mathematics lessons jointly with the National Grade 5 Mathematics Textbook. It is designed for quality teaching and learning to achieve the implemented curriculum outlined in the Mathematics Syllabus.

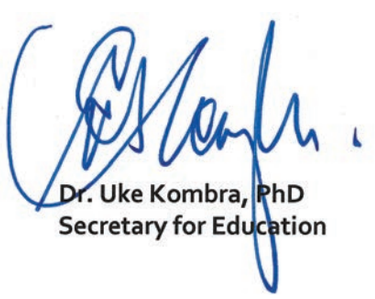
The Teacher's Manual provides suitable teaching and learning strategies, content, concepts and plans for teachers to promote and maintain standard lessons for daily, termly and yearly teaching and learning activities nationwide. It guides critical thinking and problem solving approaches in which the teacher 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 assess.

The Teacher's 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. It guides teachers to deliver lessons to promote enjoyment and love of mathematics.

Some teachers are confident in teaching Mathematics while others find it challenging. 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, the teacher 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 5 Mathematics to be used with the National Textbook as an official teaching resource in all primary schools throughout Papua New Guinea.



**Dr. Uke Kombra, PhD**
**Secretary for Education**

# How to use the Teacher's Manual

## Introdudction

It is important to understand the composition of the National Textbook in order to use the Teacher's Manual effectively .The Teacher's Manual (TM) has been developed for teachers to teach learning contents to their students more effectively with the National Textbook (TB). The features of this Teacher's Manual and its contents correspond to the National Mathematics Textbook according to Grades 3, 4 & 5 Mathematics Syllabus. The standards outlined in the syllabus are reflected in this Teacher's Manual to help teachers plan and conduct lessons. The Preliminary pages of the Teacher's Manual consists of the following 6 sections: **Components of the Teacher's Manual, Lesson Presentation using Textbook and Teacher's Manual, How to Use the Blackboard Plan, How to Conduct Assessment, Attachments and Yearly Overview.** It is important for you to take time to read and understand how to use the Textbook and the Teacher's Manual.

# 1. Components of the Teacher's Manual

## 1.1 Composition of the National Textbook

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

**1. Chapter Heading**

Heading colour changes to assist teachers to recognise each teaching term.


**2. Titles and Numbers**

Each chapter consists of Chapter and Sub-chapter titles with numbers. All problems in the textbook have Tasks and Activities including their numbers. 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. Brainstorming Activity**

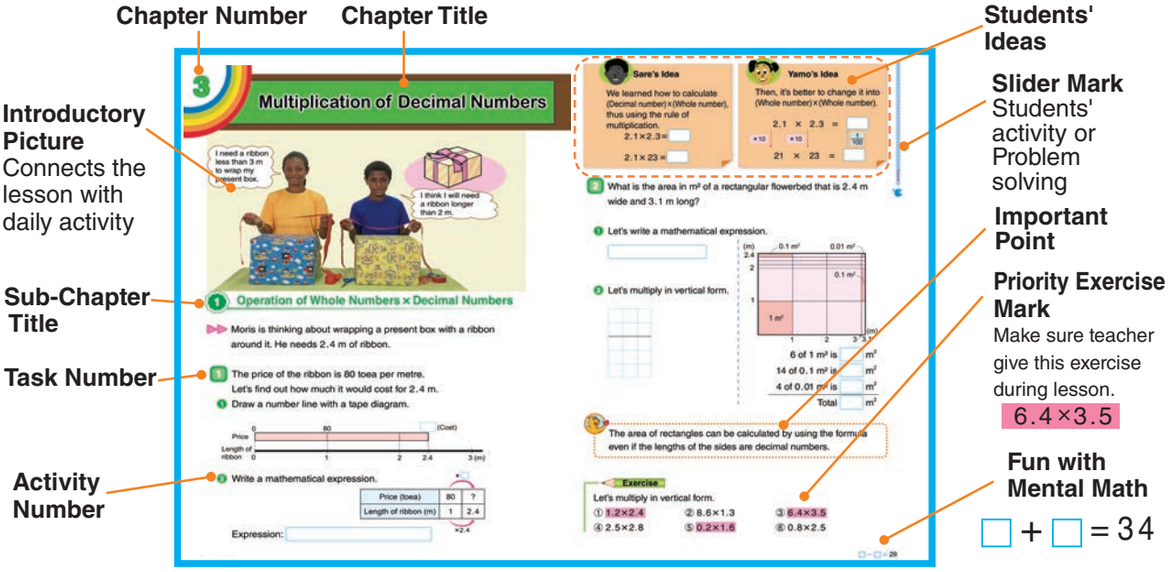
Some chapters have Ice breaking activity as the lead up activity for the chapter.

**5. Fun with Mental Math!**

□ × □ = 29

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

## Sample Textbook Page



## Key Competencies acquired through the use of the 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, the textbooks are designed in order to use acquired abilities and skills for future learning contents and daily life situations.

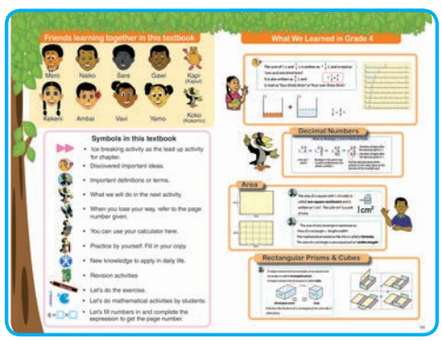
## Structure of a Chapter in the Textbook

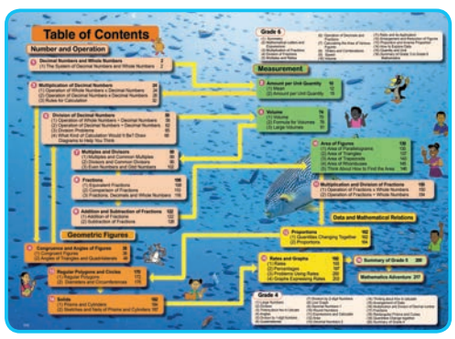
The structure in the Chapters consist of several Sub-chapters, Tasks, Activities, Exercises and ends with a set of Exercise and Problems.


## Parts of the Textbook

### Textbook Introduction Page

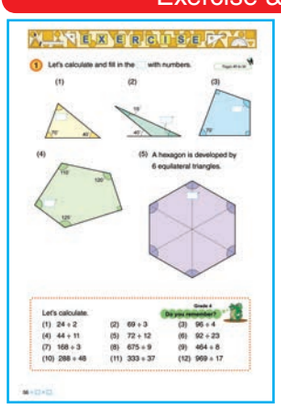
The introduction page consists of two pages which introduces very important information and icons allowing students and teachers to be familiar with what is expected to be encountered in the textbook. It also has chapters learned from previous grade outlined carefully in a table of contents. It promotes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

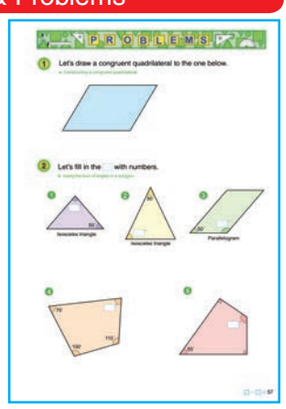


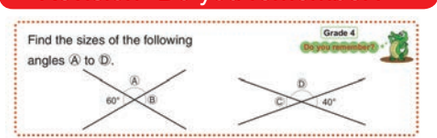

### Exercise & Problems

At the end of each chapter, Exercises are set for students to consolidate what has been learned 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 learned.



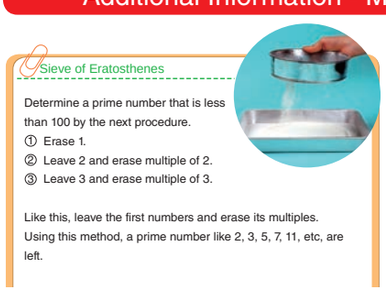




### Revision "Do you remember?"




This section of the textbook is purposely for revision. Before moving on to 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 consolidating of previous content.

### Additional Information - Mathematics Extra




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: **Lesson Information, Sub-Unit and Lesson Objectives, Prior Knowledge, Assessment, Preparation, Lesson Flow, Teacher's Note, Sample Blackboard Plan and Reduced Textbook page of the lesson**. 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 Number, 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.

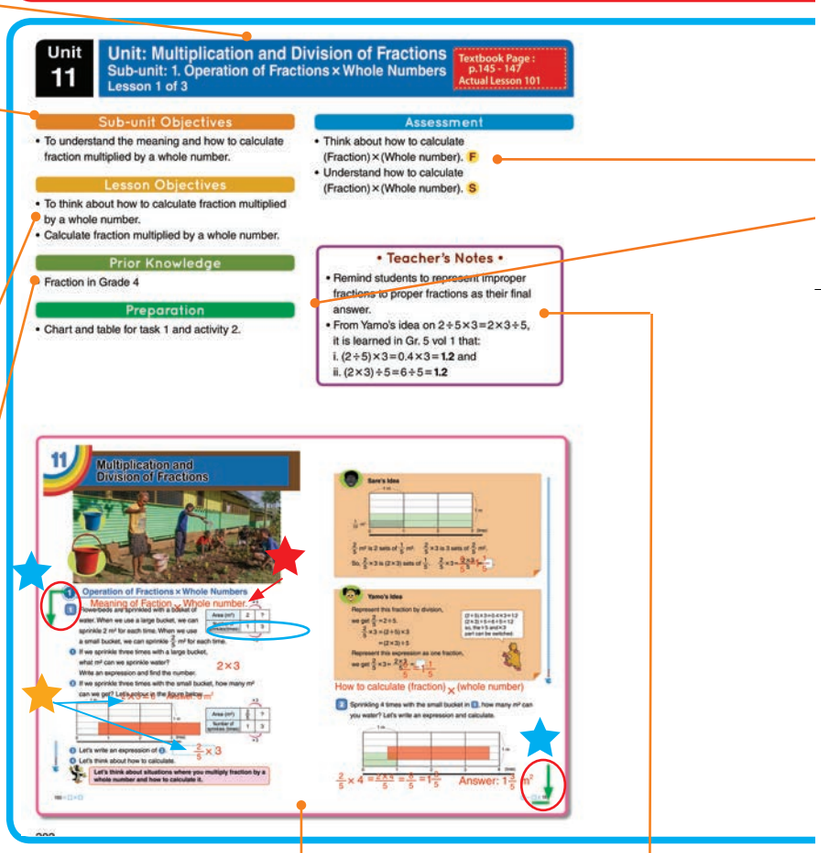
### Lesson Objective

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.

### Sample Teacher's Manual Page




### 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.

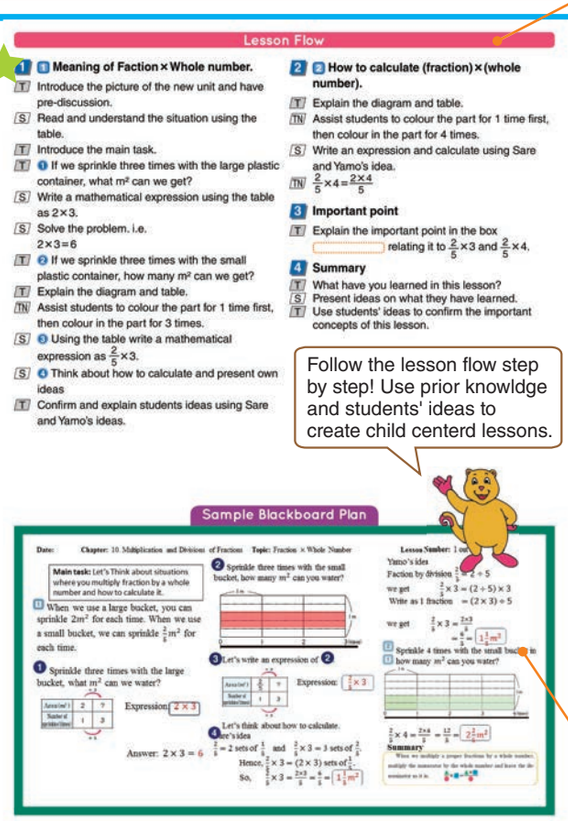
- **Lesson span** :Where the lesson begins and ends is indicated.
- Answers and solutions of the Tasks, Activities, Problems and Exercises.
- Teaching points such as; Purpose of the Tasks, Exercises and Problem types and characteristics of the problem, calculation and concepts.

## Assessment

There are two types of assessments in this Teacher's Manual, 'Formative F' and 'Summative S'. The details are shown on page IX.

## 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 Meaning of Faction × Whole number.
T Introduce the picture of the new unit and have pre-discussion.
S Read and understand the situation using the table.
T Introduce the main task.
T 1 If we sprinkle three times with the large plastic container, what m² can we get?
S Write a mathematical expression using the table as 2×3.
S Solve the problem. i.e. 2×3=6
T 2 If we sprinkle three times with the small plastic container, how many m² can we get?
T Explain the diagram and table.
TN Assist students to colour the part for 1 time first, then colour in the part for 3 times.
S 3 Using the table write a mathematical expression as $\frac{2}{5}\times3$.
S 4 Think about how to calculate and present own ideas
T Confirm and explain students ideas using Sare and Yamo's ideas.

2 How to calculate (fraction) × (whole number).
T Explain the diagram and table.
TN Assist students to colour the part for 1 time first, then colour in the part for 4 times.
S Write an expression and calculate using Sare and Yamo's idea.
TN $\frac{2}{5}\times4=\frac{2\times4}{5}$

3 Important point
T Explain the important point in the box ( ) relating it to $\frac{2}{5}\times3$ and $\frac{2}{5}\times4$.

4 Summary
T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

Follow the lesson flow step by step! Use prior knowldge and students' ideas to create child centerd lessons.

Sample Blackboard Plan

Date: Chapter: 10. Multiplication and Division of Fractions Topic: Fraction × Whole Number Lesson Number: 1 out

Main task: Let's Think about situations where you multiply fraction by a whole number and how to calculate it.

When we use a large bucket, you can sprinkle 2m² for each time. When we use a small bucket, we can sprinkle $\frac{1}{3}$m² for each time.

1 Sprinkle three times with the large bucket, what m² can we water?

Expression: 2 × 3

Answer: 2 × 3 = 6

2 Sprinkle three times with the small bucket, how many m² can you water?

3 Let's write an expression of 2

Expression: $\frac{1}{3}\times3$

4 Let's think about how to calculate. Here's idea

$\frac{1}{3}$ = 2 sets of $\frac{1}{3}$ and $\frac{1}{3}\times3$ = 3 sets of $\frac{1}{3}$

Hence, $\frac{2}{3}\times3=(2\times3)$ sets of $\frac{1}{3}$

So, $\frac{2}{3}\times3=\frac{2\times3}{3}=\frac{6}{3}=1\frac{1}{3}$m²

Yamo's idea

Faction by division $\frac{2}{5}=2\div5$

we get $\frac{2}{5}\times3=(2\div5)\times3$

Write as 1 fraction $=(2\times3)\div5$

we get $\frac{2}{5}\times3=\frac{2\times3}{5}=\frac{6}{5}=1\frac{1}{5}$m²

5 Sprinkle 4 times with the small bucket in how many m² can you water?

$\frac{2}{5}\times4=\frac{2\times4}{5}=\frac{12}{5}=2\frac{2}{5}$m²

Summary

When we multiply a proper fractions by a whole number, multiply the numerator by the whole number and leave the denominator as it is.

$\frac{2}{5}\times4=\frac{8}{5}$

## Teacher's Notes

Contains supplementary information that is useful for teachers and enhances their content background knowledge as well.

## Lesson flow

The lesson flow consists of several teaching points that will help in the understanding and visualisation 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.

T/S : Instruction for both teacher and students to carry out together.

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 are indicated by the dotted boxes below;

Important Ideas

Important Definitions or Terms

## Sample Blackboard Plan

Shows a plan of how the blackboard can be arranged and must be utilised as a guide. Refer to page VII for more details.

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. Content Standard**

The Content Standards outlines the expected content to be attained in this grade and is outlined in the syllabus, comprising of the facts, concepts and ideas that are important for the students.

**2. Unit Objective**

The 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 depth and content.

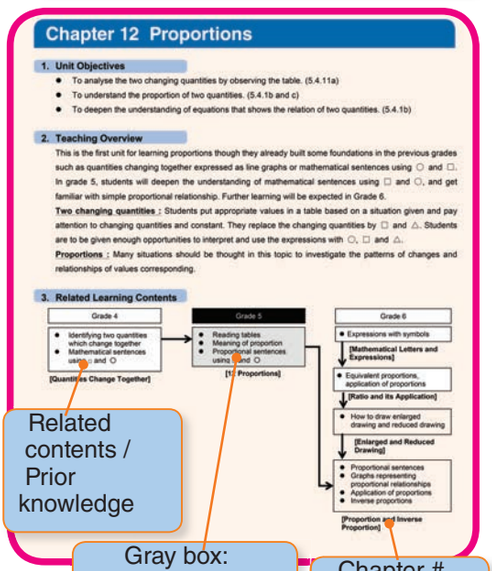
**3. Teaching Overview**

The Teaching Overview outlines the main content areas to be covered in each unit with sub units briefly described to rationalise 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.

**4. Related Learning Content**

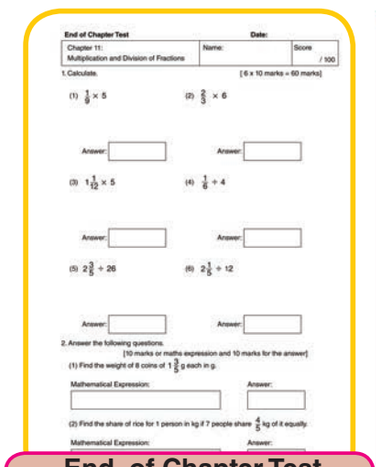
Related Learning Content outlines the content map of what the students have learned already, in-line with the current unit to be taught. The previous content covered will serve as the foundation for students to learn new concepts and contents. Furthermore, the current unit to be learned is also linked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

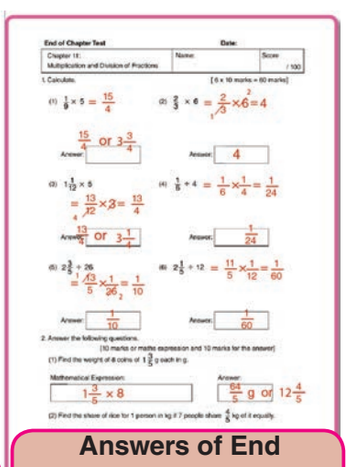
The three digits such as 5.1.3 represents the grade level (5), strand (1), and the content standard (3).The expansion of the content standard is further outlined in the Unit Objective.




## 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 conducted 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. The test should be conducted as **a separate lesson** to confirm students progress or as assessment. Answers to the end of chapter test is located before a page of End of Chapter Test as sample on left.


End of Chapter Test


Answers of End of Chapter Test

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 Textbook and Teacher's Manual

In every lesson preparation, teachers should always consider what to do before, during and after the lesson. Both the Teacher's Manual and Textbook 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 Textbook and Teacher's Manual 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 and be familier with the answers to the activities and exercises in advance.
4. Study the lesson flow, 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 Teacher's Manual 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 learned and predict what is expected to be learned in the next lesson.

**Must Dos**

- Strictly follow Teachers Manual with reference to the Textbook.
- Conduct experimental activities when necessary.
- Expansion of student ideas in the textbook.
- Involve students in outdoor exercises when required to.
- Encourage students to use mathematical tools or instruments appropriately for its purpose.
- Encourage more student interactions.
- 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 blackboard plan.
4. Student responses during summary of the lesson.
5. Making adjustments based on the evaluation to improve teaching strategies may require re-teaching.

# 3. How to Use the Blackboard Plan

The Blackboard is an important tool for teachers to use daily. This Teacher's Manual 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.

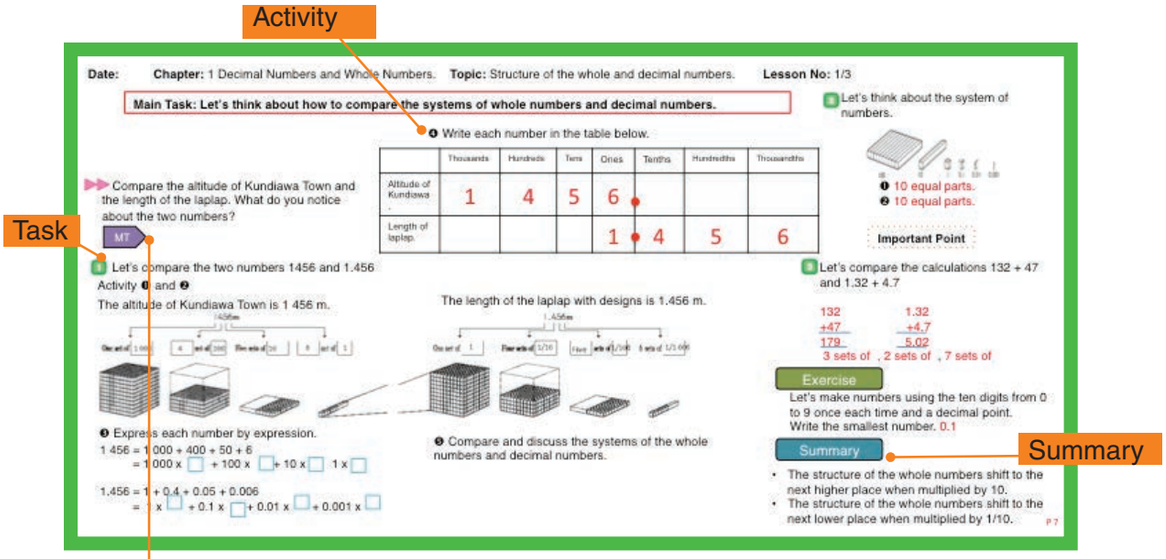
Use the blackboard according to the following steps.

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




MT: Main Task mark

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

## 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 For or As)
2. Summative Assessment (Assessment Of)
This should guide teachers to prepare assessment tasks and methods.
You will find summative **S** and formative **F** assessment indicated in every lesson so it is important for you to plan how you want to assess students' learning and performance.

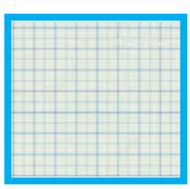
**F Formative assessment**
Formative assessment examples in the Teacher's Manual:
- Observation checklists
- Correction of exercises
- Analysis of discussions
- Students' participation.

**S Summative assessment**
Summative assessment examples include:
- Exercise and Problems
- End of Chapter Test
- Projects
- Homework and Assignments.

## 5. Attachments

The Teacher's Manual has four attached pages that the teacher can use when teaching lessons. The pages consist of a Mathematics game information, Contents Chart and dotted grids (5 $mm^2$ grid, a 1 $cm^2$ grid, a 1 $cm^2$ ) and triangle rulers and a protractor.

1. **Mathematics game information**
2. **Content Chart from Elementary Prep to Grade 8**
3. **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.
4. **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.
5. **1 $cm^2$ dotted grid**
   The 1 $cm^2$ dotted grid can be used for drawing various lines, shapes or figures.
6. **Triangle rulers and protractor**
   The triangle rulers and protractor can be used to draw shapes and figures, measure and confirm lengths and angles.




These attachments can be photocopied and given to students when materials are not available in schools.

# 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.

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. Column of Unit Names are highlighted by term colours suchas term1: green, term2: orange, term3: blue and tearm 4: Pink. Finally, page numbers are attached to each lesson to easily identify the lesson topics for planning.
**Note:** In the Yearly overview, the term 'units' is used while the term 'chapter' is used in the textbook.

| Strand | Unit # | Unit Name and Sub-unit Name | Lesson # | Page # |
|---|---|---|---|---|
| Measurement | 6 | **Volume** | | **74** |
| | | 1. Volume | 49 | 74,75 |
| | | | 50 | 76,77 |
| | | 2. Formula for Volumes | 51 | 78,79 |
| | | | 52 | 79,80 |
| | | 3. Large Volumes | 53 | 81 |
| | | | 54 | 82 |
| | | | 55 | 83 |
| | | | 55 | 83,84 |
| | | | 57 | 85 |
| | | Exercise, Problems and Evaluation | 58,59 | 86,87 |
| Number and Operation | 7 | **Multiples and Divisors** | | **88** |
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| | | | 61 | 91,92,93 |
| | | | 62 | 94 |
| | | 2. Divisors and Common Divisors | 63 | 95,96,97 |
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| | | | 65 | 99,100 |
| | | | 66 | 100,101 |
| | | 3. Even Numbers and Odd Numbers | 67 | 102 |
| | | Exercise, Problems, Evaluation and Mathematics Extra | 68,69 | 103,104,105 |
| Number and Operation | 8 | **Fractions** | | **106** |
| | | 1. Equivalent Fractions | 70 | |
| | | 2. Comparison of Fractions | 71 | 110,111 |
| | | | 72 | 112 |
| | | | 73 | 113 |
| | | | 74 | 114,115 |
| | | 3. Fraction, Decimals and Whole Numbers | 75 | 116,117 |
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| | | | 77 | 118 |
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# Chapter 1 Decimal Numbers and Whole Numbers

## 1. Content Standard

5.1.3 Use base 10 system representation to compare and convert whole number to decimal numbers.

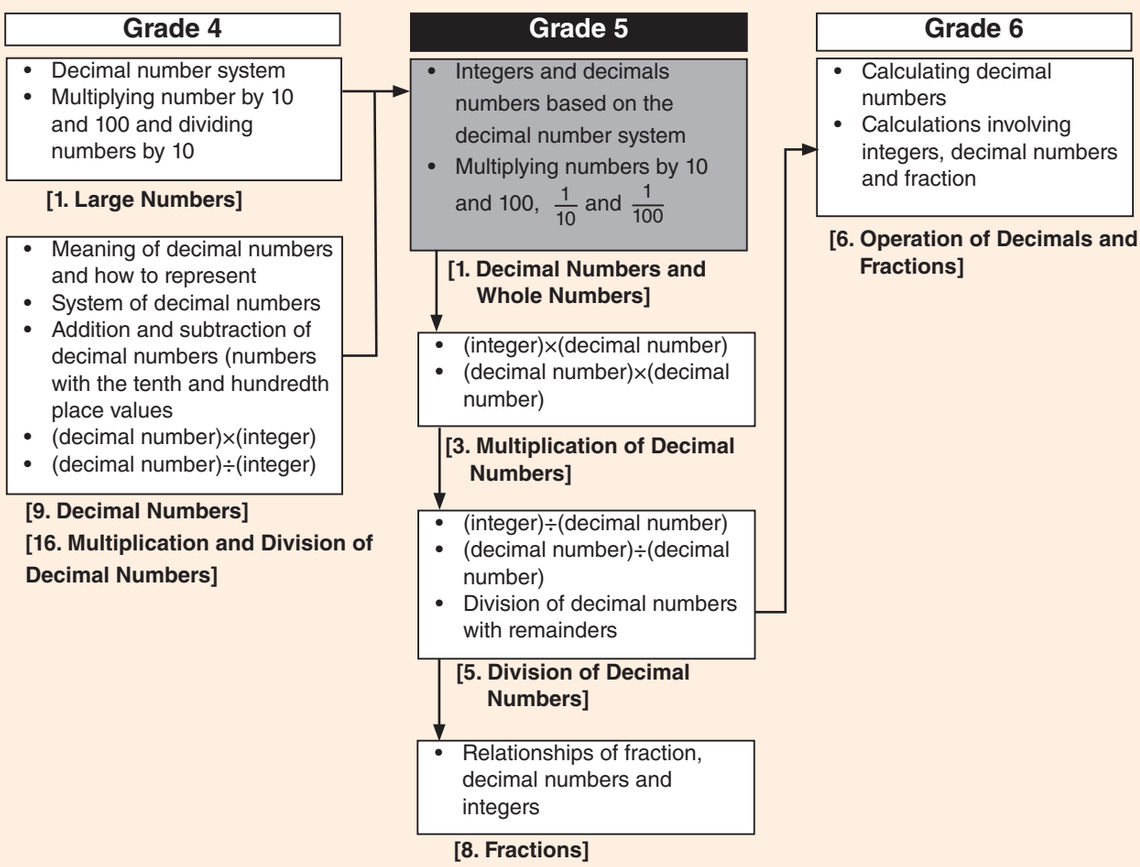
## 2. Unit Objectives

- To deepen the understanding about whole number and decimal number through considering decimal numeration sysytem.
- Multiply a number by 10 times, 100 times, $\frac{1}{10}$ or $\frac{1}{100}$.

## 3. Teaching Overview

Students learned large whole numbers and decimal numbers with up to thousandths in the previous grades. In this unit, they learn decimal numbers and whole numbers comprehensively in the same binary number system. Number place table will help students to understand how numbers slip off as they make the original number 10 and 100 times or tenths and hundredths though the arrangement of numbers does not change.

## 4. Related Learning Contents



# Unit 1

# Unit: Decimal Numbers and Whole Numbers

## Sub-unit 1: The System of Decimal Numbers and Whole Numbers

## Lesson 1 of 3

Textbook Pages : 002 to 005
Actual Lesson 001

## Sub-unit Objective

- To deepen the understanding about the structure of whole numbers and decimal numbers.

## Lesson Objectives

- To understand that a decimal and whole number have the same structure.
- To deepen understanding about the system of decimal numbers.

## Prior Knowledge

- Decimal numbers up to hundredth place (Grade 4)

## Preparation

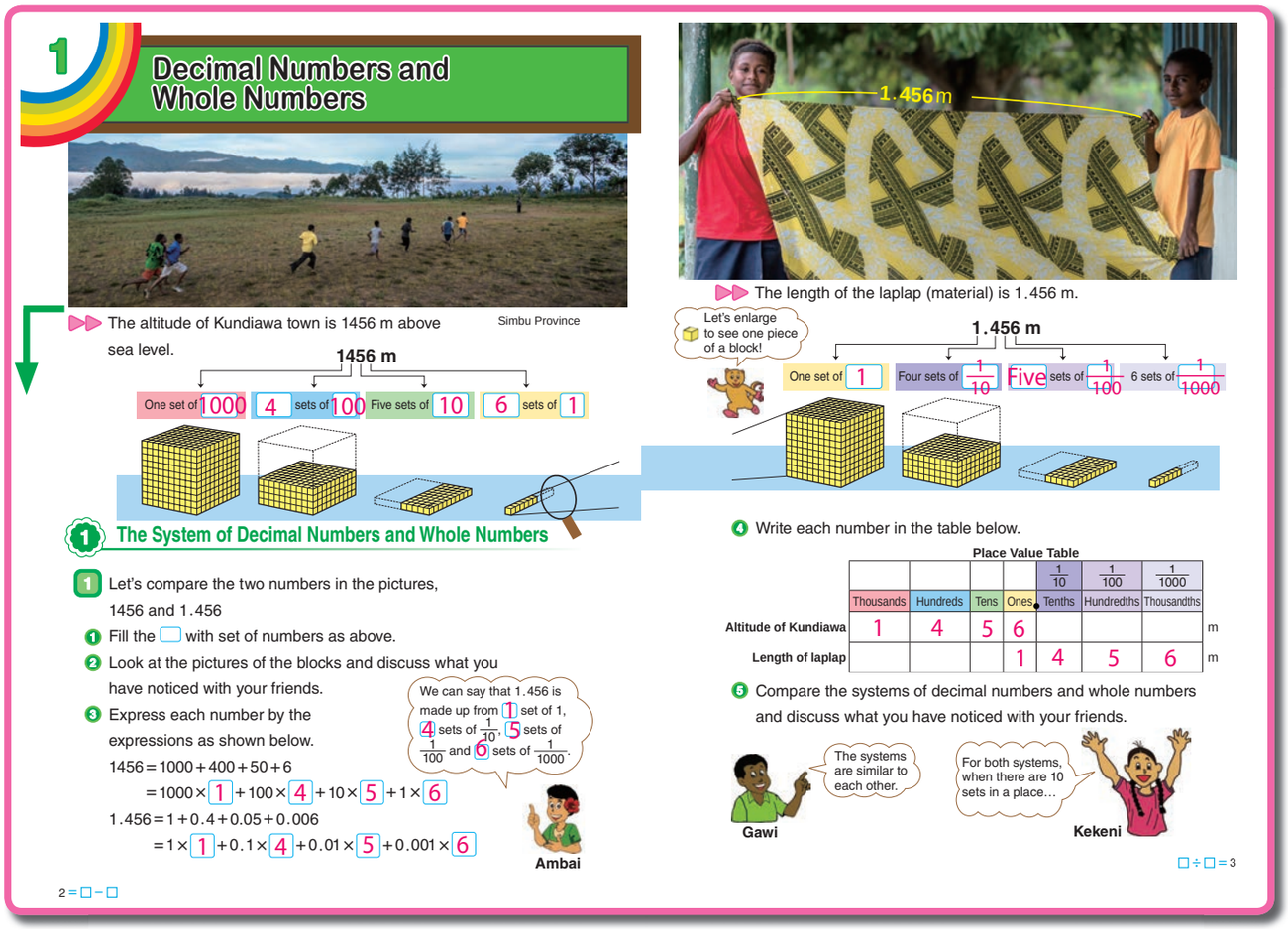
- Diagram of the structure of whole numbers and decimal numbers on pages 2 and 3

## Assessment

- Enjoy comparing the structure of whole numbers and decimal numbers. F
- Demonstrate the understanding of the structure of decimal numbers by completing the tasks. S
- Solve the exercises correctly. S

## Teacher's Notes

Notice that the cube diagram in the textbook is magnified. From ones place value on page 2 is further broken down to the thousandths place on page 3.
In fact, the size of the bigger block is reduced to a single cube and when seen through a magnifying lens, the emphasis is to visualise that the structure of the whole number and decimals is the same.



## Lesson Flow

### 1 ① Comparing two numbers 1456 and 1.456

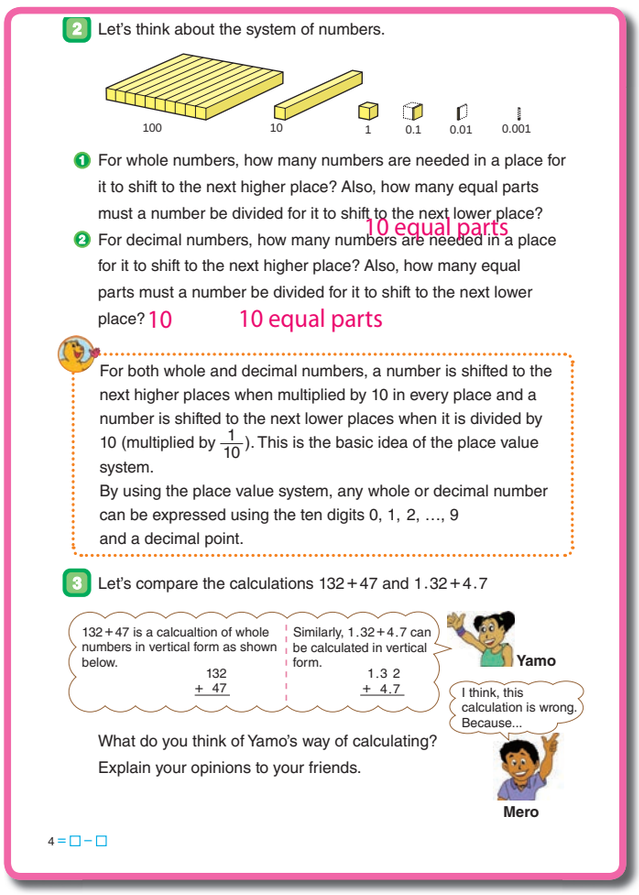
T ▷▷ Ask students to compare the altitude of Kundiawa town and the length of the laplap. What do you notice about the two numbers?
T Introduce the Main Task. (Refer to the BP)
S ① Fill in the boxes with sets of numbers for 1456 and 1.456
T ② Look at the picture of the blocks and discuss what they notice.
S The structure of blocks for whole numbers and decimal numbers are similar.
S ③ Express each number by filling in the boxes.

### 2 Write the whole and decimal number in the place value chart.

S ④ Fill in the place value chart with numbers.
1. The altitude of Kundiawa town.
2. The length of the laplap.

### 3 ⑤ Discuss the system of whole and decimal numbers.

T From the place value chart in ④, compare and discuss what you have noticed with your friends.
S There are 10 sets in a place value therefore, the systems are similar.




### 4 ② Think about the system of whole number and decimal number.

T Ask students to think about the system of numbers and explain what they think.
T/S ① For whole numbers;
a) How many numbers are needed in a place for it to shift to the next higher place? (10)
b) How many equal parts must a number be divided for it to shift to the next lower place? (10 equal parts)
T/S ② For decimal numbers;
a) How many numbers are needed in a place for it to shift to the next higher place?(10)
b) How many equal parts must a number be divided for it to shift to the next lower place? (10 equal parts)

### 5 Important Point

T/S Explain the important point in the box .

### 6 ③ Investigate the two calculations.

T Ask the students to do a comparison of the two ideas in the calculation of whole number and decimal number.
What do you think of Yamo's way of calculating?
S Explain their opinions to their friends.

### 7 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 8 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

**Page 5 of the textbook**

**Exercise**

Let's make numbers using the ten digits from 0 to 9 once each time and a decimal point. 0.1
Write the smallest number. Write a number that is smaller than 1 and is nearest to 1. Ex 2. answer 0.9

## Sample Blackboard Plan

Lesson 001 Sample Blackboard Plan is on page 7.

# Unit 1

# Unit: Decimal Numbers and Whole Numbers

## Sub-unit 1: The System of Decimal Numbers and Whole Numbers

## Lesson 2 of 3

**Textbook Pages : 005 and 006**
**Actual Lesson 002**

## Lesson Objective

- To find that when we multiply a number by 10, 100, the decimal point and number moves to the right side.

## Prior Knowledge

- The structure of decimal number and whole number.

## Preparation

- Diagram of stickers and place value chart on pages 5 and 6.
- Place value chart for activity ③

## Assessment

- Determine how the decimal point and number moves when multiplying a number by 10 or 100. F
- Solve the exercises correctly. S

## Teacher's Notes

The meaning of multiplying decimal numbers is given in the table in ③ where each digit in the decimal number moves and not the decimal point.
The technique in application to calculate decimal numbers is given in ⑤ where we assume that the decimal point moves.

**Exercise**

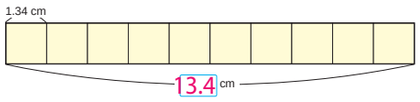
Let's make numbers using the ten digits from 0 to 9 once each time and a decimal point.
Write the smallest number. Write a number that is smaller than 1 and is nearest to 1.

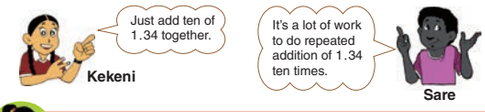
### How to move the decimal point when multiplying by 10 or 100.

**10 Times and 100 Times of a Number**

④ Let's consider numbers multiplied by 10 and 100.

① There are 10 stickers, each one is 1.34 cm wide and are lined up as shown below. How many centimetres (cm) is the total length?



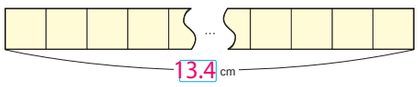




**Vavi's Idea**

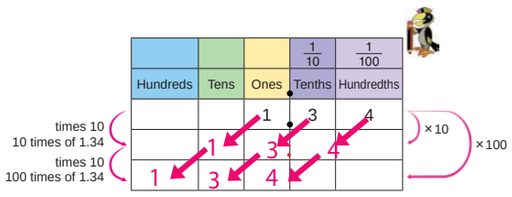
It is ten times of 1.34, so we can solve it by doing
1.34 × 10 = 13.4

$$\begin{array}{r} 1.34 \\ \times\ \ 10 \\ \hline 13.4 \end{array}$$

② There are 100 stickers, each one is 1.34 cm wide and are lined up. How many cm is the total length?

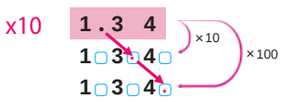



③ Write the total lengths when there are 10 stickers and 100 stickers in the table below.




④ What rules are there?

⑤ Write in the decimal points when 1.34 is multiplied by 10 and 100.




If a number is multiplied by 10, the decimal point moves 1 place to the right.
If a number is multiplied by 100, the decimal point moves to 2 places to the right.

**Exercise**

Let's answer the following questions.
① Write the numbers when 23.47 is multiplied by 10 and 100.
234.7 and 2347
② How many times of 8.72 are 87.2 and 872?
10 times and 100 times

□ ÷ □ = 5

6 = □ − □

## Lesson Flow

### 1 Review the previous lesson.

### 2 ❹ ❶ Multiply 1.34 cm by 10.

T Introduce the Main Task. (Refer to the BP)
T Let's study numbers multiplied by 10.
S 10 stickers, each 1.34 cm in length are lined up as shown below.
S It's a lot of work to do addition of 1.34 ten times.
T How many centimetres is the total length?
S We can solve by multiplication using Vavi's idea.
S $1.34 \times 10 = 13.4$

### 3 ❷ Multiply 1.34 cm by 100.

T Let's study numbers multiplied by 100.
S It's a lot of work to do addition of 1.34 hundred times.
T How many centimetres is the total length?
S We can solve by multiplication using Vavi s idea.
S $1.34 \times 100 = 134$

### 4 ❸ When multiplying by 10 or 100, discuss what they notice and explain using the place value chart.

T Put up the place value chart and ask the students to fill in the blank spaces.
S Fill in the place value chart using Vavi's idea.
T ❹ Study the place value chart and share any rules discovered.
S 1. When multiplying by 10 each digits in the number moves one place higher.
2. When multiplying by 100 each digits in the number moves two places higher
T ❺ Write in the decimal points when 1.34 is multiplied by 10 and 100.
S 1. When multiplying by 10 the decimal point moves one place to the right.
2. When multiplying by 100 the decimal point moves two places to the right.

### 5 Important Point

T/S Explain the important point in the box .

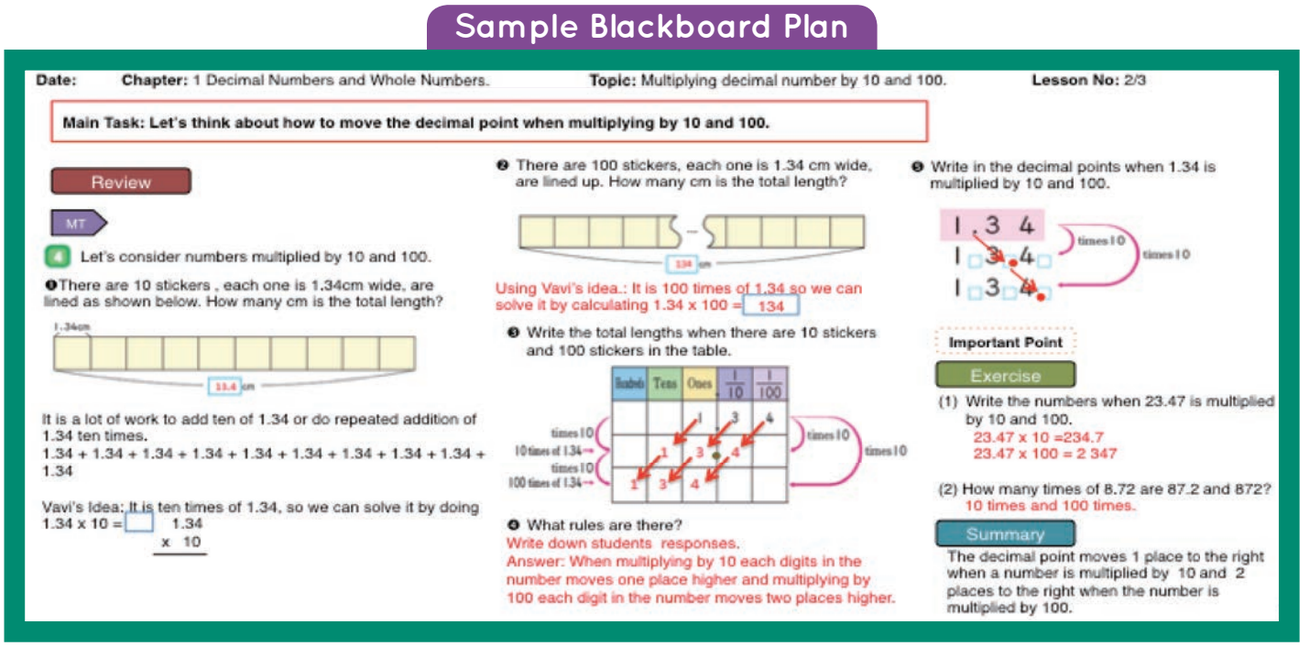
### 6 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 1

# Unit: Decimal Numbers and Whole Numbers
## Sub-unit 1: The System of Decimal Numbers and Whole Numbers
## Lesson 3 of 3

Textbook Page : 007
Actual Lesson 003

## Lesson Objective

- Understand that when multiplying by $\frac{1}{10}$ and $\frac{1}{100}$, the decimal point moves to the left side.

## Prior Knowledge

- How to move the decimal point when multiplying by $\frac{1}{10}$ and $\frac{1}{100}$.

## Preparation

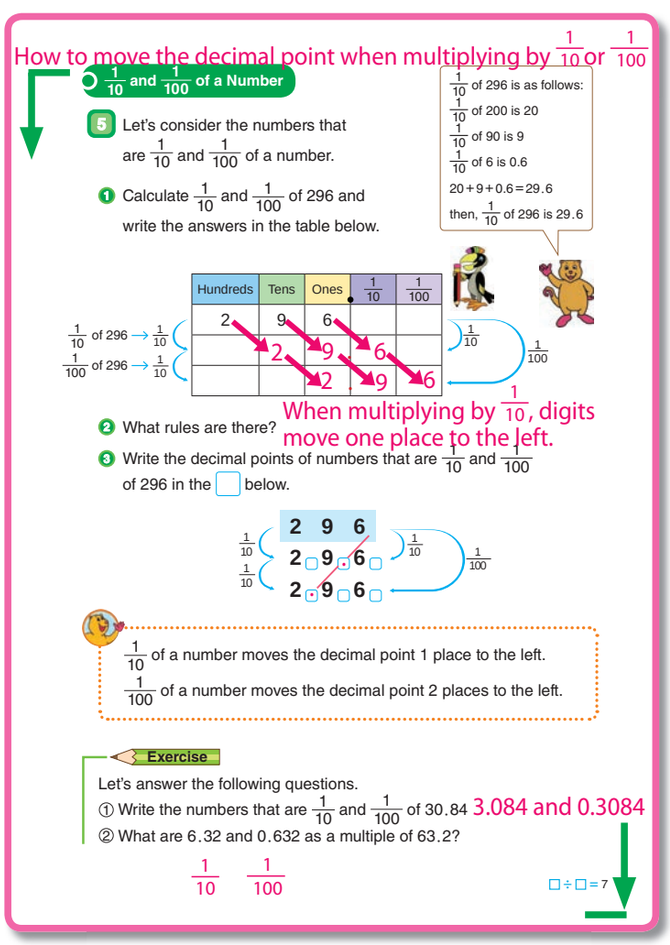
- Place value chart for 1
- Chart for 3

## Assessment

- Determine how the decimal point moves when multiplying a number by $\frac{1}{10}$, $\frac{1}{100}$. F
- Solve the exercises correctly. S

## Teacher's Notes

For activity 1 and 2, let students give their responses and write them down on the blackboard.
Later the teacher can confirm their responses.



## Lesson Flow

### 1 Review the previous lesson.

T Introduce the Main Task. (Refer to the BP)

### 2 5 Considering the numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of 296.

T ❶ Ask students to fill in the place value chart using the hint from the Kapul.

S Fill in the place value chart with the answers for $\frac{1}{10}$ of 296 and $\frac{1}{100}$ of 296.

T ❷ From the place value chart in ❶, what rules have you discovered?

S 1. When multiplying by $\frac{1}{10}$ each digit in the number moves one place lower than 1.
2. When multiplying by $\frac{1}{100}$ each digit in the number moves two places lower than 1.

T ❸ Write in the decimal points of numbers that are $\frac{1}{10}$ and $\frac{1}{100}$ of 296 in the ☐.

S 1. When multiplying by $\frac{1}{10}$ the decimal point moves one place to the left.
2. When multiplying by $\frac{1}{100}$ the decimal point moves two places to the left.

### 3 Important Point

T/S Explain the important point in the box ⬚.

### 4 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

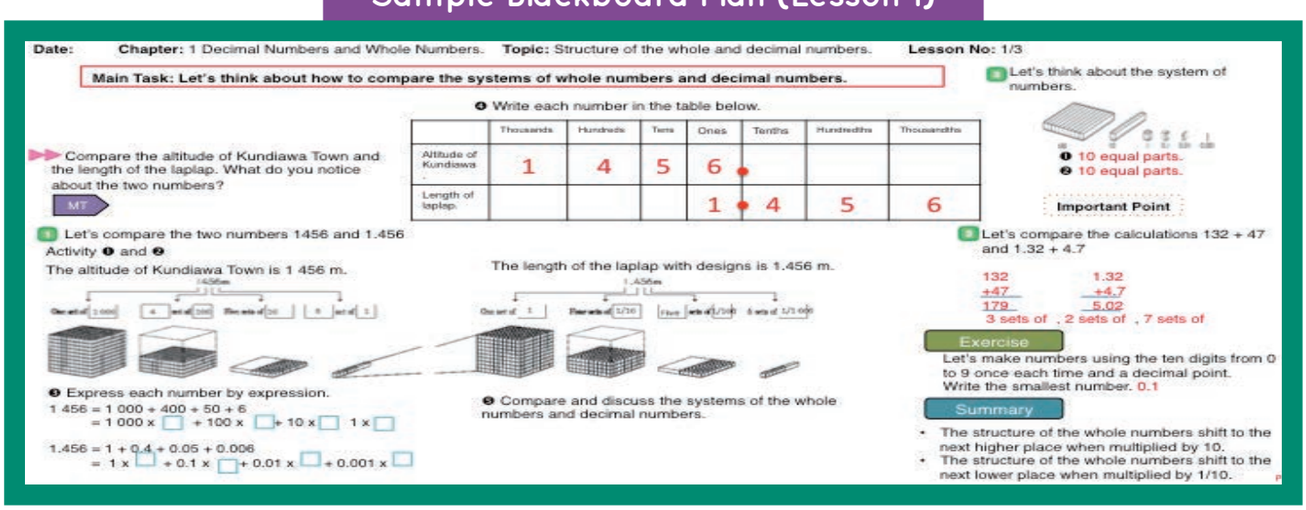
### 5 Summary

T What have you learned in this lesson?

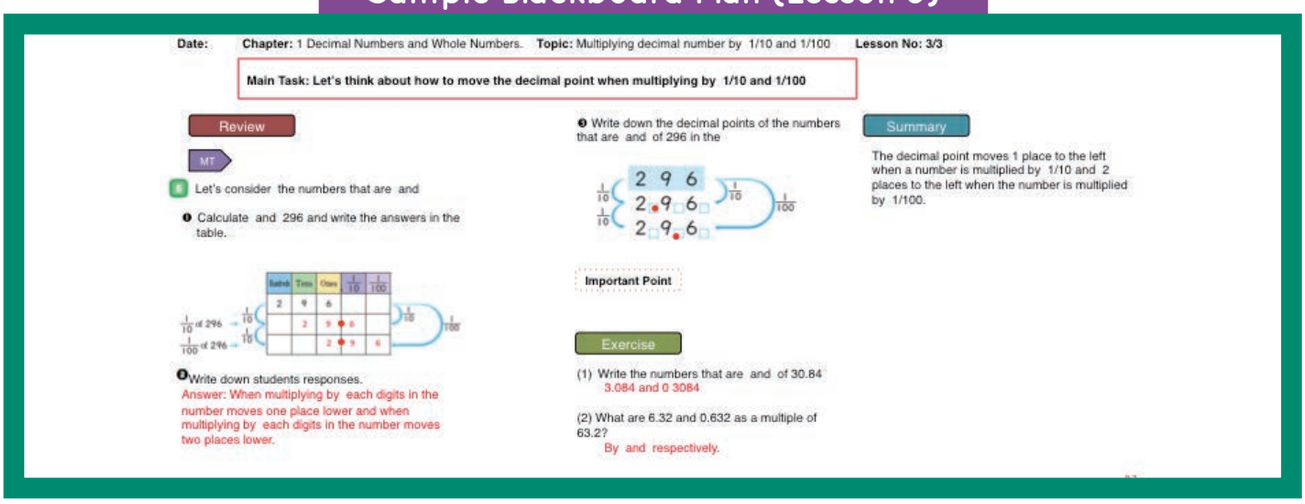
S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 1)




## Sample Blackboard Plan (Lesson 3)



# Unit 1

# Unit: Decimal Numbers and Whole Numbers
## Exercise, Problems and Evaluation
### Lesson 1 and 2 of 2

Textbook Pages : 008 and 009
Actual Lesson 004 and 005

## Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems 1, Problems 2 and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

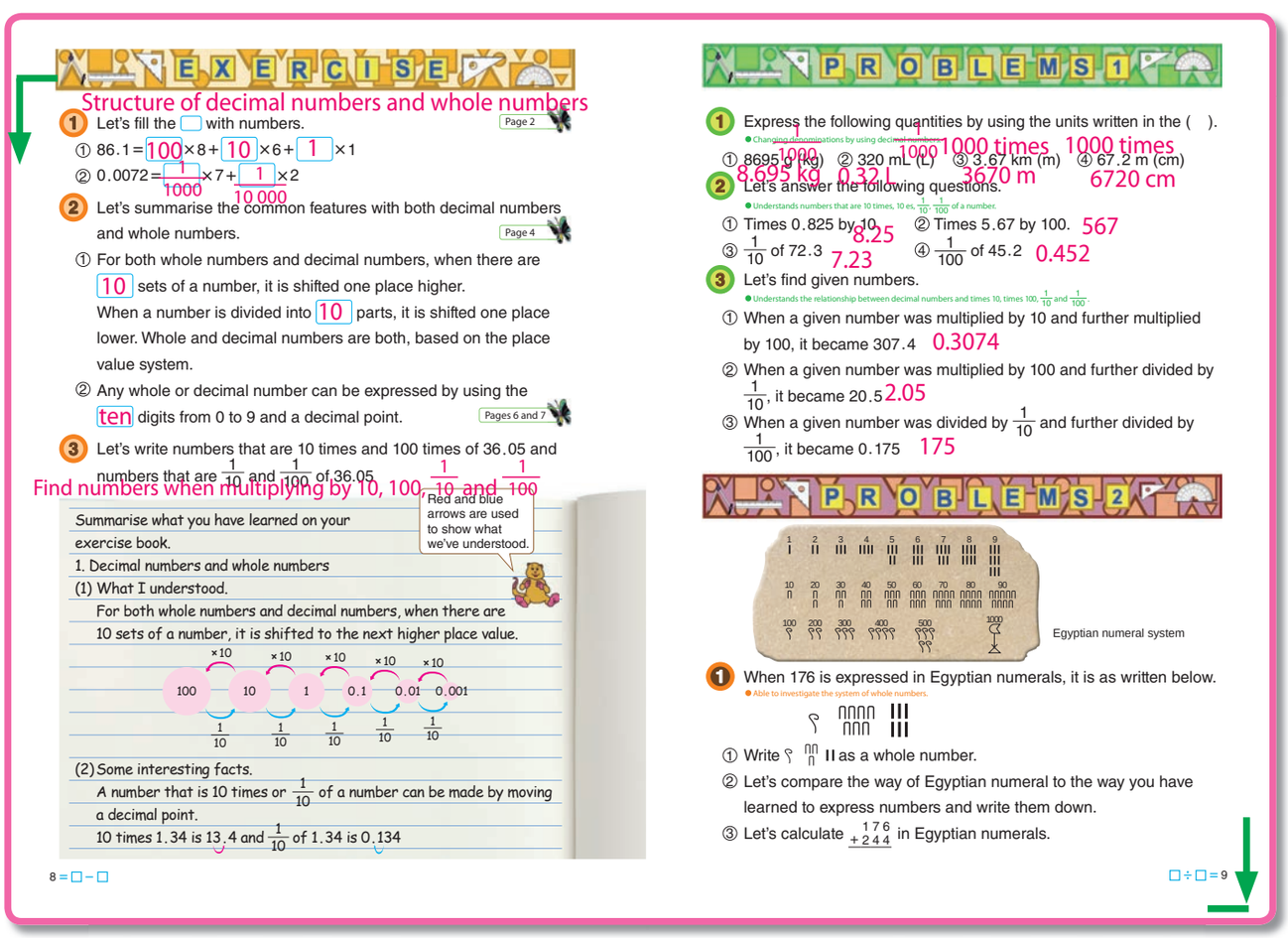
- Evaluation test copy for each student

## Assessment

- Complete the Exercise and Problems 1 and 2 correctly. S

## Teacher's Notes

This is the last lesson of Chapter 1. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.



EXERCISE

Structure of decimal numbers and whole numbers

1 Let's fill the ☐ with numbers. Page 2

① 86.1 = 100 × 8 + 10 × 6 + 1 × 1

② 0.0072 = 1/1000 × 7 + 1 × 2 / 10 000

2 Let's summarise the common features with both decimal numbers and whole numbers. Page 4

① For both whole numbers and decimal numbers, when there are 10 sets of a number, it is shifted one place higher. When a number is divided into 10 parts, it is shifted one place lower. Whole and decimal numbers are both, based on the place value system.

② Any whole or decimal number can be expressed by using the ten digits from 0 to 9 and a decimal point. Pages 6 and 7

3 Let's write numbers that are 10 times and 100 times of 36.05 and numbers that are 1/10 and 1/100 of 36.05.

Find numbers when multiplying by 10, 100, 1/10 and 1/100

Summarise what you have learned on your exercise book.

Red and blue arrows are used to show what we've understood.

1. Decimal numbers and whole numbers

(1) What I understood.

For both whole numbers and decimal numbers, when there are 10 sets of a number, it is shifted to the next higher place value.

×10 ×10 ×10 ×10 ×10

100 10 1 0.1 0.01 0.001

1/10 1/10 1/10 1/10 1/10

(2) Some interesting facts.

A number that is 10 times or 1/10 of a number can be made by moving a decimal point.

10 times 1.34 is 13.4 and 1/10 of 1.34 is 0.134

8 = ☐ − ☐

PROBLEMS 1

1 Express the following quantities by using the units written in the ( ).

● Changing denominations by using decimal numbers

① 8695 g (kg) 1000 ② 320 mL (L) 1000 ③ 3.67 km (m) 1000 times ④ 67.2 m (cm) 1000 times

8.695 kg 0.32 L 3670 m 6720 cm

2 Let's answer the following questions.

● Understands numbers that are 10 times, 10 es, 1/10, 1/100 of a number.

① Times 0.825 by 10. 8.25 ② Times 5.67 by 100. 567

③ 1/10 of 72.3 7.23 ④ 1/100 of 45.2 0.452

3 Let's find given numbers.

● Understands the relationship between decimal numbers and times 10, times 100, 1/10 and 1/100

① When a given number was multiplied by 10 and further multiplied by 100, it became 307.4 0.3074

② When a given number was multiplied by 100 and further divided by 1/10, it became 20.5 2.05

③ When a given number was divided by 1/10 and further divided by 1/100, it became 0.175 175

PROBLEMS 2

Egyptian numeral system

1 When 176 is expressed in Egyptian numerals, it is as written below.

● Able to investigate the system of whole numbers.

① Write as a whole number.

② Let's compare the way of Egyptian numeral to the way you have learned to express numbers and write them down.

③ Let's calculate 176 + 244 in Egyptian numerals.

□ ÷ □ = 9

## Lesson Flow

### 1 ① Let's fill in the box with numbers.

T Ask students to complete activity ① and ② on the board.
S Write their answers on the board, other students confirm.

### 2 Complete Exercise ② and ③

T Ask students to work individually to complete task 2 and 3.
S Work individually to complete task then share their ideas with their friends.
T Confirm answers with students

### 3 Solve the Problems 1

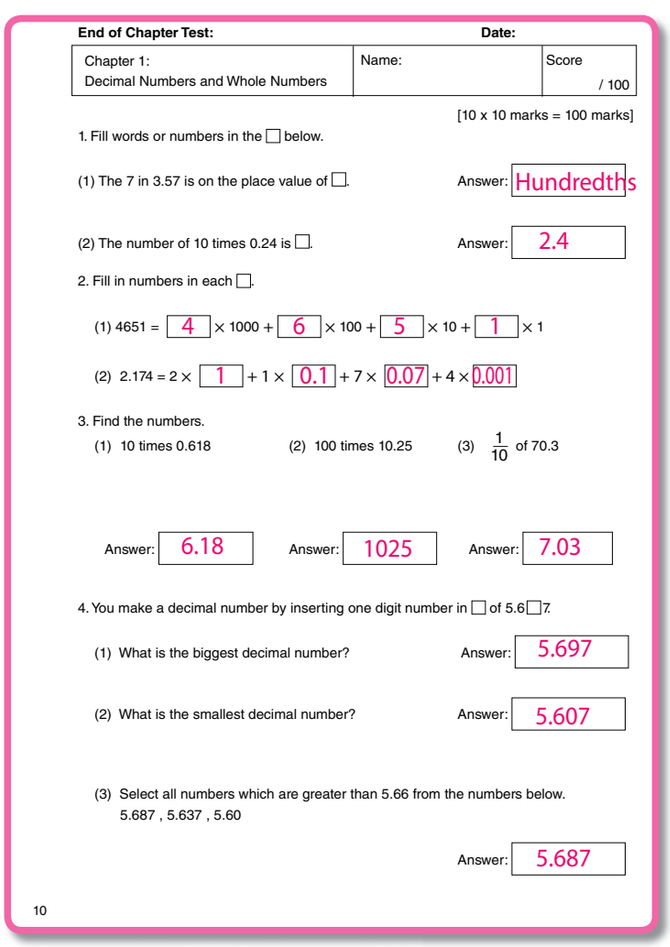
S Solve all the problems.
T Confirm students' answers.

### 3 Solve the Problems 2

S Solve all the problems.
T Confirm students' answers.
TN Collect students' books for marking if time does not allow.

### 4 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.



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

| Chapter 1: Decimal Numbers and Whole Numbers | Name: | Score / 100 |
|---|---|---|

[10 x 10 marks = 100 marks]

1. Fill words or numbers in the ☐ below.

(1) The 7 in 3.57 is on the place value of ☐. Answer: Hundredths

(2) The number of 10 times 0.24 is ☐. Answer: 2.4

2. Fill in numbers in each ☐.

(1) 4651 = 4 × 1000 + 6 × 100 + 5 × 10 + 1 × 1

(2) 2.174 = 2 × 1 + 1 × 0.1 + 7 × 0.07 + 4 × 0.001

3. Find the numbers.

(1) 10 times 0.618 Answer: 6.18

(2) 100 times 10.25 Answer: 1025

(3) $\frac{1}{10}$ of 70.3 Answer: 7.03

4. You make a decimal number by inserting one digit number in ☐ of 5.6☐7.

(1) What is the biggest decimal number? Answer: 5.697

(2) What is the smallest decimal number? Answer: 5.607

(3) Select all numbers which are greater than 5.66 from the numbers below.
5.687 , 5.637 , 5.60

Answer: 5.687

10

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

| Chapter 1:<br>Decimal Numbers and Whole Numbers | Name: | Score<br>/ 100 |
|---|---|---|

[10×10 marks=100 marks]

1. Fill in the words or numbers in the □ below.

(1) The 7 in 3.57 is on the place value of □ . Answer: □

(2) The number of 10 times 0.24 is □. Answer: □

2. Fill in the numbers in each □.

(1) 4651 = □ ×1000 + □ ×100 + □ ×10 + □ ×1

(2) 2.174 = 2× □ +1× □ +7× □ +4× □

3. Find the numbers.

(1) 10 times 0.618 Answer: □

(2) 100 times 10.25 Answer: □

(3) $\frac{1}{10}$ of 70.3 Answer: □

4. You make a decimal number by inserting one digit number in the □ of 5.6 □ 7.

(1) What is the biggest decimal number? Answer: □

(2) What is the smallest decimal number? Answer: □

(3) Select all the numbers which are greater than 5.66 from the numbers below.
5.687 , 5.637 , 5.60

Answer: □

# Chapter 2 Amount per Unit Quantity

## 1. Content Standard

5.4.1 Explore proportions in two changing quantities and explain the patterns by using the relation of direct proportionality.

## 2. Unit Objectives

- To understand how to express mean through working with quantity per unit.
- To think about the amount based on measurement of per unit quantity.

## 3. Teaching Overview

**Mean :**

Students are given actual situation that require leveling off data such as number of laps run by students for them to understand the concept of averaging.

The action of averaging is a way of finding ideal situations such as “what if everybody ran the same number of laps?” or “what if every cup holds the same amount of water?”.

They deal with both discrete quantities for example something countable such as number of people or fruits, and continuous quantities such as lengths, volume, weight etc.

Discrete quantities were easy for students to understand in the previous grades and continuous quantities were not since they had to think of uncountable quantities such as some amount between 1 and 2 litres.

However, it will be rather difficult for students to think about the mean of discrete quantities in this unit than the mean of continuous quantities.

For instance, the mean of water in 3 containers can be expressed in a decimal value.

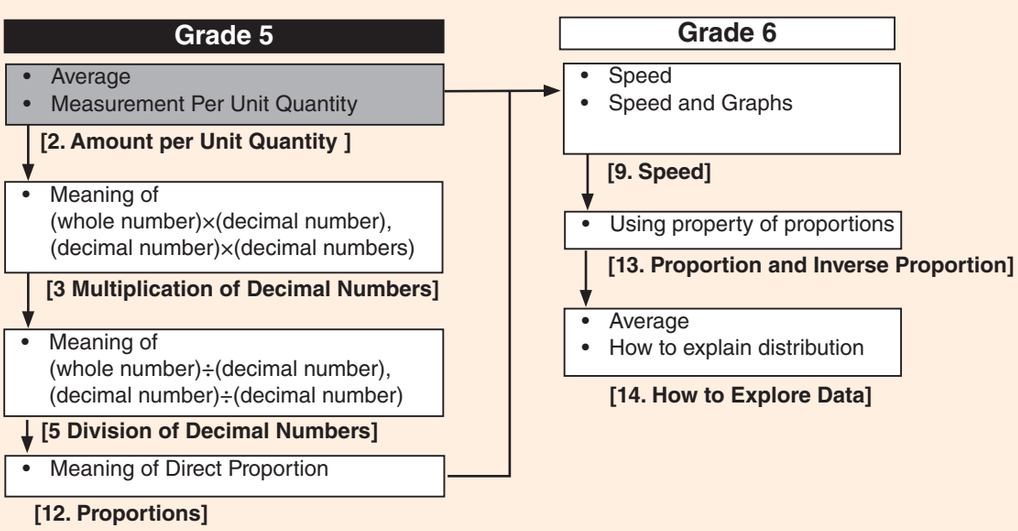
However, the mean of the number of bananas held by 3 children can be expressed as a decimal value like 2.4 bananas which is not realistic. Students should understand that mean can be expressed in decimal or fraction even though the objects are countable.

**Amount per Unit Quantity :**

This is a difficult concept for students since the measurement is called synthetic quantity. In the case of comparing degrees of congestions with different number of people within different areas, they need to make ideal situations such as “same area, different number of people” or “different areas, same number of people”.

Finally, they will find out the formula, number of people ÷ area.

## 4. Related Learning Contents



# Unit 2: Unit: Amount per Unit Quantity

## Sub-unit 1: Mean

### Lesson 1 of 3

Textbook Pages : 010 to 012
Actual Lesson 006

## Sub-unit Objectives

- To define the meaning of mean and how to use it.
- To find mean from various quantities.

## Lesson objective

- To understand how to balance a quantity.

## Prior Knowledge

- Bar Graph
- Paper Blocks

## Preparation

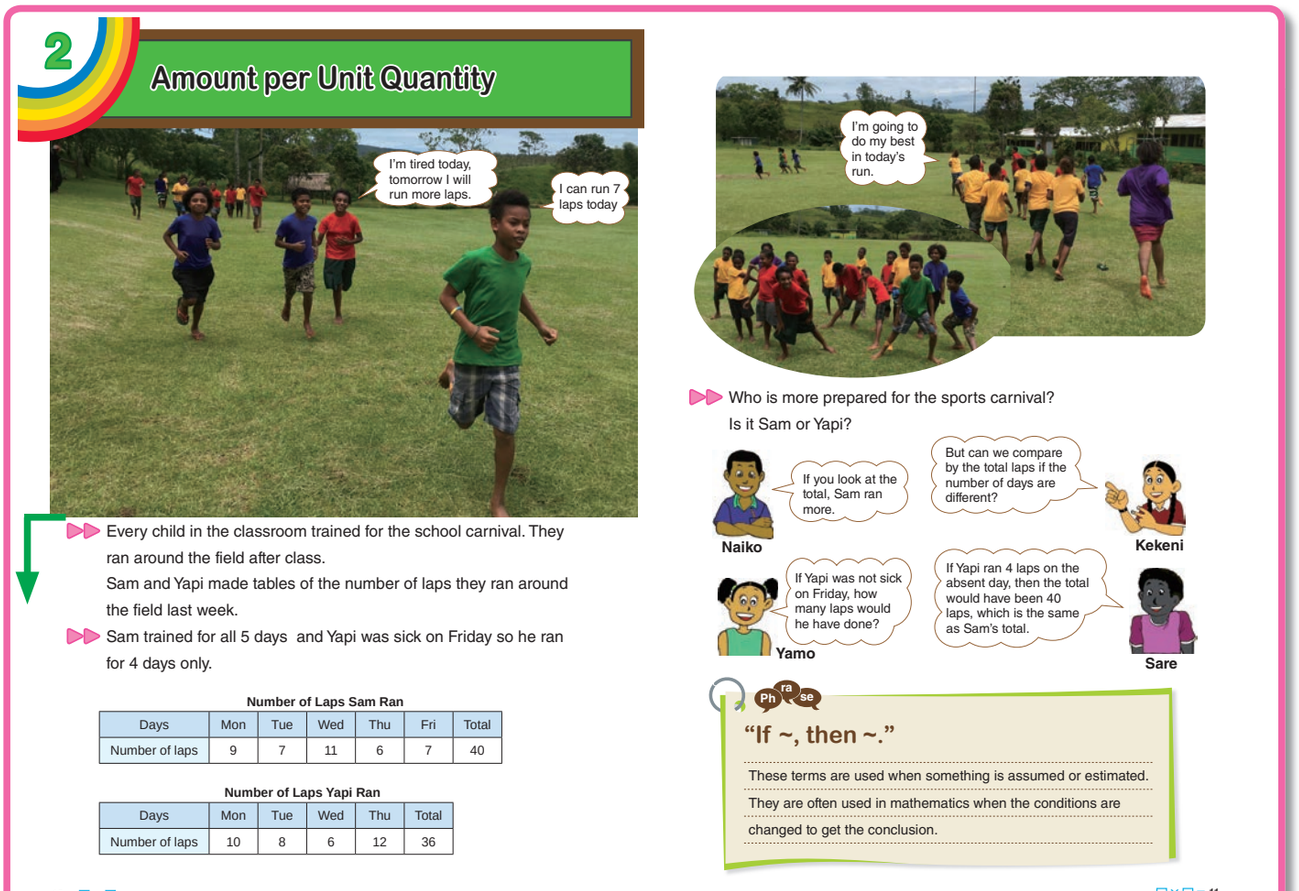
- Table and Bar Graphs to be placed on the blackboard
- Grid papers to draw bar graph (Students can copy the graphs from the textbook)

## Assessment

- Apply the idea of balancing to compare two quantitites. F
- Explain averaging. S

## Teacher's Notes

- In this lesson, we can balance the laps run by Sam and Yapi. When preparing graphs, make the squares for balancing be movable so it will be easy to show the idea of averaging when balancing.
- Key Phrases
  1) Sam ran 5 days making 40 laps
  2) Yapi ran 4 days making 36 laps
- The following are important mathematical terms that can be used in their discussions, **If** and **Then**.



## Lesson Flow

### 1 Think about the laps run by two children.

T Ask the students to look at the pictures and have pre-discussion.

S Do pre-discussions using the pictures.

T/S ▶▶ Read and understand the situation and use the table to discuss.

T ❶ What can you interpret from the two tables?

S Possible responses.
Sam trained for 5 days and made 40 laps.
Yapi was sick on Friday so he ran for 4 days and made 36 laps.

T ▶▶ Who is more prepared for the sports carnival? Is it Sam or Yapi?

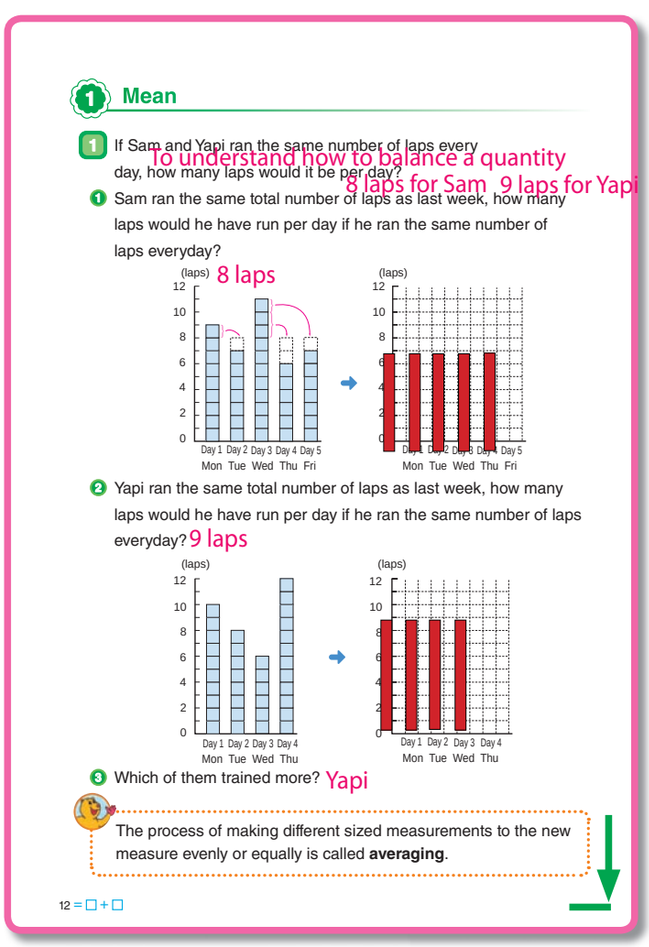
T/S Discuss the hints from the four friends and estimate which child is more prepared.

TN • If two students run the same number of days then we can compare.
• If they run the same laps then we can compare.

T Introduce the Main Task. (Refer to the BP)

### 2 Understanding the meaning of averaging.

T/S ❶ Read and understand the situation.




T ❶ How can we make the number of laps the same every day?

T/S Discuss and understand that we can easily compare when we have total number of laps (40) and same number of laps per day.

TN Bring some of the laps from the larger number of laps to smaller number.

S Manipulate the paper blocks to balance the graph.

S Draw bar graph to balance the graph for Sam.

T How many laps did Sam ran each day?

S 8 laps per day.

T ❷ How can we make the number of laps the same every day?

T/S Discuss and understand that we can easily compare when we have total number of laps (36) and same number of laps per day.

TN Bring some of the laps from the larger number of laps to smaller number.

S Use the graph and manipulate with the blocks.

S Draw bar graph to balance the graph for Yapi.

T How many laps did Yapi run each day?

S 9 laps per day.

### 3 Comparing their efforts, who trained more?

T ❸ Which child trained more?

S Yapi

T Why do you say Yapi?

S After balancing we realise that Yapi ran more with a total of 9 laps each day.

### 4 Important Point

T/S Explain the important point in the box .

### 5 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

### Sample Black Board Plan

Lesson 006 Sample Blackboard Plan is on page 15.

# Unit 2: Unit: Amount per Unit Quantity

## Sub-unit 1: Mean

### Lesson 2 of 3

Textbook Page : 013
Actual Lesson 007

## Lesson Objective

- To think about how to find the mean of some numbers or quantities.

## Prior Knowledge

- Introduction to averaging

## Preparation

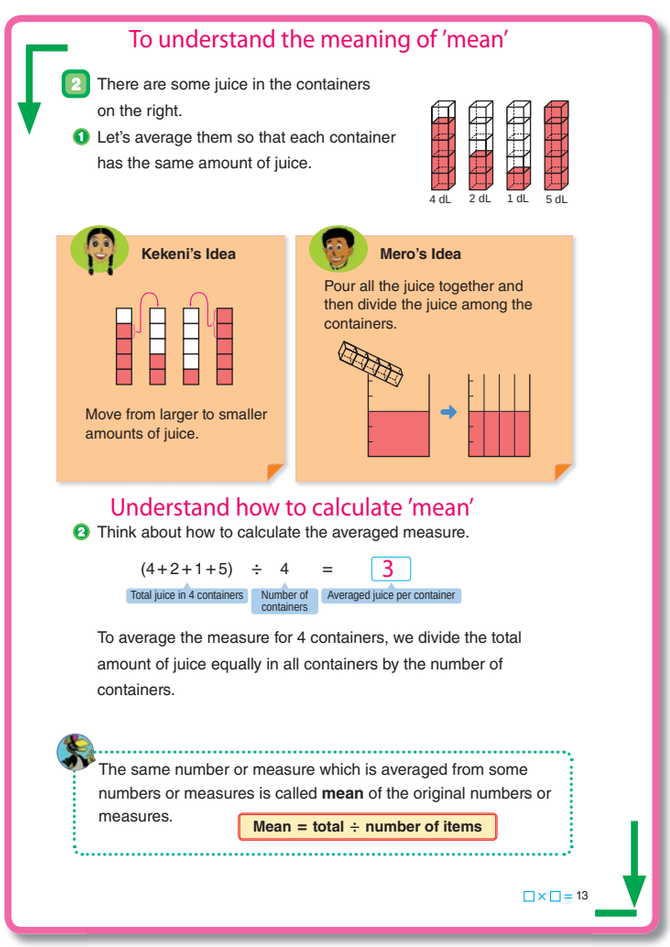
- Diagram of juice representation
- Diagram of Kekeni's and Mero's ideas

## Assessment

- Think about how to find the mean measure. F
- Define mean and explain how to find mean. S

## Teacher's Notes

- The definition of mean can be explained well using Mero's idea. Teacher use Mero's idea to explain mean. Pour all the juice together (4+2+1+5) and then divide the juice among 4 containers.
- Notice that when calculating the mean, brackets are used, so apply BODMAS in the calculation.
- Average is the process of making different sized measures to new measure evenly or equally.
- Mean is the same number of measure which is averaged from some numbers or measures.
- The concept of averaging is used in everyday life therefore, it is important for students to understand how averaging is done in this lesson.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Think about how to balance the amount of juice with various dL.

T/S ❷ Read and understand the situation.
T Ask students to observe the chart and think about ways to balance.
S Think of ways on how to balance the amounts of juice and present their ideas.
T Introduce the Main Task. (Refer to the BP)
T ❶ Let's average them so that each container has the same amount of juice.
TN Let students to observe Kekeni's and Mero's ideas while the teacher explains.
S Briefly explain Kekeni's and Mero's ideas to make conclusions on how to calculate the mean.
T Make emphasis on Kekeni's and Mero's ideas.

### 3 ❷ Discuss how to calculate the mean.

T Can we express how to find the mean in a mathematical sentence?
S Yes, by using Mero's idea, the mathematical sentence can be written as $(4+2+1+5)\div 4=3$

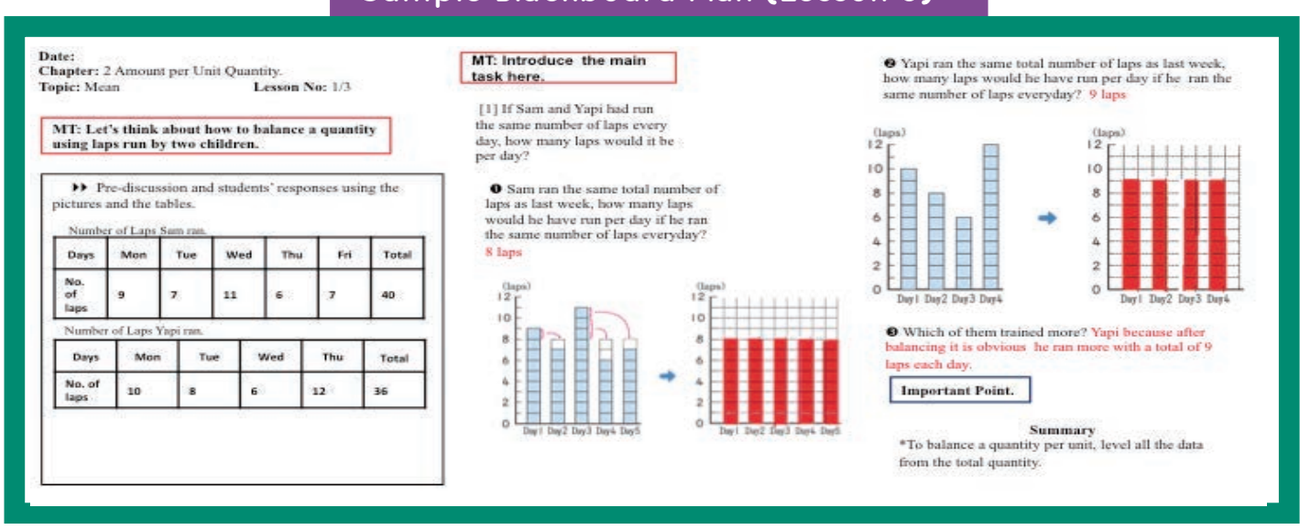
### 4 Important Point

T/S Explain the important point in the box .

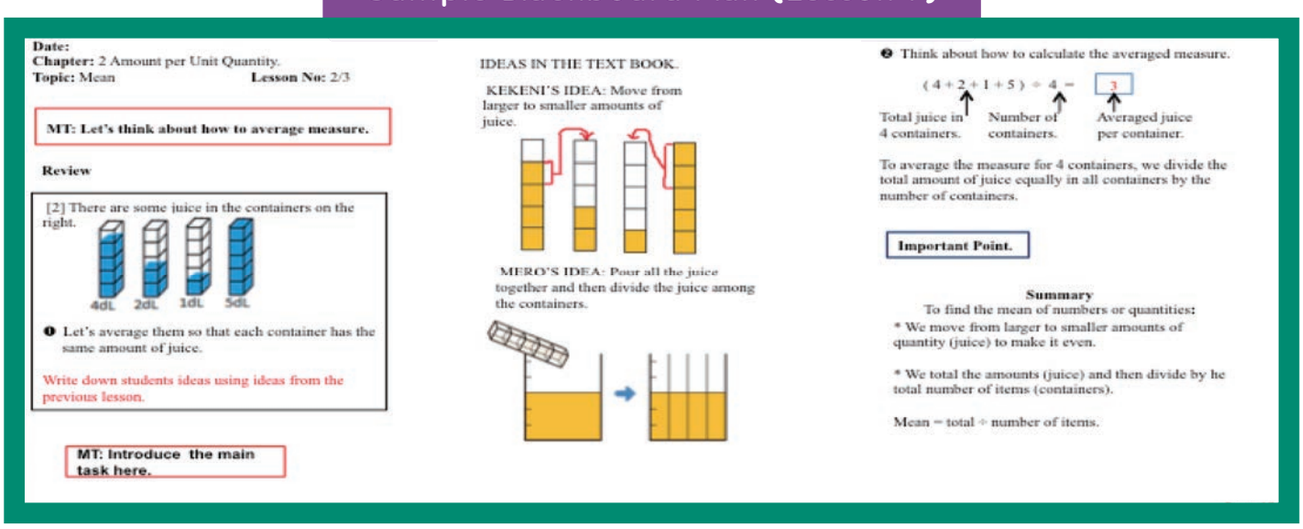
### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 6)




## Sample Blackboard Plan (Lesson 7)



# Unit 2

# Unit: Amount per Unit Quantity
## Sub-unit 1: Mean
### Lesson 3 of 3

Textbook Page : 014
Actual Lesson 008

## Lesson Objectives

- To understand that mean can be used to express measurement which cannot be averaged in reality.
- To understand that mean can be expressed in decimal numbers.

## Prior Knowledge

- Averaging
- Definition of mean

## Preparation

- Diagram representation 3
- Table for 4

## Assessment

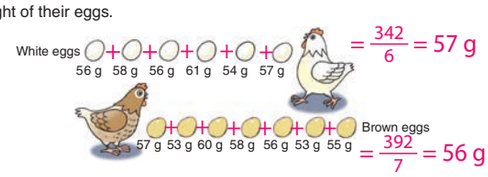
- Understand and explain that mean is applicable for measurements which cannot be averaged in reality. F
- Calculate mean for measurements which cannot be averaged in reality. S

## Teacher's Notes

- Lesson Objective one refers to discrete quantity.
- The mean can be expressed in decimal when we are comparing two or more quantities.
- Calculators can be used to calculate the mean in this lesson.
- For task 4, explain the use of zero (the number of books Ken read) in the equation of mean that it is included in the 'number of items'.
- The answer in task 4 as 2.8 can be said as almost 3.

### Calculating 'mean' to express measurement that cannot be averaged in reality

3 There were 2 chickens, one laid brown and the other laid white eggs. The weights are shown below.
Which of the eggs are heavier? Compare by calculating the mean weight of their eggs.




$= \frac{342}{6} = 57$ g

$= \frac{392}{7} = 56$ g

Even for things that cannot be averaged in real life, if the number and amount is known, the mean can be calculated.

### Understanding the expression of 'mean' as a decimal number

4 The table below shows the number of books 5 students read in August. What is the mean number of books read by the 5 students? 2.8

**Number of Books Read**

| Name | Boni | Yata | Ken | Sawa | Yaling |
|---|---|---|---|---|---|
| Number of books read | 4 | 3 | 0 | 5 | 2 |

$= \frac{14}{5} = 2.8$

Even for things that are impossible to be expressed in decimal numbers, like number of books, the mean can be expressed in decimal numbers.

14 = □ + □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Calculating mean to express measurement that cannot be averaged in reality.

T Introduce the Main Task. (Refer to the blackboard plan)
T/S 3 Read and understand the situation.
T Compare by calculating the mean weight of white eggs and mean weight of yellow eggs.
S Compare the weight by calculating mean using: Mean = total ÷ number of items
S White eggs 56 + 58 + 56 + 61 + 54 + 57 = 342 ÷ 6 = 57 answer : 57 g
Brown eggs 57 + 53 + 60 + 58 + 56 + 53 + 55 = 392 ÷ 7 = 56 answer : 56 g
Therefore, white eggs are heavier.
T Confirm answers with students'.

### 3 Important Point

T/S Explain the important point in the box .

### 4 Understanding the expression of mean as a decimal number.

T/S 4 Read and understand the situation.
T Study the table given in 4 and calculate the mean number of books read by 5 students.
S Use Mean = total ÷ number of items, 4 + 3 + 0 + 5 + 2 = 14 ÷ 5 = 2.8
TN Through the process of calculating, realise that the answer is between 2 – 3 books. Book cannot be divided though we can still use mean.

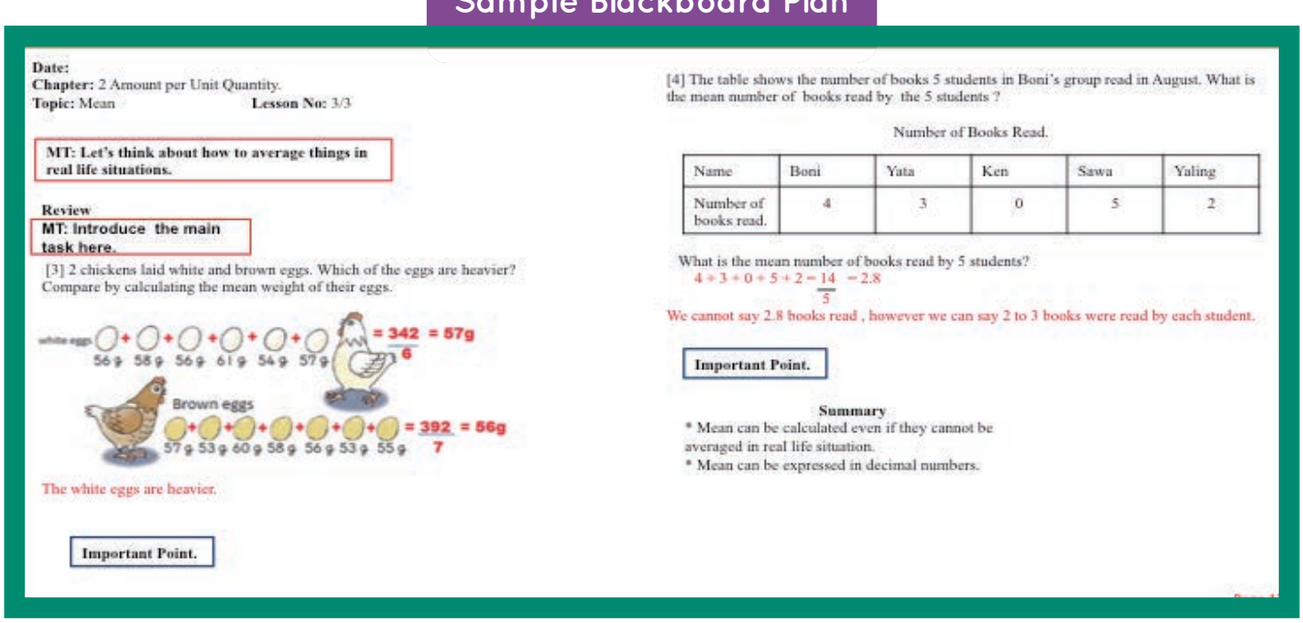
### 5 Important Point

T/S Explain the important point in the box .

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 2

# Unit: Amount per Unit Quantity
## Sub-unit 2: Amount per Unit Quantity
### Lesson 1 of 5

Textbook Page : 015 and 016
Actual Lesson 009

## Sub-unit Objectives

- To recognise the relationships between multiplicands, multipliers and products based on the features of multiplication table and identify rules and patterns.
- To understand cummulative law of multiplication.

## Lesson Objectives

- To understand that when comparing the crowd, the size of area and number of people are related.
- To understand that we can compare the quantity per area when we adjust number of people or area.

## Prior Knowledge

- Averaging quantity
- Calculating mean

## Preparation

- Task 1 information for Ⓐ, Ⓑ and Ⓒ
- Chart with blank Table for 1 and 2

## Assessment

- Think about and explain how to compare crowdedness using pictures. F
- Compare using same measure; number of students and area. S

## Teacher's Notes

To find the quantity per unit, we need to find the total quantity and divide. In the example of textbook page 15, we find the average number of students for a mat. This is the first time for students to learn measurement per unit, followed by population density (people/km²), speed (km/h) etc. Take enough time in the introduction or conclusion for students to understand this idea otherwise students might be left behind. In this case they should think and find the crowdedness with 2 quantities: number of students and number of mats.

### 2 Amount per Unit Quantity

1 Students are standing on the mats. Each mat is of the same size. Which one of Ⓐ, Ⓑ and Ⓒ is more crowded?

Ⓐ 2 mats, 12 students.
Ⓑ 3 mats, 12 students.
Ⓒ 3 mats, 15 students.

Ⓐ 2 mats, 12 students.

Ⓑ 3 mats, 12 students.

Ⓒ 3 mats, 15 students.

Let's think about how to compare crowdedness.

□ × □ = 15

1 Let's compare which one is more crowded?

Ⓐ or Ⓑ → Ⓐ

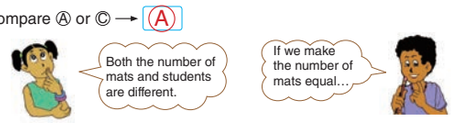
| | Number of mats | Number of students |
|---|---|---|
| Ⓐ | 2 | 12 |
| Ⓑ | 3 | 12 |
| Ⓒ | 3 | 15 |

When the number of students are the same, the one with Less mats is more crowded.

Ⓑ or Ⓒ → Ⓒ

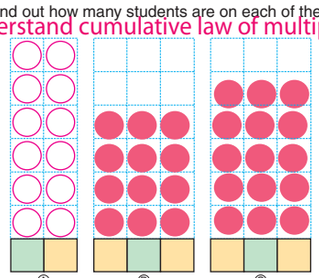
When the number of mats are the same, the one with More students is more crowded.

Compare Ⓐ or Ⓒ → Ⓐ




2 Let's find out how many students are on each of the mats.

To understand cumulative law of multiplication.




16 = □ + □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Discuss the pictures Ⓐ, Ⓑ and Ⓒ and identify which is more crowded.

T/S ❶ Read and understand the situation.
T Allow students to discuss and compare the crowdedness in Ⓐ, Ⓑ and Ⓒ.
S Possible responses;
Ⓐ 2 mats with 12 students is very crowded.
Ⓑ 3 mats with 12 students is less crowded.
Ⓒ 3 mats with 15 students is very crowded.
TN Confirm the answer in ❷.
T Introduce the Main Task. (Refer to the BP)

### 3 Think about how to compare the crowdedness of students.

TN Refer to the table to compare.
T ❶ Compare Ⓐ and Ⓑ, which is more crowded and why?
S Ⓐ is more crowded. When the number of students are the same the one with less mats is more crowded.
T Compare Ⓑ and Ⓒ, which is more crowded and why?
S Ⓒ is more crowded. When the number of mats are same, the mat with more students is more crowded.
T Compare Ⓐ and Ⓒ, which is more crowded and why?
S It is difficult to compare because both number of students and mats are different.

### 4 Find out the crowdedness of Ⓐ and Ⓒ using the unit idea.

T ❷ Find out how many students are on each mat.
TN Draw circles in each square as shown for Ⓐ and complete for Ⓑ and Ⓒ to compare Ⓐ and Ⓒ .
S Ⓐ is more crowded because 6 students can share one mat whereas in Ⓒ 5 students can share one mat.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

**Date:**
**Chapter:** 2 Amount per Unit Quantity.
**Topic:** Measurement per Unit Quantity. **Lesson No:** 1/5

**MT: Let's think about how to compare the crowdedness.**

**Review**

[1] Children are standing on mats. Which one of A, B and C is more crowded?

A. 2 mats 12 children
B. 3 mats 12 children
C 3 mats 15 children
} Observe the pictures, discuss and describe the crowdedness using the text book.

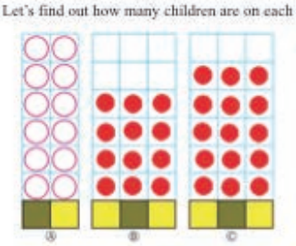
**MT: Introduce the main task here.**

❶Which is more crowded?

| | Mat | No. of Children. |
|---|---|---|
| A | 2 | 12 |
| B | 3 | 12 |
| C | 3 | 15 |

Compare A or B → A
When the number of children are the same, the one with less mats is more crowded.
Compare B or C → C
When the number of mats are the same, the one with more children is more crowded.
Compare A or C → A

❷ Let's find out how many children are on each of the mats.




A: 6 children per mat.
B: 4 children per mat.
C: 5 children per mat.

**Summary**
* When comparing the number of students in a given area, we understand that the crowdedness of people and size of area are related.
* We can then say the number of people per area is the amount per unit quantity.

# Unit 2

# Unit: Amount per Unit Quantity
## Sub-unit 2: Amount per Unit Quantity
### Lesson 2 of 5

Textbook Page : 017
Actual Lesson 010

## Lesson Objective

- To understand how to compare the crowdedness by using amount per unit quantity.

## Prior Knowledge

- Averaging quantity
- Calculating mean

## Preparation

- Chart of the important point

## Assessment

- Compare the crowdedness through calculation using same unit. F
- Solve the exercises correctly. S

## Teacher's Notes

- We introduce the unit of area in this lesson. The students should understand that the level of crowding can be measured by number of people per 1 m² or per 1 km².
- Ⓐ and Ⓑ - same number of students, different number of mats.
- Ⓑ and Ⓒ - same number of mats different number of students.
- Ⓐ and Ⓒ - different number of mats and students.

Understand how to compare crowding using per unit quantity

❸ The area of 1 mat is 1 m².
How many students are there in per 1 m² ?

Ⓐ 12 ÷ 2 = 6
Ⓑ 12 ÷ 3 = 4
Ⓒ 15 ÷ 3 = 5

Number of students | Area (m²) | Number of students per 1 m²

The level of crowding is expressed by 2 measures, the number of students and the area.
Usually we compare the level of crowding by using the same unit, such as **1 m²** or **1 km²**.
When people are not grouped in an organised way, the number of people per 1 m² expresses the mean of crowding.

**Exercise**

① Two groups of children are playing in two different garden shelters.
One group has 10 children playing in a 8 m² garden shelter and the other group has 13 children playing in a 10 m² garden shelter.
Which garden shelter is more crowded?

10 ÷ 8 = 1.25
13 ÷ 10 = 1.3
10 m² garden shelter is more crowded

② There are two communities. Samuel's community with 7 km² and 1260 people and Robert's community with 10 km² and 1850 people.
Which community is more populated?

1260 ÷ 7 = 180
1850 ÷ 10 = 185
Robert's community is more crowded

□ × □ = 17

## Lesson Flow

### 1 Review the previous lesson

### 2 Understanding how to compare crowdedness using amount per unit quantity.

T Introduce the Main Task. (Refer to the Blackboard Plan)
T How can we compare the number of students per 1 m²?
S Identify that area of 1 mat is equal to 1 m², 2 mats is equal to 2 m² and 3 mats is equal to 3 m².
T ❸ How can we find the number of students in per 1 m²?
S Explain that the mathematics sentences is the number of students divided by the area of mat.
A. is 12 ÷ 2 = 6 students per m².
B. is 12 ÷ 3 = 4 students per m².
C. Is 15 ÷ 3 = 5 students per m².
TN We are using: Number of students ÷ Area (m²) = Number of students per 1 m².

### 3 Important Point

T/S Explain the important point in the box .

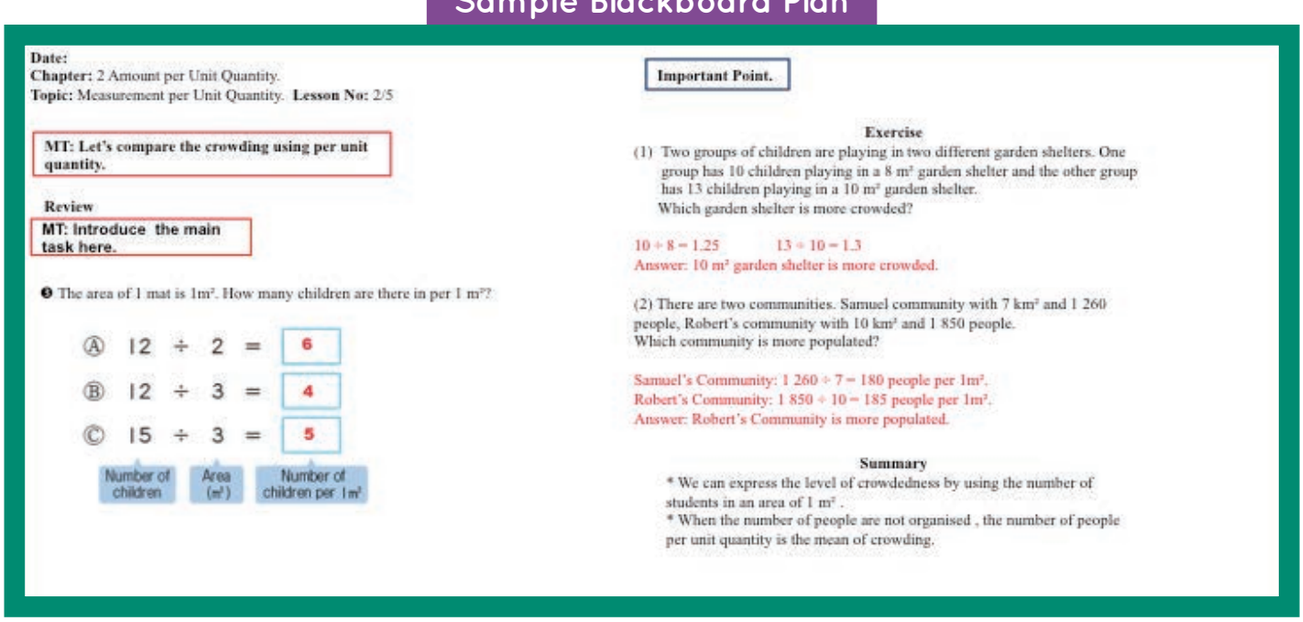
### 4 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 2

# Unit: Amount per Unit Quantity
## Sub-unit 2: Amount per Unit Quantity
### Lesson 3 of 5

Textbook Page : 018
Actual Lesson 011

## Lesson Objective

- To understand the meaning of population density and find population density.

## Prior Knowledge

- Large numbers (Grade 3)
- Decimal Numbers and Whole Numbers (Grade 4)
- Working with two units, number of people and the area (1 $m^2$ and 1$km^2$)

## Preparation

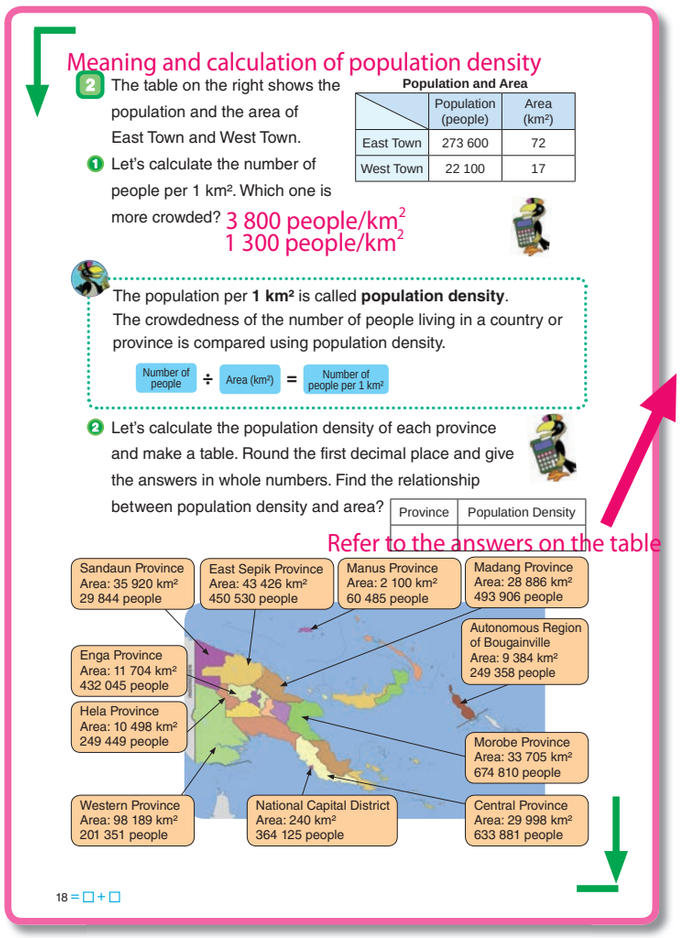
- Chart of task 2
- Chart of table for exercise
- Calculator

## Assessment

- Compare population and landmass. F
- Explain the meaning of population density. S
- Calculate population density correctly. S

## Teacher's Notes

- Students may use their prior knowledge on division with large numbers to work out their answers or they may use a calculator.
- 2 TN For students to visualise the area of the landmass in square km to compare and see which town is bigger before actual calculation.
- The focus is to understand the meaning of population density and to find the population density.
- Students may use calculators to calculate since the numbers are too large to divide with remainders.



Meaning and calculation of population density

2 The table on the right shows the population and the area of East Town and West Town.

Population and Area

| | Population (people) | Area ($km^2$) |
|---|---|---|
| East Town | 273 600 | 72 |
| West Town | 22 100 | 17 |

1 Let's calculate the number of people per 1 $km^2$. Which one is more crowded? 3 800 people/$km^2$, 1 300 people/$km^2$

The population per **1 km²** is called **population density**. The crowdedness of the number of people living in a country or province is compared using population density.

Number of people ÷ Area ($km^2$) = Number of people per 1 $km^2$

2 Let's calculate the population density of each province and make a table. Round the first decimal place and give the answers in whole numbers. Find the relationship between population density and area?

| Province | Population Density |
|---|---|

Refer to the answers on the table



18 = □ + □

| Province | Population | Area($km^2$) | Population Density people/$km^2$ |
|---|---|---|---|
| Sandaun | 29 844 | 35 920 | 1 |
| ESP | 450 530 | 43 426 | 10 |
| Manus | 60 485 | 2 100 | 29 |
| Madang | 493 906 | 28 886 | 17 |
| AROB | 249 358 | 9 384 | 27 |
| Morobe | 674 810 | 33 705 | 20 |
| Central | 633 811 | 29 998 | 21 |
| NCD | 364 125 | 240 | 1 517 |
| Western | 201 351 | 98 189 | 2 |
| Hela | 249 449 | 10 498 | 24 |
| Enga | 432 045 | 11 704 | 37 |

## Lesson Flow

### 1 Review the previous lesson.

### 2 Defining the meaning of population density.

T Introduce the Main Task. (Refer to the BP)
T/S ❷ Read and understand the situation.
T Which town has the largest land mass, East town or West town?
TN Help students to identify that 72 km² is around 9 km × 9 km and 17 km² is around 4 km × 4 km.
S East town has the largest land mass of 72 km² compared to West town which is 17 km².
T Comparing East town and West town, which of them has the largest population (number of people).
S East town has the largest largest population of 273 600 people compared to West town with 22 100 people.
T ❶ Let students calculate the number of people per 1 km².
S 1. East town 273 600 ÷ 72 = 3 800 people per km².
2. West town 22 100 ÷ 17 = 1 300 people per km².
T Which town is more crowded?
S East town is more crowded than West town.

### 3 Important Point

T/S Explain the important point in the box .

### 4 Calculating the population density for each province.

S ❷ Calculate the population density given in the textbook by using calculators.
TN Draw the table and allow the students to fill in the table with the correct information.
T Confirm students answers by correcting the exercise with students in class.

### 5 Comparing the population density and the area.

T Find the relationship between the population density and area.
S The larger the land mass, the population density is smaller, the smaller the land mass, the population density is larger.
TN Refer to the Blackboard Plan.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

**Date:**
**Chapter:** 2 Amount per Unit Quantity.
**Topic:** Measurement per Unit Quantity. **Lesson No:** 3/5

**MT: Let's compare and calculate population density.**

**Review**

**MT: Introduce the main task here.**

[2] The table shows the population and the area of East Town and West Town.

Population and Area

| | Population (People) | Area (km²) |
|---|---|---|
| East Town | 273 600 | 72 |
| West Town | 22 100 | 17 |

❶ Let's calculate the number of people per 1 km². Which one is more crowded?
East Town: 273 600 ÷ 72 = 3 800 people per 1km².
West Town: 22 100 ÷ 17 = 1 300 people per 1km².
Answer: East Town is more crowded.

**Important Point.**

❷Let's calculate the population density of each province and make a table. Round the first decimal place and give the answers in whole numbers.
Find the relationship between population density and area.

| Province | Population | Area (km²) | Population Density. People /km² |
|---|---|---|---|
| Sandaun | 29 844 | 35 920 | 1 |
| ESP | 450 530 | 43 426 | 10 |
| Manus | 60 485 | 2 100 | 29 |
| Madang | 493 906 | 28 886 | 17 |
| AROB | 249 358 | 9 384 | 27 |
| Morobe | 674 810 | 33 705 | 20 |
| Central | 633 811 | 29 998 | 21 |
| NCD | 364 125 | 240 | 1 517 |
| Western | 201 351 | 98 189 | 2 |
| Hela | 249 449 | 10 498 | 24 |
| Enga | 432 045 | 11 704 | 37 |

We should conclude from the table that:

a) Sandaun and Western Province have the lowest population density.
b) NCD has the highest population density.
c) Comparing the population density and the area, the larger the land mass the population density is smaller and the smaller the land mass the population density is big.

**Summary**
* The population per 1 km² is called the population density.
* The number of people ÷ area per km² = population density.

Page 23

# Unit 2: Unit: Amount per Unit Quantity

## Sub-unit 2: Amount per Unit Quantity

### Lesson 4 of 5

Textbook Page : 019
Actual Lesson 012

## Lesson Objectives

- To understand the meaning of per unit quantity.
- To find the whole amount using the per unit quantity.

## Prior Knowledge

- Population Density

## Preparation

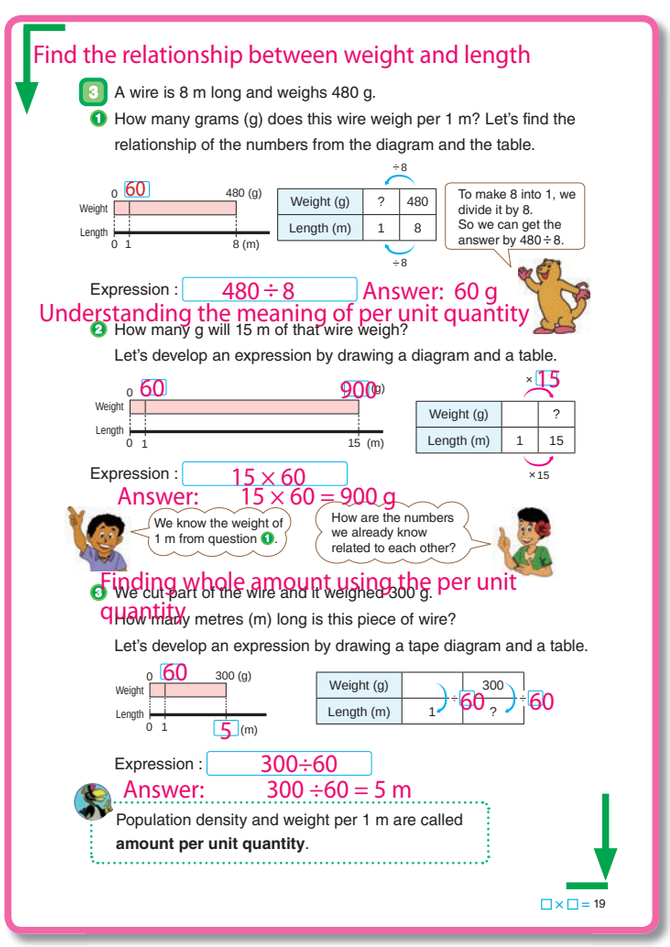
- Chart of task 3
- Tape diagrams and tables

## Assessment

- Compare the length and the weight of a wire. F
- Identify that the relationship between density and weight per 1 m. S

## Teacher's Notes

Students may use their knowledge on division to work out their answers.
The focus is to understand the meaning of **amount per unit quantity**.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Find the relationship between weight and length.

T Introduce the Main Task. (Refer to the Blackboard Plan)
T/S ❸ Read and understand the situation.
T ❶ How many grams does per 1 m of this wire weigh?
S Use the tape diagram and table to write a mathematical expression. (480 ÷ 8)
TN Assist the students to identify that, to get 1 m we divide 8 m by 8.
So we can get the answer by using the mathematical expression, 480 ÷ 8.
S 480 ÷ 8 = 60 g so the weight of the wire is 60 g/m.
T ❷ How many grams will 15 m of that wire weigh?
S Using the tape diagram and table, 1 m is 60 g so for 15 m the weight will be 15 × 60
Answer: 15 × 60 = 900 g.
T ❸ How many m long will the same piece of wire with a weight of 300 g?
S From ❷, 1 m is 60 g so 300 g wire will have the length of 300 ÷ 60.
Answer: 300 ÷ 60 = 5 m.
T Assist students to identify that, to find the whole amount, we use the amount per unit quantity in ❷.

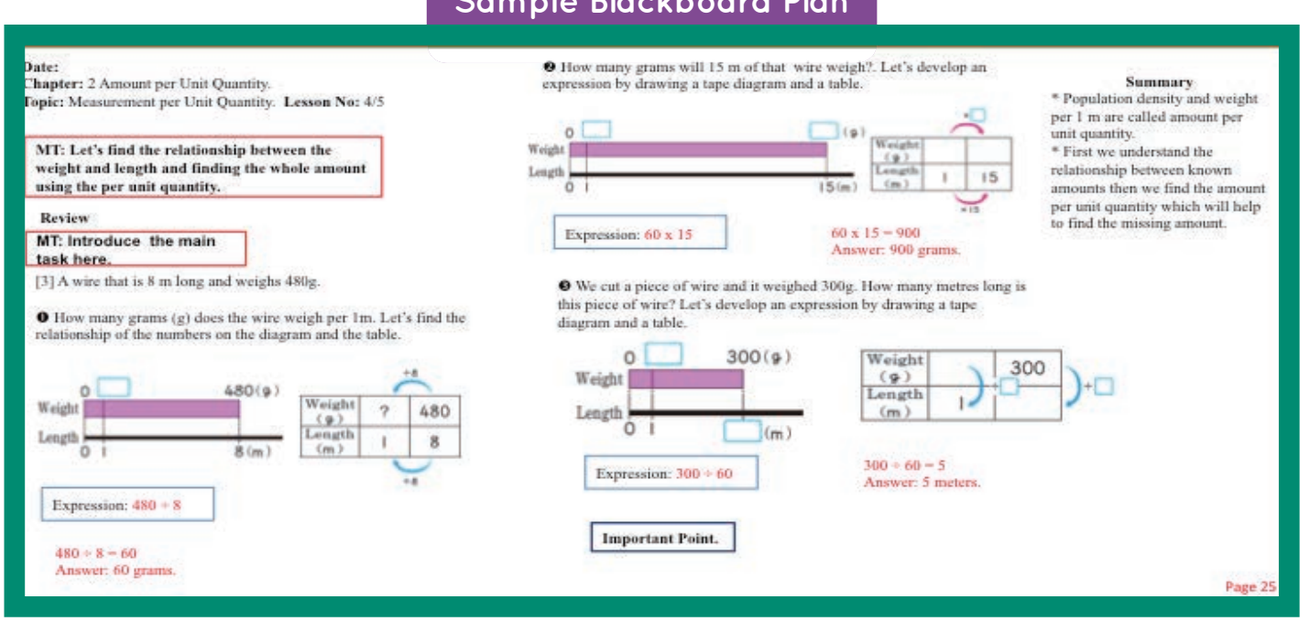
### 3 Important Point

T/S Explain the important point in the box ⬚.

### 4 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 2: Unit: Amount per Unit Quantity

## Sub-unit 2: Amount per Unit Quantity

### Lesson 5 of 5

Textbook Page : 020 and 021
Actual Lesson 013

## Lesson Objectives

- To apply per unit quantity to find the unknown amount.
- To find the amount per unit quantity in various situations.

## Assessment

- Calculate and compare measures per unit quantity. F
- Solve the exercises correctly. S

## Prior Knowledge

- Definition of amount per unit quantity

## Preparation

- Chart of definition for amount per unit quantity on page 20 and 21
- Tape diagrams and tables for all tasks

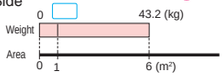
## Teacher's Notes

Through these tasks in this lesson the students should be able to understand and apply the meaning of **amount per unit quantity**.
For 4 and 5 help the students to interpret the relationship between the known numbers and use them to find the amount per unit quantity.
We can find the amount of unknown quantity when we know the unit per quantity.
For 6 and 7 assist the students to find the known and the unknown numbers to fill in the table.

**4** Ayleen's family grew sweet potatoes in their garden. They harvested 43.2 kg of sweet potatoes from a 6 m² at east side and 62.1 kg sweet potatoes from a 9 m² at west side. Which side of the garden is good harvest? Compare by using the number of sweet potatoes per 1 m².

East Side

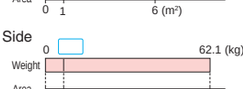
East Side: 43.2 ÷ 6 = 7.2 kg/m²




| | | |
|---|---|---|
| Weight (kg) | ? | 43.2 |
| Area (m²) | 1 | 6 |

(÷6)

West Side




| | | |
|---|---|---|
| Weight (kg) | ? | 62.1 |
| Area (m²) | 1 | 9 |

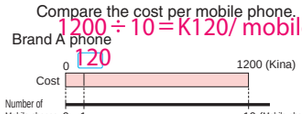
(÷9)

62.1 ÷ 9 = 6.9 kg/m²

**5** There are two brands of mobile phones.
Brand A phone costs 1200 kina for 10 mobile phones.
Brand B phone costs 1040 kina for 8 mobile phones.
Which one is more expensive?
Compare the cost per mobile phone.

1200 ÷ 10 = K120/ mobile phone

Brand A phone

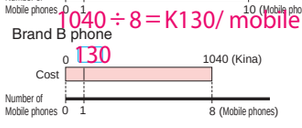



| | | |
|---|---|---|
| Costs (Kina) | ? | 1200 |
| Number of Mobile phones | 1 | 10 |

(÷10)

1040 ÷ 8 = K130/ mobile phone

Brand B phone




| | | |
|---|---|---|
| Costs (Kina) | ? | 1040 |
| Number of Mobile phones | 1 | 8 |

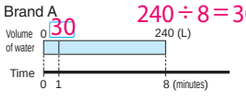
(÷8)

8 mobile phones at K1040 is more expensive

20 = □ + □

**6** Brand A machine can pump 240 L of water in 8 minutes and Brand B machine can pump 300 L of water in 12 minutes.
Which machine pumps more water per minute?

Brand A: 240 ÷ 8 = 30 L/min




Pump A

| | | |
|---|---|---|
| Volume of water (L) | 30 | 240 |
| Time (min) | 1 | 8 |

Brand B: 300 ÷ 12 = 25 L/min


| | | |
|---|---|---|
| Volume of water (L) | 25 | 300 |
| Time (min) | 1 | 12 |

**7** Copier Ⓐ copies 300 sheets of paper in 4 minutes and copier Ⓑ copies 380 sheets of paper in 5 minutes.

Ⓐ 300 ÷ 4 = 75 papers/min

| | | |
|---|---|---|
| Number of sheets | 75 | 300 |
| Time (min) | 1 | 4 |

Ⓑ 380 ÷ 5 = 76 papers/min

| | | |
|---|---|---|
| Number of sheets | 76 | 380 |
| Time (min) | 1 | 5 |

1. Which copier is faster? Ⓑ
2. How many sheets of paper can copier Ⓐ copy in 7 minutes?
3. How many minutes does it take for copier Ⓑ to copy 1140 sheets of paper?

75 × 7 = 525 papers

1140 ÷ 76 = 15 minutes


**Exercise**

A small tractor ploughs 900 m² in 3 hours.
How many square metres (m²) can it plough in 8 hours?

900 ÷ 3 = 300 m²/hr
300 × 8 = 2400 m² Answer: 2400 m² in 8 hr

□ × □ = 21

## Lesson Flow

### 1 Review the previous lesson.

### 2 Compare using the number of sweet potatoes per 1 m².

T 4 Introduce the Main Task. (Refer to the BP)
T/S Read and understand the situation.
S Write mathematical expressions.
T Assist students to see the relationship between weight and area and identify which side of the garden is better.
S Find the weight of sweet potatoes for 1 m² in the East side of the garden and fill in the box. (43.2 ÷ 6 = 7.2 kg per m²)
S Find the weight of sweet potatoes for 1 m² in the West side of the garden and fill in the box. (62.1 ÷ 9 = 6.9 kg per 1 m²)
T Which side of the garden is better?
S East side of the garden with 7.2 kg per m².
T Confirm students' answers.

### 3 Using unit per quantity to compare which mobile phone is more expensive.

T/S 5 Read and understand the situation.
S Write mathematical expressions.
S Find the cost of brand A and fill in the box. (1200 ÷ 10 to get 120 kina per mobile phone)
S The cost of brand B, (1040 ÷ 8 = 130 kina per mobile phone)
T Which brand is more expensive?
S Brand B is more expensive.
T Confirm students' answers.

### 4 Find the unit per quantity for time and volume.

T/S 6 Read and understand the situation.
S Write mathematical expressions.
S Find the volume of water for machine A and fill in the table. (240 ÷ 8 = 30 L per minute)
S Find the volume of water for machine B and fill in the table. (300 ÷ 12 = 25 L per minute)
T Which machine pumps more water per minute?
S Machine A.
T Confirm students' answers.

### 5 Compare the speed of two copiers.

T/S 7 Read and understand the situation.
S Write mathematical expressions.
T 1 Which copier is faster?
S Answer is B, 76 papers per minute (refer to board plan for calculation)
T 2 How many sheets of paper can copier A copy in 7 minutes?
S 75 papers per minute.
So for 7 minutes is 75 × 7 = 525 papers.
T 3 How many minutes does it take for copier B to copy 1140 sheets of paper?
S 76 papers per minute. So for 1140 papers, it will take 1140 ÷ 76 = 15 minutes.
T Confirm students' answers.

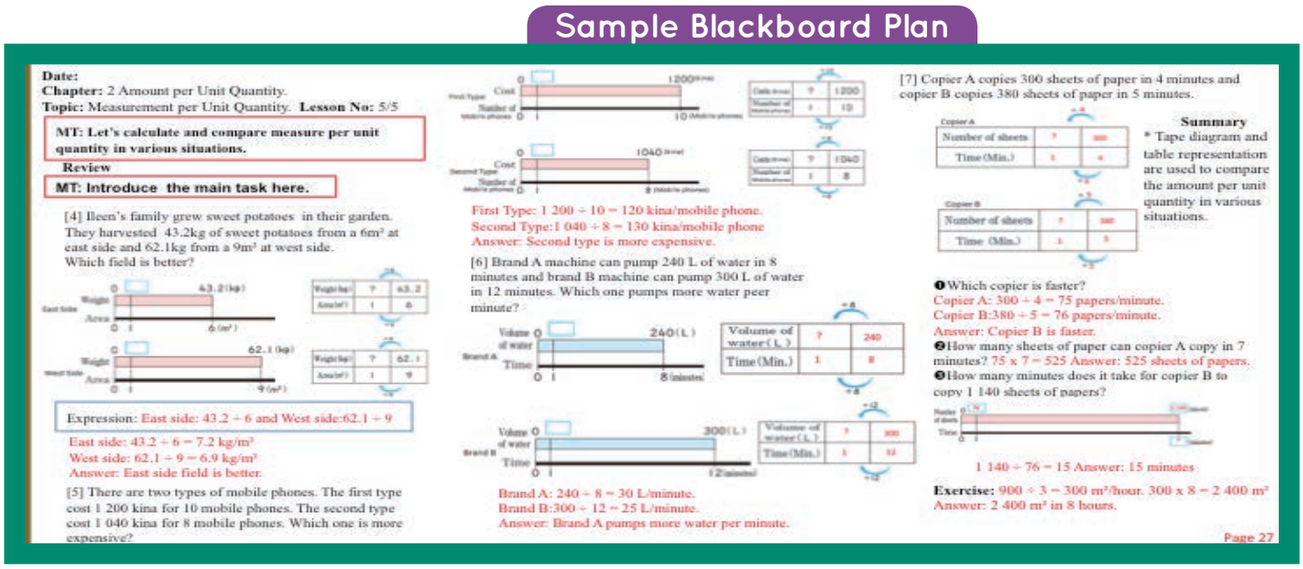
### 6 Complete the Exercise

S Solve the exercise.
T Confirm students' answers.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 2

# Unit: Amount per Unit Quantity
## Excercise, Problems and Evaluation
## Lesson 1 and 2 of 2

**Textbook Pages : 022 and 023**
**Actual Lesson 014 and 015**

## Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

- Evaluation test copy for each student

## Assessment

- Complete the Exercise and Problems correctly. S

## Teacher's Notes

This is the last lesson of Chapter 2. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.

### EXERCISE

1. The table below shows the number of empty cans Anita collected in 5 days. What is the mean number of cans she collected per day? Page 14

**Number of Empty Cans Collected**

| Days | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|---|---|---|---|---|---|
| Number of cans | 6 | 7 | 5 | 8 | 8 |

34÷5=6.8 cans/day

2. There are two schools with same size classrooms. Which school Ⓐ or Ⓑ is more crowded? Pages 15 to 17

Ⓐ 1080 students in 6 classes. 1080 ÷ 6 = 180 students/class

Ⓑ 1640 students in 8 classes. 1640 ÷ 8 = 205 students/class

Answer: School Ⓑ is more crowded

3. A shop sells colour paints. The black paint costs 600 kina for 12 tins and the white paint costs 440 kina for 8 tins. Which colour paint is more expensive? Page 19

600 ÷ 12 = K50/paint 440 ÷ 8 = K55/paint

Answer: Second type is more expensive

4. A 180 m² plantation produced 432 kg cocoa. How many kilograms (kg) of cocoa were harvested per 1 m²? Page 20 2.4 kg/m²

Grades 3 and 4 Do you remember?

Let's calculate.

① 52×27 14.04 ② 86×67 5762 ③ 35×78 2730

④ 154×48 7392 ⑤ 565×64 36 160 ⑥ 927×32 29 664

⑦ 5.4×4 21.6 ⑧ 6.2×9 55.8 ⑨ 2.5×8 20

22 = □ + □

### PROBLEMS

1. The population of a district in PNG is about 39 000 people and the area is about 50 km². Calculate the population density of this district.
   - Understanding how to calculate the population density.

   780 people/km²

2. An optical fiber cable costs 480 kina per 4 m.
   - Understanding the meaning of measurements per unit.

   ① How much does 1 m of this cable cost? K120/m

   ② How much does 5 m of this cable cost? K600

   ③ A company IC Net bought the cable worth 1440 kina. How many metres did the company buy? 12 m

3. A printer can print 350 sheets of paper in 5 minutes.
   - Understanding the meaning of amount of work per unit.

   ① How many sheets of paper can it print in 1 minute? 70 sheets /min

   ② How many sheets of paper can it print in 8 minutes? 560 sheets

   ③ How many minutes will it take to print 2100 sheets of paper? 30 min

4. Anton's goal is to read 25 pages of a book per day. He read an average of 23 pages for 6 days from Sunday to Friday. To reach his goal over the 7 days from Sunday, how many pages must he read on Saturday? 25×7 - 23×6 = 175 - 138 = 37 pages
   - Understanding the relationship between mean, total and number of item.

5. The table below shows the duration of handstand and number of grade 5 students at Joyce's school. From this table, let's calculate the average duration of handstand per student in grade 5.
   - Understanding the meaning of mean and measurement per unit and applying it to solve problems.

**Duration of Handstand and the Number of Grade 5 students**

| Duration of handstand (second) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of students | 3 | 0 | 2 | 4 | 5 | 16 | 9 | 10 | 4 | 6 | 1 |

336 ÷ 60 = 5.6 handstand/child

□×□=23

## Lesson Flow

### 1 Complete the Exercise

S Solve all the exercises.
T Confirm students' answers.

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN Collect students books for marking if time does not allow.

### 3 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.

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

| Chapter 2: Decimal Amount per Unit Quantity | Name: | Score / 100 |
|---|---|---|

[5 x 10 marks for maths expression and 5 x 10 marks for answer]

1. Mr. Pau's flower bed of 15 $m^2$ has 120 seedlings and Ms. Koroi's flower bed of 18 $m^2$ has 135 seedlings. Which flower bed is more crowded?.

| Mathematical Expressions | Answer: |
|---|---|
| 120÷15=8.33<br>135÷18=7.5 | 15 $m^2$ flowerbed |

2. There are 2 cars, A and B. Car A travels 700 km with 35 Litres of petrol. Car B travels 800km on 50 L of petrol. Which car can travel further if they use same amount of petrol?

| Mathematical Expressions | Answer: |
|---|---|
| 700÷35=20<br>800÷50=16 | Car A |

3. A car drives 150 km with 12 L of petrol. How many km can it drive with 60 L of petrol?

| Mathematical Expressions | Answer: |
|---|---|
| 150÷12=12.5<br>12.5×60=750 | 750 km |

4. Kila harvested 63 kg of potatoes from the 50 $m^2$ filed at his house. Asa harvested 108 kg of potatoes from the 80 $m^2$ field at his house. Which field had a better harvest?

| Mathematical Expressions | Answer: |
|---|---|
| 63÷50=1.26<br>108÷80=1.35 | 80$m^2$ field |

5. Betty's result of 5 tests are 81, 95, 78, 86 and 85. What is the average score?

| Mathematical Expressions | Answer: |
|---|---|
| (81+95+78+86+85)÷5=85 | 85 marks |

30

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

| Chapter 2:<br>Decimal Amount per Unit Quantity | Name: | Score<br>/ 100 |
|---|---|---|

[5×10 marks for maths expression and 5×10 marks for answer]

1. Mr. Pau's flowerbed of 15 m² has 120 seedlings and Ms. Koroi's flowerbed of 18 m² has 135 seedlings. Which flowerbed is more crowded?.

| Mathematical Expressions | Answer: |
|---|---|
| | |

2. There are 2 cars, A and B. Car A travels 700 km with 35 Litres of petrol. Car B travels 800km with 50 L of petrol. Which car can travel further if both cars use the same amount of petrol?

| Mathematical Expressions | Answer: |
|---|---|
| | |

3. A car travels 150 km with 12 L of petrol. How many km can it travel with 60 L of petrol?

| Mathematical Expressions | Answer: |
|---|---|
| | |

4. Kila harvested 63 kg of potatoes from the 50 m² filed at his garden. Asa harvested 108 kg of potatoes from the 80 m² field at his garden. Whose garden had a better harvest?

| Mathematical Expressions | Answer: |
|---|---|
| | |

5. Betty's result of 5 tests are 81, 95, 78, 86 and 85. What is her average test score?

| Mathematical Expressions | Answer: |
|---|---|
| | |

# Chapter 3 Multiplication of Decimal Numbers

## 1. Content Standard

5.1.4 Apply the process of multiplication to multiply decimal numbers by a decimal number and whole number by a decimal number

## 2. Unit Objectives

- To understand the meanings of and how to calculate multiplication of decimal numbers.
- To solve the problem by applying the method of multiplying decimal numbers.
- To understand that commutative law, associative law and distributive law also apply in the calculation of decimal numbers.

## 3. Teaching Overview

Students learned decimal number × whole number in the previous grades.

They will learn operation of whole numbers × decimal numbers and operation of decimal numbers × decimal numbers in this unit.

**Operation of Whole Numbers × Decimal Numbers :**

Students find out that whole number multiplied by decimal number can be taught as the same as they solved whole number multiplied by whole number.

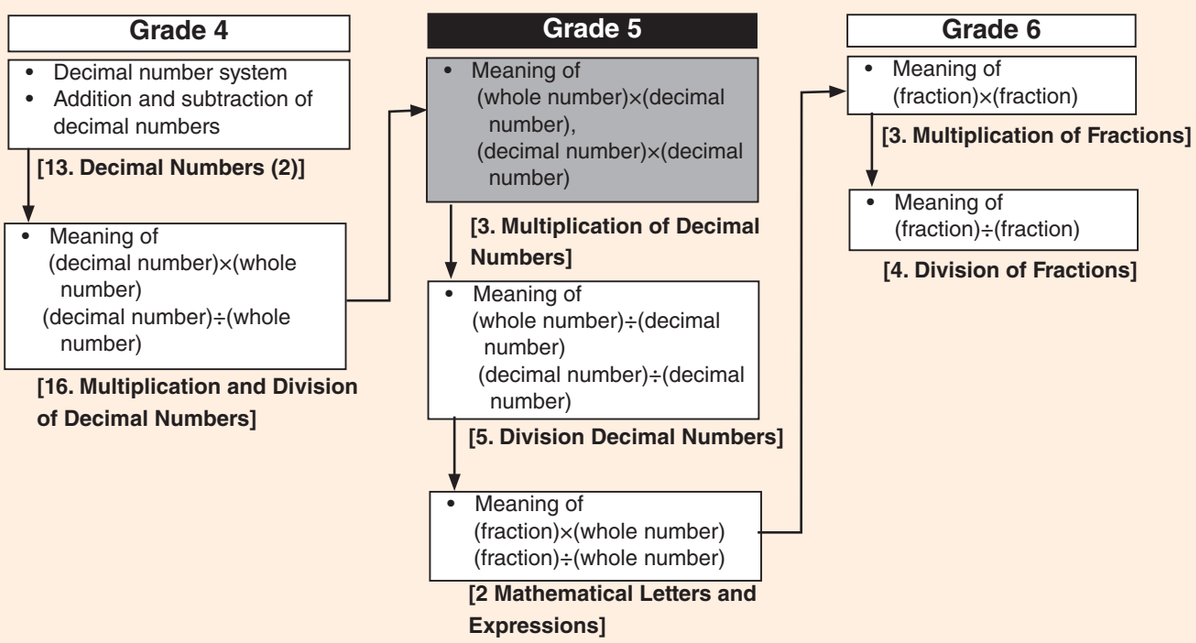
They can apply the rules of multiplication learned in the previous grades.

**Decimal Number × Decimal Number :**

They apply the learning of the previous sub-unit. In this sub-unit, one of the important learning points is to understand that if a number multiplied by a decimal number less than 0, the answer will be smaller than the first number.

Rules of Calculation : They find out the 3 calculation rules (commutative, associative and distributive laws) are also applied for multiplication of decimal numbers.

## 4. Related Learning Contents



# Unit 3

# Unit: Multiplication of Decimal Numbers
## Sub-unit 1: Operation of Whole Numbers x Decimal Numbers
## Lesson 1 of 2

Textbook Page : 024 to 026
Actual Lesson 016

## Sub-unit Objectives

- To understand the meaning of multiplication of decimal number.
- To apply the calculation of multiplication of decimal numbers in vertical form.
- To apply the correct process of multiplying decimal numbers in vertical form.

## Lesson Objective

- To think about how to calculate decimal number × decimal number.

## Prior Knowledge

- Multiplication and Division of Decimal Numbers (Grade 4)

## Preparation

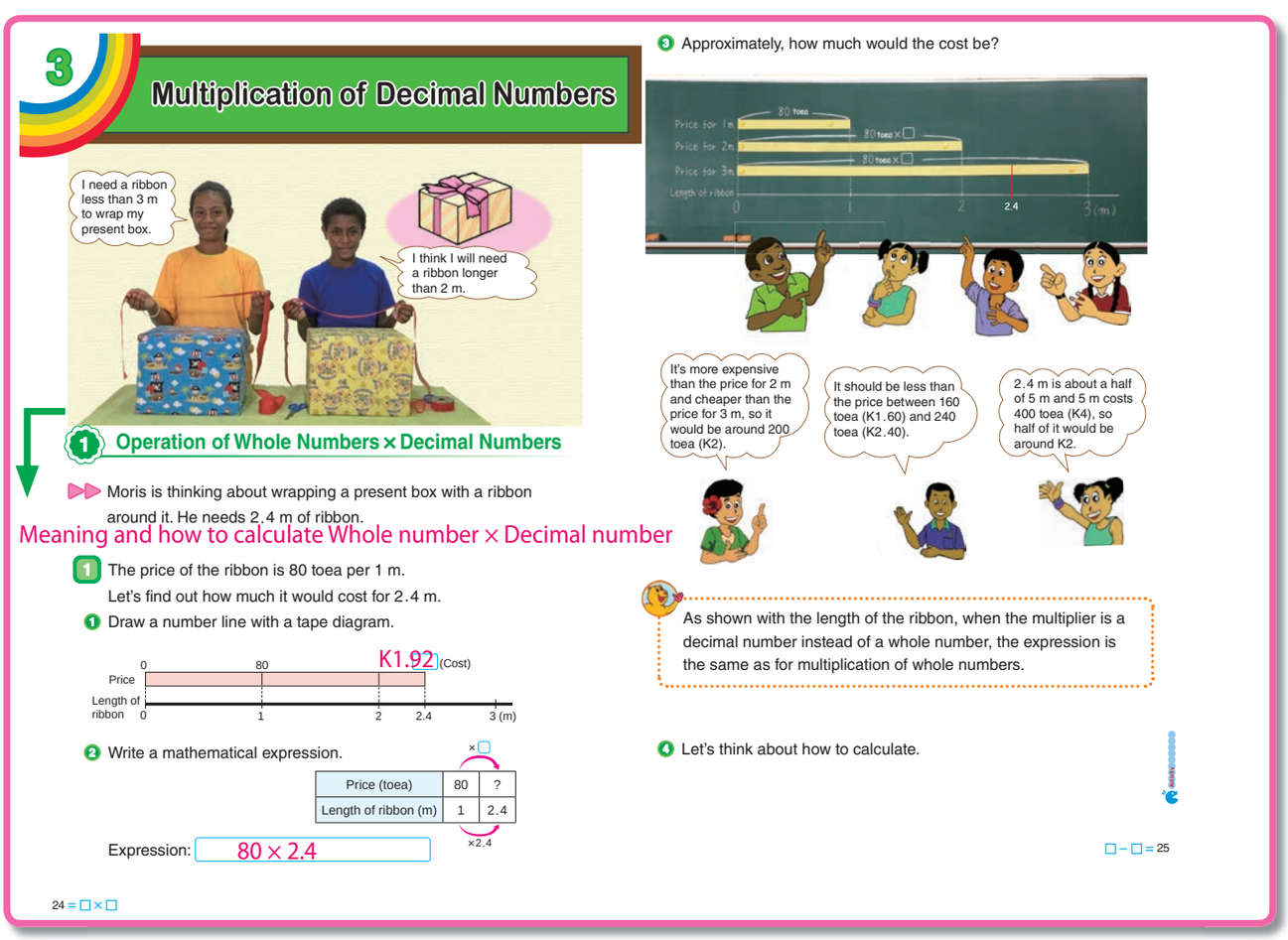
- Box and ribbons
- Prepare 6 pieces of 1 metre ribbon

## Assessment

- Think about how to calculate whole number × decimal number. F
- Explain how to calculate whole number × decimal number. S

### • Teacher's Notes •

**How to convert toea and kina.**
100 toea is one kina. Use idea of amount per unit quantity.
In the case where there is no ribbon, improvise with other materials, such as ropes, strings, etc...



## Lesson Flow

### 1 ▶▶ Introduction

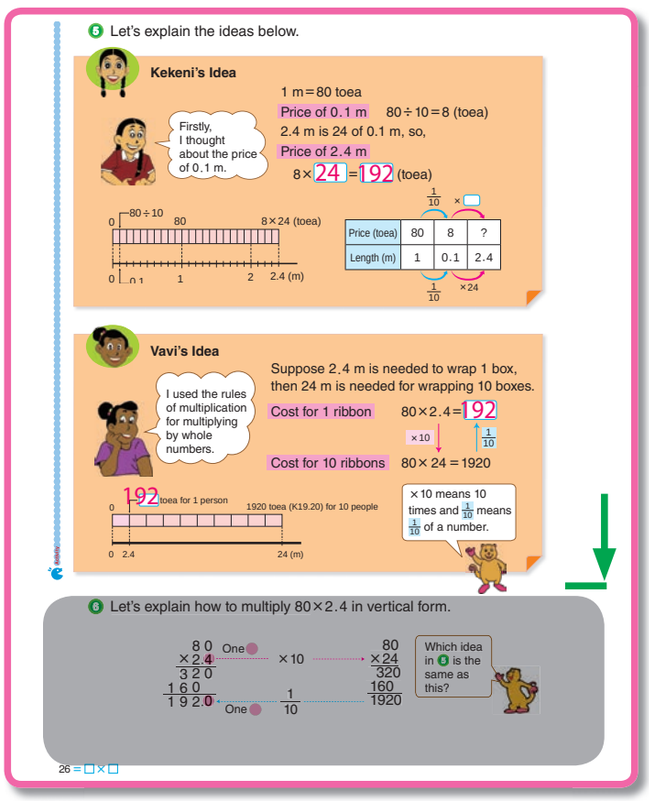
T Ask a student to demonstrate how to wrap a box with a 1 m ribbon around it in front of the class.
T Is the ribbon long enough to wrap the box?
S Give responses from their observation.

### 2 How to calculate whole number × decimal number.

T Introduce the Main Task. (Refer to the BP)
T/S 1 Read and understand the situation.
T The price of the ribbon is 80 toea per metre. Let's find out how much 2.4 m will it.
S 1 Draw a number line with a tape diagram.
T 2 Write a mathematical expression.
S 80×2.4

### 3 Estimating how much the total cost will be.

T 3 Approximately, how much would the cost be?
TN Put up the three tapes of 1 m, 2 m and 3 m.
S Give various responses according to their own estimations corresponding to the tapes and the cost.
T Check students' estimations and relate to the speech bubbles.




### 4 Important Point

T/S Explain the important point in the box .

### 5 4 Think about how to calculate.

T Let the students to think about and present their ideas.
S Present their ideas.

### 6 Explain Kekeni's and Vavi's Ideas.

T 5 Direct the students attention to look at how Kekeni's and Vavi's Ideas are expressed.
T Explain Kekeni's and Vavi's ideas.
S Kekeni's Idea:
Firstly, I thought about the price of 0.1 m.
According to the price of 0.1 m (80÷10=8 toea), therefore, 2.4 is 24 of 0.1 m.
So now the price of 2.4 is 8×24=K1.92.
Another similar sample is from the table of information.
Vavi's Idea: I used the rules of multiplication to multiplying by whole numbers. If 2.4 is the amount for 1 ribbon, then the amount for 10 ribbons would be 24 m.
If the cost of 10 ribbons is 80×24=1920 (K19.20)
Then, the cost for 1 ribbon would be $\frac{1}{10}$ of 1920=192 (K1.92)
Another sample is shown on the number line.
S Understand and make meaning of the two ideas.
TN Interact with students through the explanations.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

### Sample Blackboard Plan

Lesson 016 Sample Blackboard Plan is on page 35.

# Unit 3: Unit: Multiplication of Decimal Numbers

## Sub-unit 1: Operation of Whole Numbers x Decimal Numbers

## Lesson 2 of 2

Textbook Page : 026 and 027
Actual Lesson 017

### Lesson Objective

- To understand how to calculate whole number × decimal number in vertical form.

### Prior Knowledge

- Meaning of Whole Number × Decimal Number and how to calculate.

### Preparation

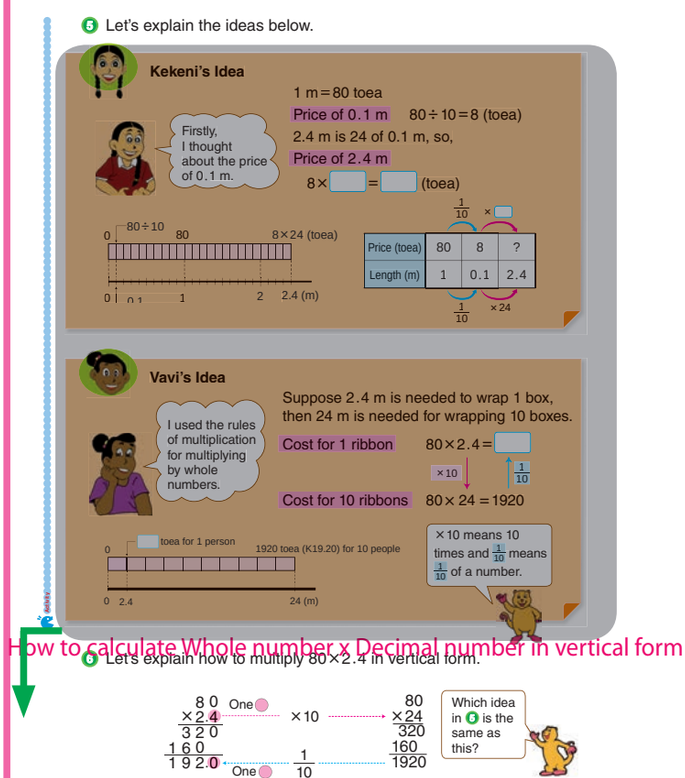
- Chart of How to multiply 80 × 2.4 in vertical form
- Chart showing the diagram interpretation of unit idea for Task 2 2.

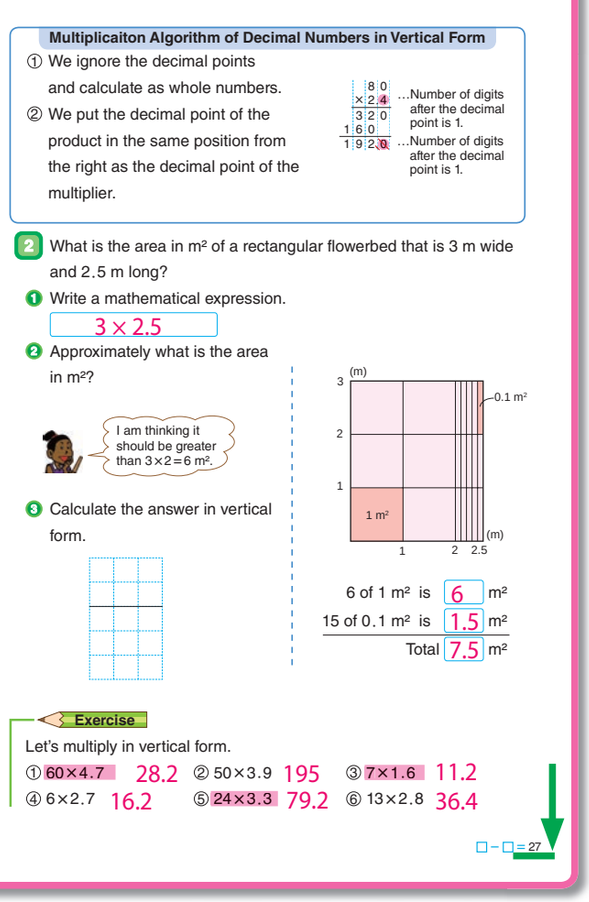
### Assessment

- Think about how to calculate whole number × decimal number in vertical form. F
- Explain how to calculate whole number × decimal number in vertical form. F
- Solve the exercise correctly. S

### Teacher's Notes

When converting decimal numbers to whole numbers for easier calculations, always write the products as original decimal numbers. Explain and present the problem in vertical form.To change the decimal number to a whole number, we multiply by 10 because there is one number after the decimal point, when calculations are done the result or answer is the product.
The decimal point should be placed on the number of places from the left to the right. In this case it is one place after the decimal point.
The product is 192.0



## Lesson Flow

### 1 Review the previous lesson.

### 2 ⑥ Let's explain how to multiply whole number × decimal number in vertical form

S Explain in their own words how to multiply 80×2.4 in vertical form.
TN Refer to Teacher's Notes for explanation.
T Introduce the Main Task. (Refer to the BP)

### 3 How to multiply 80×2.4 in vertical form.

S Explain in their own understanding on how to calculate 80×2.4 in vertical form.
T Refer students to the textbook and confirm how to multiply in vertical form.

### 4 Calculate 3×2.5 in vertical form.

T/S ② Read and understand the given situation
T ① Write a mathematical expression.
S 3×2.5
T ② Approximately what is the area in m² ?
S Estimate that the area should be greater than 3×2=6 m².
T ③ Ask students to calculate the answer in vertical form.
S Carefully think through the calculation process in vertical form and fill in the boxes.
TN Refer to board plan for answers.
T/S Explain the diagram representation and confirm with the vertical calculation.

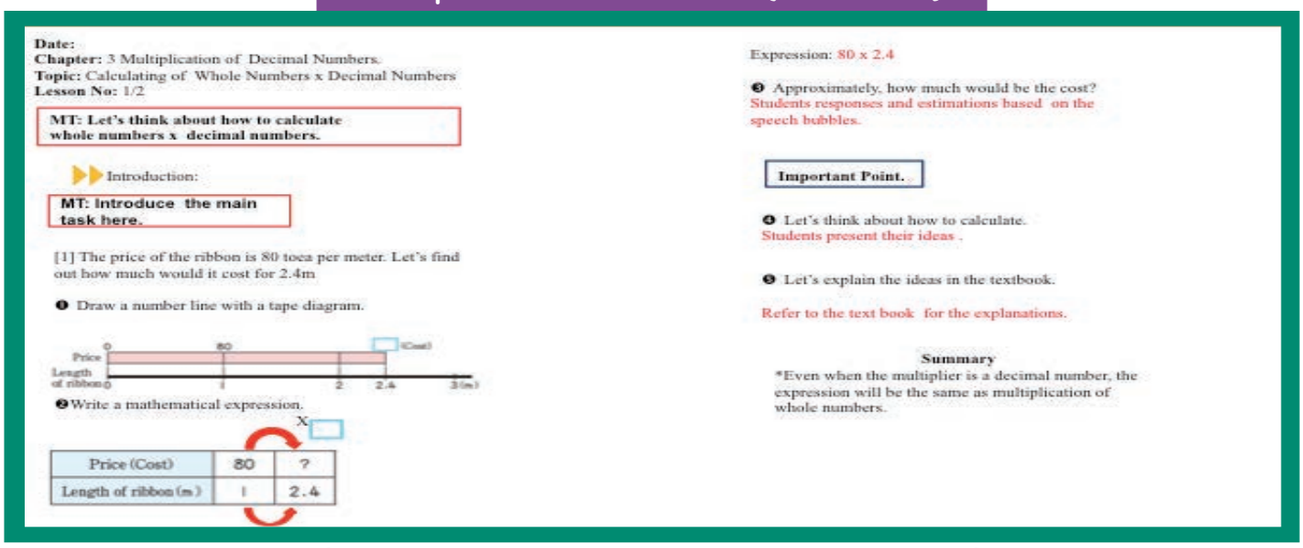
### 5 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

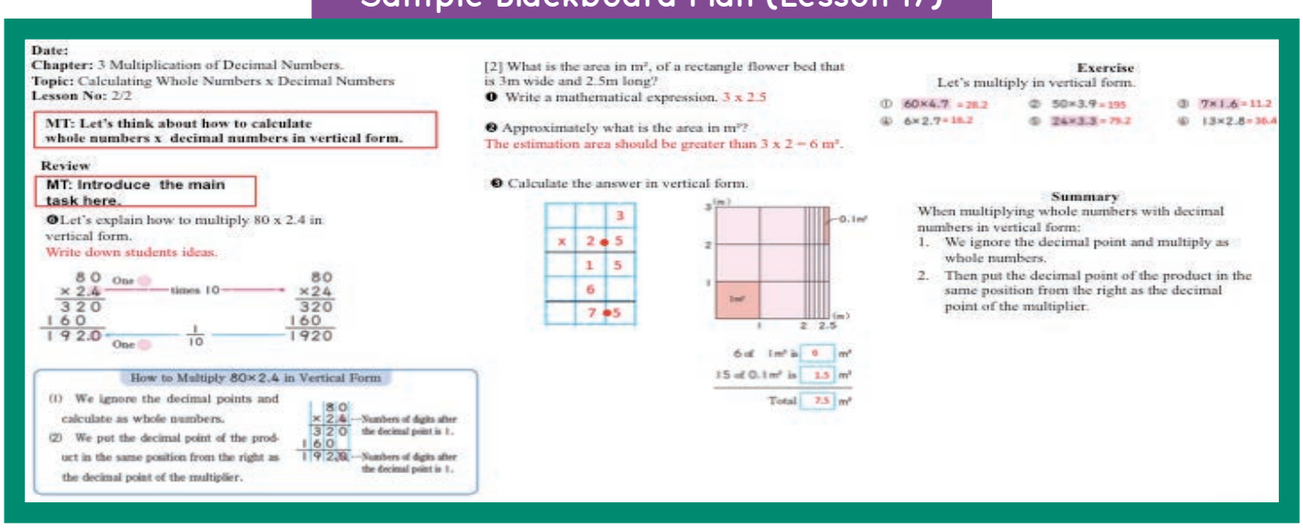
### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 16)




## Sample Blackboard Plan (Lesson 17)



# Unit 3

# Unit: Multiplication of Decimal Numbers
## Sub-unit 2: Operation of Decimal Numbers × Decimal Numbers
## Lesson 1 of 3

Textbook Page : 028
Actual Lesson 018

## Sub-unit Objectives

- To think about how to calculate decimal number × decimal number.
- To understand how to calculate decimal number × decimal number in vertical from.

## Lesson Objective

- To think about how to calculate decimal number × decimal number.

## Prior Knowledge

- How to calculate Whole number × Decimal Number in vertical form
- Calculating Whole numbers × Decimal Numbers

## Preparation

- A chart of the number line and the table of information

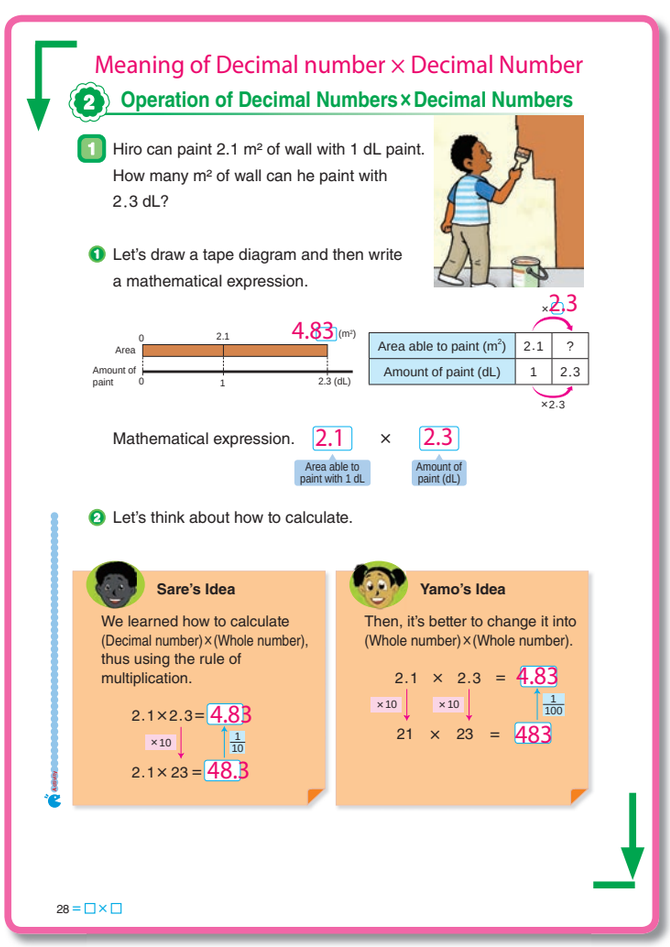
## Assessment

- Think about how to multiply decimal number × decimal number. F
- Explain how to calculate decimal number × decimal number. S

## Teacher's Notes

In this problem, both Sare's and Yamo's ideas include the rule of multiplication.

- If multiplicand is multiplied by 10, the product should be multiplied by $\frac{1}{10}$.
- If both multiplicand and multiplier are multiplied by 10, the product is multiplied by $\frac{1}{100}$.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Making meaning of decimal number × decimal number

T Introduce the Main Task. (Refer to the Blackboard Plan)
T/S ❶ Read and understand the given situation.
T ❶ Assist the students to understand the given situation and draw a diagram, then, make a mathematical expression.
T If 1 dL can paint 2.1 $m^2$, how many $m^2$ of wall will be painted with 2.3 dL?
S Using their prior knowledge, draw a line diagram similar to the drawing in the textbook.
S Mathematical expression: 2.1 × 2.3

### 3 To think about how to calculate 2.1 × 2.3 using prior knowledge.

T Discuss in their groups or in pairs about how to calculate 2.1 × 2.3
S Present their ideas and explain.

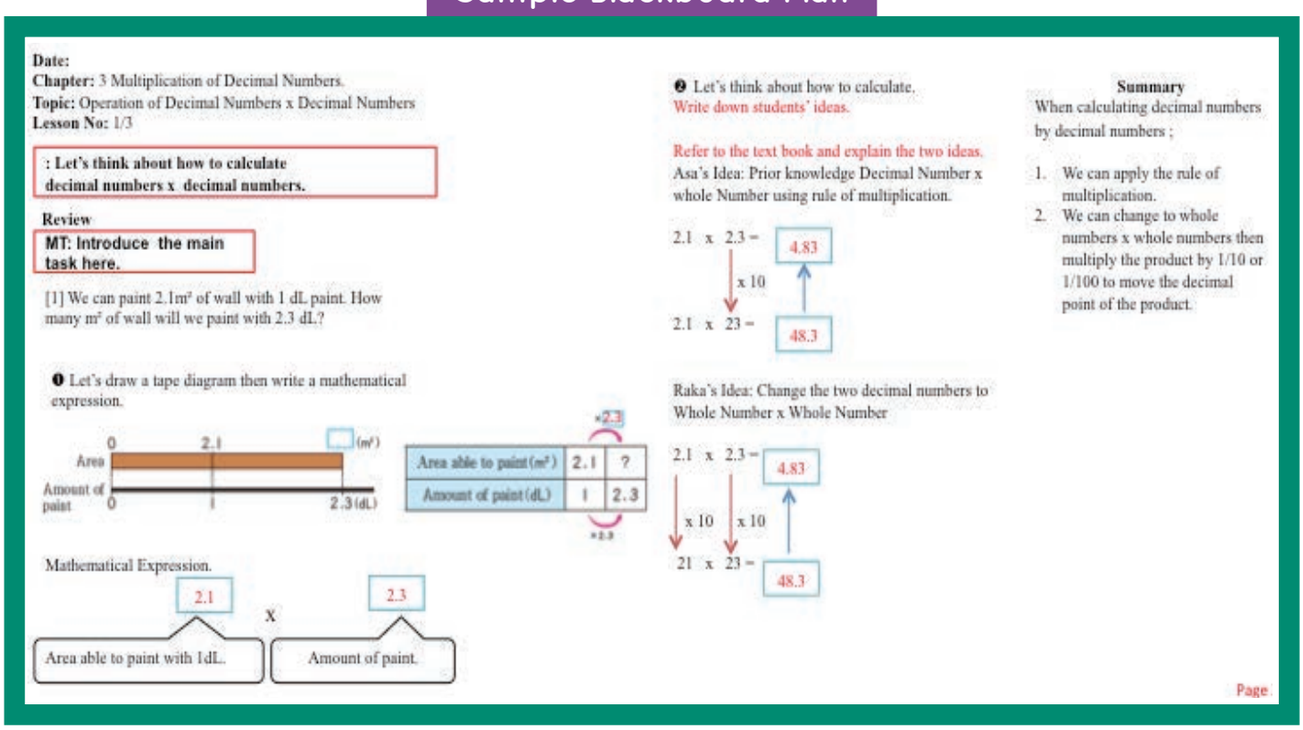
### 4 ❷ Let's think about how to calculate 2.1 × 2.3

S Think about and explain Sare's and Yamo's ideas.
T Emphasise the ideas above with explanations to clarify any misconceptions.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 3

# Unit: Multiplication of Decimal Numbers
## Sub-unit: 2. Operation of Decimal Numbers × Decimal Numbers
## Lesson 2 of 3

Textbook Page : 029 and 030
Actual Lesson 019

## Lesson Objective

- To understand how to calculate decimal number × decimal number in vertical form.

## Prior Knowledge

- The product of the right end number becomes 0
- Calculating Decimal Number × Decimal Number

## Preparation

- A chart expressing the unit idea in a diagram

## Assessment

- Explain decimal number × decimal number in vertical form. F
- Solve the exercise correctly. S

## Teacher's Notes

In task 2 2, the calculation is done in vertical form applying the prior knowledge about the unit idea (diagram of the rectangular flowerbed).
Assist the students to visualise the area using the unit idea to understand how the decimal point is arranged and calculated.

### How to multiply Decimal number × Decimal number in vertical form

3 Let's explain how to multiply 2.1 × 2.3 in vertical form.

2.1 (One) ×10 → 21
×2.3 (One) ×10 → ×23
63
42
4.83 (Two) 1/100 → 483

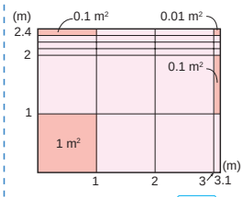
2 What is the area in m² of a rectangular flowerbed that is 2.4 m wide and 3.1 m long?

1 Let's write a mathematical expression.

2.4 × 3.1

2 Let's multiply in vertical form.

x
2.4
3.1
2.4
7 2
7.4 4




6 of 1 m² is 6 m²
14 of 0.1 m² is 1.4 m²
4 of 0.01 m² is 0.04 m²
Total 7.44 m²

The area of rectangles can be calculated by using the formula even if the lengths of the sides are decimal numbers.

**Exercise**

Let's multiply in vertical form.

① 1.2×2.4 2.88 ② 8.6×1.3 11.18 ③ 6.4×3.5 22.4
④ 2.5×2.8 7 ⑤ 0.2×1.6 0.32 ⑥ 0.8×2.5 2

### Calculating Decimal number × Decimal number in vertical form

3 Let's think about how to multiply 5.26 × 4.8 in vertical form.

5.26 (Two) ×100 → 526
×4.8 (One) ×10 → ×48
4208
+2104
25.248 (Three) 1/1000 → 25248

When multiplying in vertical form, place the decimal point on the product by adding the number of digits after the decimal point of the multiplicand and the multiplier and count from the right end of the product.

**The product where the right of the decimal point becomes zero (0)**

4 Let's think about how to multiply 4.36 × 7.5

4.36 ×100 → 436
×7.5 ×10 → ×75
2180
3052
32.700 1/1000 → 32700

**The position of decimal point in the product.**

5 Let's put decimal points on the products for the following calculations.

① 5.6 × 4.3 = 24.08
② 3.27 × 1.2 = 3.924
③ 1.48 × 2.5 = 3.700

**Exercise**

Let's multiply in vertical form.

① 3.14×2.6 8.164 ② 4.08×3.2 13.056 ③ 7.24×7.5 54.3
④ 1.4×4.87 6.818 ⑤ 4.8×2.87 13.776 ⑥ 8.2×2.25 18.45

□ − □ = 29 30 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Explain how to multiply 2.1 × 2.3

T 1 3 Explain how to multiply 2.1 × 2.3 in vertical form while students follow through using the textbook.

TN One decimal place number × one decimal place number gives a total of two decimal places number as the product.

T Introduce the Main Task. (Refer to the BP)

### 3 Explain how to calculate 2.4 × 3.1

S 2 1 Read and understand the situation and write a mathematical expression as 2.4 × 3.1

T 2 Let's multiply 2.4 × 3.1 in vertical form.

S Calculate 2.4 × 3.1 in vertical form.

T Explains the area diagram representation.

S Correspond with the explanation to fill in the box for the diagram representation.

T Confirm answers in relation to the diagram representation and vertical calculation.

### 4 Important Point

T/S Explain the important point in the box .....

### 5 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

### 6 Think about how to multiply 5.26 × 4.8 in vertical form.

T 3 Let's think about how to multiply 5.26 × 4.8

S Explain how to multiply 5.26 × 4.8 in vertical form using the textbook.

TN Two decimal place number × one decimal place number gives a total of three decimal place number as the product.

### 7 Important Point

T/S Explain the important point in the box .....

### 8 4 Think about how to multiply 4.36 × 7.5 in vertical form when the product of the right end becomes 0.

T Refer to 3 as an example to complete 4.

TN Emphasise on the answer where zeros (0) at the end of the product of the decimal numbers are insignificant.

S Fill in the boxes.

### 9 To think about the position of decimal points.

T 5 Let's put decimal points on the products for the following calculations.

S 1.) 5.6 × 4.3 = 24.08 2.) 3.27 × 1.2 = 3.924
3.) 1.48 × 2.5 = 3. 700

### 10 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

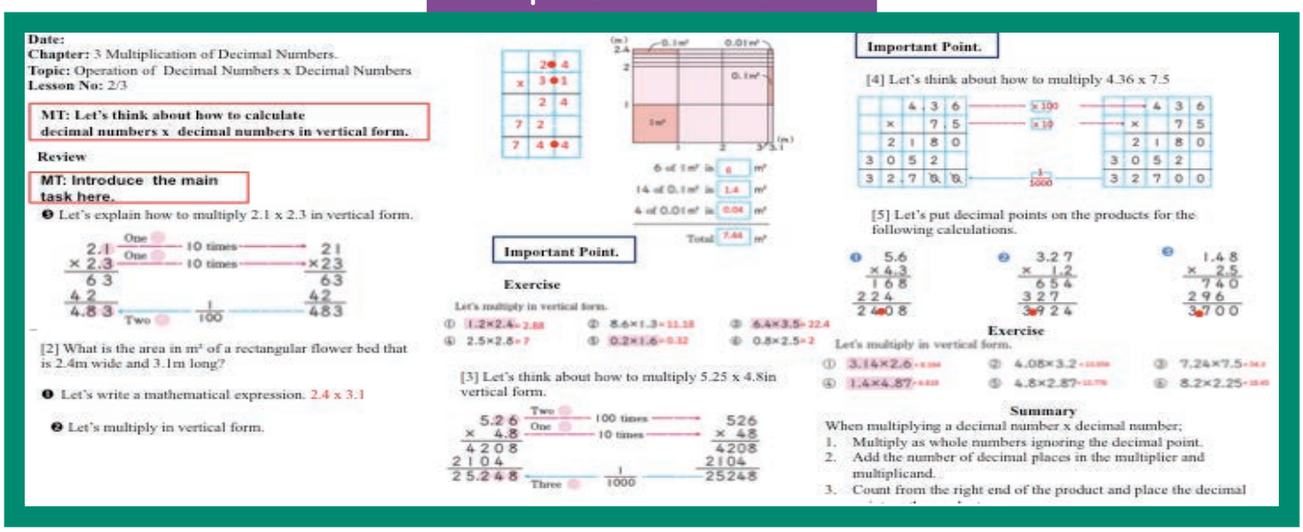
### 11 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 3

# Unit: Multiplication of Decimal Numbers

## Sub-unit 2: Operation of Decimal Numbers × Decimal Numbers

## Lesson 3 of 3

Textbook Page : 031
Actual Lesson 020

## Lesson Objective

- To understand the relationship between the product and the multiplicand.

## Prior Knowledge

- Calculating Decimal Number × Decimal Number in vertical form

## Preparation

- A chart of a Tape diagram (Number Line) and Table of Information for task 6

## Assessment

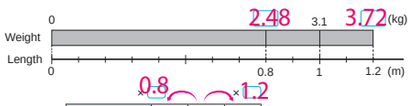
- Explain the relationship between the product and the multiplicand. F S
- Solve the exercises correctly. S

## Teacher's Notes

- When the multiplier is more than 1, the product is more than the multiplicand.
  25 × 6 = 150
  multiplicand multiplier product
- When the multiplier is a decimal number less than 1, the product is less than the multiplicand.
  25 × 0.6 = 15
  multiplicand multiplier product
- When the multiplier is more than 1, the product is more than the multiplicand.
  0.25 × 6 = 1.5
  multiplicand multiplier product
- When the multipler is a decimal number less than 1, the product is less than the multiplicand.
  0.25 × 0.6 = 0.15
  multiplicand multiplier product

### Multiplication of Decimal Numbers Smaller than 1

6 There is a metal bar that weighs 3.1 kg per metre.
What is the weight of 1.2 m and 0.8 m of this bar respectively?




×0.8 ×1.2

| Weight (kg) | ? | 3.1 | ? |
|---|---|---|---|
| Length (m) | 0.8 | 1 | 1.2 |

×0.8 ×1.2

3 1
× 1 2
2 4 8

1 Let's find the weight of 1.2 m metal bar.
3.1 × 1.2 = 3.72 Answer: 3.72 kg
2 Let's find the weight of 0.8 m metal bar.
3.1 × 0.8 = 2.48 Answer: 2.48 kg
3 Let's compare the sizes of the products and the multiplicands.
When the multiplier decreases, the product decreases.

When the multiplier is a decimal number smaller than 1, the product becomes smaller than the multiplicand.
If the multiplier is a decimal number larger than 1, Multiplicand < Product.
If the multiplier is a decimal number less than 1, Multiplicand > Product.

Comparing product and multiplicand.

7 Put decimal points on the products and compare the products and the multiplicands.

1
25 × 6 = 150
25 × 0.6 = 15.0

2
0.25 × 6 = 1.50
0.25 × 0.6 = .150

Exercise

Let's multiply in vertical form.
① 4.2×0.7 2.94 ② 6.8×0.4 2.72 ③ 0.8×0.3 0.24
④ 2.17×0.6 1.302 ⑤ 0.14×0.5 0.07 ⑥ 0.07×0.2 0.014

□ − □ = 31

## Lesson Flow

### 1 Review the previous lesson.

### 2 Find the relationship between the length and the weight.

T/S Read and understand the situation.
T Introduce the Main Task. (Refer to the BP)
T 6 Ask students to interpret the tape diagram and the table.
S Interpret the tape diagram and the table and fill in the boxes.
T ❶ Let's find the weight of 1.2 m metal.
S Write the mathematical expression as 3.1×1.2 and calculate in vertical form.
TN Having the idea that 3.1 kg = 1 m.
Then, 3.1×1.2=3.72 Answer: 3.72 kg
T ❷ Let's find the weight of 0.8 m metal.
S Write the mathematical expression as 3.1×0.8 and calculate in vertical form.
S So 3.1×0.8=2.48 Answer: 2.48 kg

### 3 ❸ Compare the size of the product and the multiplicand.

T Let's compare the size and understand the relationship between the product and the multiplicand.
S Explain the relationship between the product and the multiplicand.(Refer to the Teacher's Notes)

### 4 Important Point

T/S Explain the important point in the box .

### 5 7 Positions of the decimal points and comparing.

S Complete ❶ and ❷ and compare the products and the multiplicands.
TN ❶ a.) 25×6=150
When the multiplier is more than 1,
the product is more than the multiplicand.
b.) 25×0.6=15.0 Answer: 15
When the multiplier is a decimal number and its less than 1, the product is less than the multiplicand.
TN ❷ a.) 0.25×6=1.50 Answer: 1.5
When the multiplier is more than 1, the product is more than the multiplicand.
b.) 0.25×0.6=0.150 Answer: 0.15
When the multiplier is a decimal number and its less than 1, the product is less than the multiplicand.

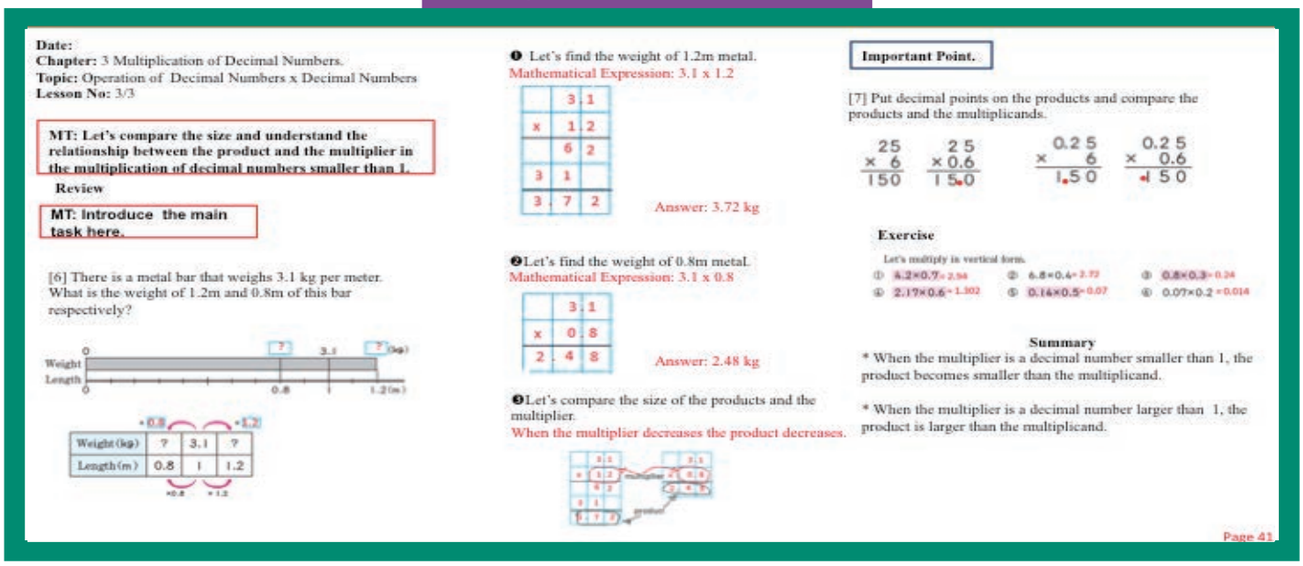
### 6 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 3: Unit: Multiplication of Decimal Numbers

## Sub-unit 3: Rules for Calculation

### Lesson 1of 2

Textbook Page : 032
Actual Lesson 021

## Sub-unit Objective

- To understand that commutative law and associative law can be applied in decimal numbers.

## Lesson Objective

- To understand and apply commutative law and the associative law in calculating decimal numbers.

## Prior Knowledge

- Multiplication of decimal numbers smaller than 1
- Commutative and Associative laws (Grades 3 and 4)

## Preparation

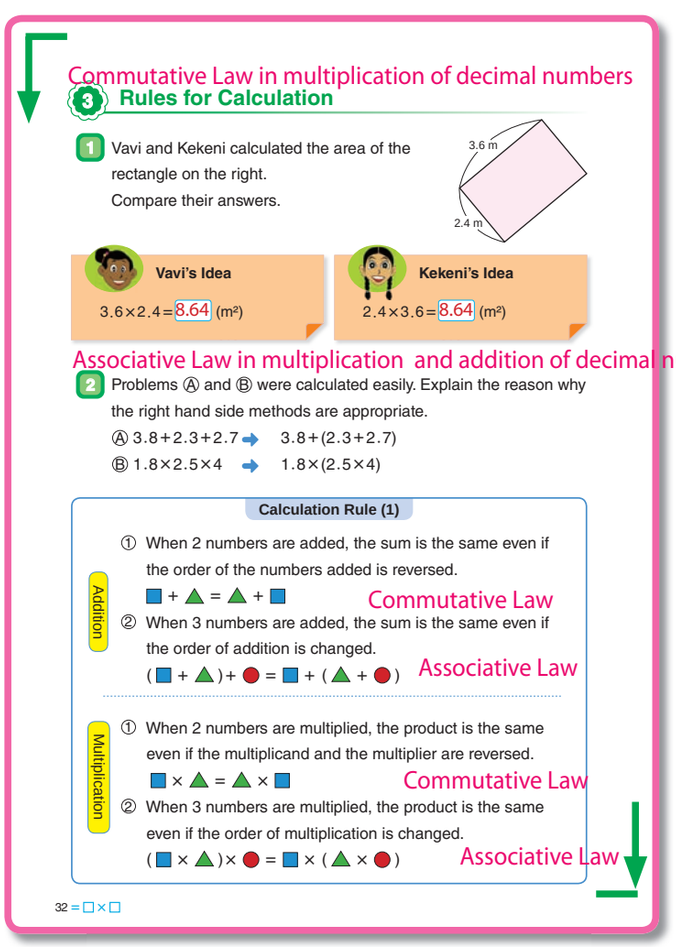
- A diagram of a rectangle drawn in Task 1
- Chart of Calculation Rule (1)

## Assessment

- Understand and apply commutative law and the associative law in calculating with decimal numbers. F S

## Teacher's Notes

- In this lesson, students do not have to know the term "commutative" and "associative" laws but instead learn the process of applying the rules such as;
- Commutative law is when 2 numbers are multiplied or added even when their order is reversed, the product or sum is the same.
- Associative law is when 3 numbers are multiplied or added, the order of calculation does not change the product or sum.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Think about how to calculate the area of the rectangle.

T/S 1 Read and understand the situation.
T Introduce the Main Task. (Refer to the Blackboard Plan)
T Ask the students to find the area of the rectangle.
S Think about how to calculate the area of the rectangle and present their ideas.
T Compare students' ideas with Vavi's and Kekeni's ideas.
TN Vavi's Idea: $3.6 \times 2.4 = 8.64$ Answer: 8.64 m²
Kekeni's Idea: $2.4 \times 3.6 = 8.64$ Answer: 8.64 m²
T What did you notice from these two orders of calculations?
S Even when changing the order of calculation, the answer is still the same.

### 3 Think about how to use the rules of calculation in multiplication and addition.

T/S 2 Read and understand the situation.
T What do you think about the calculation on the right hand side for Ⓐ and Ⓑ?
S In both Ⓐ and Ⓑ, the order of calculation is changed so that the answer in the bracket becomes a whole number as 5 and 10 respectively and makes the calculation more easier.

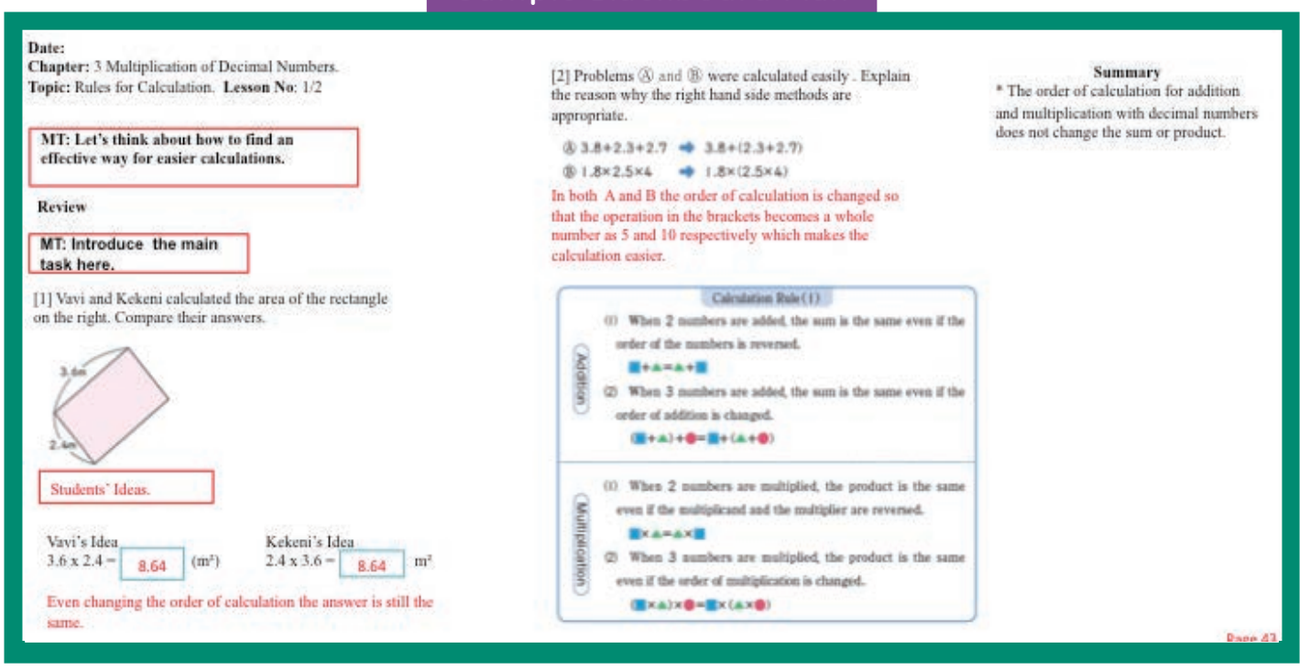
### 4 Calculation rule (1)

T Ask students to discuss and explain the calculation rule from the textbook or chart.
S Discuss and explain their ideas to their friends.
T Confirms the understanding of the calculation rule 1.
TN Students need to understand that the calculation rules apply to decimal numbers as well.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 3

# Unit: Multiplication of Decimal Numbers
## Sub-unit 3: Rules for Calculation
## Lesson 2 of 2

Textbook Page : 033 and 034
Actual Lesson 022

## Lesson Objective

- To understand that distributive law can be applied in the calculation of decimal numbers.

## Prior Knowledge

- Multiplication of decimal numbers
- Distributive law in whole numbers (Grade 4)

## Preparation

- Diagram representation of 3, 4 and 5
- Chart of Calculation Rule (2)

## Assessment

- Make mathematical expression by observing the figure. F
- Calculate using distributive law. F S
- Solve the exercise correctly. S

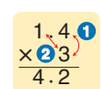
## Teacher's Notes

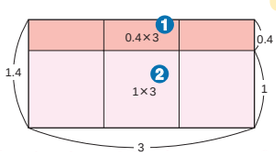
- In this lesson, students do not have to know the term "distributive" laws but instead learn the process of applying the rules.
- When using operations of addition and multiplication or subtraction and multiplication with brackets, expand the operation in the brackets before calculation.
- Consider the correct order of operations when calculating.

### Distributive Law 2 in the case of multiplication of decimal number

3 The answer to 1.4×3 can be calculated by thinking as follows.
Let's explain the method by using this diagram.

1.4×3=(1+0.4)×3
=1×3+0.4×3

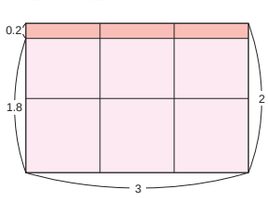



### Distributive Law 2 in the case of multiplication of decimal number

4 The answer to 1.8×3 can be calculated by thinking as follows.
Let's explain the method by using this diagram.

1.8×3=(2−0.2)×3
=2×3−0.2×3



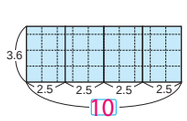

### Distributive Law

**Calculation Rule (2)**

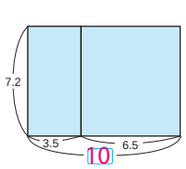
(■ + ▲) × ● = ■ × ● + ▲ × ●
(■ − ▲) × ● = ■ × ● − ▲ × ●

5 Let's explain how the calculation rules are used for easier calculations.

① 3.6×2.5×4
=3.6×( 2.5 × 4 )
=3.6× 10
= 36




② 7.2×3.5+7.2×6.5
=7.2×( 3.5 + 6.5 )
=7.2× 10
= 72




It is useful to remember the multiplications that have products such as 1 and 10.
0.25×4=**1**　1.25×8=**10**　2.5×4=**10**

**Exercise**

Let's calculate using the calculation rules. Write down how you calculated.

① 6.9×4×2.5　6.9×10= 69
② 3.8×4.8+3.8×5.2　3.8×(4.8 + 5.2)=3.8×10=38
③ 0.5×4.3×4
= 4.3×(0.5×4)
= 4.3×2
= 8.6
④ 3.6×1.4+6.4×1.4
= 1.4×(3.6 +6.4)
= 1.4×10
= 14

□ − □ = 33　　34 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Think about how to calculate 1.4×3

T/S 3 Read and understand the situation.
T Introduce the Main Task. (Refer to the BP)
T Ask students to explain the mathematical sentence by observing the figure.
S 1.4 is divided by 2 parts, 1 and 0.4. Calculated separately, 1×3 and 0.4×3
S When calculating the area separately, the whole area is 4.2

### 3 Think about how to calculate 1.8×3

T/S 4 Read and understand the situation.
T Ask students to explain mathematical sentences by observing the figure.
S 1.8=2−0.2 so 1.8×3=(2−0.2)×3
S When subtracting small area (0.2×3) from the large area (2×3), we can find the area (1.8×3)

### 4 Calculation rule (2).

T/S Based on tasks 3 and 4, explain that calculation rule (2) can be applied in the calculation of decimal numbers.

### 5 5 Explain how calculation rule (2) is used.

S ❶ 2.5×4=10, so when calculating 2.5×4 first, the whole calculation become easier.
S ❷ 3.5+6.5=10, so when calculating 3.5+6.5 first, the whole calculation becomes easier.

### 6 Important Point

T/S Explain the important point in the box .

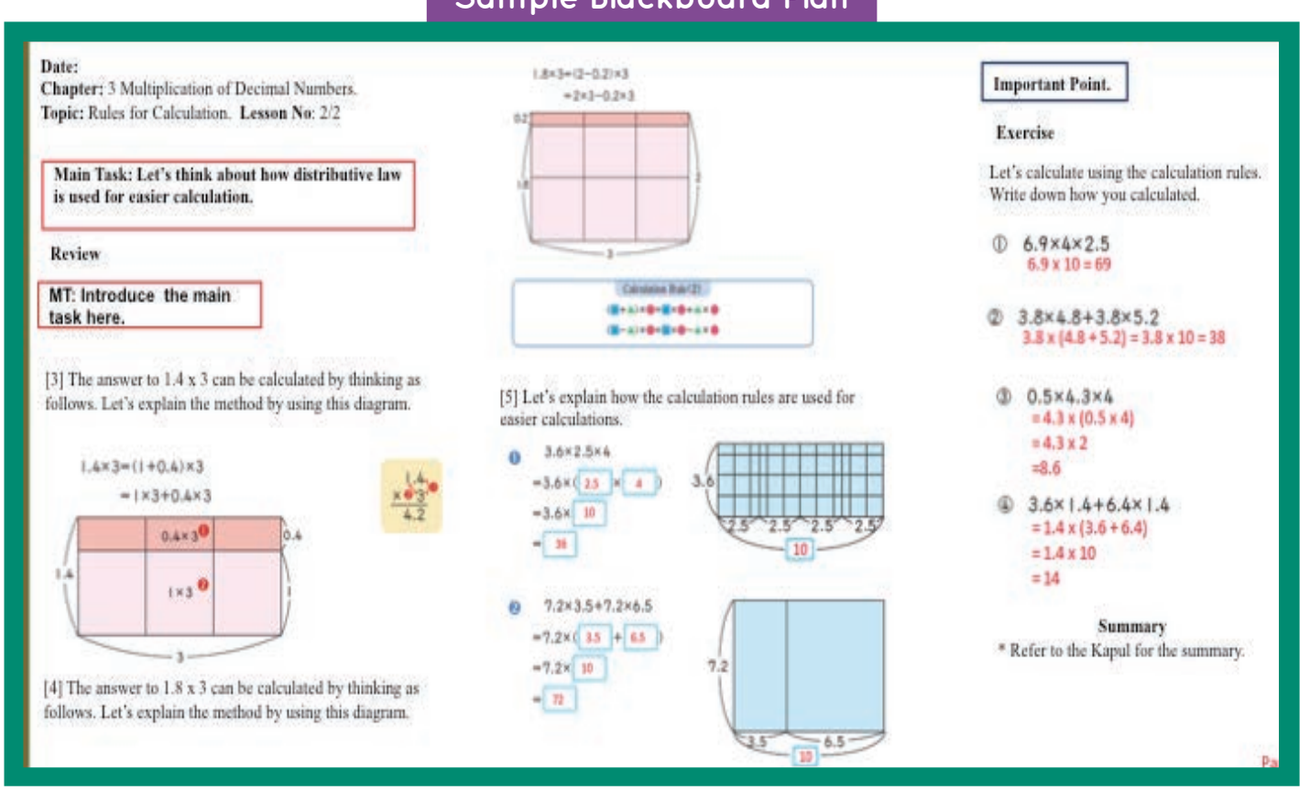
### 7 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 8 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 3

# Unit: Multiplication of Decimal Numbers
## Exercise, Problems and Evaluation
## Lesson 1 and 2 of 2

Textbook Page : 035 and 036
Actual Lesson 023 and 024

### Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

### Prior Knowledge

- All the contents covered in this unit

### Preparation

- Evaluation test copy for each student

### Assessment

- Complete the Exercise and Problems correctly. S

### Teacher's Notes

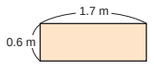
This is the last lesson of Chapter 3. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.

## EXERCISE

1 Let's multiply in vertical form. Pages 29 to 33

① 50×4.3 215 ② 6×1.8 10.8 ③ 26×3.2 83.2 ④ 3×1.4 4.2
⑤ 31×5.2 161.2 ⑥ 62×0.7 43.4 ⑦ 0.6×0.8 0.48 ⑧ 3.5×0.9 3.15
⑨ 1.5×3.4 5.1 ⑩ 0.3×0.25 0.095 ⑪ 1.26×2.3 2.898 ⑫ 4.36×1.5 6.54

2 Let's find the area of the rectangle. Pages 33 and 34




0.6×1.7 =1.02
Answer: 1.02 m²

3 There is a wire that weighs 4.5 g per 1 m. Page 31
Let's find the weight of 8.6 m and the weight of 0.8 m of this wire.
4.5×8.6=38.7 Answer: 38.7g 4.5×0.8=3.6 Answer: 3.6g

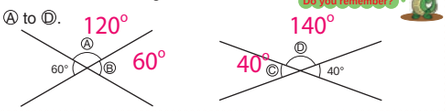
4 Let's fill the ☐ with equal or inequality signs. Page 31
① 3.5×3.5 > 3.5 ② 3.5×0.1 < 3.5
③ 3.5×0.9 < 3.5 ④ 3.5×1 = 3.5

5 Choose numbers from the ☐ below and make problems for multiplications of decimal numbers.
Exchange your problems with your friends and solve. Page 34

| 1.5 | 7 | 0.8 | 30 | 2.3 | 5 |
|---|---|---|---|---|---|

Grade 4 Do you remember?

Find the sizes of the following angles Ⓐ to Ⓓ.




☐ − ☐ = 35

## PROBLEMS

1 Summarize how to calculate with decimal numbers.
● Understanding how to calculate with decimal numbers.
To calculate 2.3×1.6 first multiply 2.3 by 10 and multiply 1.6 by 10, then calculate 23×16 and then the answer is 1/100 of 368.

2 Let's multiply in vertical form.
● Multiplying decimal numbers in vertical form.
① 28×1.3 36.4 ② 19×1.2 22.8 ③ 3.2×1.8 5.76
④ 0.4×0.6 0.24 ⑤ 3.5×0.7 2.45 ⑥ 7.6×0.5 3.8
⑦ 2.87×4.3 12.341 ⑧ 1.08×2.1 2.268 ⑨ 0.07×0.8 0.056

3 There is a copper wire that costs 90 kina per 1 m.
● Estimating the product with multiplier should be larger or smaller than 1.
① How much will it cost for 3.2 m? 3.3×90=288 Answer: 288 toea/K2. 88
② How much will it cost for 0.6 m?
0.6×90=54 Answer: 54 toea

4 Let's calculate in easier ways. Show how you calculated.
● Using the calculation rules.
① 0.5×5.2×8 5.2×(8×0.5) =5.2×4=20.8 ② 2.8×15 (3 - 0.2)x15 =45 - 3 =42

5 Let's put decimal points on the products for the following calculations.
● Using operations of decimal numbers × decimal numbers

① 0.1 5 × 2.8 = 1 2 0 + 3 0 = 4 2 0
② 6.4 3 × 2.4 = 2 5 7 2 + 1 2 8 6 = 1 5 4 3 2

36 = ☐ × ☐

## Lesson Flow

### 1 Complete the Exercise

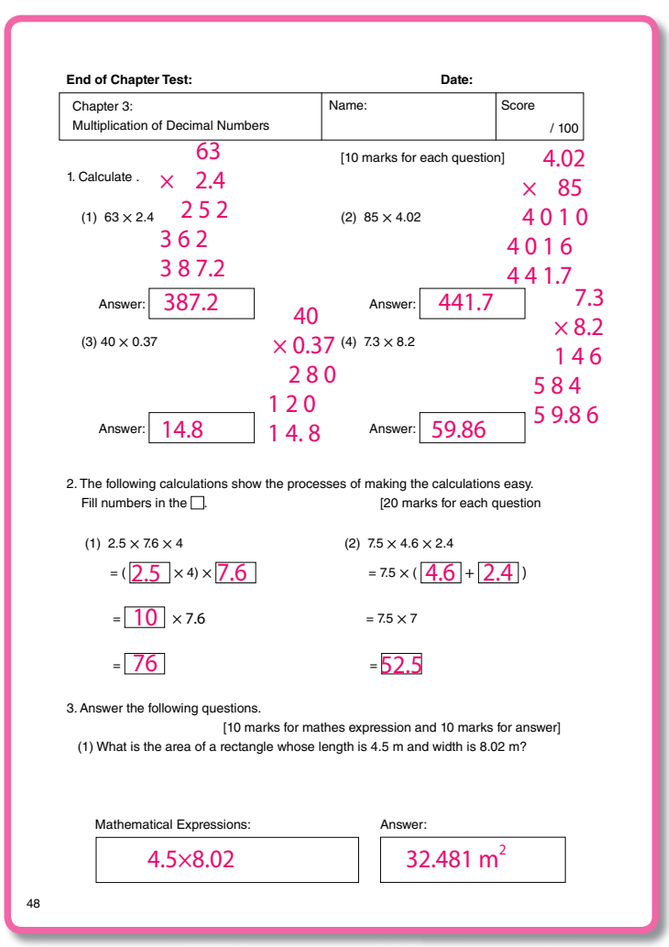
S Solve all the exercises.
T Confirm students' answers.
TN ② Area of rectangle
③ Word problems of decimal number
④ Comparison of decimal numbers
⑤ Making word problems of decimal numbers

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN ① Explain how to multiply decimal number by decimal number.
② Multiplication of decimal number in vertical form.
③ Understand the relation between product and 2nd number in the operation.
④ Apply commutative law and distributive law.
⑤ Explain the structure of multiplication of decimal number.

### 3 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.



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

| Chapter 3: Multiplication of Decimal Numbers | Name: | Score / 100 |
|---|---|---|

1. Calculate . [10 marks for each question]

(1) 63 × 2.4

63 × 2.4 = 252 + 362 = 387.2

Answer: 387.2

(2) 85 × 4.02

4.02 × 85 = 4010 + 4016 = 441.7

Answer: 441.7

(3) 40 × 0.37

40 × 0.37 = 280 + 120 = 14.8

Answer: 14.8

(4) 7.3 × 8.2

7.3 × 8.2 = 146 + 584 = 59.86

Answer: 59.86

2. The following calculations show the processes of making the calculations easy.
Fill numbers in the □. [20 marks for each question

(1) 2.5 × 7.6 × 4
= (2.5 × 4) × 7.6
= 10 × 7.6
= 76

(2) 7.5 × 4.6 × 2.4
= 7.5 × (4.6 + 2.4)
= 7.5 × 7
= 52.5

3. Answer the following questions.
[10 marks for mathes expression and 10 marks for answer]
(1) What is the area of a rectangle whose length is 4.5 m and width is 8.02 m?

Mathematical Expressions: 4.5×8.02

Answer: 32.481 $m^2$

48

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

| Chapter 3:<br>Multiplication of Decimal Numbers | Name: | Score<br>/ 100 |
|---|---|---|

1. Calculate.

[10 marks for each question]

(1) $63 \times 2.4$

Answer:

(2) $85 \times 4.02$

Answer:

(3) $40 \times 0.37$

Answer:

(4) $7.3 \times 8.2$

Answer:

2. The following calculations show the processes of making the calculations easy.
Fill numbers in the □.

[20 marks for each question]

(1) $2.5 \times 7.6 \times 4$

$= (\square \times 4) \times \square$

$= \square \times 7.6$

$= \square$

(2) $7.5 \times 4.6 \times 2.4$

$= 7.5 \times (\square + \square)$

$= 7.5 \times 7$

$= \square$

3. Answer the following questions.

[10 marks for mathes expression and 10 marks for answer]

(1) What is the area of a rectangle with length is 4.5 m and width is 8.02 m?

Mathematical Expressions:

Answer:

# Chapter 4 Congruence and Angles of Figures

## 1. Content Standard

5.3.1 Investigate and understand the properties of congruent triangles and quadrilaterals.

## 2. Unit Objectives

- To deepen students' understanding of plane geometrical figures through observing and composing figures.
- To understand congruence of geometrical figures.

## 3. Teaching Overview

Students already learned that figures are categorised by their elements.

They also learned that they can draw specific figures by paying attention to the features of each element. In this unit, students observe figures by the perspective of congruency.

**Congruent Figures :**

Students understand that two congruent figures can fit exactly on top of each other.

They learn that congruent figures can be identified by minimum conditions.

They also learn that they can draw congruent figures by the minimum conditions given.

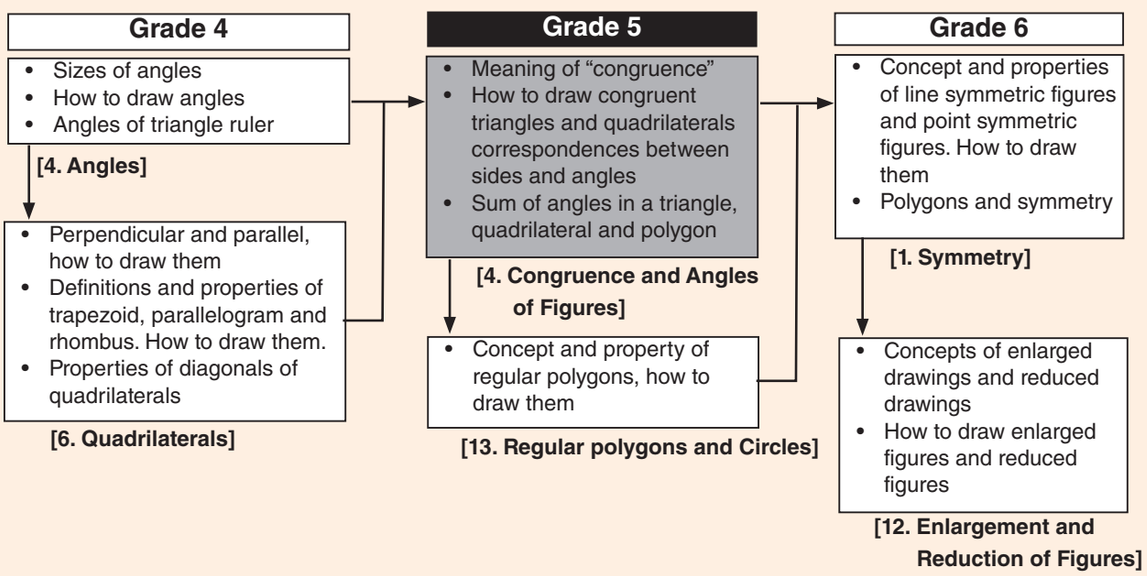
Note that they should be given enough opportunity for constructions.

**Angles of Triangles and Quadrilaterals :**

First, students focus on the interior angles of a triangle and their sum.

Then they expand the knowledge on the sum of interior angles of quadrilaterals and other polygons.

## 4. Related Learning Contents



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 1:Congruent Figures
## Lesson 1 of 5

Textbook Page : 038 to 040
Actual Lesson 025

## Sub-unit Objectives

- To understand the meaning of congruence.
- To understand how to draw a congruent triangle and a congruent quadrilateral.
- To understand the term corresponding.

## Lesson Objectives

- To understand and define the meaning of congruent.
- To think about the properties that determine congruency of plane figures.

## Prior Knowledge

- Rectangles, squares and right triangles (Grade 3)
- Perpendicular lines, parallel lines and quadrilaterals (Grade 4)
- Angles (Grade 4)

## Preparation

- Protractor, compass and 1 cm grid sheets.

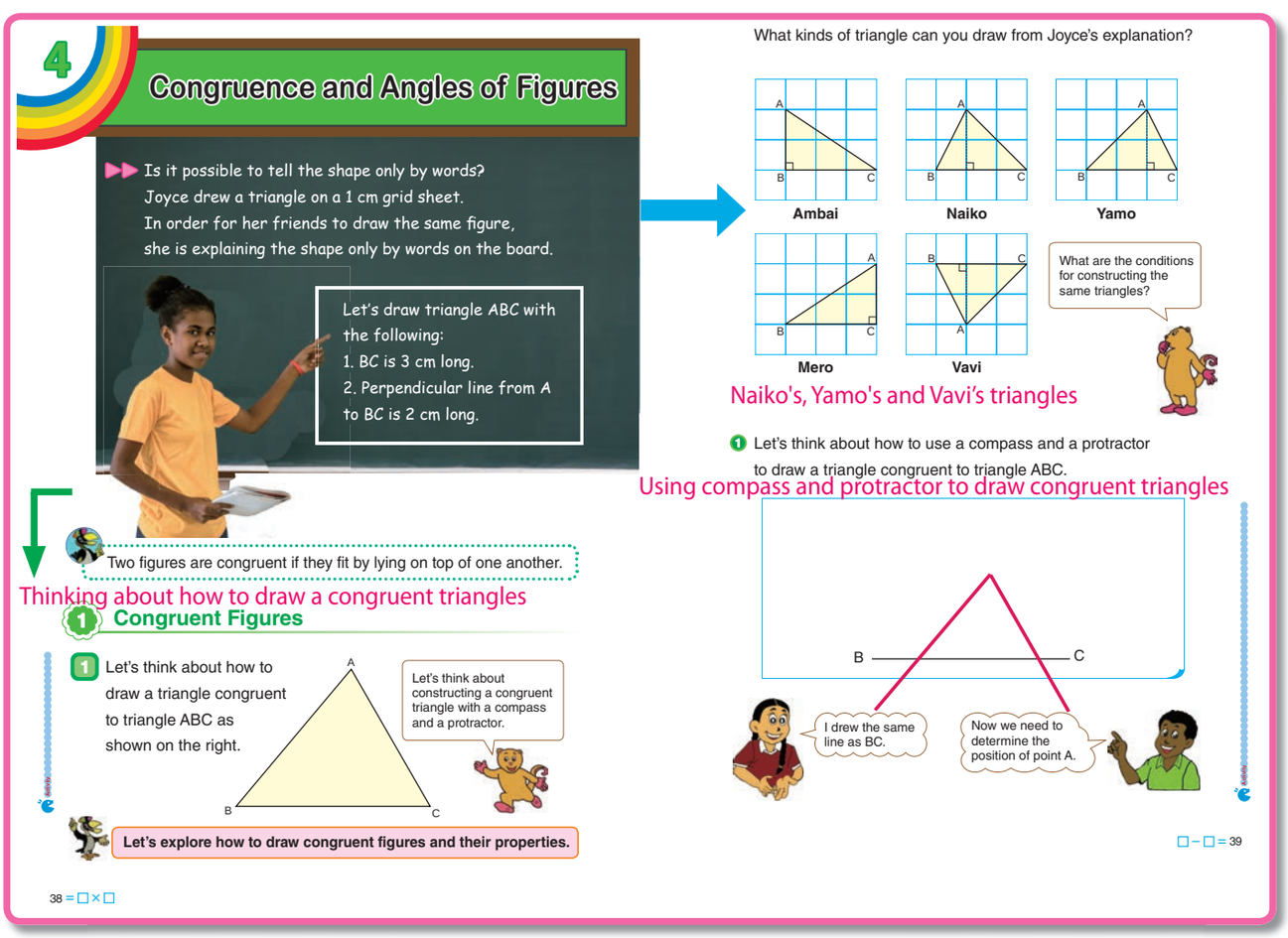
## Assessment

- Draw a congruent triangle by using a compass and a protractor. F
- Explain the meaning of congruent. S

## Teacher's Notes

When two geometrical figures overlap each other and have the same shape and size, they are congruent. The corresponding side lengths and corresponding angle sizes are the same.

Students should be able to determine and verify the properties of geometrical figures through activities such as finding, drawing and constructing congruent geometrical figures.



## Lesson Flow

### 1 Understand the term congruence and its meaning.

T Introduce the Main Task. (Refer to the BP)

S ▶▶ Discuss the situation on the blackboard and draw a triangle using the given instructions on the 1 cm grid paper.

S Compare the triangles drawn with other members of the class and the examples on page 38.

T Can the same triangle be drawn using the same instructions?

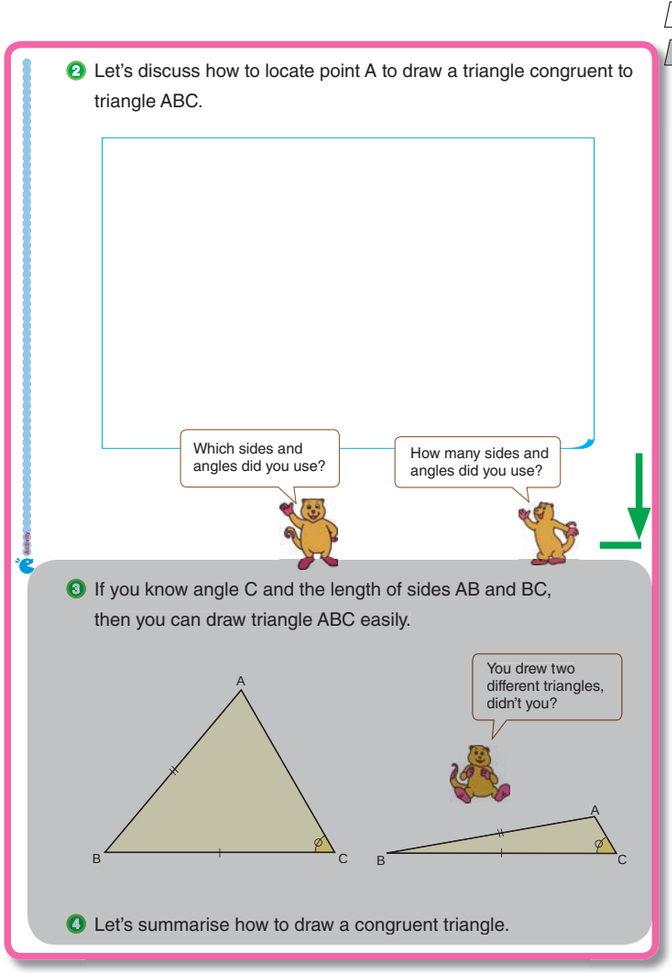
S Explain that some triangles are exactly the same but not all triangles are exactly alike.

T Select two triangles that are exactly alike and inform the students that these triangles are congruent.

S Explain the term congruent based on their observation of the 2 triangles shown.

### 2 Important Point

T/S Explain the important point in the box .




### 3 1 Think about how to draw a triangle congruent to triangle ABC shown.

T How can we draw a triangle congruent to triangle ABC?

S Explain in groups how to draw a triangle congruent to ABC.

TN Ask students' to think about how to use the compass and protractor to construct the triangle.

S 1 Investigate and think about using a protractor and compass to determine the exact position of point A, when points B and C are given.

### 4 Discuss how to locate point A.

S 2 Discuss and identify how point A can be located using a protractor or compass.

T Which sides and angles and how many sides and angles did you use?

S Share ideas with the class on how to draw triangles congruent to triangle ABC.

### 5 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

### Sample Blackboard Plan

Lesson 025 Sample Blackboard Plan is on page 53.

# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 1: Congruent Figures
### Lesson 2 of 5

Textbook Page : 040 and 041
Actual Lesson 026

## Lesson Objective

- To understand how to draw congruent triangles.

## Prior Knowledge

- Perpendicular lines, parallel lines and quadrilaterals (Grade 4)
- Angles (Grade 4)
- How to draw congruent triangle

## Preparation

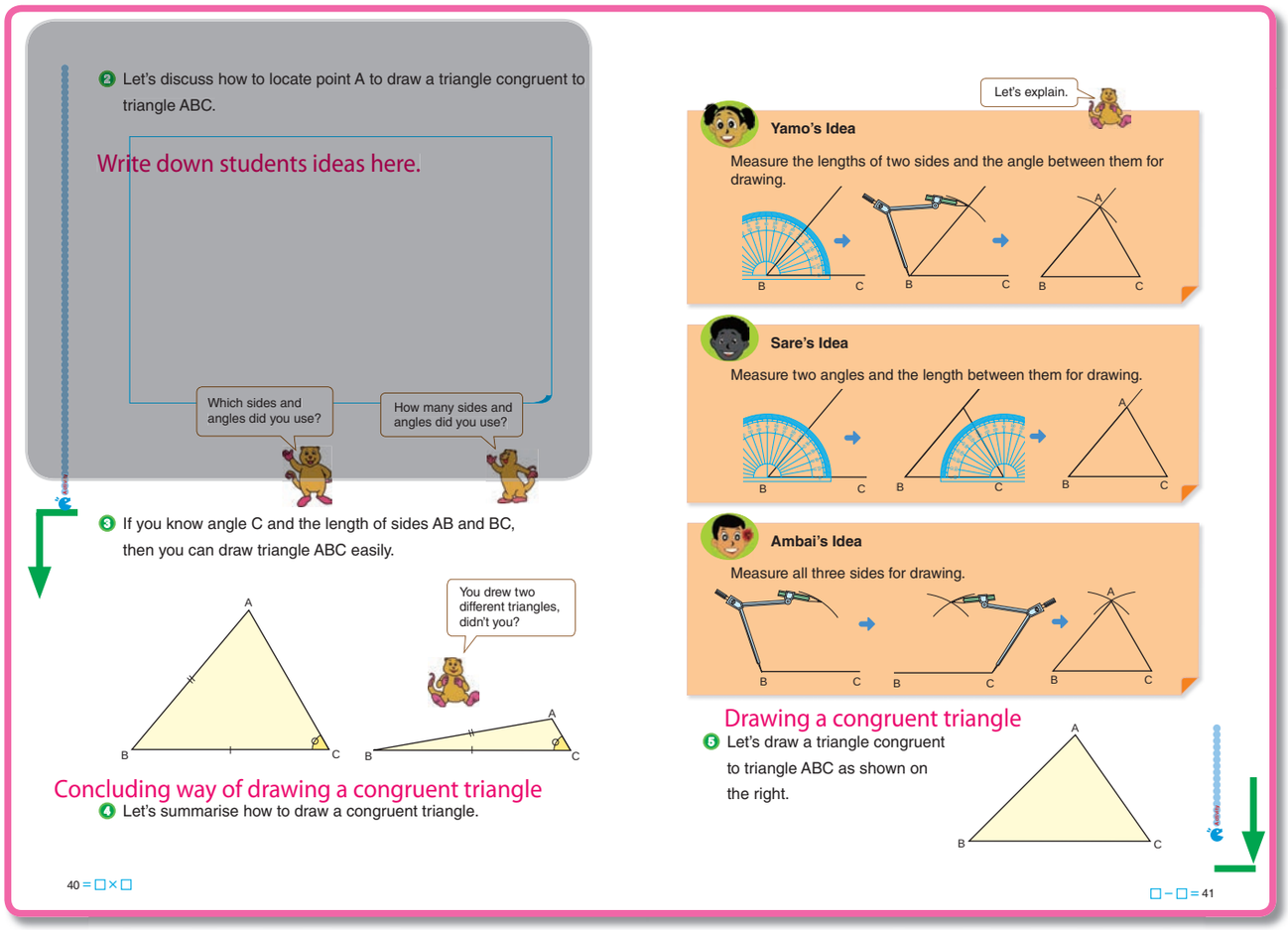
- Protractor and compass

## Assessment

- Investigate and explain how to draw a triangle congruent to triangle ABC. F
- Draw a congruent triangle by using the properties of the side lengths and angles. F S

## Teacher's Notes

When drawing a congruent triangle, consider the ideas discussed in Yamo's, Sare's and Ambai's ideas to get a better understanding of how to draw congruent triangles using a protractor and compass.
These ideas highlight the importance of having exactly the same corresponding side lengths and angles.



## Lesson Flow

### 1 Review the previous lesson.

### 2 ❸ Compare two different triangles where 2 side lengths and 1 angle is given.

T Introduce the Main Task. (Refer to the BP)
TS Discuss and confirm that knowing 2 sides (AB) and (BC), and 1 angle (C) is not enough to determine the congruency of triangles.
T Why aren't these triangles congruent?
S Explain that side (AC) of both triangles are different in length.

### 3 Summarise how to draw a congruent triangle.

S ❹ Discuss some specific ways of drawing congruent triangles.
S Practice drawing congruent triangles using compasses and protractors using Yamo's, Sare's and Ambai's ideas.

TN Remind the students to use the compass and protractor correctly when constructing triangles.

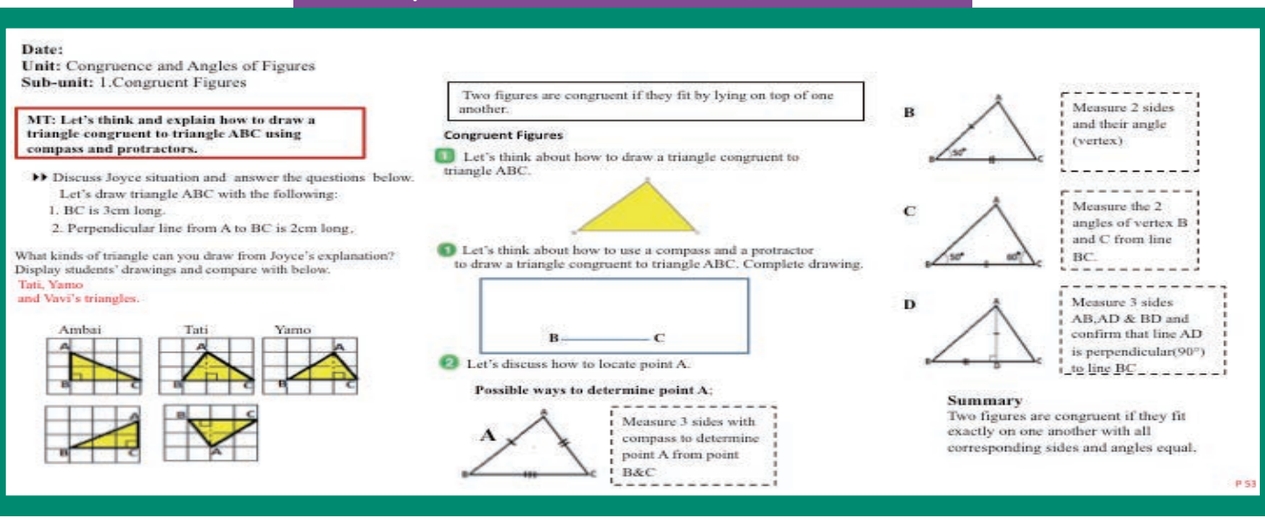
### 4 Draw a triangle congruent to triangle ABC.

S ❺ Draw triangles congruent to triangle ABC using the three ideas to get a better understanding of how to draw congruent triangles in various ways.
T Allow the students to present their drawings and briefly explain how they drew their congruent triangles.

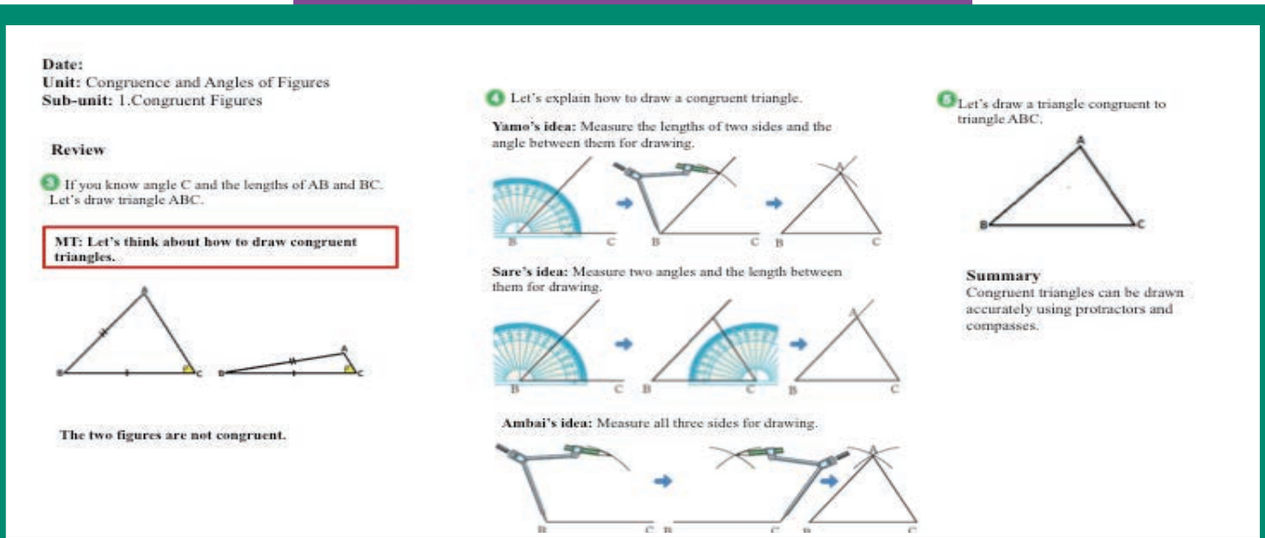
### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 25)




## Sample Black Board Plan (Lesson 26)



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 1: Congruent Figures
### Lesson 3 of 5

Textbook Page : 042 and 043
Actual Lesson 027

## Lesson Objectives

- To understand the meaning of the term correspond.
- To understand the characteristics of edges and angles in congruent figures.

## Prior Knowledge

- Perpendicular lines, parallel lines and quadrilaterals (Grade 4)
- Angles (Grade 4)
- How to draw congruent triangles

## Preparation

- Protractor, compass and ruler

## Assessment

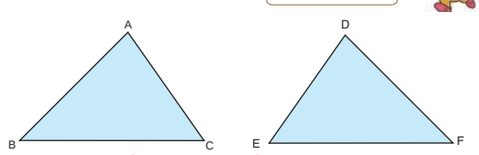
- Compare and measure the length and size of corresponding sides and angles in congruent triangles. F
- Understand the characteristics of congruent figures. S

## Teacher's Notes

- When two matching geometrical figures overlap each other having the same shape and size, they are congruent.
  The corresponding side lengths and corresponding angle sizes are the same.
- Students should be able to determine and verify the properties of geometrical figures through activities such as finding, drawing and constructing congruent geometrical figures.

2 Triangle DEF below is the reverse of triangle ABC.

Confirm that triangle DEF is the reverse of triangle ABC.




### The meaning of congruent figures

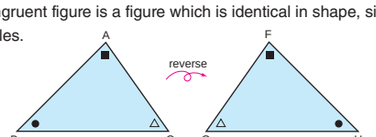
1 Let's confirm whether the two triangles match when they fit by lying on one another.

Two figures are also congruent if they match by reverse.
In congruent figures, the matching points, the matching sides and the matching angles are called; **corresponding vertices, corresponding sides and corresponding angles**, respectively.

2 In the above triangles ABC and DEF, find the corresponding sides and compare the lengths.

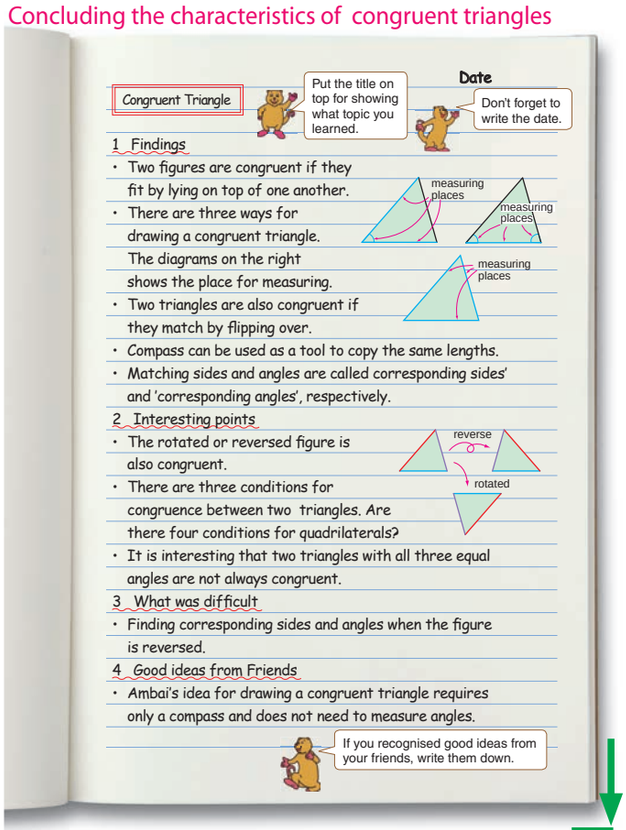
3 Find the corresponding angles and compare their sizes.

In congruent figures, the corresponding sides are equal in length and the corresponding angles are also equal in size.
Congruent figure is a figure which is identical in shape, size and angles.




42 = □ × □

### Concluding the characteristics of congruent triangles




□ − □ = 43

## Lesson Flow

**1 Review the previous lesson.**

**2 ❷ Investigate triangle ABC and DEF to confirm that one is the reverse of the other.**

T Introduce the Main Task. (Refer to the Blackboard Plan)
S ❶ Do the activity by tracing Triangle ABC and placing it over triangle DEF.
T Are they congruent?
S Recognise that the triangles fit exactly on top of each other.
T Confirm through demonstration.

**3 Important Point**

T/S Explain the important point in the box ⬚.

**4 ❷ Identify and compare the lengths of corresponding sides in triangle ABC and DEF.**

S Measure and compare the lengths of corresponding sides and briefly explain.
T Confirm that corresponding sides are equal in length.

**5 ❸ Identify and compare the sizes of corresponding angles in triangle ABC and DEF.**

S Measure and compare the sizes of corresponding angles and briefly explain.
T Confirm that corresponding angles are equal in size.

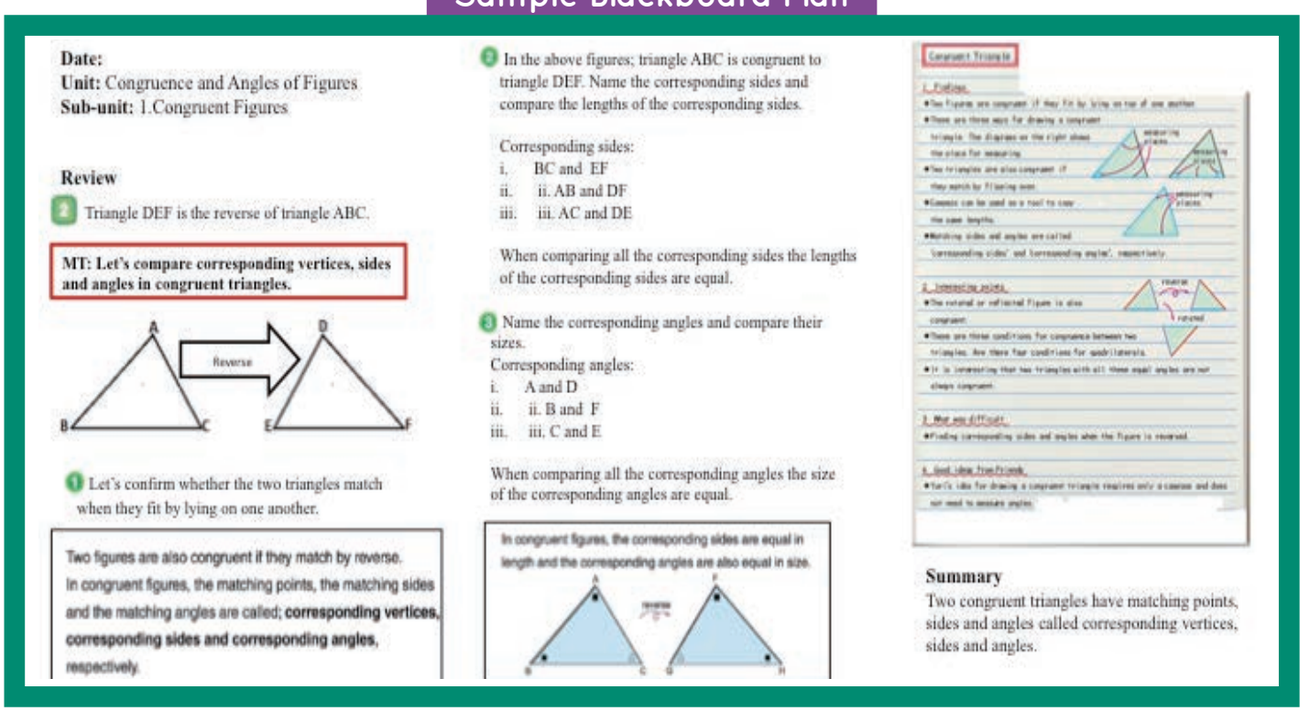
**6 Important Point**

T/S Explain the important point in the box ⬚.

**7 Summary**

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 1: Congruent Figures
### Lesson 4 of 5

Textbook Page :
044 to 046
Actual Lesson 028

## Lesson Objective

- To understand how to draw a congruent quadrilateral.

## Prior Knowledge

- Perpendicular lines, parallel lines and quadrilaterals (Grade 4)
- Angles (Grade 4)
- Drawing congruent triangles

## Preparation

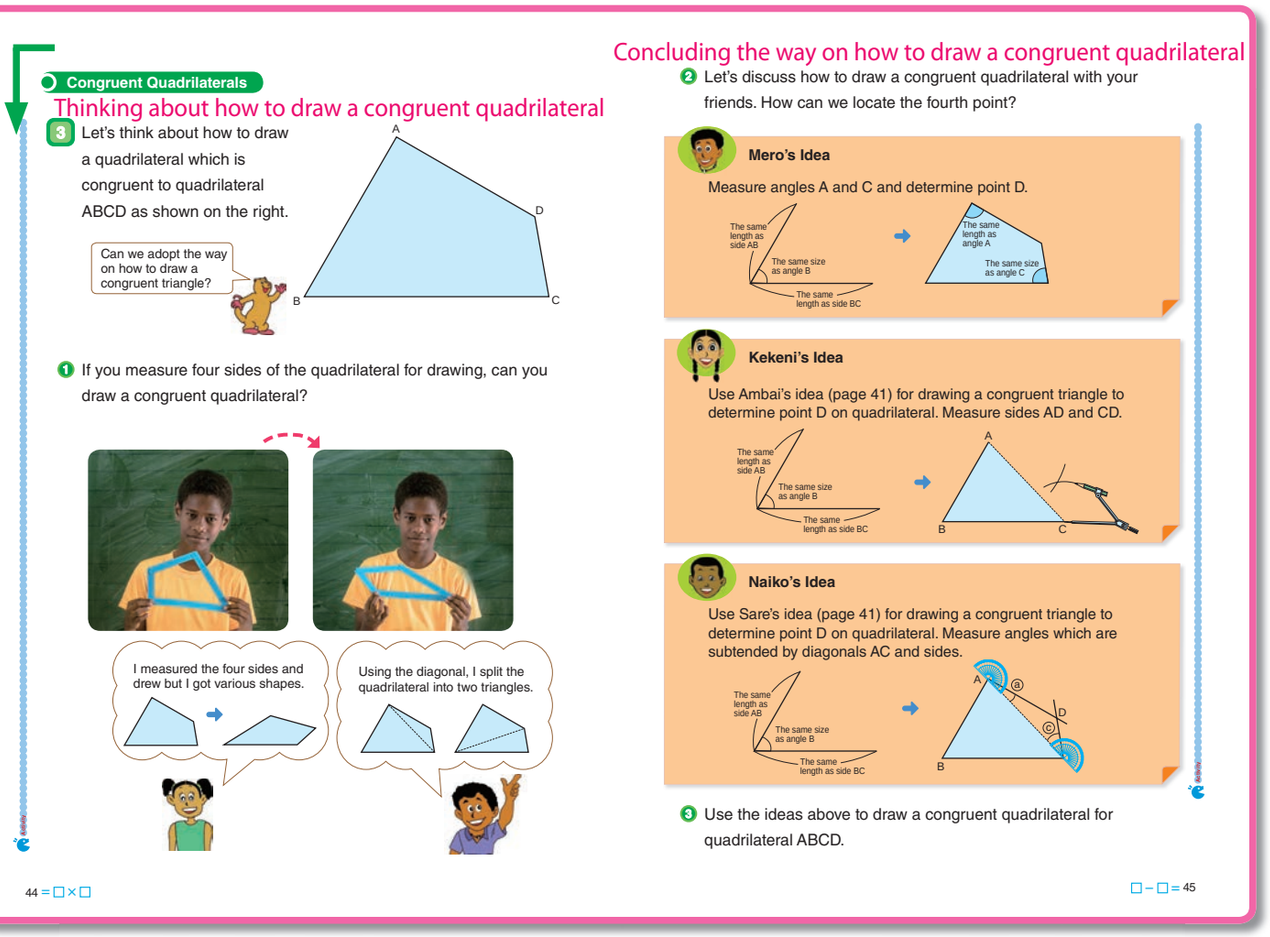
- Protractor, compass and ruler

## Assessment

- Investigate and explain how to draw a quadrilateral congruent to quadrilateral ABCD. F S
- Draw a congruent quadrilateral by using the properties of the side lengths and angles. F S

## Teacher's Notes

Students should be able to determine and verify the properties of geometrical figures through activities such as finding, drawing and constructing congruent geometrical figures. In this lesson, students will be able to build on what they have learned on drawing congruent triangles from lesson #2 by using a compass, protractor and ruler to draw figures.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Investigate quadrilateral ABCD and discuss how to draw a quadrilateral congruent to ABCD.

T Introduce the Main Task. (Refer to the BP)
TS 3 Read and understand the situation.
S 1 Measure the four sides of quadrilateral ABCD and draw a quadrilateral congruent to ABCD using the length of sides.
T Are they congruent?
S Find out that drawing using the side lengths will not result in a quadrilateral congruent to ABCD like triangles.

### 3 Discuss how to draw congruent quadrilaterals.

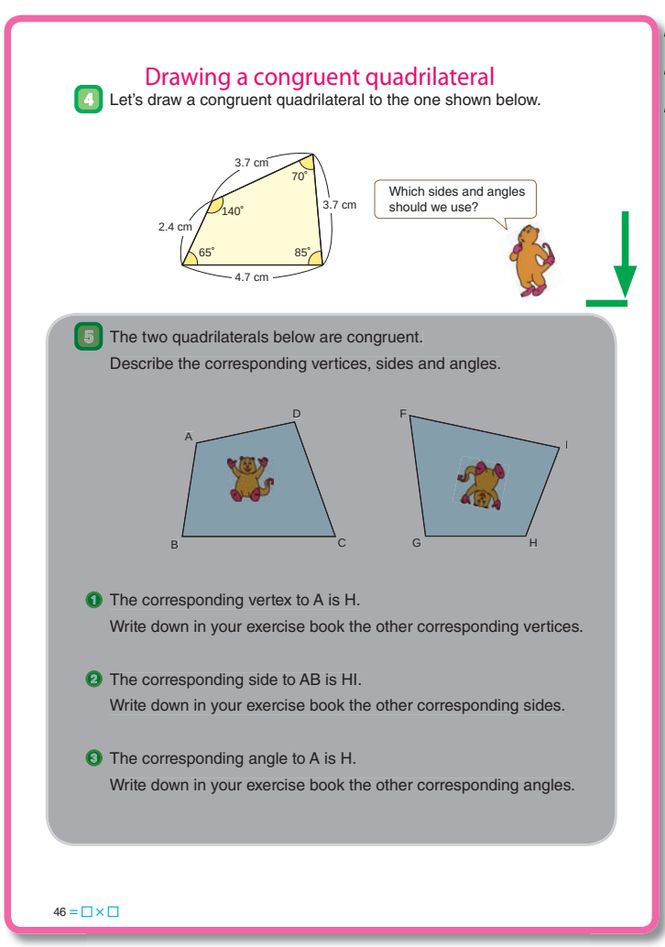
T 2 Discuss how you can draw a quadrilateral congruent to ABCD.
S Discuss the possibility of dividing the quadrilaterals into 2 triangles or using angles.
TS Explain how the three ideas are used to draw congruent quadrilaterals.
I. Mero's Idea:
Measure angles A and C and extend the lines to determine point D.
II. Kekeni's Idea:
Split the quadrilateral into 2 triangles and use a compass to determine point D from points A and C.
III. Naiko's Idea:
Split the quadrilateral into 2 triangles and measure the angle from diagonal AC to determine point D.
T Ask the students to try out the ideas discussed to draw a quadrilateral congruent to ABCD.
S 3 Draw a congruent quadrilateral using the ideas discussed.

### 4 Draw a congruent quadrilateral.

S 4 Draw a quadrilateral congruent to the one in the textbook by applying the ideas learned.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.




## Sample Blackboard Plan

Lesson 028 Sample Blackboard Plan is on page 59.

# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 1: Congruent Figures
### Lesson 5 of 5

Textbook Page : 046
Actual Lesson 029

## Lesson Objective

- To identify and confirm that pairs of vertices, sides and angles in congruent quadrilaterals correspond to each other.

## Prior Knowledge

- Perpendicular lines, parallel lines and quadrilaterals (Grade 4)
- Angles (Grade 4)
- Drawing congruent triangles and quadrirateral

## Preparation

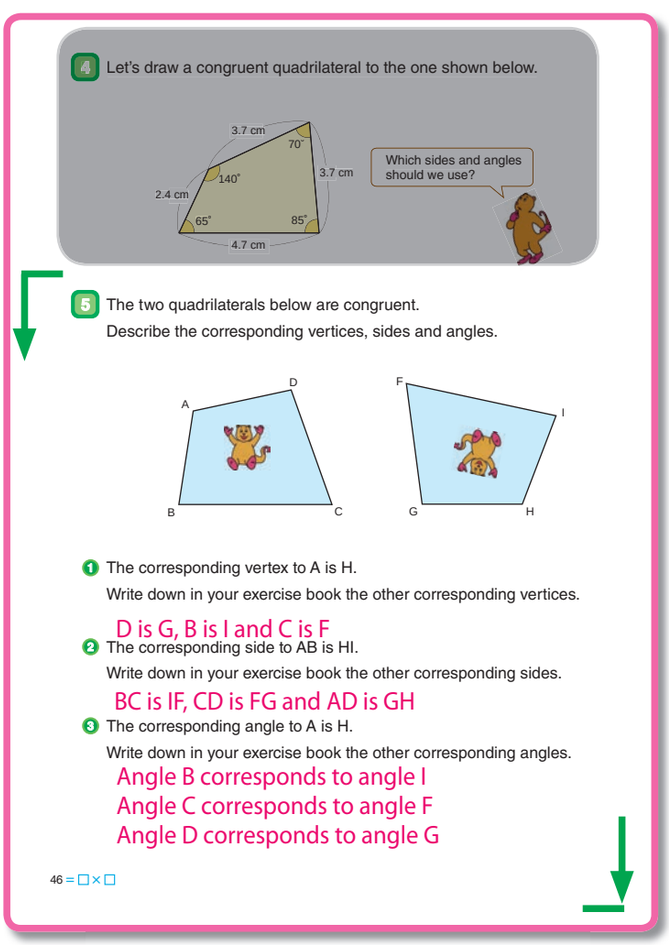
- Protractor, compass and ruler

## Assessment

- Investigate and identify corresponding vertices, sides and angles in congruent figures. F
- Identify congruent quadrilateral by using their properties. S

## Teacher's Notes

Students should be able to determine and verify the properties of congruent figures through activities of investigating congruency by comparing corresponding vertices, sides and angles.
In congruent figures, all corresponding vertices, side lengths and angles are equal either in length or size.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Investigate quadrilateral ABCD and FGHI and identify the properties that make them congruent.

TS 5 Read and understand the situation.
T Introduce the Main Task. (Refer to the BP)
T 1 Allow the students to identify the corresponding vertices on both quadrilaterals.
S D is G, B is I and C is F.

### 3 2 Investigate and identify the corresponding sides of quadrilateral ABCD and FGHI.

T Allow the students to identify the corresponding sides of both quadrilaterals.
S BC is IF, CD is FG and AD is GH.

### 4 3 Investigate and identify the corresponding angles of quadrilateral ABCD and FGHI.

T Allow the students to identify the corresponding angles of both quadrilaterals.
S Angle B corresponds to Angle I, Angle C corresponds to Angle F and Angle D corresponds to Angle G.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 28)

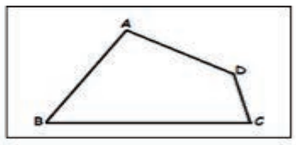
**Date:**
**Unit:** Congruence and Angles of Figures
**Sub-unit:** 1.Congruent Figures

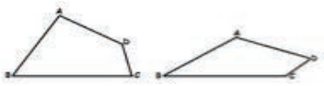
**Review**

3 Let's think about how to draw a quadrilateral which is congruent to quadrilateral to ABCD as shown.

**MT: Let's think about and explain how to draw a congruent triangle.**

1 If you measure four sides of the quadrilateral for drawing, can you draw a congruent quadrilateral?




**Lengths of sides will be the same but not congruent to ABCD.**
**(Individual drawings will vary.)**

2 How can we locate the forth point (D)?
Refer to the three ideas in the text book for explanation.

3 Use the three ideas to draw a congruent quadrilateral to quadrilateral ABCD.
Individual drawings using the three ideas.

4 Draw the congruent quadrilateral to the one shown in the text book.

**Summary**
Congruent quadrilaterals can be drawn using;
- side, angle, side
- angle, angle, angle
- side, side, side
- angle, side, angle

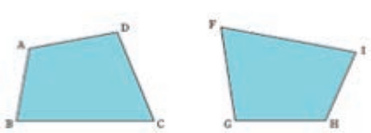
## Sample Blackboard Plan (Lesson 29)

**Date:**
**Unit:** Congruence and Angles of Figures
**Sub-unit:** 1.Congruent Figures

**Review**

5 The two quadrilaterals are congruent.. Describe the corresponding vertices, sides and angles.

**MT: Let's investigate congruent Quadrilaterals by identifying their corresponding vertices, sides and angles.**




1 The corresponding vertex to A is H.

Other corresponding Vertices.
Vertex B and I
Vertex C and F
Vertex D and G

2 The corresponding side to AB is HI.

Other corresponding Sides.
Side BC and FI
Side CD and FG
Side AD and GH

3 The corresponding angle to A is H.

Other corresponding Angles.
Angle B and I
Angle C and F
Angle D and G

**SUMMARY**
We can say that two quadrilaterals are congruent when their pair of corresponding vertices, sides and angles are equal in size or length.

# Unit 4

# Unit: Congruence and Angles of Figures
## Exercise
## Lesson 1 of 1

Textbook Page : 047
Actual Lesson 030

### Lesson Objective

- To confirm what students learned about concruent figures.

### Prior Knowledge

- All the contents covered in sub-unit 1

### Preparation

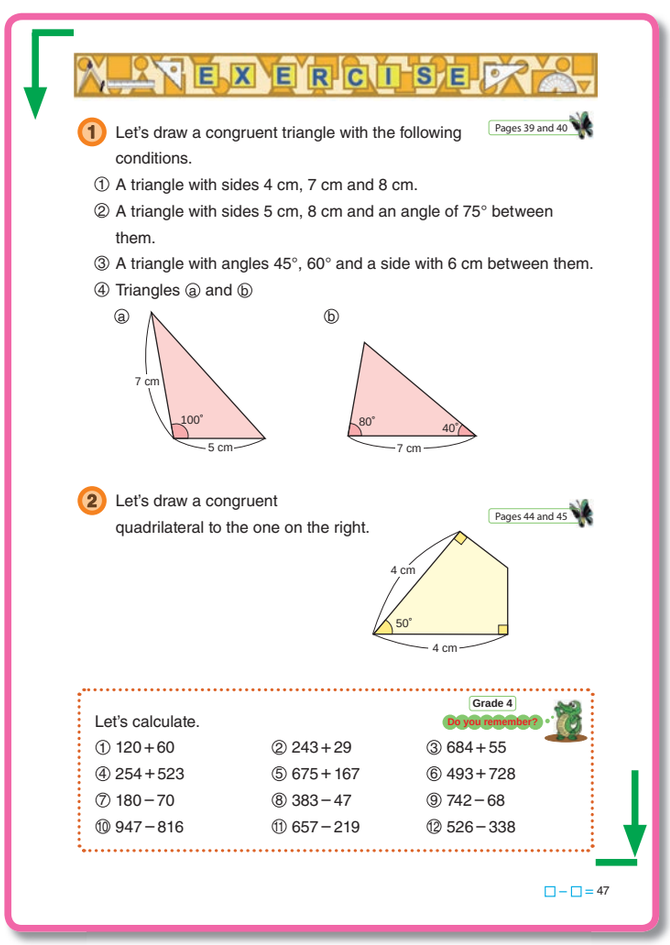
- Enlarged diagrams of figures given in the Exercise

### Assessment

- Solve the exercises correctly. F S

### Teacher's Notes

- Refer students' to the sub-unit 1 content of this unit as their reference to complete the exercises.



EXERCISE

1 Let's draw a congruent triangle with the following conditions. Pages 39 and 40

① A triangle with sides 4 cm, 7 cm and 8 cm.
② A triangle with sides 5 cm, 8 cm and an angle of 75° between them.
③ A triangle with angles 45°, 60° and a side with 6 cm between them.
④ Triangles ⓐ and ⓑ

ⓐ



ⓑ



2 Let's draw a congruent quadrilateral to the one on the right. Pages 44 and 45



Let's calculate. Grade 4 Do you remember?

| | | |
|---|---|---|
| ① 120 + 60 | ② 243 + 29 | ③ 684 + 55 |
| ④ 254 + 523 | ⑤ 675 + 167 | ⑥ 493 + 728 |
| ⑦ 180 − 70 | ⑧ 383 − 47 | ⑨ 742 − 68 |
| ⑩ 947 − 816 | ⑪ 657 − 219 | ⑫ 526 − 338 |

□ − □ = 47

## Lesson Flow

### 1 Complete the Exercise

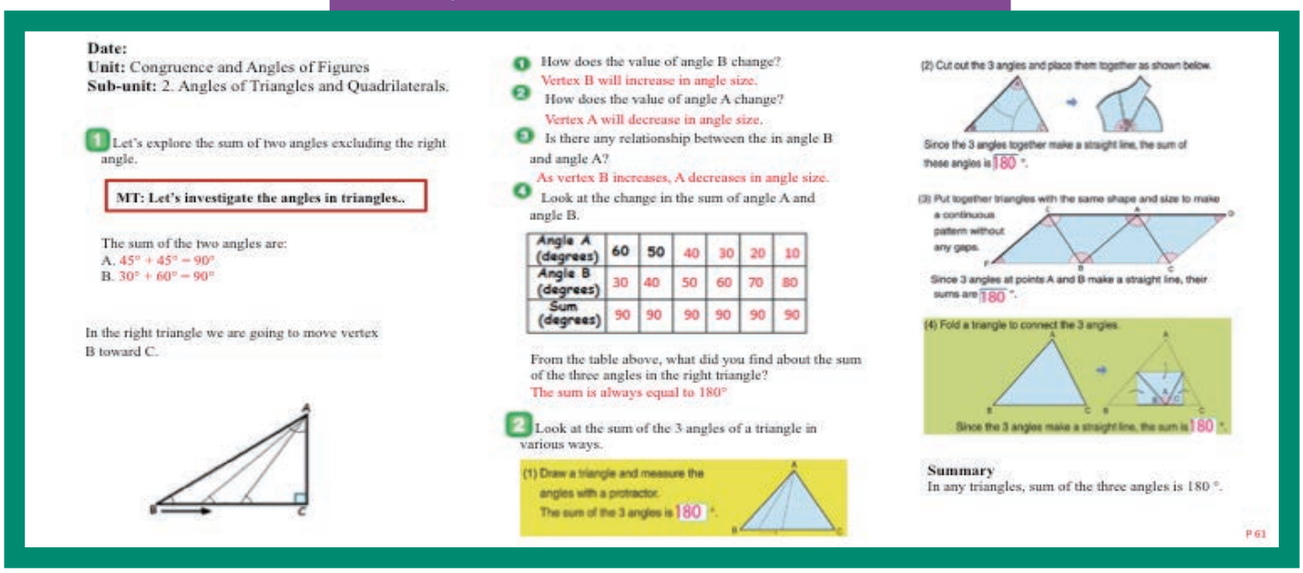
S Solve all the exercises.

T Confirm students' answers.

TN ① Make sure the students fully understand each of the properties given from (1) to (4) before drawing the congruent of the triangles mentioned.

TN ② Guide the students in drawing the congruent of the figure.
The students can use rulers, protractors and compass for this exercise.

## Sample Blackboard Plan (Lesson 31)



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 2: Angles of Triangles and Quadrilaterals
## Lesson 1 of 5

Textbook Page : 048 to 050
Actual Lesson 031

## Sub-unit Objectives

- To understand that the sum of the three angles in any triangle as 180°.
- To find the sum of interior angles in other polygons based on the sum of interior angles of a triangle.

## Lesson Objective

- To understand that the sum of 3 angles in any triangle is180° regardless of their shapes and sizes.

## Prior Knowledge

- Quadrilaterals and triangles.
- Perpendicular lines, parallel lines and quadrilaterals.
- Angles. (Grade 4)

## Preparation

- Protractor, compass and ruler, papers for 2.

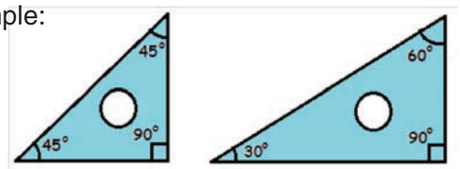
## Assessment

- Investigate the angle sum of various types of triangles. F
- Explain various ways to show that the angle sum of triangles are 180°. S

## Teacher's Notes

The angle sum of a triangle is 180°.

Example:




The angle sum of the set squares will be

(A) 45 + 45 + 90° = 180°

(B) 30 + 60 + 90° = 180°

## 2 Angles of Triangles and Quadrilaterals

### 1 Understanding the angles in a triangle

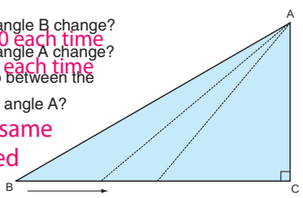
Let's explore the sum of two angles excluding the right angle.

The sum of the two angles are;

A 90 °

B 90 °


In the right triangle below, we are going to move vertex B toward C.




1. How does the value of angle B change? increase by 10 each time
2. How does the value of angle A change? reduce by 10 each time
3. Is there any relationship between the changes in angle B and angle A?

Angle B increases the same amount of that reduced in angle A. (10°)

4. Look at the change in the sum of angle A and angle B.

| Angle A (degrees) | 60 | 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|---|
| Angle B (degrees) | 30 | 40 | 50 | 60 | 70 | 80 |
| Sum (degrees) | 90 | 90 | 90 | 90 | 90 | 90 |

From the above table, what did you find about the sum of the three angles in a right triangle?

Always 180°

Let's explore the sum of three angles in a triangle.

48 = □ × □

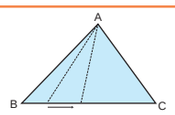
## Total sum of angles in a triangle

Angles of Triangles

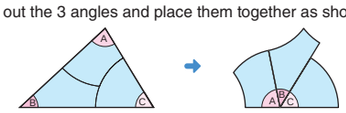
A straight angle is 180°, isn't it?

2 Look at the sum of the 3 angles of a triangle in various ways.

① Draw a triangle and measure the angles with a protractor.
The sum of the 3 angles is 180 °.

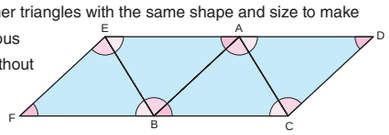



② Cut out the 3 angles and place them together as shown below.



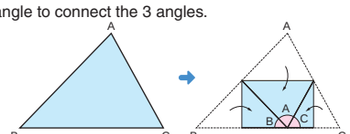

Since the 3 angles together make a straight line, the sum of these angles is 180 °.

③ Put together triangles with the same shape and size to make a continuous pattern without any gaps.




Since 3 angles at points A and B make a straight line, their sums are 180 °.

④ Fold a triangle to connect the 3 angles.




Since the 3 angles make a straight line, the sum is 180 °.

□ − □ = 49

## Lesson Flow

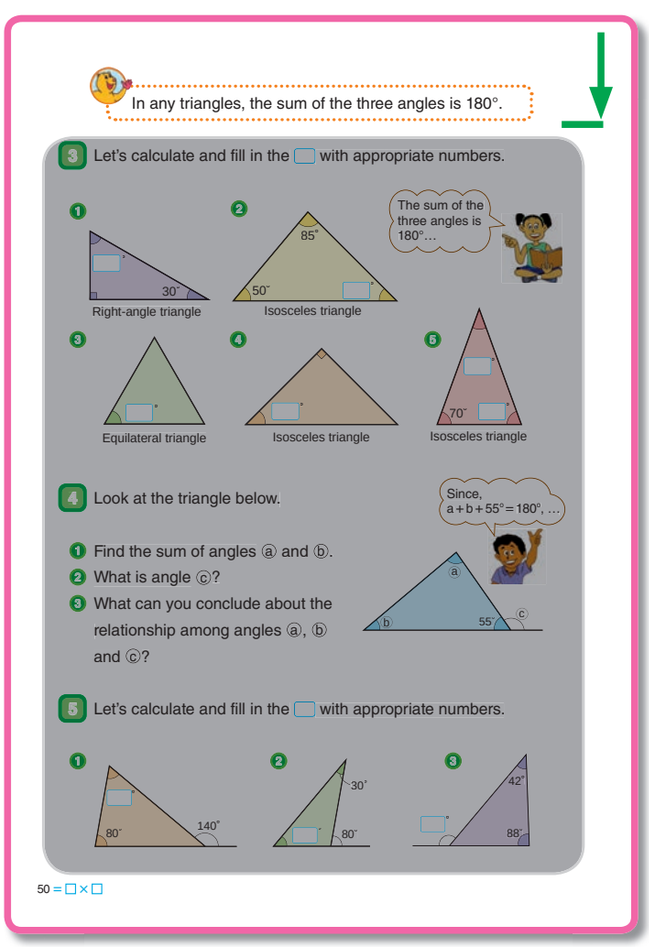
### 1 Review the previous lesson.

### 2 1 Explore the 2 angles of a right triangle that are not 90°.

T Introduce the Main Task. (Refer to the BP)
T Ask the students' to use a protractor to measure the angles in a triangle.
S Use a protractor to measure the angles of the 2 different set squares (triangle rulers) excluding the right angle.
T What is the sum of the 2 angles that are not right angles?
S Give Answers as (A) 45 + 45 = 90° and
(B) 30 + 60 = 90°.

### 3 1 1 to 4 Measure the angles of various triangles formed and analyse the results.

T What will change when we move vertex B towards vertex C in triangle (C)?
S 1 Angle B will increase in size.
S 2 Angle A will decrease in size.
S 3 As vertex B increases, angle A decreases in size.




TN Students should notice that the angle of vertex B will increase in size while the angle of vertex A will reduce in size.
S 4 Complete the table and confirm the changes in the angle sum for vertex B and A.
T What did we find from the results on the table?
S Confirm that the sum of the 2 angles will always be 90°.

### 4 Discuss about the interior angle sum of triangles using the results from 1.

T/S Discuss from the findings, the angle sum of a triangle.
S Explain that the sum of the 2 angles (90°) plus the right angle (90°) will be 180°.

### 5 2 Discuss the four methods 1 to 4 to determine that the angle sum of a triangle is 180°.

S Explain each method.
(1) Measure the 3 angles with a protractor to get the angle sum 180°.
(2) Cut out and place the 3 angles to give a straight angle which is 180°
(3) Put together the vertex of congruent triangles. The 3 angles FEB will come together forming a straight angle to give the sum of 180°.
(4) Fold the triangle to connect the 3 angles to form a straight angle with a sum of 180°.

### 6 Important Point

T/S Explain the important point in the box ☐.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

### Sample Blackboard Plan

Lesson 031 Sample Blackboard Plan is on page 61.

# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 2: Angles of Triangles and Quadrilaterals
### Lesson 2 of 5

Textbook Page : 050
Actual Lesson 032

## Lesson Objective

- To calculate angles using the sum of 3 angles (180°) in a triangle.

## Prior Knowledge

- Quadrilaterals and triangles
- Perpendicular lines, parallel lines and quadrilaterals
- Angles (Grade 4)

## Preparation

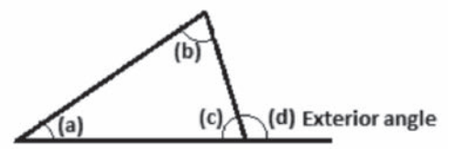
- Triangles of all the tasks

## Assessment

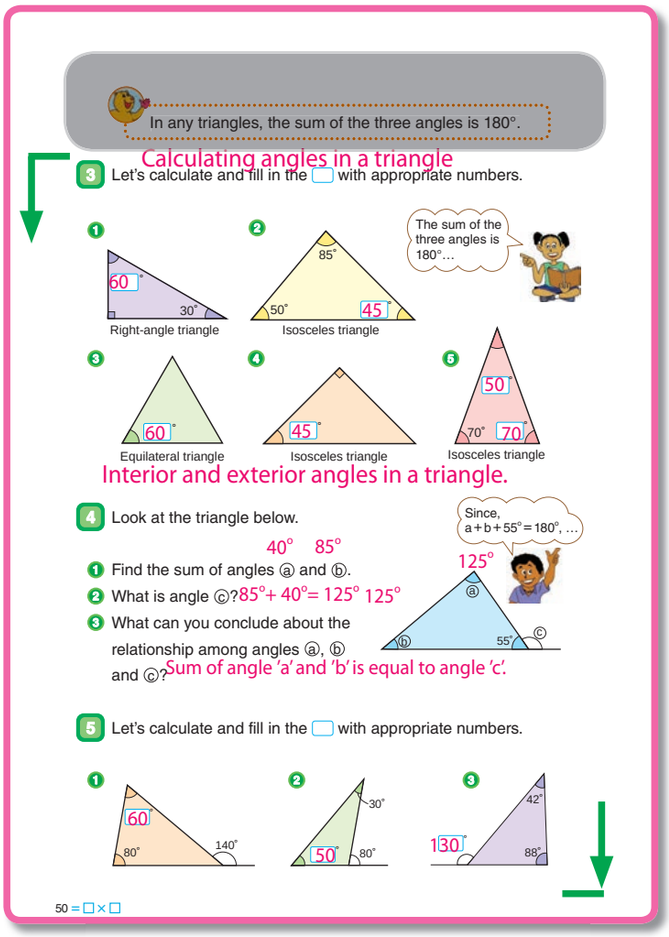
- Find the unknown angles using the angle sum of 180° and other properties. F
- Demonstrate that the sum of two interior angles opposite an exterior angle in a triangle are equal. F

## Teacher's Notes

Relationship of interior and exterior angles of a triangle.
The sum of the two angles (a) and (b) which are opposite to angle (c) are equal in size to that of the exterior angle (d).




i. (a) + (b) + (c) = 180°
ii. (c) + (d) = 180°
iii. (a) + (b) = (d)



## Lesson Flow

### 1 Review the previous lesson.

### 2 ③ Calculate unknown angles of a triangle.

T Introduce the Main Task. (Refer to the BP)

T Allow the students to discuss and demonstrate how they can calculate and find the unknown angles in a triangle.

S Explain by demonstrating the use of the angle sum of 180° to calculate ❶.

S Complete activity ❷ to ❺ to find angles using the angle sum of 180° and other properties of triangles.

T Confirm students' answers.

### 3 ④ Investigate the relationship of interior and exterior angles of a triangle.

S ❶ Calculate the sum of angle (a) and (b) since (a) + (b) + 55 = 180°.
Sum of angle (a) and (b) is 180° − 55° = 125°

S ❷ Calculate angle (c) as 125° since 55° + 125° = 180° on a straight line.

S ❸ Conclude that angle (c) has the same angle size as the sum of angle (a) and (b).

T Confirm students' answers.

TN The sum of two interior angles (a) and (b) is equal to the exterior angle (c).

### 4 ⑤ Calculate the interior and exterior angles of triangles ❶ to ❸.

T Ask the students to complete the task using what they have learned.

S Calculate to find the unknown angles in ❶ to ❸.

T Confirm students' answers.

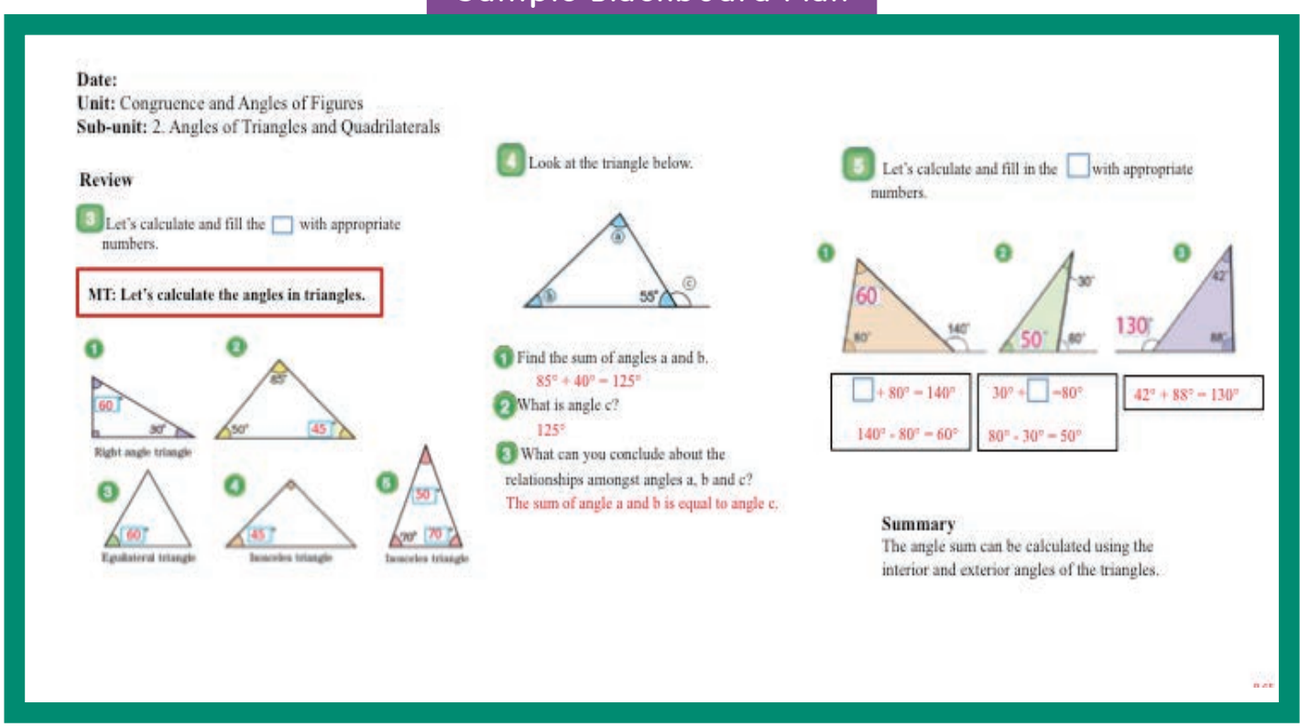
### 5 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 2: Angles of Triangles and Quadrilaterals
### Lesson 3 of 5

Textbook Page : 051 and 052
Actual Lesson 033

## Lesson Objective

- To understand the sum of interior angles of a quadrilateral is 360°.

## Prior Knowledge

- Quadrilaterals and triangles
- Angle sum of Triangles
- Angles (Grade 4)

## Preparation

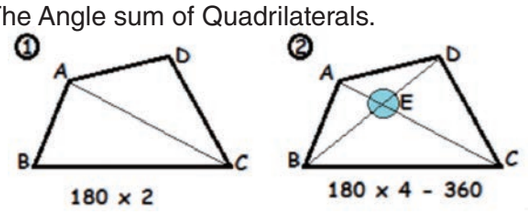
- Protractor and ruler

## Assessment

- Investigate the angle sum of various quadrilaterals. F
- Explain various ways to show that the angle sum of quadrilaterals are 360°. S

## Teacher's Notes

The Angle sum of Quadrilaterals.



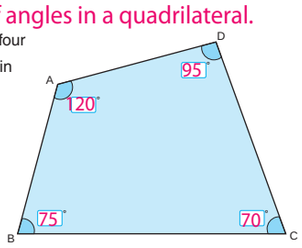

① Divide a quadrilateral into 2 triangles along a diagonal and based on the fact that the sum of 3 angles of a triangle is 180°. When we multiply 180° by 2, we get 360°.
② Add point E to the inside of the quadrilateral, then divide the quadrilateral into 4 triangles by connecting point E with each of the vertex.
Get the sum of all angles by multiplying 180° by 4 and subtract 360° which is the sum of the angles around point E.

Angles of Quadrilaterals

### Finding total sum of angles in a quadrilateral.

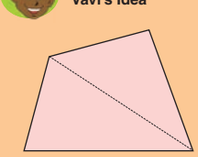
6 Let's explore the sum of four angles in a quadrilateral in various ways.

How did we find the sum of three angles in the triangles?



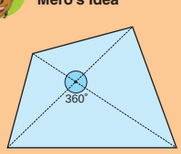

1 Measure the four angles with a protractor.
2 Let's calculate through dividing the quadrilateral by diagonals.

**Vavi's Idea**



Divide by a diagonal. There are two triangles inscribed.
Therefore,
180°×2= 360°.

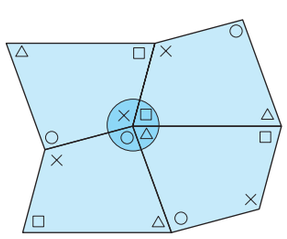
**Mero's Idea**




Divide a quadrilateral into four by diagonals.
There are four triangles inscribed, 180°×4=720°
subtract the extra 360°, so 360°.

3 Let's think about and discuss other ways of finding the sum of angles in a quadrilateral.

4 Let's explore the sum of quadrilaterals through tessellation.



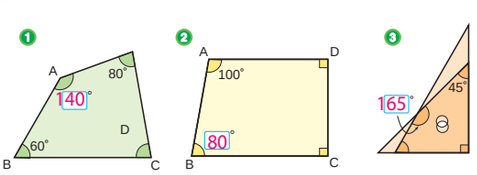
Let's tessellate to find the sum of angles using the four congruent quadrilaterals.

5 Share your findings with your friends.

What have you learned?

In any quadrilateral, the sum of 4 angles is 360°.

7 Let's fill in the ☐ by calculations.




□ − □ = 51

52 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 6 Investigate the sum of 4 angles in a quadrilateral.

T Introduce the Main Task. (Refer to the BP)
S 1 Use a protractor to measure the 4 angles of the quadrilateral.
T What is the sum of the 4 angles?
S Calculate the angle sum to 360°.
120° + 75° + 70° + 95° = 360°

### 3 2 Calculate by dividing the quadrilateral using diagonal lines.

T Remind the students that when the quadrilaterals are divided by diagonal lines, triangles are formed. Allow the students to use this idea to calculate Vavi's and Mero's ideas.
S Vavi's Idea:
Divide the quadrilateral with 1 diagonal line to make 2 triangles inscribed, therefore
180° × 2 = 360°.
Mero's Idea:
Divide the quadrilateral with 2 diagonals to make 4 triangles inscribed, therefore
180° × 4 = 720° − 360° to get 360°.
T Confirm students' answers.

### 4 Discuss other ways for finding the angle sum of quadrilaterals.

T 3 Allow students to find other ways using Vavi's and Mero's ideas.
S Draw 2 diagonals to form 3 triangles and calculate 180° × 3 = 540° − 180° to get 360°.
S 4 Explore the sum through tessellating congruent quadrilaterals.
S 5 Share ideas with friends about what was found when tessellating.
TN Students should use the same idea of tessellation by manipulating the four congruent quadrilaterals to investigate the angle sum of quadrilaterals.
In this case, where the 4 angles meet at one point in the centre, they form a 360° angle.

### 5 Important Point

T/S Explain the important point in the box .

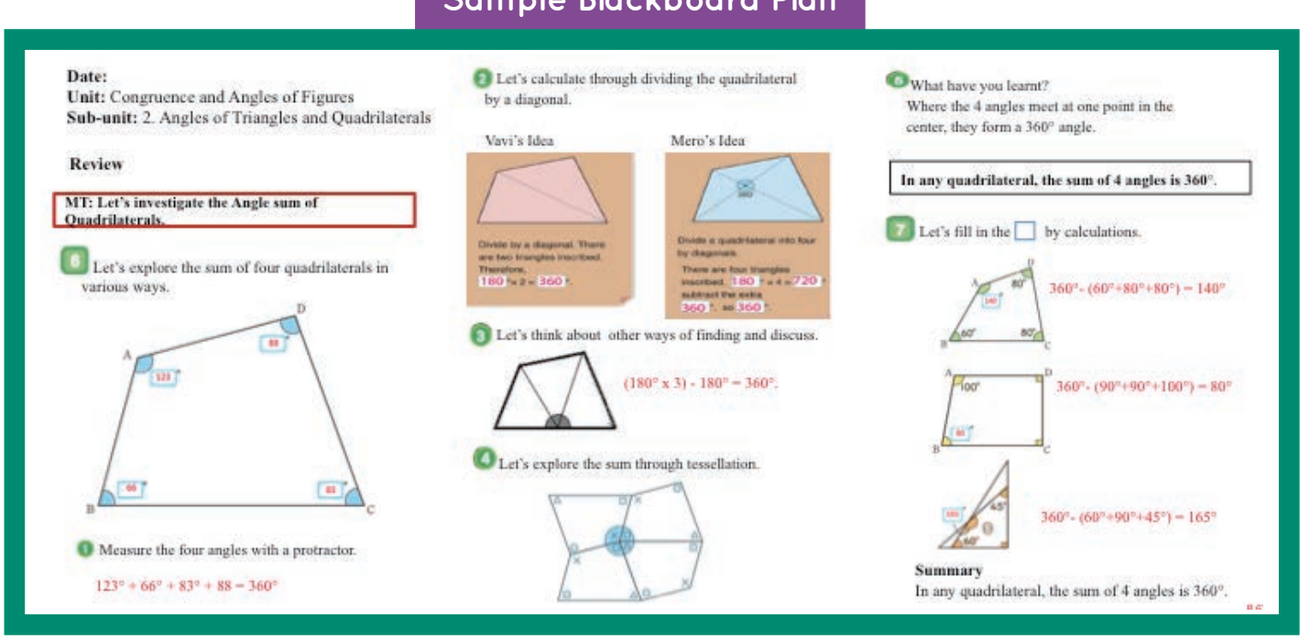
### 6 7 Complete the activity by calculating the unknown angles.

S Calculate the unknown angles for the quadrilaterals 1 to 3.
T Confirm students' calculations.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 2: Angles of Triangles and Quadrilaterals
### Lesson 4 of 5

Textbook Page : 053 to 055
Actual Lesson 034

## Lesson Objective

- To think about how to find the sum of interior angles of polygons.

## Prior Knowledge

- Quadrilaterals and triangles
- Angle sum of Triangles
- Angles (Grade 4)

## Preparation

- Protractor and ruler

## Assessment

- Think about how to find the angle sum of polygons. F
- Calculate how to find angle sum of polygons. S

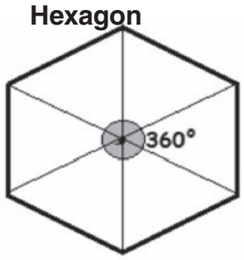
## Teacher's Notes

The angle sum of polygons can be calculated when triangles are inscribed within a polygon. Divide the polygon into triangles by connecting each of the vertex at a point to form 360°.
Get the sum of all angles by multiplying 180° by the number of triangles and subtract 360° which is the sum of the angles around the point.
The same idea will be expanded in Gr.6 using pronumerals.

**Pentagon**


$180° \times 5 - 360° = 540°$

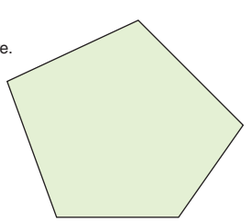
**Hexagon**




$180° \times 6 - 360° = 720°$

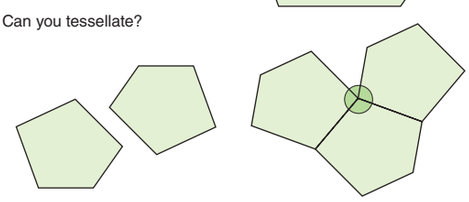
### Angles of Polygons

A pentagon is a five sided figure.



8 Let's explore how to find the sum of 5 angles in a pentagon.

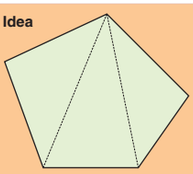
1 Can you tessellate?



For tessellation of figures, the sum of angles which meet at one vertex is 360°. In the case of a pentagon, it cannot be tessellated.

2 Let's divide a pentagon into triangles.

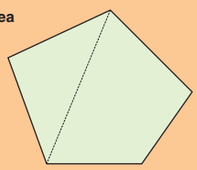
**Yamo's Idea**



If I draw diagonals from a vertex…

Draw diagonals and divide it into 3 triangles.
Therefore, 180° × 3 = 540 °.

**Mero's Idea**



If I draw a diagonal…

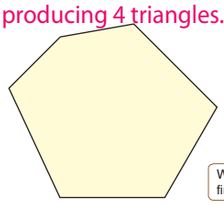
Divide a pentagon into a triangle and a quadrilateral.
Therefore, 180° + 360° = 540 °.

3 Let's think about other ways of finding the sum of angles and discuss.

In any pentagon, the sum of 5 angles is 540°.

9 A hexagon is a six sided figure.
Let's explore how to find the sum of 6 angles in a hexagon.

1. $360° + 360° = 720°$ (by using one diagonal in making two quadrilaterals)
2. $180° \times 4 = 720°$ (by making 3 diagonals in producing 4 triangles.



Write down how you find the sum.

In any hexagon, the sum of 6 angles is 720 °.

□ − □ = 53　　54 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Investigate how to find the sum of angles in a pentagon.

T Introduce the Main Task. (Refer to the BP)

T 8 Allow the students to discuss how to find the sum of 5 angles of a pentagon and ask them if they are able to tessellate pentagons like quadrilaterals.

S 1 Discover that pentagons cannot be tessellated.

T Confirm with students that pentagons cannot be tessellated. For tessellation of figures, the sum of angles which t one vertex is 360°.

### 3 Important Point

T/S Explain the important point in the box ( ).

### 4 Compare the 2 ideas of how to find the angle sum of pentagons.

T 2 Remind the students to use the angle sum of triangles and quadrilaterals to calculate.

S Yamo's Idea:
Divide the pentagon with 2 diagonal lines to make 3 triangles and calculate,
180° × 3 = 540°.
Mero's idea:
Divide the pentagon into a triangle and quadrilateral and calculate the sum,
180° + 360° = 540°.

### 5 Discuss other ways for finding the angle sum of quadrilaterals.

T What are other ways to calculate the angle sum of the pentagon?

S 3 Draw 5 triangles inscribed in the pentagon with vertices joining in the centre to form an angle sum of 360° and calculate. (refer to angle sum of quadrilaterals) 180° × 5 − 360° = 540°.

### 6 Important Point

T/S Explain the important point in the box ( ).

### 7 Discuss how to find the sum of 6 angles in a hexagon.

T 9 Give hints to the students to use the same ideas of how to find the angle sum of pentagons.

S Idea 1: Divide the hexagon with 3 diagonal lines to make 4 triangles and calculate,
180° × 4 = 720°.
Divide the hexagon into a triangle and pentagon and calculate the sum,
180° + 540° = 720°.
Idea 2: Draw 6 triangles inscribed in the pentagon with vertices joining in the centre to form an angle of 360° and calculate. (refer to angle sum of quadrilaterals)
180° × 6 − 360° = 720°.

### 8 Important Point

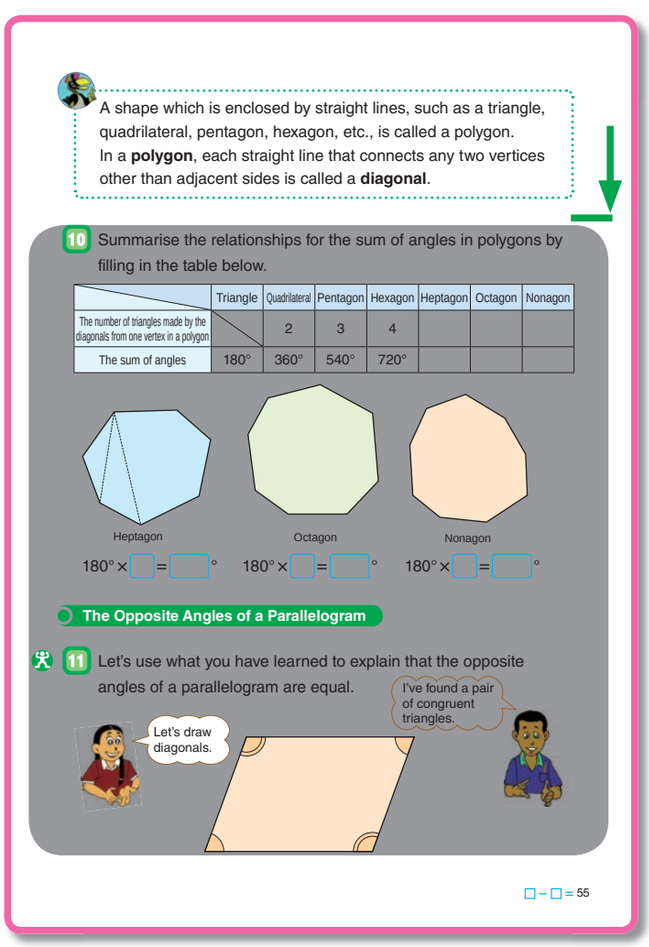
T/S Explain the important point in the box ( ). and ( ) .

### 9 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.




### Sample Blackboard Plan

Lesson 034 Sample Blackboard Plan is on page 71.

# Unit 4

# Unit: Congruence and Angles of Figures
## Sub-unit 2: Angles of Triangles and Quadrilaterals
### Lesson 5 of 5

Textbook Page : 055
Actual Lesson 035

## Lesson Objectives

- To find the relationship of the sum of angles in polygons.
- To think about the characteristics of a parallelogram.

## Prior Knowledge

- Quadrilaterals and triangles
- Angle sum of Triangles
- Angles (Grade 4)

## Preparation

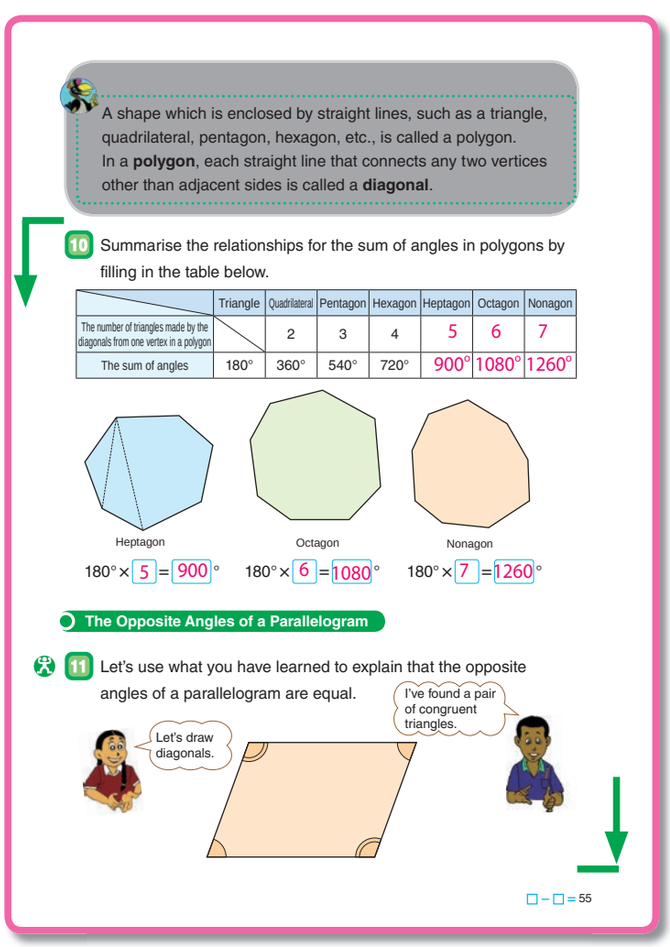
- Table in task 10 and the polygons
- Parallelogram in task 11

## Assessment

- Calculate the angle sum of other polygons using the number of triangles formed. F
- Describe the angle properties of a parallelogram based on congruence. S F

## Teacher's Notes

Students will realise that the number of triangles will increase in polygons according to the number of sides and therefore the sum of angles increases as well.



A shape which is enclosed by straight lines, such as a triangle, quadrilateral, pentagon, hexagon, etc., is called a polygon.
In a **polygon**, each straight line that connects any two vertices other than adjacent sides is called a **diagonal**.

10 Summarise the relationships for the sum of angles in polygons by filling in the table below.

| | Triangle | Quadrilateral | Pentagon | Hexagon | Heptagon | Octagon | Nonagon |
|---|---|---|---|---|---|---|---|
| The number of triangles made by the diagonals from one vertex in a polygon | | 2 | 3 | 4 | 5 | 6 | 7 |
| The sum of angles | 180° | 360° | 540° | 720° | 900° | 1080° | 1260° |



**The Opposite Angles of a Parallelogram**

11 Let's use what you have learned to explain that the opposite angles of a parallelogram are equal.





## Lesson Flow

### 1 Review the previous lesson.

T Introduce the Main Task. (Refer to the BP)
T Briefly review the previous lesson concepts on the angle sum of Pentagons and Hexagons.
How many triangles were formed from one vertex in a pentagon and a hexagon?
S Pentagon-3 triangles, Hexagon- 4 triangles

### 2 Find the relationship of the sum of angles in polygons.

T 10 Ask students to explain how they calculated the angles using this information.
S Explain that the number of triangles times 180° equals the sum of angles.
T Ask the students to complete the table in the textbook.
S Complete the table by identifying the number of triangles before calculating the angle sum for Heptagon, Octagon and Nonagon.

## Lesson Flow

### 3 Discuss the properties of opposite angles in a parallelogram.

T 11 Ask students to discuss and explain why opposite angles in a parallelogram are equal.

S When a diagonal line is drawn to make two congruent triangles, the corresponding opposite angles are equal.

TN Students should base their explanation on the fact that when a diagonal is drawn to make triangles, the 2 triangles are congruent. According to what they have learned previously, corresponding angles in congruent figures are equal.

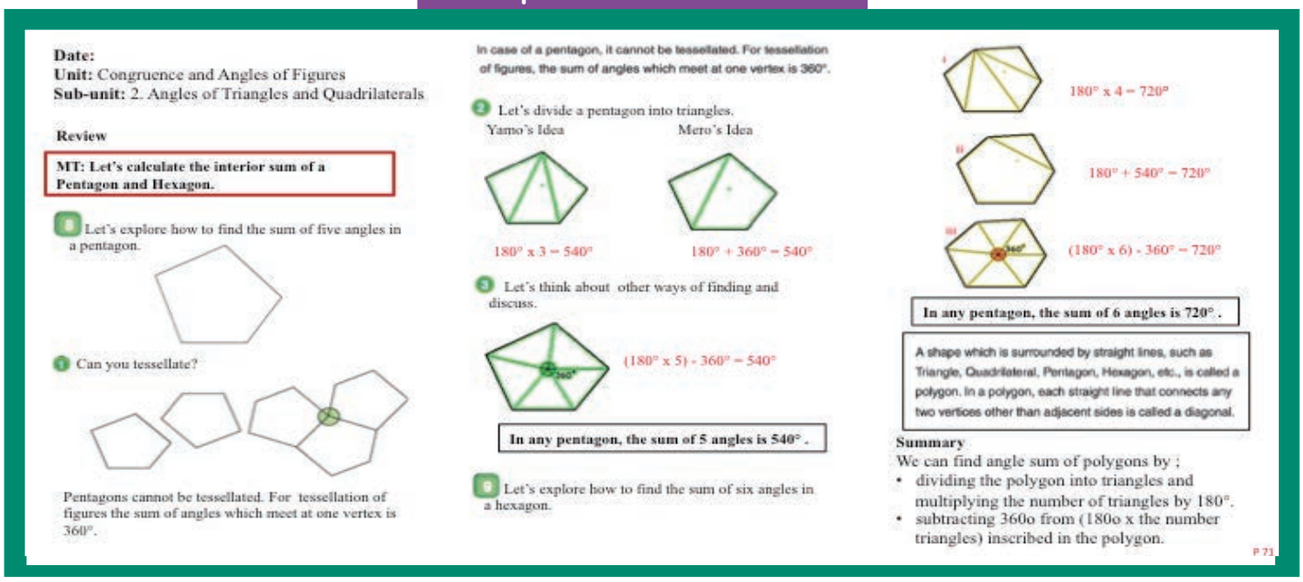
### 4 Summary

T What have you learned in this lesson?

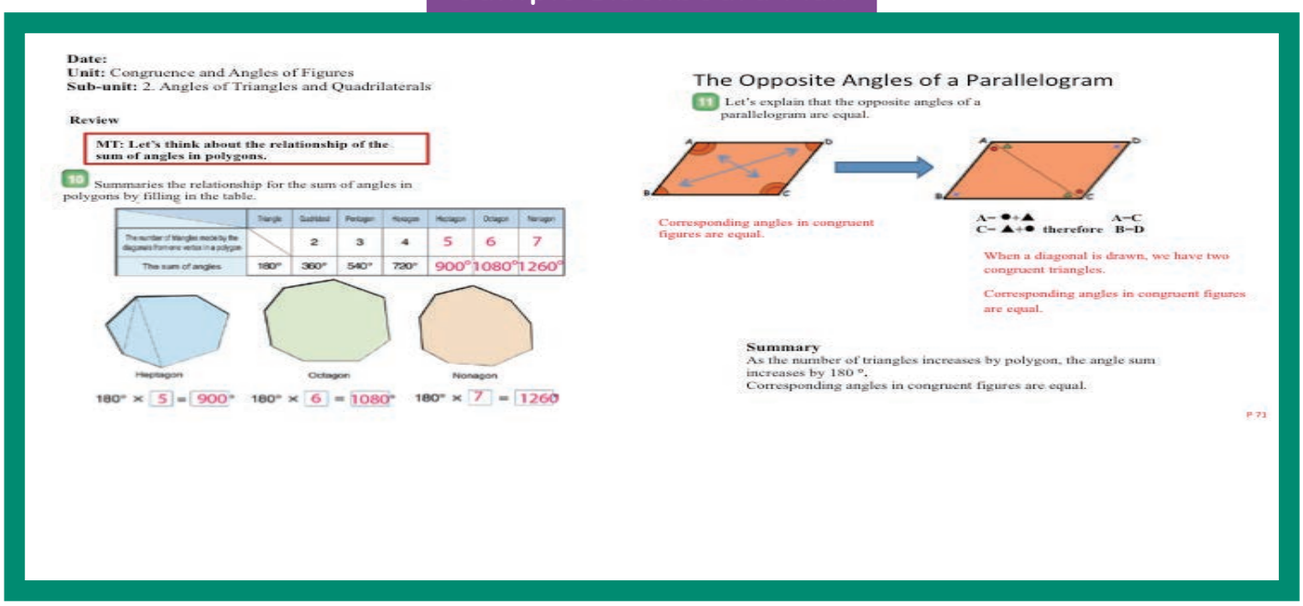
S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan




## Sample Blackboard Plan



# Unit 4: Unit: Congruence and Angles of Figures
## Exercise, Problems and Evaluation
## Lesson 1 and 2 of 2

Textbook Page : 056 and 057
Actual Lesson 036 and 037

### Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

### Prior Knowledge

- All the contents covered in this unit

### Preparation

- Evaluation test copy for each student

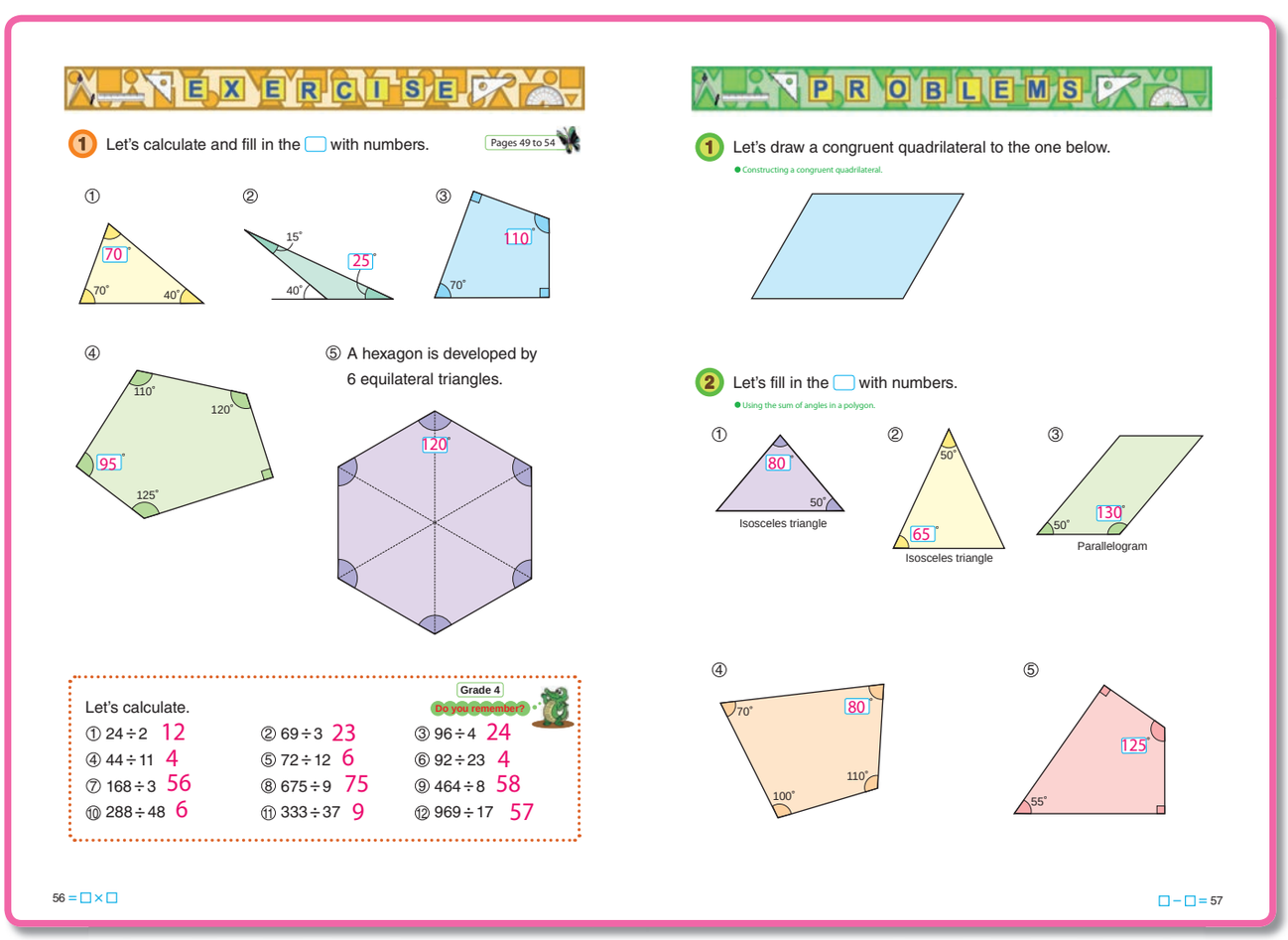
### Assessment

- Complete the Exercise and Problems correctly. S

### Teacher's Notes

This is the last lesson of Chapter 4.

Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.



EXERCISE

1 Let's calculate and fill in the ☐ with numbers. Pages 49 to 54

① 70°, 70°, 40°

② 15°, 25°, 40°

③ 110°, 70°

④ 110°, 120°, 95°, 125°

⑤ A hexagon is developed by 6 equilateral triangles. 120°

Let's calculate. Grade 4 Do you remember?

| | | |
|---|---|---|
| ① 24 ÷ 2 12 | ② 69 ÷ 3 23 | ③ 96 ÷ 4 24 |
| ④ 44 ÷ 11 4 | ⑤ 72 ÷ 12 6 | ⑥ 92 ÷ 23 4 |
| ⑦ 168 ÷ 3 56 | ⑧ 675 ÷ 9 75 | ⑨ 464 ÷ 8 58 |
| ⑩ 288 ÷ 48 6 | ⑪ 333 ÷ 37 9 | ⑫ 969 ÷ 17 57 |

56 = ☐ × ☐

PROBLEMS

1 Let's draw a congruent quadrilateral to the one below.
● Constructing a congruent quadrilateral.

2 Let's fill in the ☐ with numbers.
● Using the sum of angles in a polygon.

① 80°, 50° Isosceles triangle

② 50°, 65° Isosceles triangle

③ 130°, 50° Parallelogram

④ 70°, 80°, 110°, 100°

⑤ 125°, 55°

☐ − ☐ = 57

## Lesson Flow

### 1 Complete the Exercise

S Solve all the exercises.
T Confirm students' answers.
TN ① Calculate by filling in the box ☐.

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN ① Constructing a congruent triangle.
② Using the sum of angles in a polygon.

### 3 Complete the Evaluation Test

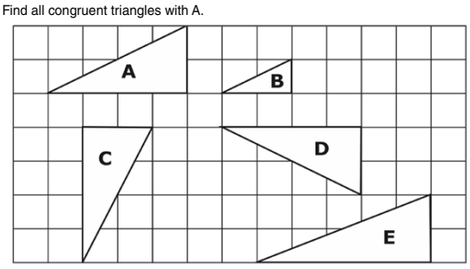
TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.

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

| Chapter 4: Congruence and Angles of Figures | Name: | Score / 100 |
|---|---|---|

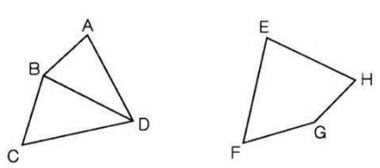
[20 marks for the set of right answers]

1. Find all congruent triangles with A.




Answer: C and D

2. The 2 quadrilaterals shown below are congruent. Answer the following questions.
[4 x 20 marks = 80 marks]







(1) Which vertex corresponds to Vertex D? Answer: Vertex E

(2) Which side corresponds to Side BC? Answer: Side GH

(3) Which angle corresponds to Angle G? Answer: Angle B

(4) Which diagonal corresponds to Diagonal BD? Answer: Diagonal GE

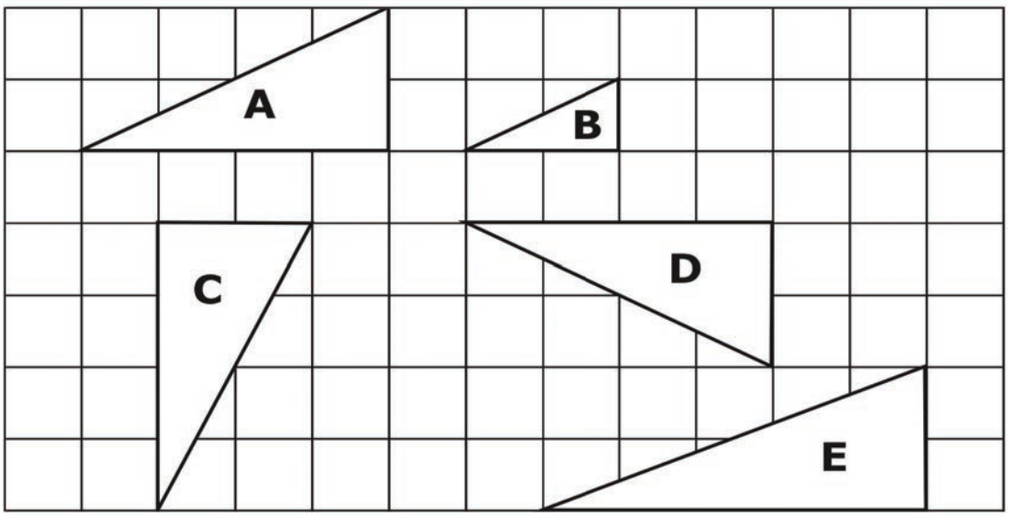
74

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

| Chapter 4:<br>Congruence and Angles of Figures | Name: | Score<br>/ 100 |
|---|---|---|

1. Find all the congruent triangles with A.

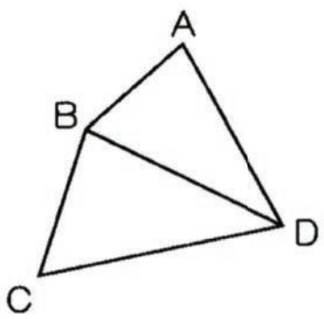
[20 marks for the set of right answers]

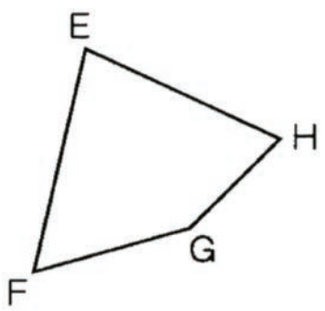



Answer:

2. The two quadrilaterals shown below are congruent. Answer the following questions.

[4×20 marks=80 marks]




① Which vertex corresponds to Vertex D? Answer:

② Which side corresponds to Side BC? Answer:

③ Which angle corresponds to Angle G? Answer:

④ Which diagonal corresponds to Diagonal BD? Answer:

# Chapter 5 Division of Decimal Numbers

## 1. Content Standard

5.1.5 Apply the process of division to divide a decimal number by decimal number and a whole number by a decimal number.

## 2. Unit Objectives

- To understand the meaning of division of decimal numbers and use it correctly.
- To understand the meaning of division when the divisor is a decimal number.
- To think about how to calculate division of decimal numbers and be able to calculate it.

## 3. Teaching Overview

Students already learned division of decimal number divided by whole number. In this unit, they will learn division of dividing by decimal numbers.

**Operation of Whole Numbers and Decimal Numbers ÷ Decimal Numbers :**

They learn that they can calculate them by thinking the same way as divisions dividing by whole numbers. They will notice that they can find the answers by moving decimal points which means applying rules of divisions learned before.

They should also pay attention to the relationship between the quotient and the divisor.

If quotient is smaller than 1, the quotient will be bigger than the dividend.

**Division Problems :**

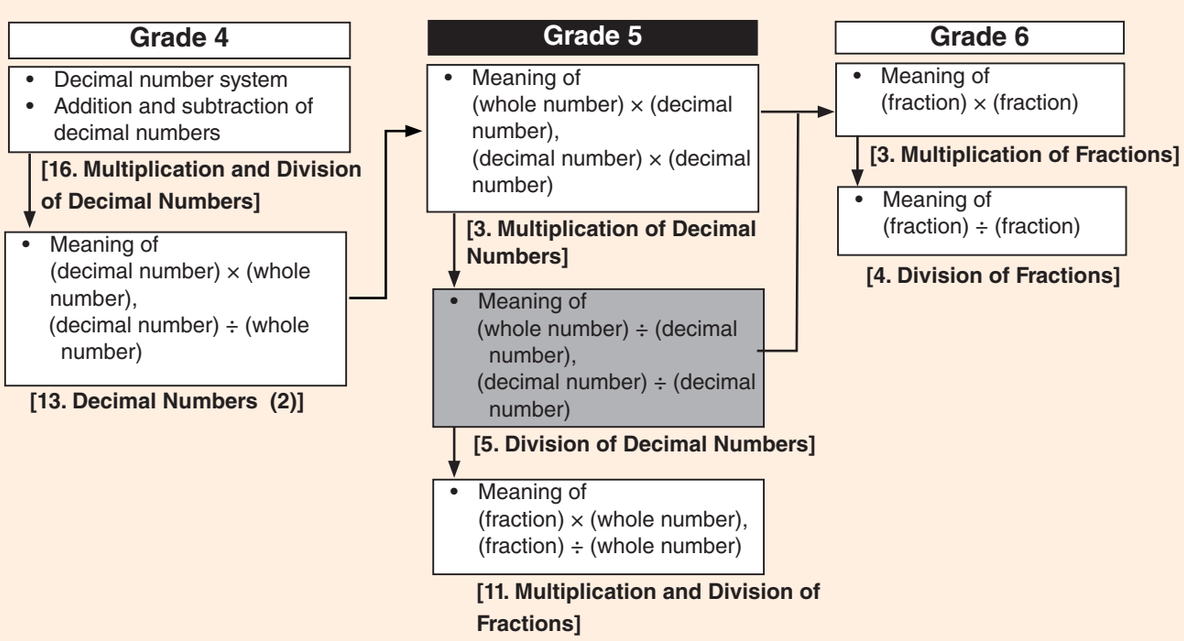
In this topic, students learn how to estimate result of calculation, meaning of remainder, the reason for rounding the quotient, etc.

**What Kind of Calculation Would It Be? :**

Students learn how to decide the appropriate mathematical expression.

Activities making mathematical stories will develop the skill of making decision on expressions.

## 4. Related Learning Contents



# Unit 5

# Unit: Division of Decimal Numbers
## Sub-unit 1: Operation of Whole Numbers ÷ Decimal Numbers
## Lesson 1 of 2

Textbook Page : 058 to 060
Actual Lesson 038

## Sub-unit Objectives

- To understand the meaning of whole number ÷ decimal number and make a mathematical expression.
- To think about how to calculate whole number ÷ decimal number.
- To think about how to calculate whole number ÷ decimal number in vertical form.

## Lesson Objectives

- To understand the meaning of whole number ÷ decimal number and make a mathematical expression.
- To think about how to calculate whole number ÷ decimal number.

## Prior Knowledge

- Rules of Division
- Multiplication of Decimal Number
- Calculating Whole Numbers × Decimal Numbers
- Calculating Decimal Number × Decimal Number
- Rules for Calculation

## Assessment

- Divide a whole number by a decimal number if the divisor is a decimal number. F
- Demonstrate the understanding of the meaning of whole number ÷ decimal number. S

## Preparation

- Tape diagram of 1 and Mero's and Kekeni's idea on chart

## Teacher's Notes

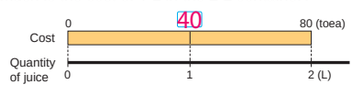
- Ideas of two students here are to find out which one is cheaper by knowing the cost of 1L according to the situation.
- Remind students that both Mero and Kekeni are trying to find the answer of 56÷1.6.
- Mero's thinking is based on the cost of 0.1 L, which makes the division of a whole number possible.
- Kekeni used the idea on the rule of division and then calculated by making the divisor into a whole number.

5 Division of Decimal Numbers


### 1 Operation of Whole Numbers ÷ Decimal Numbers

1 Jane and Betu went to the supermarket to buy juice.

1 How much is the cost of 1 L in the 2 L container?




Ⓐ Write a mathematical expression.

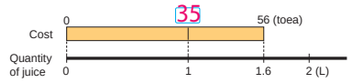
80÷2

| Cost (Kina) | ? | 80 |
|---|---|---|
| Quantity of juice (L) | 1 | 2 |

÷2

Ⓑ Let's calculate the mathematical expression in Ⓐ

2 How much is the cost of 1 L for the 1.6 L container?




Ⓐ Write a mathematical expression.

56 ÷1.6

| Cost (toea) | ? | 56 |
|---|---|---|
| Quantity of juice (L) | 1 | 1.6 |

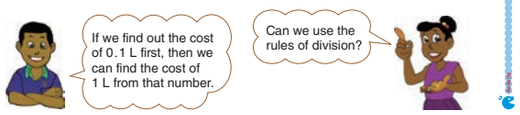
÷1.6

Ⓑ Approximately how much would the cost be?

Around 56÷2=28 or 60÷2=30

As shown with the quantity of juice, when the divisor is a decimal number instead of a whole number, the expression is the same as for division of whole numbers and means to calculate the quantity per unit.

Ⓒ Let's think about how to calculate 56 ÷ 1.6




58 = □ × □

□ − □ = 59

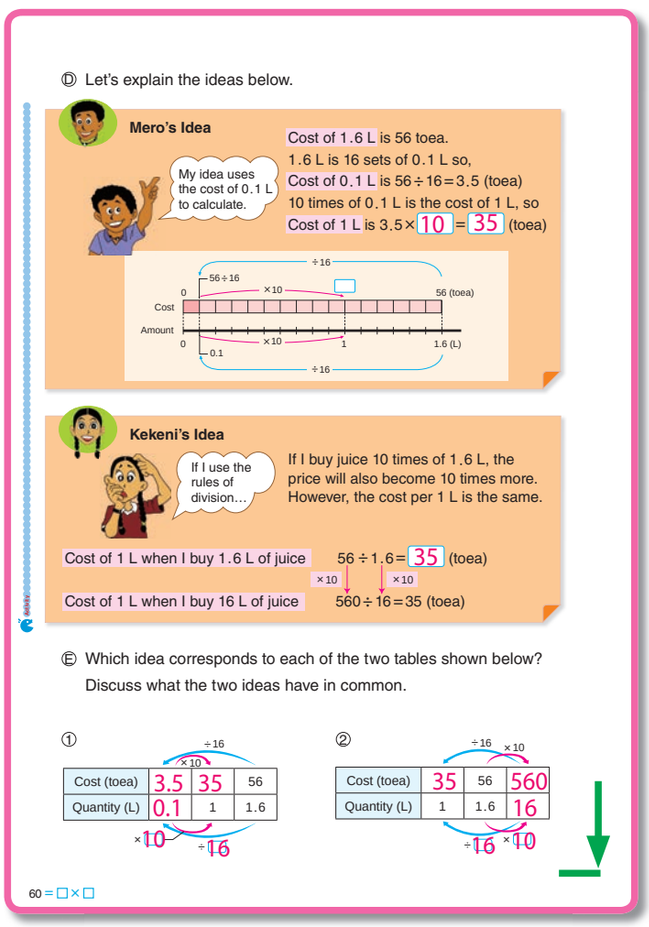
## Lesson Flow

### 1 Think about how to find which juice container is cheaper.

T Ask the students to look at the pictures and have pre-discussion by posing questions.
S Do pre-discusions using the pictures.
TN Comparision may be difficult because the cost and the quantity are not the same.
T Introduce the Main Task. (Refer to the BP)
T/S 1 Read and understand the situation.
S Discuss and compare the situation about finding which juice container is cheaper.

### 2 Finding the cost of 1 L in the 2 L juice container.

T 1 How much is the cost of 1 L in the 2 L container?
TN Use the tape diagram and the table of information to write the mathematical expression.
T Ⓐ Write a mathematical expression.
S Expression: 80 ÷ 2.
T Ⓑ Confirm with students that they can find the answer by calculating 80 ÷ 2.
S 80 ÷ 2 = 40. So the cost for 1 L of juice is 40 toea.




### 3 Finding the cost of 1 L in the 1.6 L juice container.

T 2 How much is the cost of 1 L for the 1.6 L container?
TN Apply the similar method used in 1.
S Ⓐ Write a mathematical expression using the tape diagram and table of information. (56 ÷ 1.6)
T Approximately how much will the cost be?
S Ⓑ By estimation 60 ÷ 2 = 30, so around 30 toea.
TN Students can find out which is cheaper if they compare each juice container by 1 L.

### 4 Important Point

T/S Explain the important point in the box .

### 5 Think about how to calculate 56 ÷ 1.6

T Ⓒ Ask students on how to calculate 56 ÷ 1.6 and present their ideas.
S Present and explain their ideas.

### 6 Explain Mero's and Kekeni's ideas on how to calculate 56 ÷ 1.6

S Explain Mero's and Kekeni's ideas.
TN Ⓓ Mero's Idea: His thinking is based on the cost of 0.1 L, which makes the division of a whole number possible.
Kekeni's Idea: She used the idea on the rule of division and then calculated by making the divisor into a whole number.
T Ⓔ Which idea corresponds to the two tables below on page 60?
S Table 1 corresponds to Mero's idea and table 2 corresponds to Kekeni's idea.
S In both ideas, the decimal numbers are changed to whole number to make calculation easier.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

### Sample Blackboard Plan

Lesson 038 Sample Blackboard Plan is on page 79.

# Unit 5

# Unit: Division of Decimal Numbers

## Sub-unit 1: Operation of Whole Numbers ÷ Decimal Numbers

## Lesson 2 of 2

Textbook Page : 061
Actual Lesson 039

### Lesson Objective

- To think about how to divide whole number ÷ decimal number in vertical form.

### Prior Knowledge

- How to calculate Whole Number ÷ Decimal Number (Previous lesson)
- The idea per unit
- The rules of division

### Preparation

- Chart on vertical calculation in Ⓕ
- Chart for important point
- Diagram for task 2

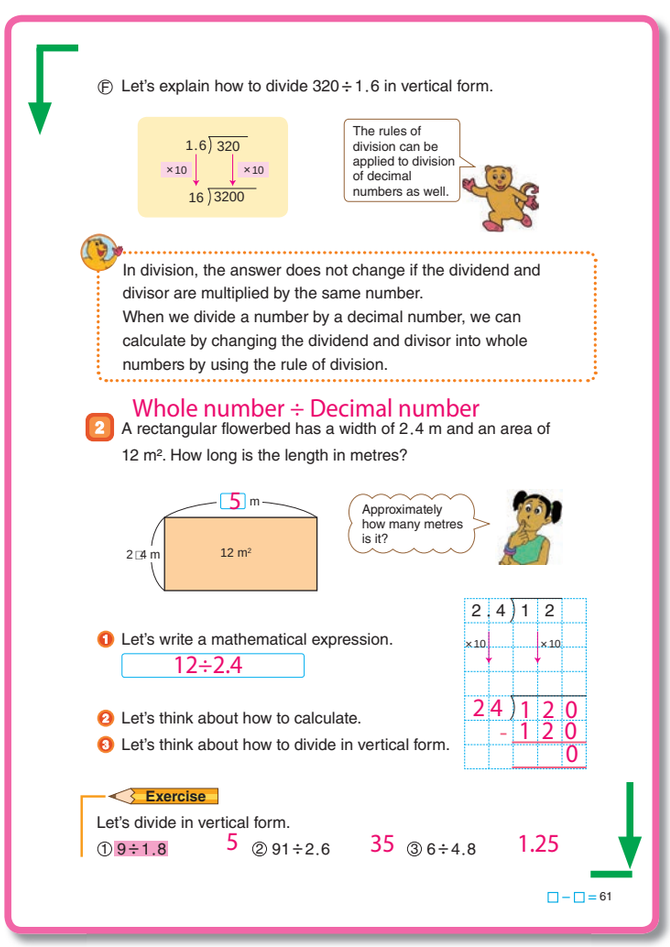
### Assessment

- Think about how to calculate whole number ÷ decimal number in vertical form. F
- Explain how to calculate whole number ÷ decimal number in vertical form. S
- Solve the exercises correctly. S

### Teacher's Notes

**Supplementary Exercise**

1.) 9 ÷ 1.5 = [6]
2.) 8 ÷ 1.6 = [5]
3.) 10 ÷ 2.5 = [4]
4.) 30 ÷ 2.6 = [15]
5.) 27 ÷ 1.8 = [15]
6.) 72 ÷ 4.5 = [16]
7.) 98 ÷ 2.8 = [35]
8.) 42 ÷ 1.4 = [30]




### Lesson Flow

**1 Review the previous lesson.**

**2 Think about how to divide 320 ÷ 1.6 in vertical form.**

T Introduce the Main Task. (Refer to the BP)
T Ⓕ Explain how to divide 320 ÷ 1.6 in vertical form.
TN Divide the whole number by a decimal number. Change the divisor and the dividend into whole numbers. In this case, multiply the divisor and the dividend by 10.
S Apply the rules of division to divide 320 ÷ 1.6

**3 Important Point**

T/S Explain the important point in the box ( ).

**4 Solve 12 ÷ 2.4 in vertical form by using the rules of division.**

T/S 2 Read and understand the situation.
T 1 Explain the situation of this task and let students write the mathematical expression to get the answer for the [ ].

## Lesson Flow

S Mathematical Expression: 12 ÷ 2.4

T ❷ Let's think about how to calculate 12 ÷ 2.4
S Present their ideas with friends.

### 5 Think about how to divide in vertical form.

T ❸ Ask students to calculate in vertical form.
S
- Use the rule of division to change the decimal number into a whole number.
- Multiply the divisor and the dividend with 10 to make the divisor become 24 and dividend become 120.
  Then divide 120 ÷ 24 in vertical form.

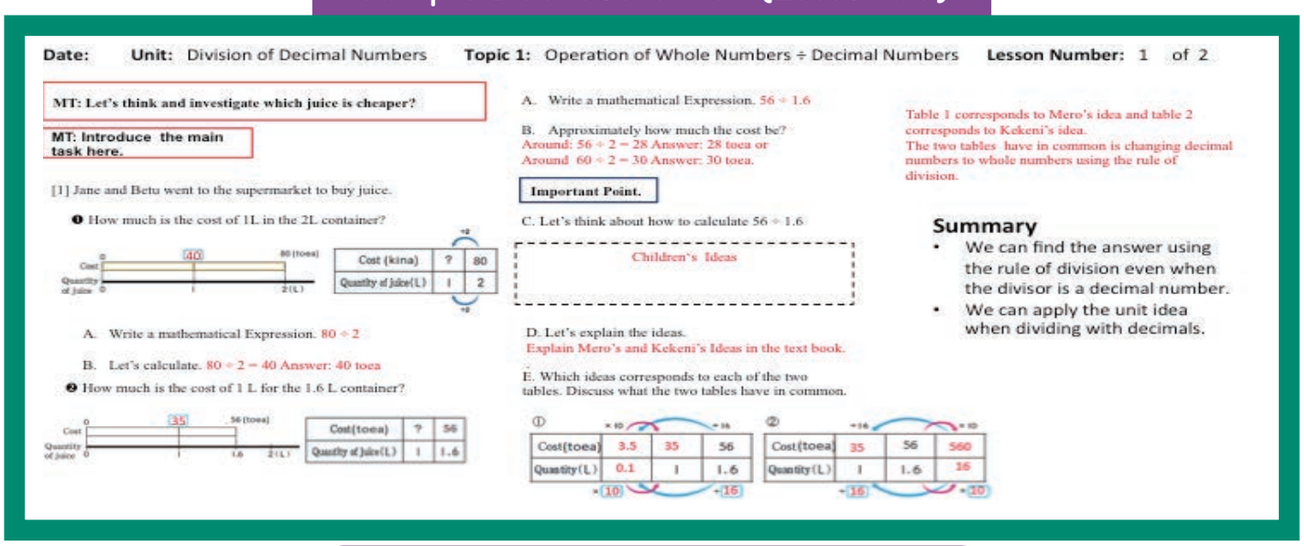
### 6 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

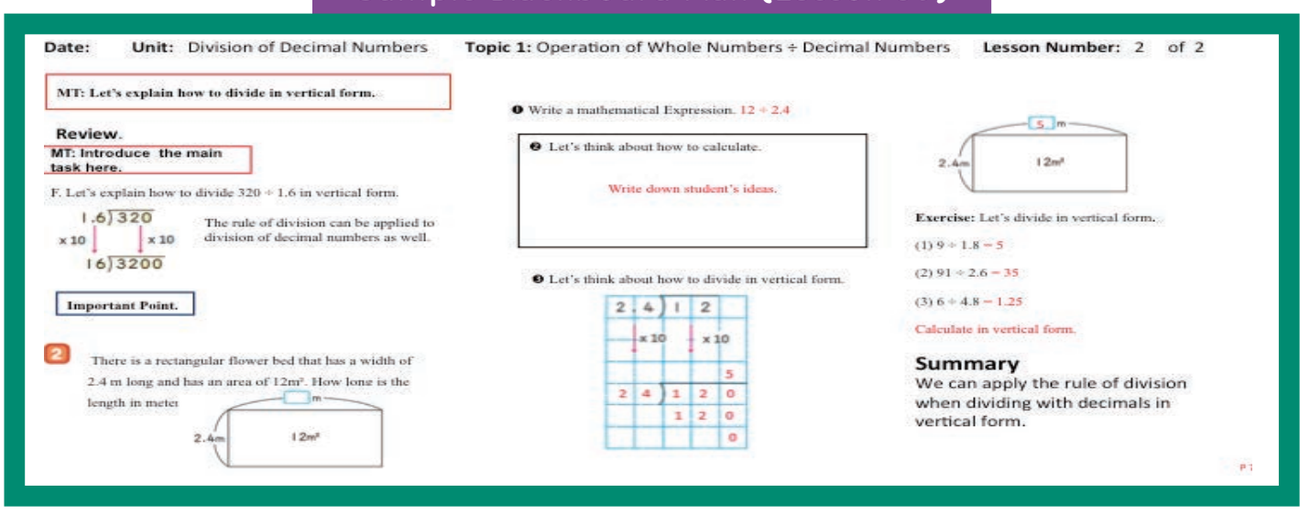
### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 38)




## Sample Blackboard Plan (Lesson 39)



# Unit 5

# Unit: Division of Decimal Numbers

## Sub-unit 2: Operation of Decimal Numbers ÷ Decimal Numbers

## Lesson 1 of 2

Textbook Page : 062 and 063
Actual Lesson 040

## Sub-unit Objectives

- To think about how to calculate decimal number ÷ decimal number.
- To understand and apply the steps on how to calculate decimal number ÷ decimal number in vertical form.
- To understand the relationship of the size between quotient and dividend.

## Lesson Objectives

- To understand the meaning of decimal number ÷ decimal number.
- To understand how to calculate decimal number ÷ decimal number in vertical form.

## Prior Knowledge

- Calculating Whole Number ÷ Decimal Number in vertical form
- How to calculate Whole Number ÷ Decimal Number
- Rules of division

## Preparation

- Chart of tape diagram for task 1

## Assessment

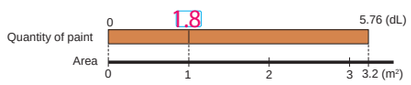
- Determine the meaning of decimal number ÷ decimal number. F
- Demonstrate the understanding on how to calculate decimal number ÷ decimal number in vertical form. S
- Solve the exercises correctly. S

## Teacher's Notes

The point which is different from the division of a decimal number is that students don't have to put back the number again after getting the answer of calculation with the whole numbers. In short, it is using Naiko's idea of $a \div b = (a \times 10) \div (b \times 10)$.

### 2 Operation of Decimal Numbers ÷ Decimal Numbers

**1** We used 5.76 dL of paint to paint a 3.2 m² wall.
How many decilitre (dL) of paint will we use to paint a 1 m² wall?



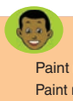

① Let's write a mathematical expression.
5.76÷3.2

| Quantity of paint (dL) | ? | 5.76 |
|---|---|---|
| Area (m²) | 1 | 3.2 |

÷3.2

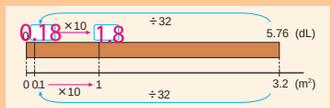
② Approximately how many dL will we use?
6÷3=2

③ Let's think about how to calculate.

**Naiko's Idea**

Paint needed for 0.1 m² is 5.76 ÷ 32 = 0.18 (dL).
Paint needed for 1 m² will be 10 times of that, so 0.18 × 10 = 1.8 (dL).




**Yamo's Idea**

I will apply the rules of division to change the divisor into a whole number.

5.76 ÷ 3.2 = 1.8
×10 ↓ ×10
57.6 ÷ 32 = 1.8

④ Let's think about how to divide in vertical form.

```
    1 8
3 2)5 7 6
  - 3 2
    2 5 6
  - 2 5 6
        0
```

**How to Divide Decimal Numbers in Vertical Form**

① Multiply the divisor by 10, 100 or more to make it a whole number and move the decimal point to the right accordingly.
② Multiply the dividend by the same amount as the divisor and move the decimal point to the right accordingly.
③ The decimal point of the answer comes at the same place as where the decimal point of the dividend has been moved to.
④ Then, calculate as if this is the division of whole numbers.

```
   1.8
3.2)5.7.6
   3 2
   2 5 6
   2 5 6
       0
```

**2** There is a rectangular flowerbed that has an area of 8.4 m² and the length of 2.8 m.
How many metres is the width?

① Let's write a mathematical expression.
8.4÷2.8

② Let's calculate ① in vertical form and find the answer.
Width is 3 cm

```
    3
2.8)8.4
  - 8 4
    0
```

**Exercise**

Let's divide in vertical form.

① 9.52 ÷ 3.4 2.8
② 9.88 ÷ 2.6 3.8
③ 7.05 ÷ 1.5 4.7
④ 8.5 ÷ 1.7 5
⑤ 7.6 ÷ 1.9 4
⑥ 9.2 ÷ 2.3 4

62 = □ × □

□ − □ = 63

## Lesson Flow

### 1 Review the previous lesson.

### 2 Estimating the value of 5.76 ÷ 3.2

T Introduce the Main Task. (Refer to the BP)
T/S ❶ Read and understand the situation.
S ❶ Write a mathematical expression. (5.76 ÷ 3.2)
TN Let the students understand how to calculate division when both the divisor and dividend are decimal numbers.
T ❷ Let's estimate the quantity of paint needed for 1 m² by looking at the information on the number line and table.
S Paint needed for 1 m² will be around (6 ÷ 3 = 2) 2 dL.

### 3 ❸ Think about how to calculate 5.76 ÷ 3.2

T Let's compare Naiko's and Yamo's ideas. How can we change it to division of whole numbers?
S Discuss and present their ideas of how to calculate 5.76 ÷ 3.2
TN Naiko's Idea in calculating 5.76 ÷ 3.2 is expressing how to calculate by dividing (decimal number) ÷ (decimal number).
Yamo's Idea in calculating 5.76 ÷ 3.2 uses the rules of division to divide.

### 4 How to divide decimal numbers in vertical form.

T ❹ Ask students to think about how to divide 5.76 ÷ 3.2 in vertical form.
S Discuss how to divide.
T Explain how to divide decimal numbers in vertical form in the box ☐.

### 5 Think about how to calculate 8.4 ÷ 2.8

T/S ❷ Read and understand the situation.
S ❶ Write a mathematical expression. (8.4 ÷ 2.8)
S ❷ Divide 8.4 ÷ 2.8 in vertical form.
T Confirm the students calculation.

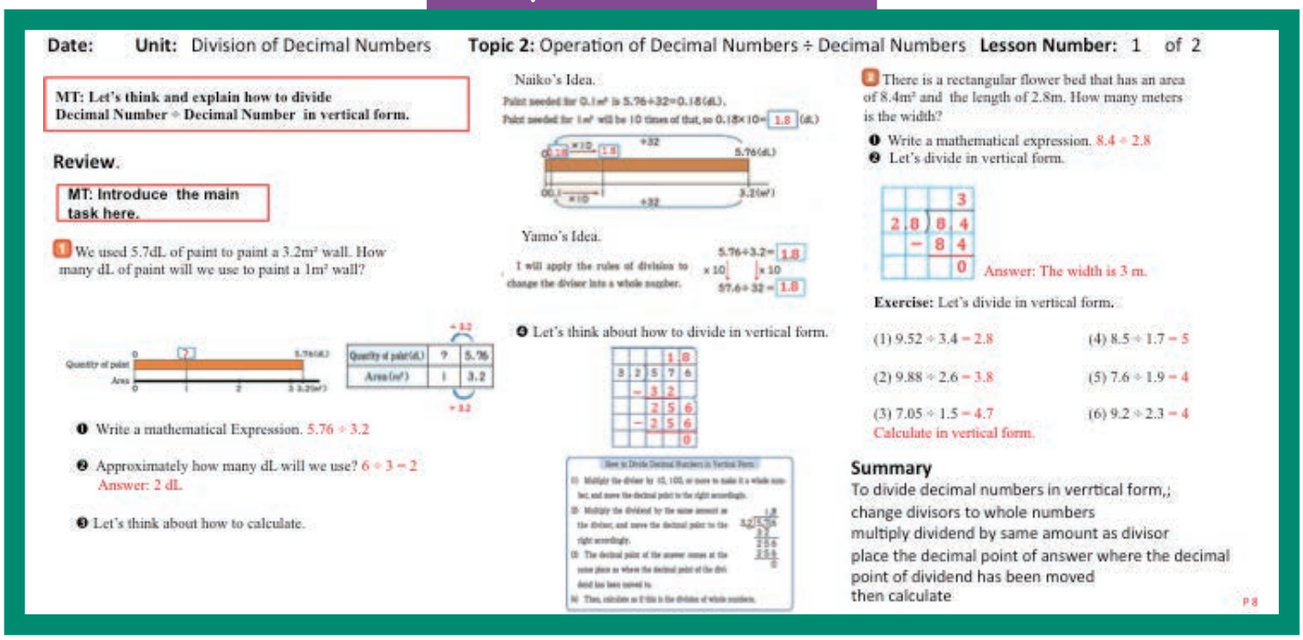
### 6 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.
TN Do the supplementary problems below if time allows for remedial purposes.
1.) 7.5 ÷ 1.5 2.) 9.6 ÷ 1.6 3.) 9.6 ÷ 1.2
4.) 8.4 ÷ 1.4 5.) 8.5 ÷ 1

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5: Unit: Division of Decimal Numbers

## Sub-unit 2: Operation of Decimal Numbers ÷ Decimal Numbers

## Lesson 2 of 2

Textbook Page : 064
Actual Lesson 041

### Lesson Objectives

- To understand where to place zero (0) when doing continuous calculation with division.
- To understand and apply the calculation on division of decimal number ÷ decimal number.

### Prior Knowledge

- Calculating decimal Number ÷ decimal Number in vertical form
- How to calculate Decimal Number÷Decimal Number
- The rules of division
- Continuous division

### Preparation

- Tape diagram and table

### Assessment

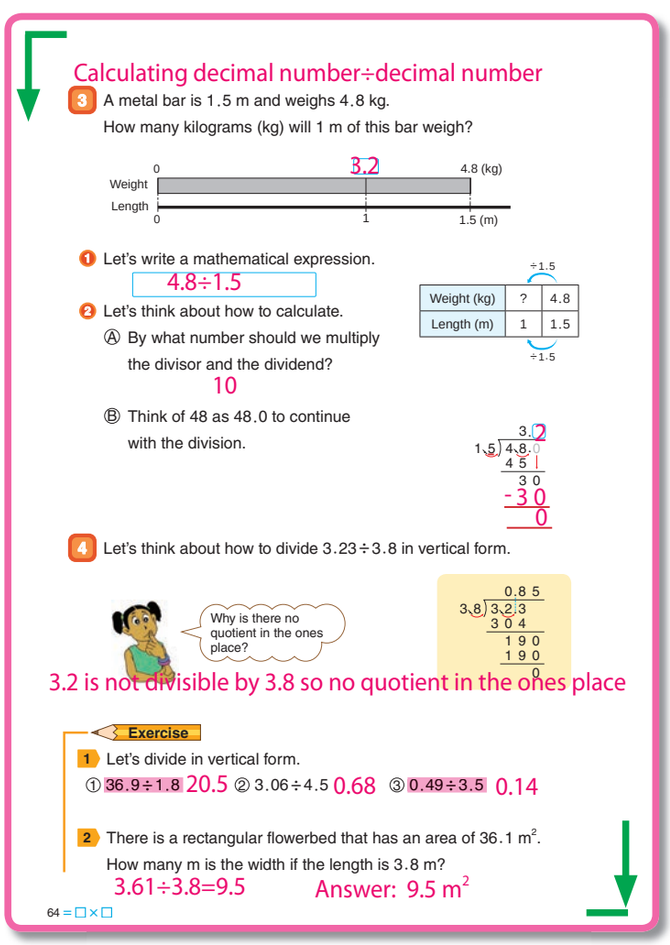
- Think about where to place zero (0) when doing continuous calculation with division. F
- Solve the exercises correctly. S

### Teacher's Notes

**Supplementary Exercise**

Let's do the following divisions in vertical form.

① 3.4 ÷ 2.5 [1.36]
② 4.62 ÷ 4.4 [1.05]
③ 5.33 ÷ 2.6 [2.05]
④ 1.68 ÷ 3.5 [0.48]



Calculating decimal number÷decimal number

3 A metal bar is 1.5 m and weighs 4.8 kg.
How many kilograms (kg) will 1 m of this bar weigh?



1 Let's write a mathematical expression.
4.8÷1.5

2 Let's think about how to calculate.
Ⓐ By what number should we multiply the divisor and the dividend?
10

| | | ÷1.5 |
|---|---|---|
| Weight (kg) | ? | 4.8 |
| Length (m) | 1 | 1.5 |
| | | ÷1.5 |

Ⓑ Think of 48 as 48.0 to continue with the division.

3.2
1.5 | 4.8.0
4 5
3 0
-3 0
0

4 Let's think about how to divide 3.23 ÷ 3.8 in vertical form.



0.8 5
3.8 | 3.2.3
3 0 4
1 9 0
1 9 0
0

3.2 is not divisible by 3.8 so no quotient in the ones place

Exercise

1 Let's divide in vertical form.
① 36.9 ÷ 1.8 20.5 ② 3.06 ÷ 4.5 0.68 ③ 0.49 ÷ 3.5 0.14

2 There is a rectangular flowerbed that has an area of 36.1 $m^2$.
How many m is the width if the length is 3.8 m?
3.61÷3.8=9.5
Answer: 9.5 $m^2$

64 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Think about how to calculate 4.8 ÷ 1.5

T Introduce the Main Task. (Refer to the BP)
T/S ③ Read and understand the situation.
T Ask the students to use the tape diagram and the table to write the mathematical expression.
S ① Write a mathematical expression as 4.8 ÷ 1.5

### 3 ② Calculate 4.8 ÷ 1.5 in vertcial form.

T/S Ⓐ Discuss the number that should be multiplied with the divisor and the dividend.
S 10
S Ⓑ Consider 48 as 48.0 and continue with the division in vertical form and fill in the box ☐.
T Confirm the vertical calculation.

### 4 ④ Think about how to calculate 3.23 ÷ 3.8

T Let's think about how to divide 3.23 ÷ 3.8 in vertical form.
T When there is no quotient in the ones place, we continue to calculate by adding 0 to solve the problem.
S Identify and express ideas after solving the problem.

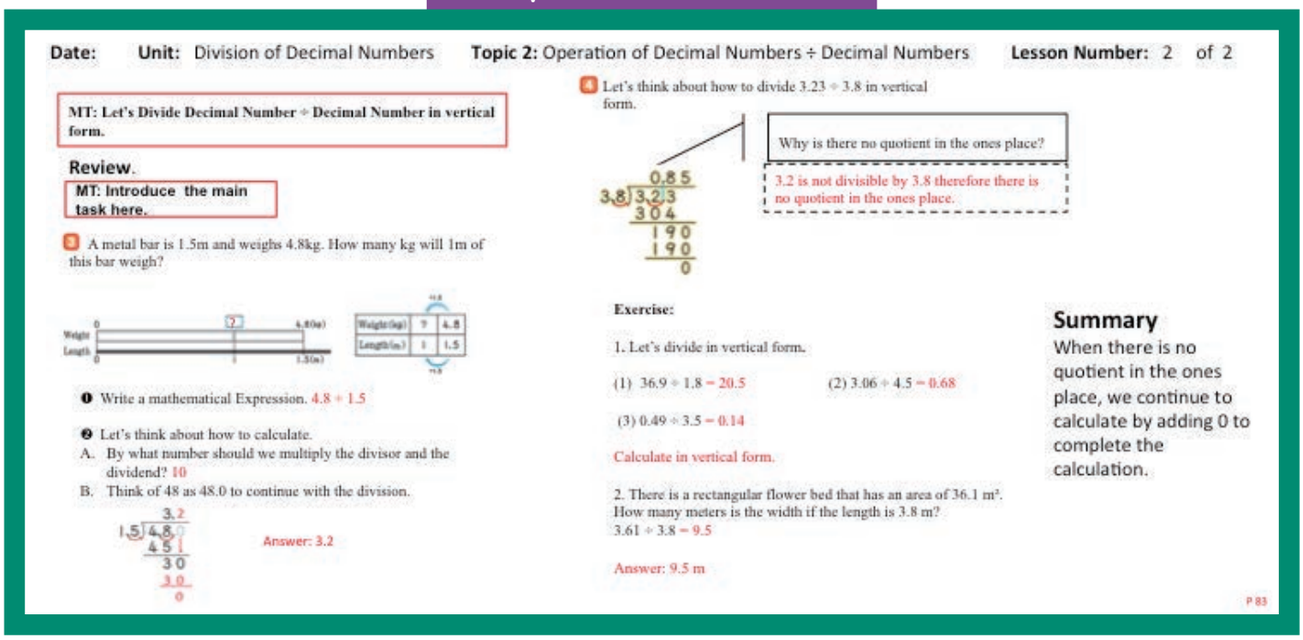
### 5 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5

# Unit: Division of Decimal Numbers
## Sub-unit 3: Division Problems
## Lesson 1 of 2

Textbook Page : 065
Actual Lesson 042

## Sub-unit Objectives

- To understand how to calculate and confirm the answers of the divisions with remainders.
- To understand how to find the quotient by rounding.

## Lesson Objective

- To understand how to calculate and confirm the answers of the divisions with remainders.

## Prior Knowledge

- Dividing by Decimal Numbers Smaller than 1

## Preparation

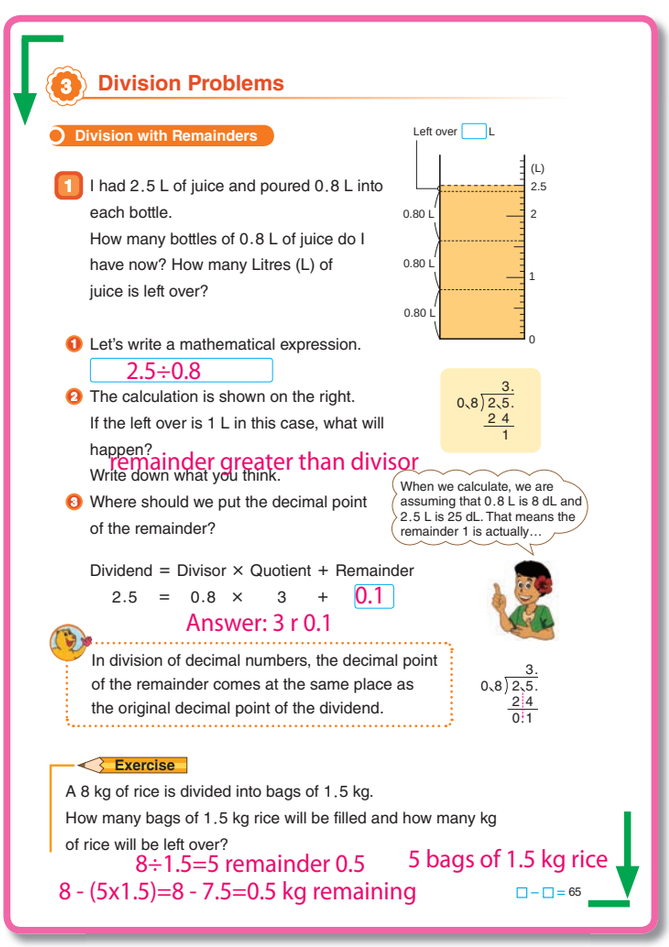
- Diagram on 1

## Assessment

- Think about how to calculate and confirm the answers of the divisions with remainders. F
- Solve the exercises correctly. S

## Teacher's Notes

Note that in the division of vertical form, the remainder is 0.1 and not 1.
The simplest formula to prove in 3 is by using:
Remainder = Dividend − (Divisor × Quotient)



3 Division Problems

Division with Remainders

1 I had 2.5 L of juice and poured 0.8 L into each bottle.
How many bottles of 0.8 L of juice do I have now? How many Litres (L) of juice is left over?

Left over ☐ L



1 Let's write a mathematical expression.
2.5÷0.8

2 The calculation is shown on the right.
If the left over is 1 L in this case, what will happen?
Write down what you think.
remainder greater than divisor

$$0.8\overline{)2.5}\quad 3\ \text{r}\ 1$$

3 Where should we put the decimal point of the remainder?

When we calculate, we are assuming that 0.8 L is 8 dL and 2.5 L is 25 dL. That means the remainder 1 is actually…

Dividend = Divisor × Quotient + Remainder
2.5 = 0.8 × 3 + 0.1
Answer: 3 r 0.1

$$0.8\overline{)2.5}\quad 3\ \text{r}\ 0.1$$

In division of decimal numbers, the decimal point of the remainder comes at the same place as the original decimal point of the dividend.

Exercise

A 8 kg of rice is divided into bags of 1.5 kg.
How many bags of 1.5 kg rice will be filled and how many kg of rice will be left over?
8÷1.5=5 remainder 0.5
5 bags of 1.5 kg rice
8 - (5x1.5)=8 - 7.5=0.5 kg remaining

☐ − ☐ = 65

## Lesson Flow

### 1 Review the previous lesson.

T Solve 4.5÷0.5 and link to this lesson.

### 2 Solving division with the remainder 1 to be 0.1

T/S ❶ Read and understand the situation.
T Introduce the Main Task. (Refer to the BP)
T Explain that the situation is similar to the review question but for this case it is different. There was 2.5 L of juice of which are poured into 0.8 L of bottles.
How many L of juice is left?
S ❶ Write a mathematical expression: 2.5÷0.8
S ❷ Think about how to explain the calculation of 2.5÷0.8 and what happens if the left over is 1 L.
T What will happen if the remainder is 1 L? Explain your answer.
S If remainder is 1 L, it will be greater than the divisor.
TN When we calculate, we are assuming that 0.8 L is 8 dL and 2.5 L is 25 dL by multiplying both the divisor and the dividend with 10.
T ❸ Where should we put the decimal point of the remainder?
S Solve the calculation problem.
TN Use the checking to method confirm where the decimal point of the remainder should be placed.
Dividend = Divisor × Quotient + Remainder
2.5 = 0.8 × 3 + 0.1

### 3 Important Point

T/S Explain the important point in the box .

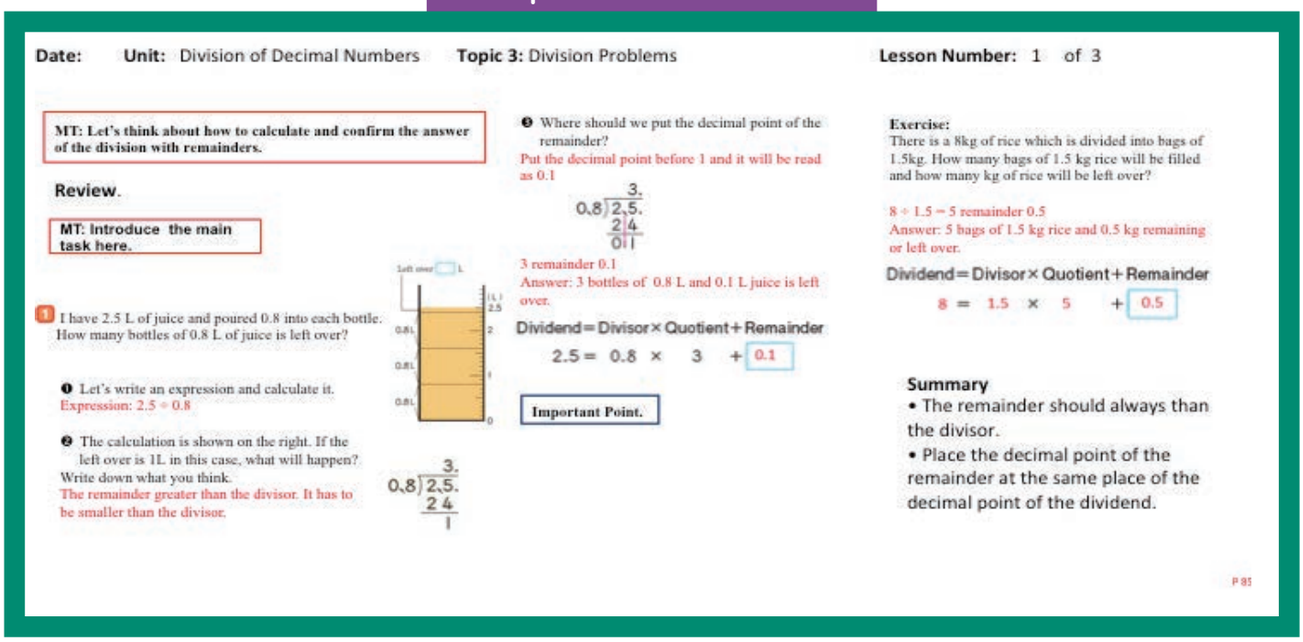
### 4 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5

# Unit: Division of Decimal Numbers
## Sub-unit 3: Division Problems
## Lesson 2 of 2

Textbook Page : 066
Actual Lesson 043

### Lesson Objective
- To understand how to find the quotient by rounding.

### Prior Knowledge
- Division with Remainder
- Adding 0 to continue the calculation

### Preparation
- Chart of calculation of long division in 2

### Assessment
- Think about how to find the quotient by rounding. F
- Solve the exercises correctly. S

### Teacher's Notes
The term 'not divisible' in the summary means that when the remainder is continous, we have to round the quotient.

**2** I weighed a 2.4 m long metal bar and it weighed 2.84 kg. How many kg does 1 m of this bar weigh?

1. Let's write an expression.
   2.84÷2.4
2. The calculation carried out is shown on the right. What will be the answer?
3. Round the quotient to the thousandths place and give the answer to the nearest hundredth. 1.18 kg

```
      1.1 8 3
2.4 ) 2.8.4
      2 4
      4 4
      2 4
      2 0 0
      1 9 2
        8 0
        7 2
          8
```

When a remainder is not divisible by the divisor or when the numbers become too long, the quotient is rounded.

**Exercise**

**1** For answering the quotient at the nearest hundredths place, round the quotient to the thousandths place.

① 2.8÷1.7 1.65 ② 5÷2.1 2.38 ③ 9.4÷3 3.13
④ 61.5÷8.7 7.07 ⑤ 0.58÷2.3 0.25 ⑥ 19.2÷0.49 39.18

**2** A 0.3 m wire weighs 1.6 g. Approximately, how many g does 1 m of this wire weighs? For answering the quotient at the nearest tenths place, round the quotient to the hundredths place.

1.6÷0.3=5.33
Answer: 5.33 g

66 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 Rounding the quotient when the remainder is not divisible.

T/S ❷ Read and understand the given situation.
T Introduce the Main Task. (Refer to the Blackboard Plan)
T Ask students to write a mathematical expression.
S ❶ Write a mathematical expression as 2.84÷2.4
T ❷ Explain the calculation 2.84÷2.4 in the vertical form.
S Observe the calculation process.
T What will be the answer?
T/S Discuss the answers together.

### 3 Think about how to round the quotient to the nearest place value.

TN The quotient is continuous 1.183333.....therefore, we need to round the quotient.
T ❸ Let students round the quotient to the thousandths place and give the answer to the nearest hundredths.
S The quotient is 1.183.... so we round off to 1.18
S The answer is 1.18 kg when rounded to the nearest hundredths.

### 4 Important Point

T/S Explain the important point in the box .

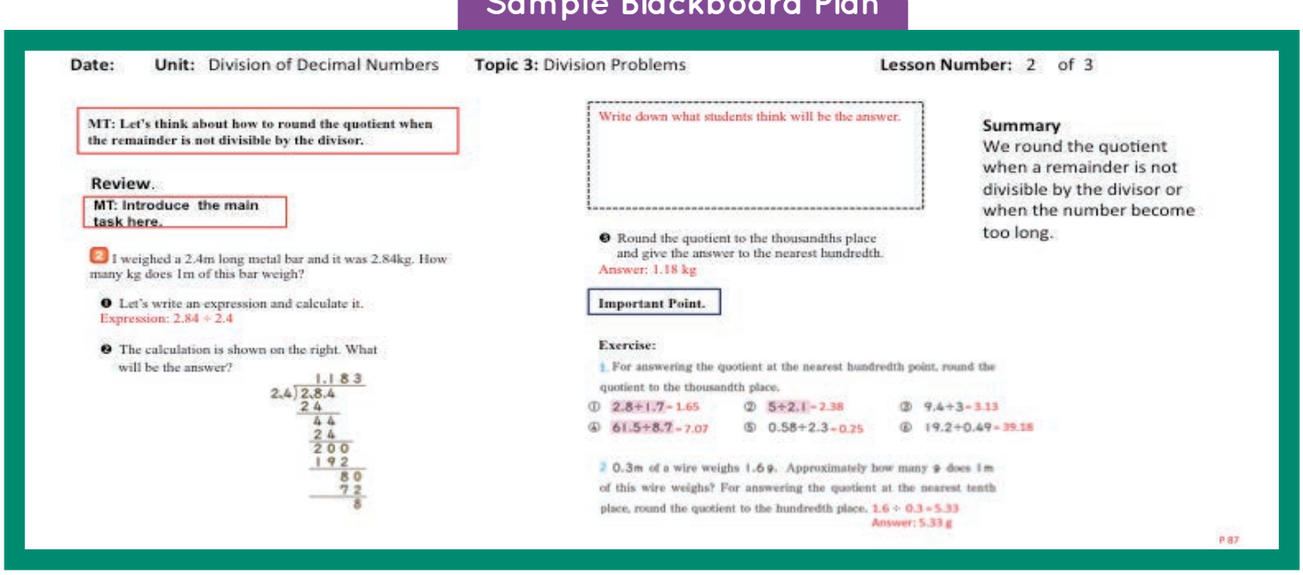
### 6 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5

# Unit: Division of Decimal Numbers
## Sub-unit 3: Division Problems
## Lesson 1 of 1

Textbook Page : 067
Actual Lesson 044

## Lesson Objective

- To think about the relationship between the quotient and the dividend when dividing by decimal numbers smaller than 1.

## Prior Knowledge

- How to divide Decimal Numbers in Vertical Form
- Adding 0 to continue the calculation

## Preparation

- Chart of tape diagrams for task 3

## Assessment

- Think about the relationship between the quotient and the dividend. F
- Think about how to divide decimal numbers smaller than 1 and notice the change in the quotient and the dividend. F
- Solve the exercises correctly. S

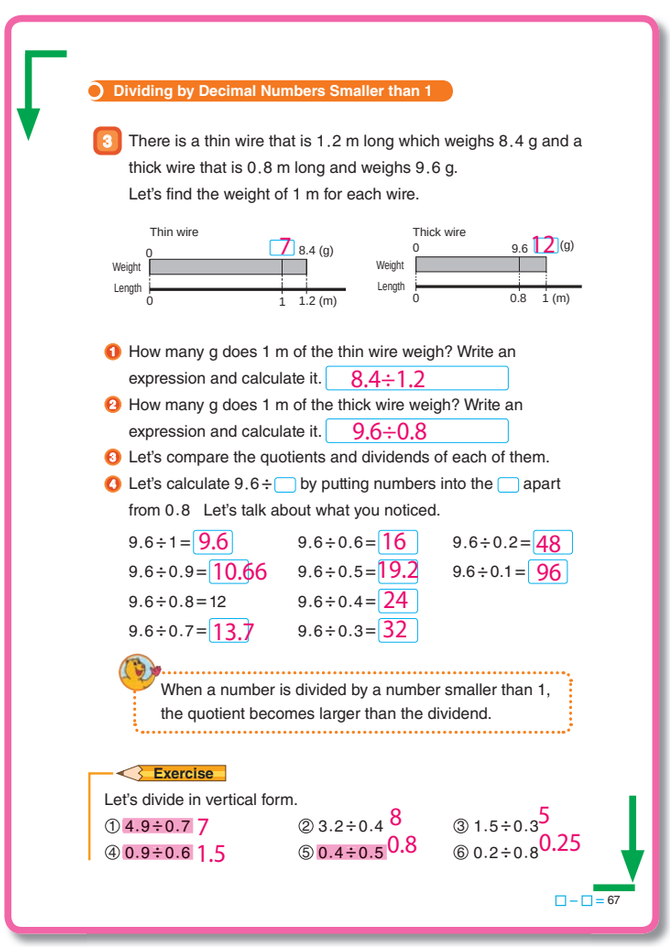
## Teacher's Notes

**Supplementary Problems**

1. Which expressions give the quotients bigger than 24?

a) 24 ÷ 2.5  b) 24 ÷ 0.1  c) 24 ÷ 0.8
d) 24 ÷ 1.2  e) 24 ÷ 1.05  f) 24 ÷ 0.96

Answer: [ b, c, f ]



Dividing by Decimal Numbers Smaller than 1

3 There is a thin wire that is 1.2 m long which weighs 8.4 g and a thick wire that is 0.8 m long and weighs 9.6 g.
Let's find the weight of 1 m for each wire.

Thin wire: Weight 0 — 7 — 8.4 (g); Length 0 — 1 — 1.2 (m)
Thick wire: Weight 0 — 9.6 — 12 (g); Length 0 — 0.8 — 1 (m)

1 How many g does 1 m of the thin wire weigh? Write an expression and calculate it. 8.4÷1.2
2 How many g does 1 m of the thick wire weigh? Write an expression and calculate it. 9.6÷0.8
3 Let's compare the quotients and dividends of each of them.
4 Let's calculate 9.6 ÷ □ by putting numbers into the □ apart from 0.8 Let's talk about what you noticed.

9.6 ÷ 1 = 9.6
9.6 ÷ 0.9 = 10.66
9.6 ÷ 0.8 = 12
9.6 ÷ 0.7 = 13.7
9.6 ÷ 0.6 = 16
9.6 ÷ 0.5 = 19.2
9.6 ÷ 0.4 = 24
9.6 ÷ 0.3 = 32
9.6 ÷ 0.2 = 48
9.6 ÷ 0.1 = 96

When a number is divided by a number smaller than 1, the quotient becomes larger than the dividend.

Exercise

Let's divide in vertical form.

① 4.9 ÷ 0.7 7
② 3.2 ÷ 0.4 8
③ 1.5 ÷ 0.3 5
④ 0.9 ÷ 0.6 1.5
⑤ 0.4 ÷ 0.5 0.8
⑥ 0.2 ÷ 0.8 0.25

□ – □ = 67

## Lesson Flow

### 1 Review the previous lesson.

### 2 Dividing by decimal numbers smaller than 1.

T/S ❸ Read and understand the given situation.
T Introduce the Main Task. (Refer to the Blackboard Plan)
T Ask the students to use the tape diagram to write the mathematical expressions.
S ❶ Write the mathematical expression of the thin wire and calculate.
Expression: 8.4 ÷ 1.2 Answer: 8.4 ÷ 1.2 = 7
S ❷ Write the mathematical expression of the thick wire and calculate.
Expression: 9.6 ÷ 0.8 Answer: 9.6 ÷ 0.8 = 12
T/S Confirm calculations using the rule of division and fill in the boxes in the tape diagrams.
T ❸ Let's compare the quotients and the dividends in ❶ and ❷ .
S In ❶ the quotient (7) is less than the dividend (8.4)
In ❷ the quotient (12) is greater than the dividend (9.6)

### 3 Understand the relationship amongst the divisor, dividend and quotient.

S ❹ Calculate and fill in the box ☐.
T Discuss what you noticed amongst the divisors, dividends and the quotients.
S The quotient becomes larger than the dividend as the divisor decreases.

### 4 Important Point

T/S Explain the important point in the box ☐.

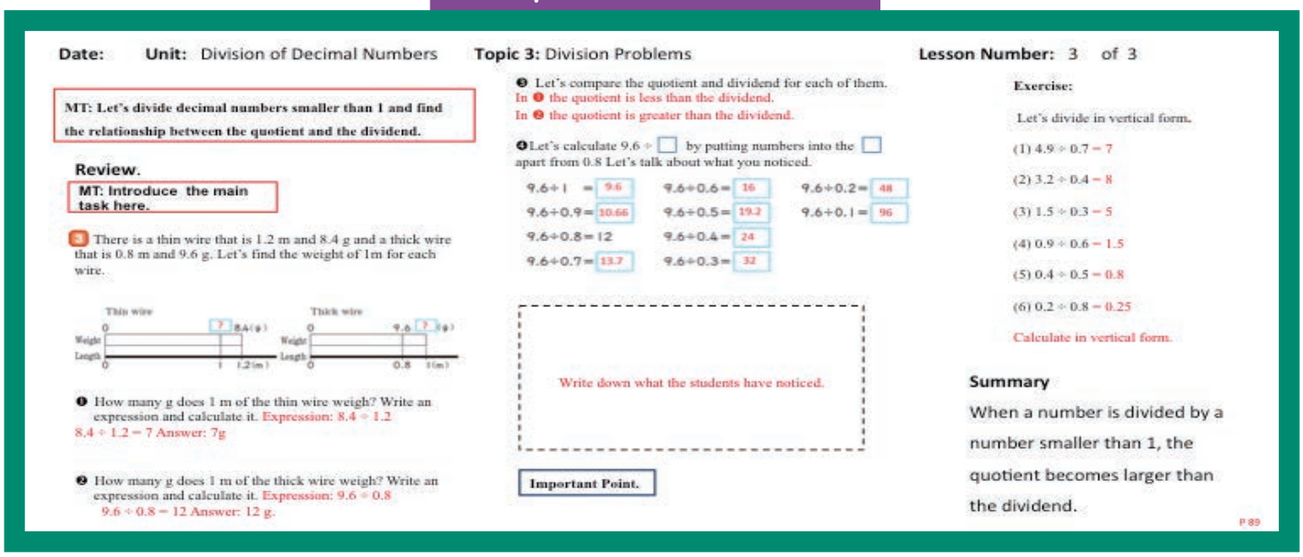
### 5 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5: Unit: Division of Decimal Numbers

## Sub-unit 4: What kind of Calculation Would It Be? Draw Diagrams to Help You Think

## Lesson 1 of 1

Textbook Page : 068 and 069
Actual Lesson 045

### Sub-unit Objectives

- To understand the relationship between multiplication and division and decide which operation to be used.
- To deepen understanding through creating multiplication and division problems.

### Lesson Objectives

- To understand word problems of multiplication and division of decimal numbers and identify which operation to use.
- To create multiplication and division word problems using samples.

### Prior Knowledge

- Previous lesson
- Amount per unit quantity

### Preparation

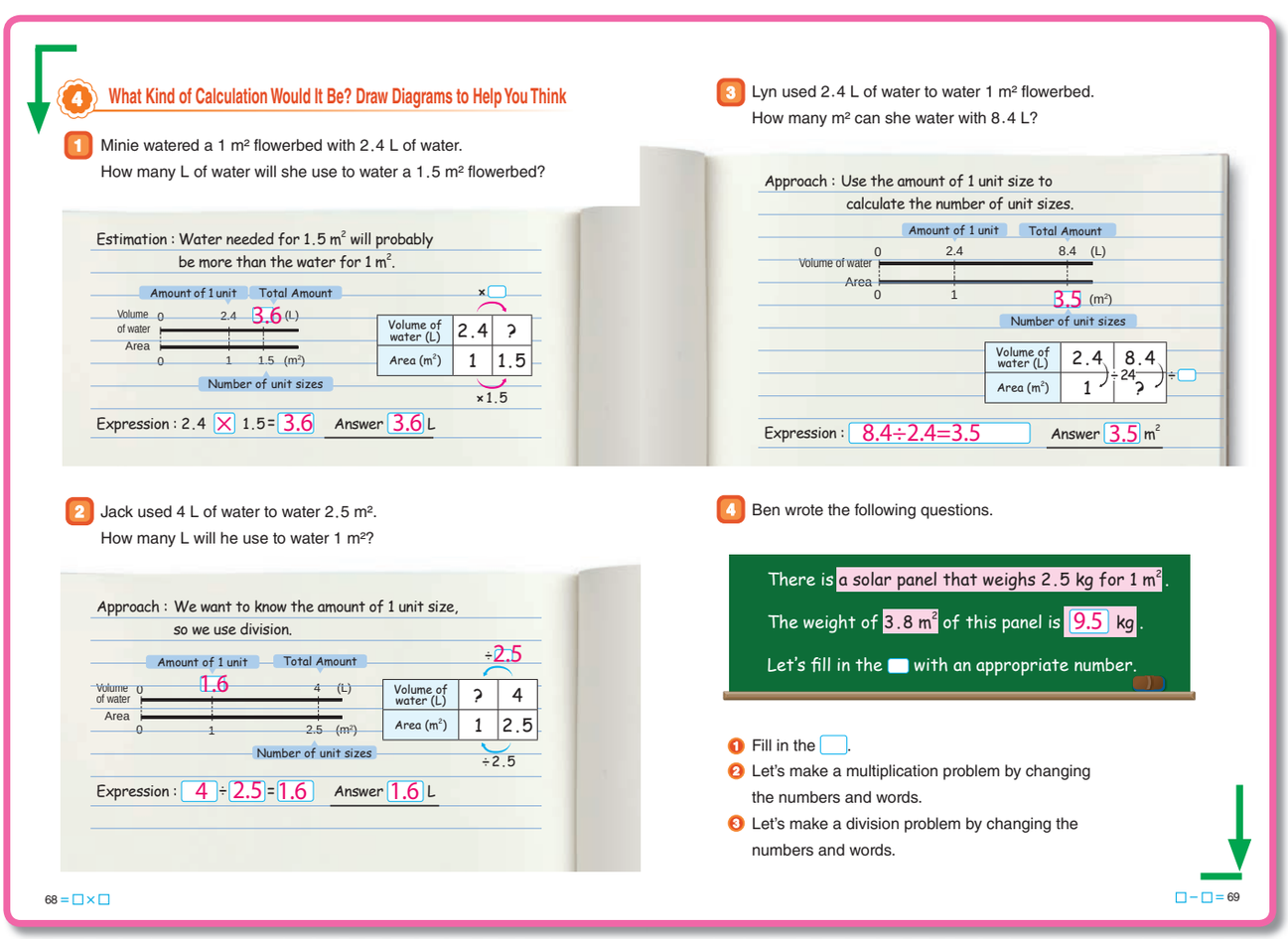
- Tape diagrams and tables for 1, 2 and 3

### Assessment

- Think about the relationship between multiplication and division of different problems. F
- Think about which operation to use and solve the problems. F
- Create multiplication and division word problems. S

### Teacher's Notes

It is important to use the tape diagram and the table for each task to enhance students ability in solving multiplication and division problems.



## Lesson Flow

### 1 Review the previous lesson.

### 2 Using multiplication as an operation to solve the problem.

T Introduce the Main Task. (Refer to the BP)
T/S ❶ Read and understand the situation.
T Which operation is used in this situation and write a mathematical expression.
S Use the tape diagram and table to identify the operation. Write a mathematical expression and calculate.
Expression: 2.4 × 1.5
Answer: 2.4 × 1.5 = 3.6 L
T Confirm the calculation using the tape diagram and the table of information.

### 3 Using division as an operation to solve the problem.

T/S ❷ Read and understand the situation.
T Which operation is used in this situation and write a mathematical expression.
S Use the tape diagram and table to identify the operation. Write a mathematical expression and calculate.
Expression: 4 ÷ 2.5
Answer: 4 ÷ 2.5 = 1. 6 L
T Confirm the calculation using the tape diagram and the table of information.

### 4 Using division as an operation to solve the problem.

T/S ❸ Read and understand the situation.
T Which operation is used in this situation and write a mathematical expression.
S Use the tape diagram and table to identify the operation. Write a mathematical expression and calculate.
Expression: 8.4 ÷ 2.4
Answer: 8.4 ÷ 2.4 = 3.5 m²
T Confirm the calculation using the tape diagram and the table of information.

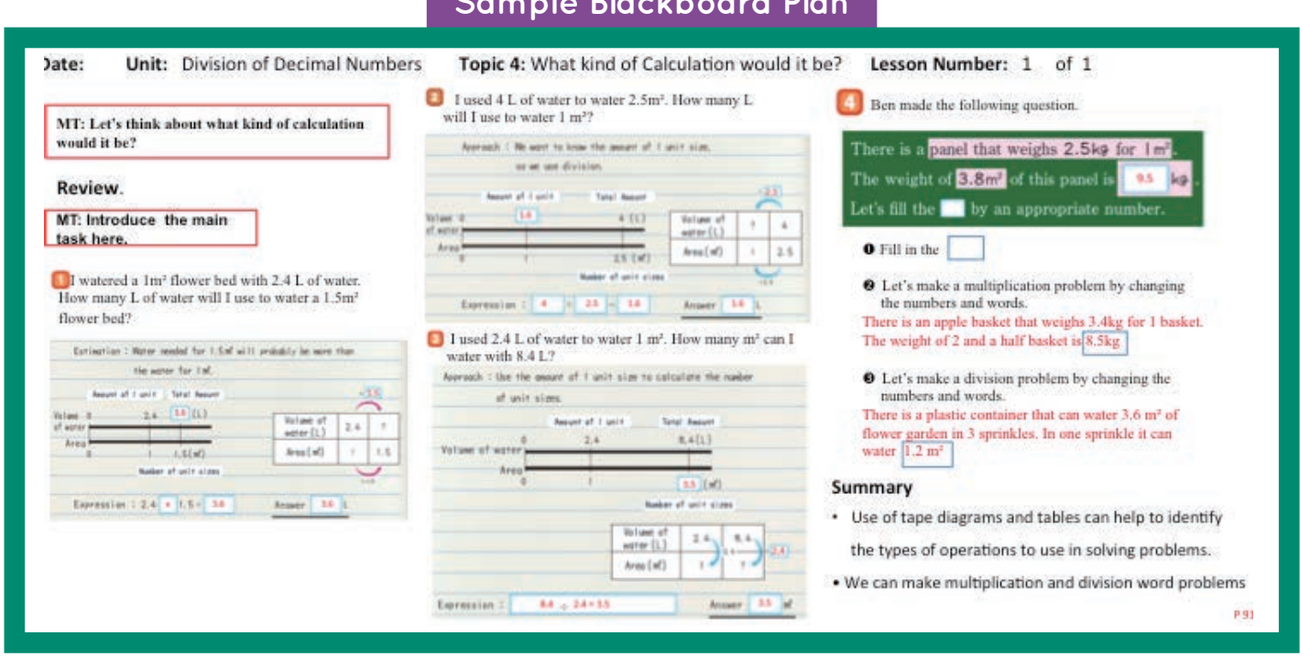
### 5 Make multiplication and division word problems.

T/S ❹ Read and understand the situation.
S ❶ Fill in the box ☐ for the situation.
S ❷ Make multiplication word problems by changing the numbers and words.
S ❸ Make division word problems by changing the numbers and words.
T Confirm the activities ❶, ❷ and ❸.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 5

# Unit: Division of Decimal Numbers
## Exercise, Problems and Evaluation
## Lesson 1 and 2 of 2

Textbook Page : 070 and 071
Actual Lesson 046 and 047

## Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

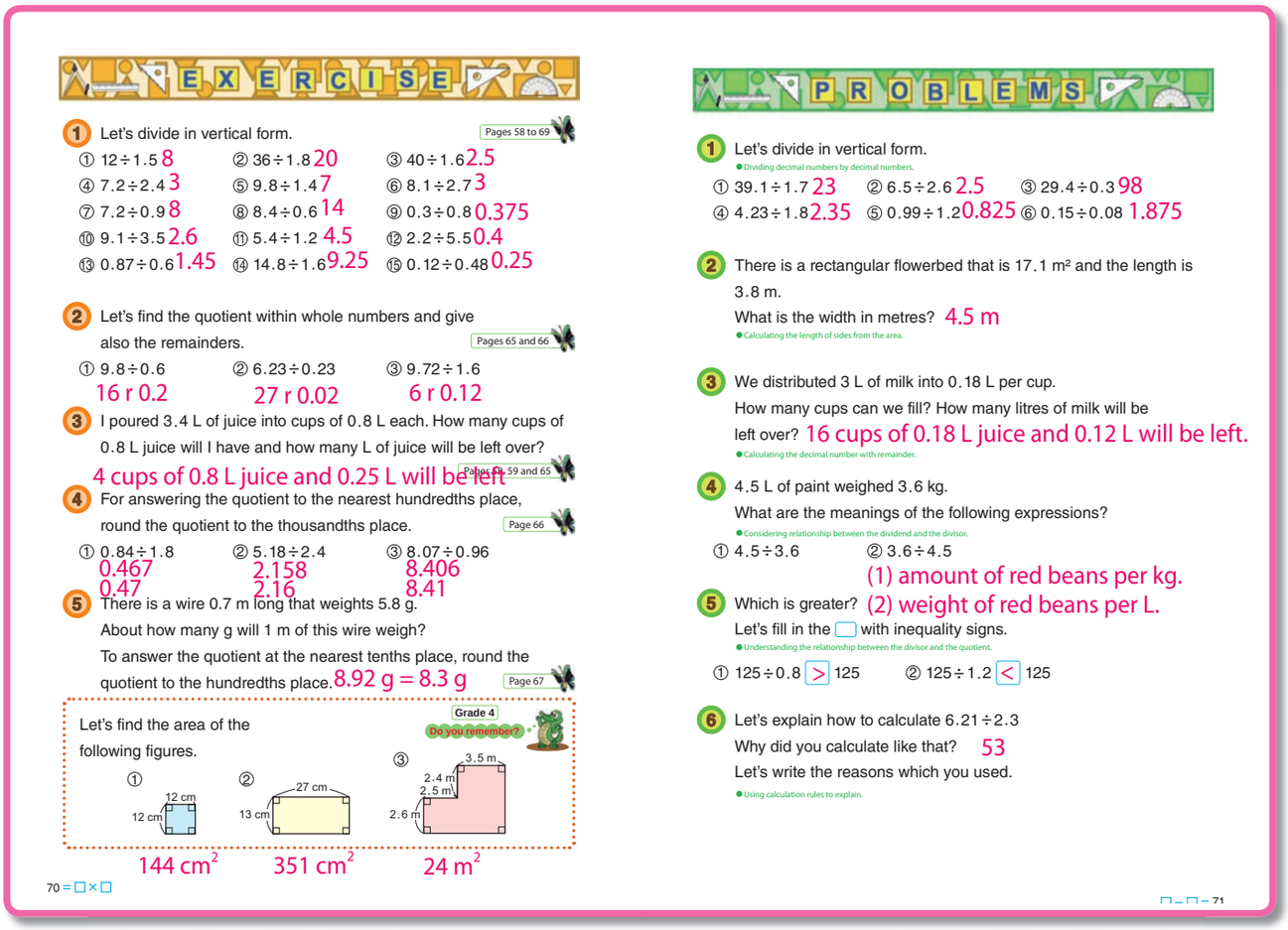
- Evaluation test copy for each student

## Assessment

- Complete the Exercise and Problems correctly. S

## Teacher's Notes

This is the last lesson of Chapter 5. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.



EXERCISE

1 Let's divide in vertical form. Pages 58 to 69

① 12÷1.5 8 ② 36÷1.8 20 ③ 40÷1.6 2.5
④ 7.2÷2.4 3 ⑤ 9.8÷1.4 7 ⑥ 8.1÷2.7 3
⑦ 7.2÷0.9 8 ⑧ 8.4÷0.6 14 ⑨ 0.3÷0.8 0.375
⑩ 9.1÷3.5 2.6 ⑪ 5.4÷1.2 4.5 ⑫ 2.2÷5.5 0.4
⑬ 0.87÷0.6 1.45 ⑭ 14.8÷1.6 9.25 ⑮ 0.12÷0.48 0.25

2 Let's find the quotient within whole numbers and give also the remainders. Pages 65 and 66

① 9.8÷0.6 16 r 0.2 ② 6.23÷0.23 27 r 0.02 ③ 9.72÷1.6 6 r 0.12

3 I poured 3.4 L of juice into cups of 0.8 L each. How many cups of 0.8 L juice will I have and how many L of juice will be left over? Pages 59 and 65
4 cups of 0.8 L juice and 0.25 L will be left

4 For answering the quotient to the nearest hundredths place, round the quotient to the thousandths place. Page 66

① 0.84÷1.8 0.467 0.47 ② 5.18÷2.4 2.158 2.16 ③ 8.07÷0.96 8.406 8.41

5 There is a wire 0.7 m long that weights 5.8 g.
About how many g will 1 m of this wire weigh?
To answer the quotient at the nearest tenths place, round the quotient to the hundredths place. 8.92 g = 8.3 g Page 67

Grade 4 Do you remember?
Let's find the area of the following figures.
① 12 cm, 12 cm ② 27 cm, 13 cm ③ 3.5 m, 2.4 m, 2.5 m, 2.6 m
144 cm² 351 cm² 24 m²

70 = □ × □

PROBLEMS

1 Let's divide in vertical form.
● Dividing decimal numbers by decimal numbers.
① 39.1÷1.7 23 ② 6.5÷2.6 2.5 ③ 29.4÷0.3 98
④ 4.23÷1.8 2.35 ⑤ 0.99÷1.2 0.825 ⑥ 0.15÷0.08 1.875

2 There is a rectangular flowerbed that is 17.1 m² and the length is 3.8 m.
What is the width in metres? 4.5 m
● Calculating the length of sides from the area.

3 We distributed 3 L of milk into 0.18 L per cup.
How many cups can we fill? How many litres of milk will be left over? 16 cups of 0.18 L juice and 0.12 L will be left.
● Calculating the decimal number with remainder.

4 4.5 L of paint weighed 3.6 kg.
What are the meanings of the following expressions?
● Considering relationship between the dividend and the divisor.
① 4.5÷3.6 (1) amount of red beans per kg.
② 3.6÷4.5 (2) weight of red beans per L.

5 Which is greater?
Let's fill in the □ with inequality signs.
● Understanding the relationship between the divisor and the quotient.
① 125÷0.8 > 125 ② 125÷1.2 < 125

6 Let's explain how to calculate 6.21÷2.3
Why did you calculate like that? 53
Let's write the reasons which you used.
● Using calculation rules to explain.

□ – □ – 71

## Lesson Flow

### 1 Complete the Exercise

S Solve all the exercises.
T Confirm students' answers.
TN 1 Division in vertical form.
2 Find the quotient within the whole numbers with its remainder.
3 Division word problem.
4 Rounding in division problems.
5 Word problem involving division.

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN 1 Dividing decimal numbers by decimal numbers.
2 Calculating the length of sides from the area.
3 Calculating the decimal numbers with the remainder.
4 Considering the relationship between the dividend and the divisor.
5 Understanding the relationship between the divisor and the quotient.
6 Using calculation rule to explain.

### 3 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.

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

| Chapter 5: Division of Decimal Numbers | Name: | Score / 100 |
|---|---|---|

1. Calculate .

[2 x 10 marks = 20 marks]

(1) 72 ÷ 0.8 (2) 38.5 ÷ 0.7

Answer: 90 Answer: 55

2. Calculate and find the quotient in integer and remainder.

[2 x 10 marks = 20 marks]

(3) 51.8 ÷ 6.3 (4) 12.4 ÷ 0.3

Answer: 8 remainder 1.4 Answer: 4 remainder 0.1

3. Calculate and find the quotient with 1 decimal place by rounding..

[2 x 10 marks = 20 marks]

(3) 67.3 ÷ 9.3 (2) 10.8 ÷ 3.2

Answer: 7.2 Answer: 3.4

4. Which expressions give greater answer than 59? Find all expressions without calculating and the reasons.

[2 x 10 marks = 20 marks]

(a) 59 ÷ 1.7 (2) 59 ÷ 1.07

(c) 59 ÷ 0.9 (d) 59 ÷ 0.99

Answer: (c) and (d) Reason: Divisor is less than 1

5. The length of a rope is 37.6 m. How many ropes of 0.6m will be cut and how long remaining?

[10 marks for maths expression and 10 marks for answer]

Answer: 37.6 ÷ 0.6

Reason: 60 ropes and 0.16m remaining

96

# Unit 5

# Unit: Division of Decimal Numbers
## Sub-unit: Comparing Heights
## Lesson 1 of 1

Textbook Page : 072 and 073
Actual Lesson 048

### Sub-unit Objective

- Comparing heights by division and multiplication.

### Lesson Objective

- Compare the heights by division and multiplication.

### Prior Knowledge

- Topics covered in the previous lessons

### Preparation

- Chart of diagram of the cassavas
- Tables and bar graphs for 1 and 2

### Assessment

- Derive mathematical expressions correctly using the tables and the bar graphs. F
- Compare the height of cassava and solve the mathematical expressions. S

### Teacher's Notes

This sub unit is focused on the application of the contents learned in this unit.

Calculation of multiples

**Comparing Lengths**

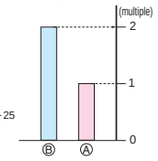
**1** There are 4 different sizes of Cassava .


1 By how many times is the length of Ⓐ compared to Ⓑ?

50 ÷ 25 = 2
Length of Ⓑ | Length of Ⓐ | Multiple

| | Ⓐ | Ⓑ |
|---|---|---|
| cm | 25 | 50 |
| Multiples | 1 | ? |

×25 ÷25

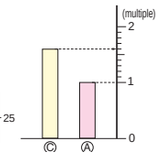



2 By how many times is the length of Ⓐ compared to Ⓒ ?
When Ⓒ is measured with Ⓐ there is a remainder.
Thus, we need to express the answer as decimal number by dividing the length between 1 and 2 into 10 equal parts.

40 ÷ 25 = 1.6

| | Ⓐ | Ⓒ |
|---|---|---|
| cm | 25 | 40 |
| Multiples | 1 | ? |

×25 ÷25

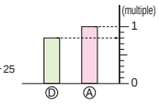



3 By how many times is the length Ⓐ to Ⓓ?
Since Ⓓ is shorter than Ⓐ, this multiple will be a number that is shorter than 1.

20 ÷ 25 = 0.8

| | Ⓐ | Ⓓ |
|---|---|---|
| cm | 25 | 20 |
| Multiples | 1 | ? |

×25 ÷25




72 = □ × □

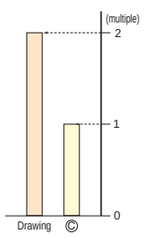
2 We are going to draw pictures of cassava based on cassava Ⓒ.

1 If we draw a cassava twice the height of Ⓒ, what will be the length of the new cassava?

40 × 2 = 80
Length of Ⓒ | Multiple | Length of drawing

| | | |
|---|---|---|
| cm | 40 | ? |
| Multiples | 1 | 2 |

×2

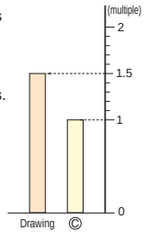



2 To make the drawing of the cassava 1.5 times the length of Ⓒ, how many cm should it be?
The length of 1.5 times is when the length between 1 and 2 is divided into 10 equal parts.

40 × 1.5 = 60

| | | |
|---|---|---|
| cm | 40 | ? |
| Multiples | 1 | 1.5 |

×1.5

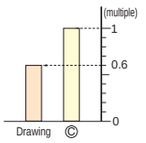



3 To make the drawing of the cassava 0.6 times the length of Ⓒ, how many cm should it be? The length multiplied by 0.6 will become smaller than when it is multiplied by 1, so it will be smaller than the original length.

40 × 0.6 = 24

| | | |
|---|---|---|
| cm | 40 | ? |
| Multiples | 1 | 0.6 |

×0.6




□ − □ = 73

## Lesson Flow

### 1 Comparison by division.

T Introduce the Main Task. (Refer to the BP).
TS Read and understand the situation.
S 1 Observe the height of each cassava and make comparison between the heights.
T 1 By how many times is the length of Ⓐ compared to Ⓑ?
S Use the table and the graph by comparison, 50÷25=2. So height of Ⓑ is 2 times than the height of Ⓐ.

### 2 Comparison by continuous division in vertical form.

T 2 By how many times is the height of Ⓒ to Ⓐ ?
TN When Ⓒ is measured with Ⓐ, there is a remainder so we need to express the remainder as a decimal number by dividing the height between 1 and 2 into 10 equal parts.
S Use the table to find the mathematical expression. 40÷25
S Solve the mathematical expression. 40÷25=1.6. So height of Ⓒ is 1.6 times the height of Ⓐ.
T 3 By how many times is the height Ⓓ to Ⓐ?
TN Since Ⓓ is shorter than Ⓐ, this multiple will be a number that is less than 1.
S Use the table to find the mathematical expression. 20÷25
S Solve the mathematical expression. 20÷25=0.8 So height of Ⓓ is shorter than Ⓐ by 0.8 times.

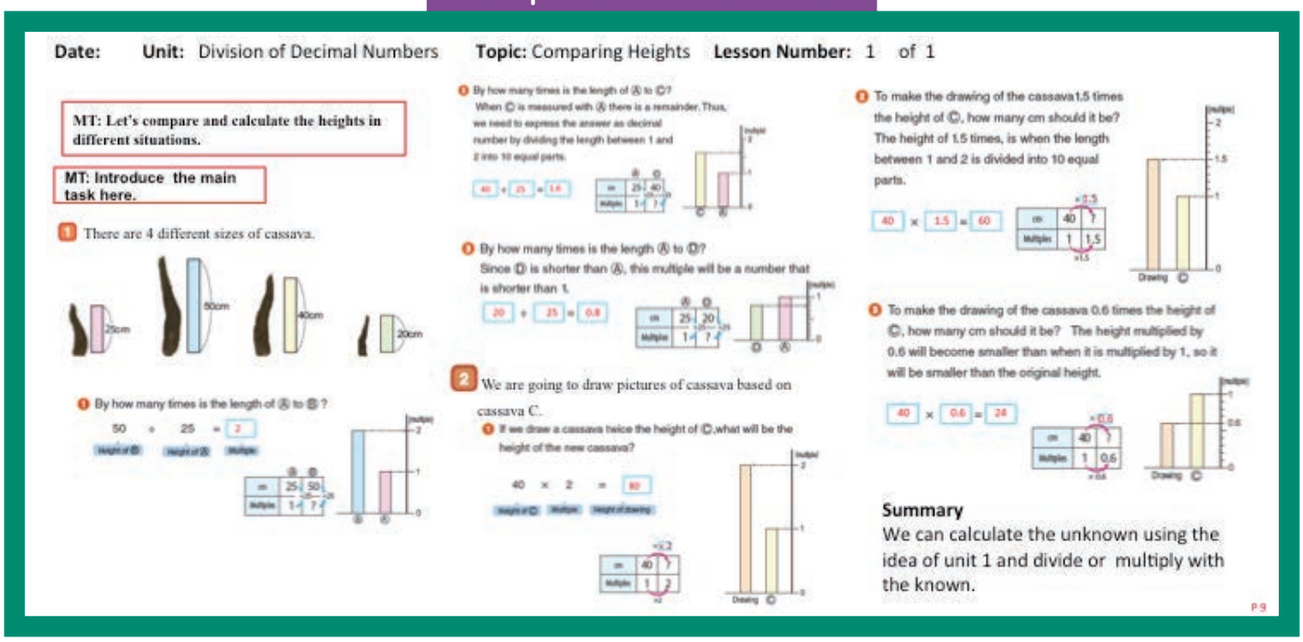
### 3 Drawing pictures of cassava based on cassava Ⓒ.

T 1 If we draw a cassava twice the height of Ⓒ, what will be the height of the new cassava?
S 40×2=80 Answer: 80 cm.
T 2 To make the drawing of cassava 1.5 times the height of Ⓒ, how many cm should it be?
TN The height of 1.5 times is when the height between 1 and 2 is divided into 10 equal parts.
S 40×1.5=60 Answer: 60 cm.
T 3 To make the drawing of cassava 0.6 times the height of Ⓒ, how many cm should it be?
TN The height multiplied by 0.6 will become smaller than when it is multiplied by 1, so it will be smaller than the original height.
S 40×0.6=24 Answer: 24 cm

### 4 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



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

| Chapter 5:<br>Division of Decimal Numbers | Name: | Score<br>/ 100 |
|---|---|---|

1. Calculate.

[2×10 marks=20 marks]

(1) 72÷0.8

Answer:

(2) 38.5÷0.7

Answer:

2. Calculate and find the quotient in integer and remainder.

[2×10 marks=20 marks]

(1) 51.8÷6.3

Answer:

(2) 12.4÷0.3

Answer:

3. Calculate and find the quotient with 1 decimal place by rounding.

[2×10 marks=20 marks]

(1) 67.3÷9.3

Answer:

(2) 10.8÷3.2

Answer:

4. Which expressions give greater answer than 59? Find all expressions without calculating and the reasons.

[2×10 marks=20 marks]

(1) 59÷1.7

(2) 59÷1.07

(3) 59÷0.9

(4) 59÷0.99

Answer:

Reason:

5. The length of a rope is 37.6 m.
How many ropes of 0.6 m will be cut and how long will remain?

[10 marks for maths expression and 10 marks for answer]

Answer:

Reason:

# Chapter 6 Volume

## 1. Content Standard

5.2.2 Understand the units of volume and develop the formula of volume and measure.

## 2. Unit Objectives

- To get the interest about volume around us and find their volume.
- To enjoy finding the volume of objects around us for understanding the concept of volume.
  To understand how to find the volume of a rectangular prism and cube and combined shape.
- To understand the meaning of formula for finding the volume of rectangular prism and cube.

## 3. Teaching Overview

Students already have the concept of some quantities such as length, weight and area.
They also have the foundation of volume in Grade 2 through measuring activities.
They learn volume with universal unit of 1 $cm^3$ in this unit.

**Volume :**

Students understand the volume by comparing the sizes of several boxes.
When 1 $cm^3$ is introduced, they will know that volume can be compared by the numbers of the universal unit.

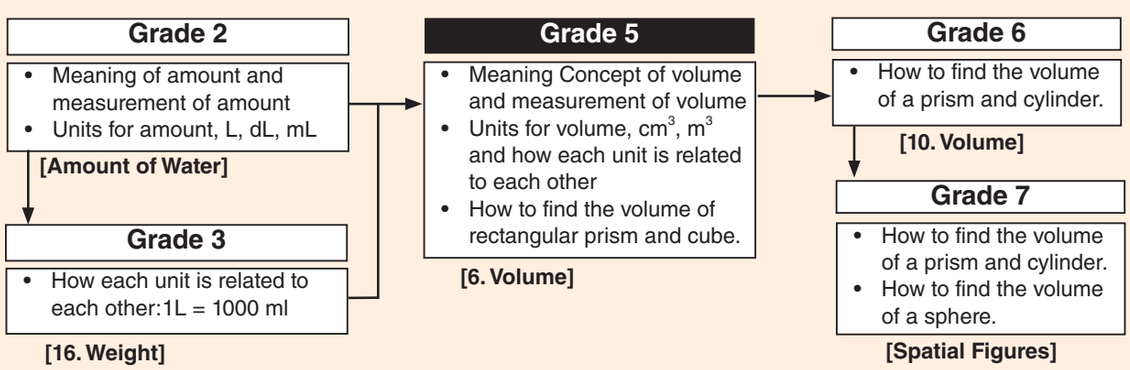
**Formula for volumes :**

Students should understand why the formula is true and understand the conservation of volume by making boxes of 200 $cm^3$.

**Large Volumes :**

Students should be able to explain how large volumes with $m^3$ are when 1 $m^3$ is introduced.

## 4. Related Learning Contents



# Unit 6

# Unit: Volume
## Sub-unit 1: Volume
## Lesson 1 of 2

Textbook Page :
074 and 075
Actual Lesson 049

## Sub-unit Objectives

- To understand how to compare the 3 dimensional shape.
- To understand the meaning of volume and unit $cm^3$.

## Lesson Objective

- To think about how to compare larger or smaller 3 dimensional shapes.

## Prior Knowledge

- Draw nets and make rectangular prisms and cubes on square paper

## Preparation

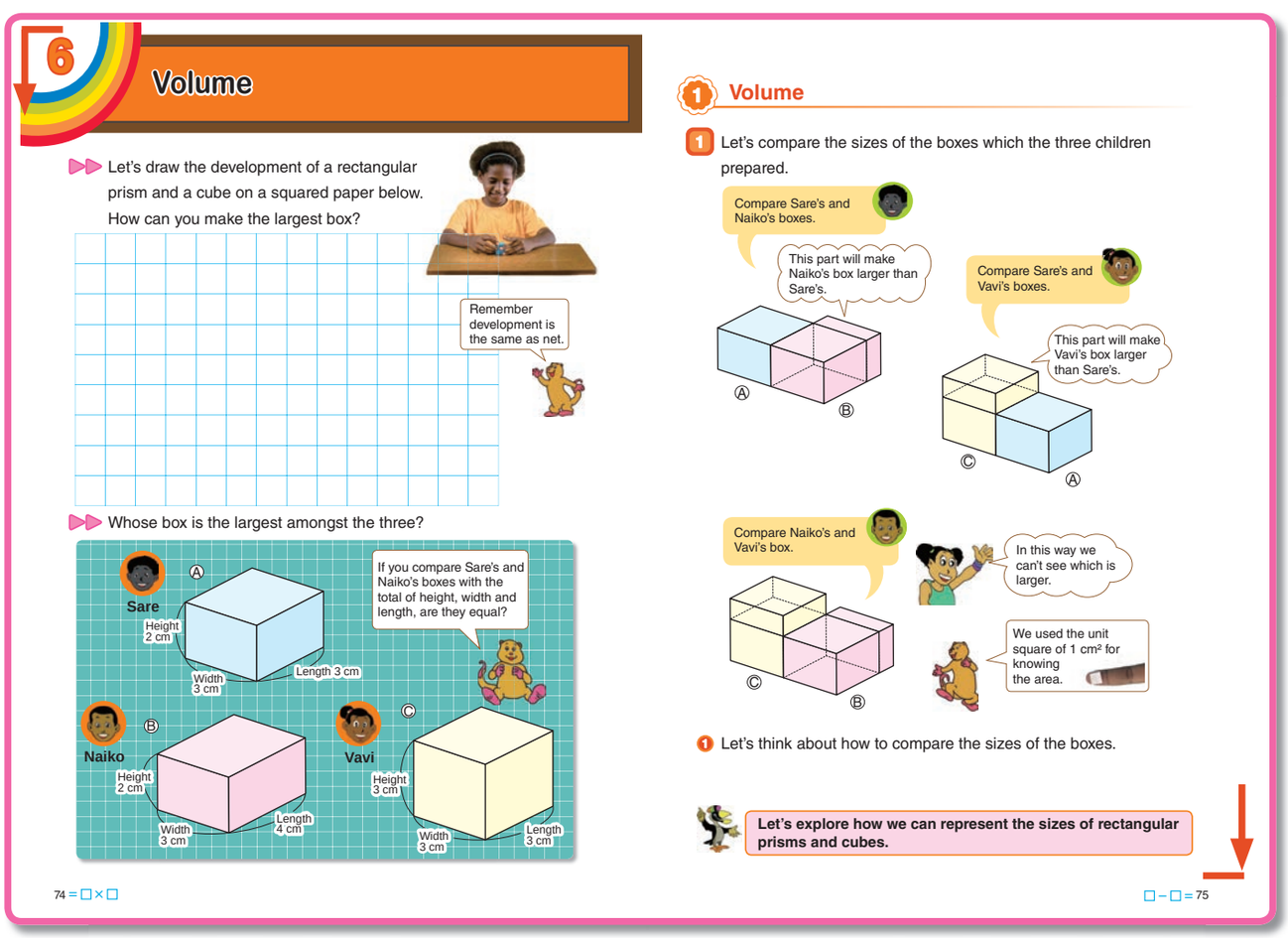
- Square grid paper (see attachement page) to make box, ruler, scissors, glue and sticky tape
- Three boxes Ⓐ, Ⓑ and Ⓒ

## Assessment

- Think about ways on how to compare the volume of boxes. F
- Enjoy comparing the size of boxes using direct comparison. F
- Enjoy comparing the volume of boxes. F S

## Teacher's Notes

Direct comparison is comparing two objects through direct observation of size, length, weight, etc...
Arbitrary units - normally it is using any objects that are around to help get approximate results.



## Lesson Flow

### 1 To make the largest box

T ▷▷ Let's draw the development (net) of a rectangular prism and a cube on a squared paper below. How can you make the largest box?

S Draw the net, cut and fold to make the shape of the three boxes for Sare, Naiko and Vavi using square gird of 9 cm × 14 cm.

TN Prepare three sample boxes prior to the lesson.

T ▷▷ Whose box is the largest amongst the three?

S Respond based on their observation.

T Introduce the Main Task. (Refer to the BP)

### 2 Compare the sizes of boxes Ⓐ, Ⓑ and Ⓒ

T ❶ Let's compare the sizes of the boxes which the three students prepared.

S Compare box Ⓐ and box Ⓑ and discuss which is bigger.

S Compare box Ⓒ and box Ⓐ and discuss which is bigger.

S Compare box Ⓒ and box Ⓑ and discuss which is bigger.

### 3 Think about ways on how to compare the sizes of boxes Ⓑ and Ⓒ.

T ❶ Let's think about how to compare sizes of the boxes.

TN Using direct comparison, students can see that the side length of box Ⓒ is smaller than box Ⓑ. However, we cannot compare easily because we cannot see which is larger.
They look almost the same size so how can we easily compare the sizes of the boxes.

S Discuss and share ideas on how to compare box Ⓑ and Ⓒ easily.

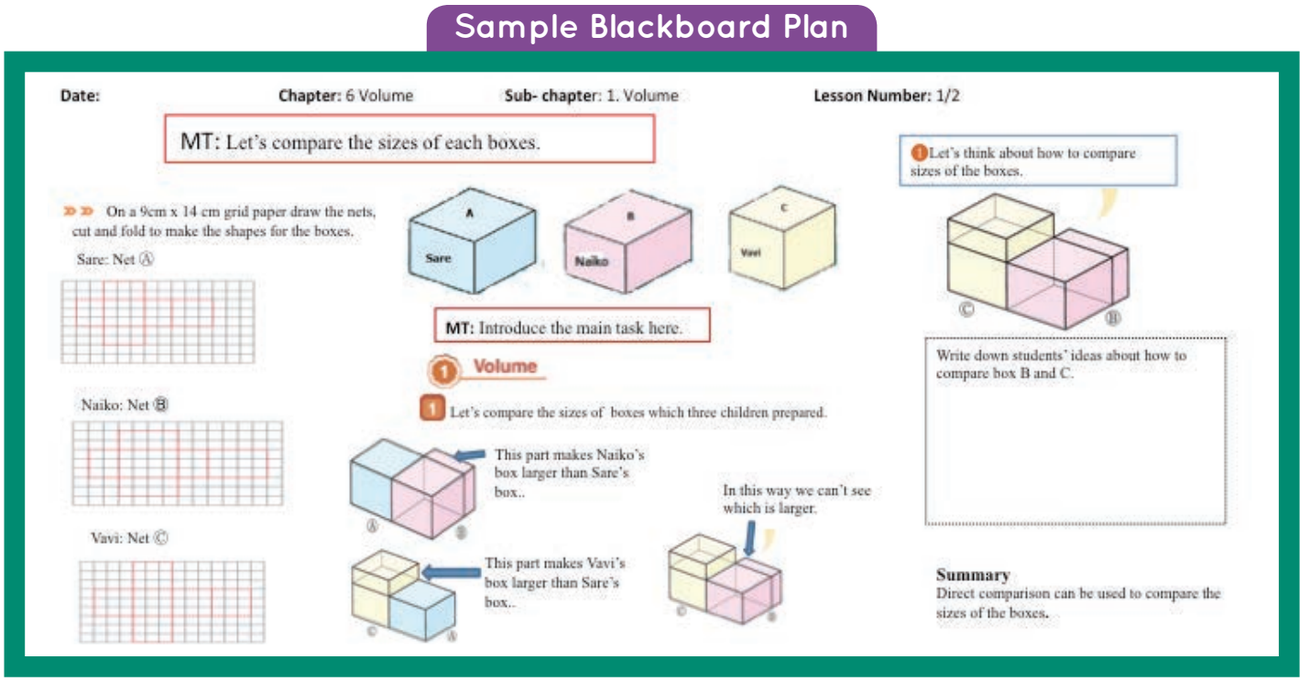
### 4 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 1: Volume
## Lesson 2 of 2

Textbook Page :
076 and 077
Actual Lesson 050

## Lesson Objectives

- To understand the meaning of volume by using 1 cm³ (1 cm cubic block).
- To understand the unit of 1 cm³.

## Prior Knowledge

- Draw net and make rectangular prisms and cubes on square paper
- Compare the volume of rectangular prism directly

## Preparation

- 1 cm cubic block
- Box Ⓑ and Ⓒ from the previous lesson

## Assessment

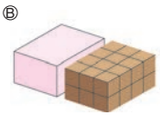
- Compare the volume of prisms using 1 cm³ blocks correctly. F
- Understand the meaning of volume and the unit of 1 cm³. S

## Teacher's Notes

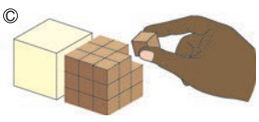
Different solids can be made from 12 cubes of 1 cm cube however, the volume remains the same.

2 We made the same solids by using 1 cm cubic blocks.
Let's compare the number of cubes needed to make Naiko and Vavi's boxes.

Ⓑ



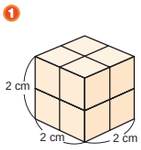
Ⓒ



Ⓑ needs 24 boxes.
Ⓒ needs 27 boxes.
Ⓑ needs 3 more boxes.

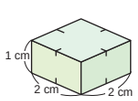
2 How many 1 cm cubes are needed for the following rectangular prism and cube?

1



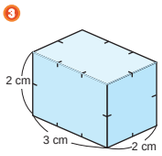

18 1 cm cubes

2




4 1 cm cubes

3

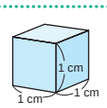



12 1 cm cubes

The size of a solid represented by a number of units is called **volume**.

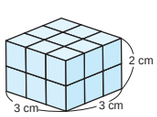
1 cm cube is used as a unit for volume. We represent volume by counting the number of cube units.

The volume of a cube with 1 cm sides is called **1 cubic centimetre** and is written as 1 cm³.
Cubic centimetre (cm³) is a unit of volume.



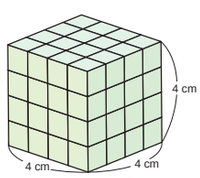

3 Let's find the volume of the following rectangular prism and the cube.

1




18 cm³

2

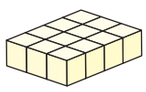



64 cm³

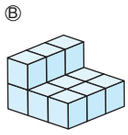
**Same Volume**

Use 12 cubes of 1 cm³ and make different shapes.

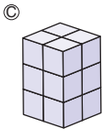
Ⓐ



Ⓑ



Ⓒ



76 = □ × □

□ − □ = 77

## Lesson Flow

### 1 Review the previous lesson.

### 2 ❷ Using 1 cm³ block to make the same rectangular prism (Ⓑ) and cube (Ⓒ).

T Introduce the Main Task. (Refer to the BP)

T Using direct comparison we still could not compare box Ⓑ and box Ⓒ easily. We need arbitrary unit in order to compare. The arbitrary unit to make comparison easier is 1 cm³ block.

S Compare box Ⓑ and Ⓒ using 1 cm³ blocks and find the number of 1 cm³ blocks needed for each box and fill in the box ☐.

### 3 ❷ Understand the meaning of volume.

T Ask the students to read the task and observe the solid shapes ❶, ❷ and ❸.

S Observe the solid shapes ❶, ❷ and ❸ to find how many 1 cm³ blocks are needed for the solid shapes respectively.

S ❶ 8 of 1 cm cubic blocks ❷ 4 of 1 cm³ blocks and ❸ 12 of 1 cm³ blocks.

### 4 Important Point

T/S Explain the important point in the box ⋯⋯.

### 5 Find the volume of rectangular prism and cube by using 1 cm³.

S ❸ Read the task and count the number of 1 cubic centimetre as a unit for volume that makes the rectangular prism and cube in ❶ and ❷.

S ❶ 18 cm³ and ❷ 64 cm³.

T Confirm each volume for ❶ and ❷ by showing the number of 1 cm³ that each shape has.

### 6 Using 12 cubes, make various solids with same volume.

TN Different shapes can be made from 12 cubes of 1 cm³ however the volume remains the same.

T Ask students to make any solids using 12 cubes of 1 cm³.
Shapes Ⓐ, Ⓑ and Ⓒ are examples.

S Make various shapes.

T What happens to the volume when the shape is changed?

S Identify that the volume remains the same even though the shape changes.

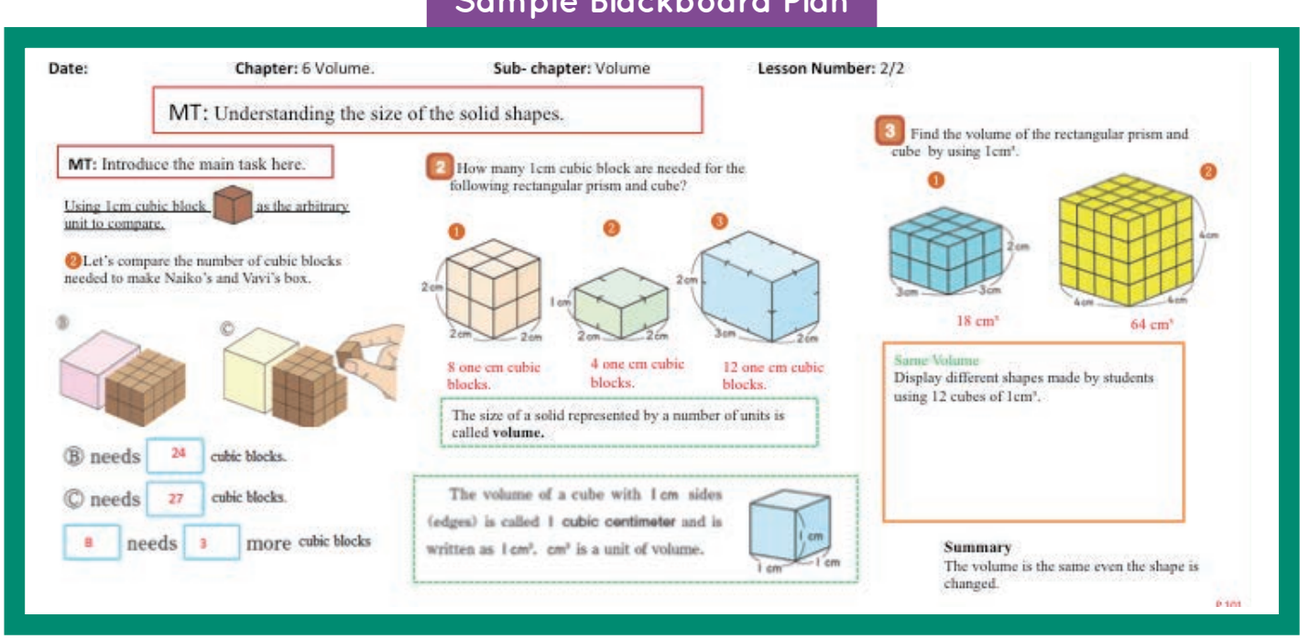
### 7 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 2: Formula for Volume
## Lesson 1 of 2

Textbook Page :
078 and 079
Actual Lesson 051

## Sub-unit Objectives

- To understand the formula for finding the volume of rectangular prisms and cubes.
- To understand that there are various shapes which have the same volume.

## Lesson Objective

- To understand the formula for finding the volume of rectangular prisms.

## Prior Knowledge

- How to show the volume
- Unit of volume

## Preparation

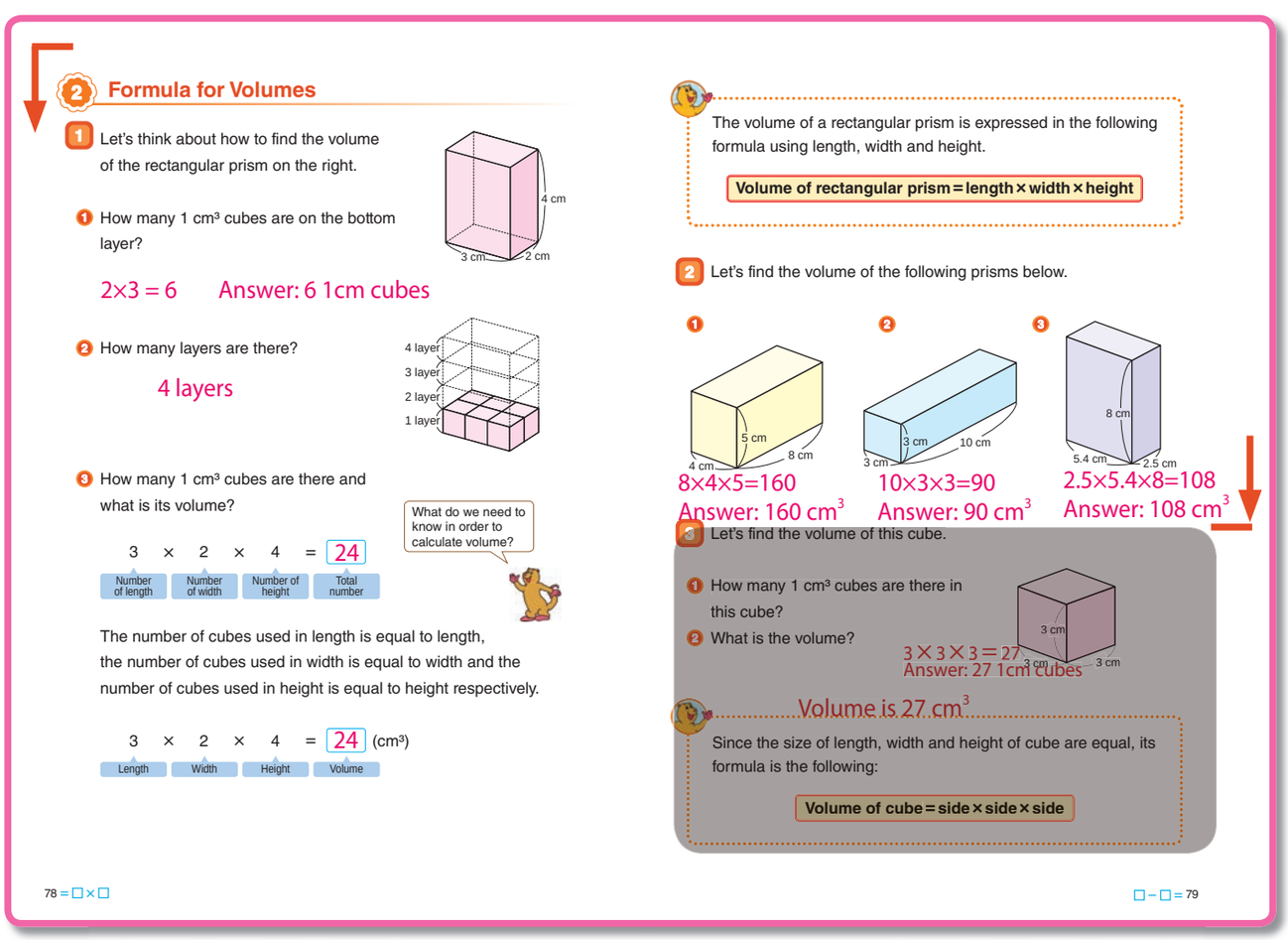
- Chart diagram for 1 and 2

## Assessment

- Think about how to find the volume of rectangular prism. F
- Understand the formula for calculating the volume of a rectangular prism. S

## Teacher's Notes

In order for the students to understand the formula to calculate the volume of rectangular prisms, firstly, use the diagram to explain using the cubes.
Later they will realise the formula in the important point.



2 Formula for Volumes

1 Let's think about how to find the volume of the rectangular prism on the right.

4 cm, 3 cm, 2 cm

1 How many 1 cm³ cubes are on the bottom layer?

2×3 = 6 Answer: 6 1cm cubes

2 How many layers are there?

4 layer, 3 layer, 2 layer, 1 layer

4 layers

3 How many 1 cm³ cubes are there and what is its volume?

What do we need to know in order to calculate volume?

3 × 2 × 4 = 24 (cm³)

Number of length × Number of width × Number of height = Total number

The number of cubes used in length is equal to length, the number of cubes used in width is equal to width and the number of cubes used in height is equal to height respectively.

3 × 2 × 4 = 24 (cm³)

Length × Width × Height = Volume

78 = □ × □

The volume of a rectangular prism is expressed in the following formula using length, width and height.

**Volume of rectangular prism = length × width × height**

2 Let's find the volume of the following prisms below.

1 5 cm, 4 cm, 8 cm
8×4×5=160
Answer: 160 cm³

2 3 cm, 3 cm, 10 cm
10×3×3=90
Answer: 90 cm³

3 8 cm, 5.4 cm, 2.5 cm
2.5×5.4×8=108
Answer: 108 cm³

3 Let's find the volume of this cube.

1 How many 1 cm³ cubes are there in this cube?

2 What is the volume?

3 × 3 × 3 = 27
Answer: 27 1cm cubes

3 cm, 3 cm, 3 cm

Volume is 27 cm³

Since the size of length, width and height of cube are equal, its formula is the following:

**Volume of cube = side × side × side**

□ − □ = 79

## Lesson Flow

### 1 Review the previous lesson.

### 2 ❶ Think about how to find the volume of rectangular prism.

T Introduce the Main Task. (Refer to the Blackboard Plan)
S Read the task, observe the rectangular prism and think about how to find its volume.
T In our previous lesson we found how many 1 cm³ as a unit of volume that made up a rectangular prism or cube by counting the number of 1 cm³.
T Let's observe the rectangular prism and find how many 1 cm³ are on the bottom layer?
S ❶ By observing the bottom or 1st layer of the triangular prism. 3×2=6.
Answer: 6 of one cubic centimetre cubes.
S ❷ By observing the triangular prism and identify that there are 4 layers.
T To answer ❸ and find the volume what do we need to know in order to calculate the volume?
S We need to know the number of length×number of width×number of layers that is the height=total number. 3×2×4=24.
S Read and understand "the number of cubes used in length is equal to the length, the number of cubes used in width is equal to width and the number of cubes used in height is equal to height respectively. 3 (length)×2 (width)×4 (height)=24 cm³ (volume)".

### 3 Important Point

T/S Explain the important point in the box .

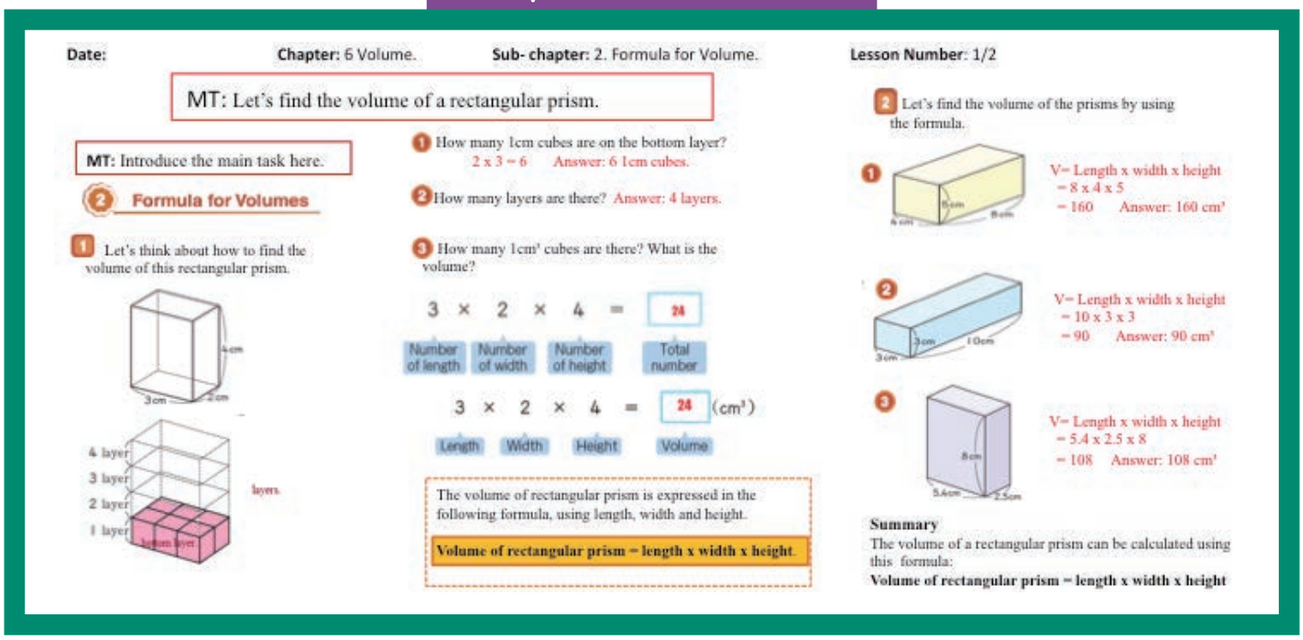
### 4 ❷ Apply the formula to find the volume.

S Calculate ❶, ❷ and ❸ by applying the formula for volume.
T Confirm students' answers.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 2: Formula for Volume
## Lesson 2 of 2

Textbook Page :
079 and 080
Actual Lesson 052

### Lesson Objective

- To understand the formula for finding the volume of a cube.

### Prior Knowledge

- Formula for finding the volume of rectangular prism

### Preparation

- Diagrams for 3, Exercise and 4
- Square papers, scissors, sticky tape , glue and rulers

### Assessment

- Think about how to find the formula for finding the volume of a cubes. F
- Find the volume of rectangular prism and cube using the formula. S
- Solve the exercises correctly. S

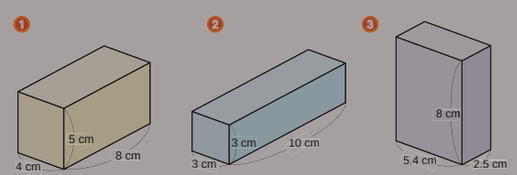
### Teacher's Notes

Use arbitratry unit (1 cm³) to find the volume of the cube in 3.
Later the students can use the formula given in the important point.

The volume of a rectangular prism is expressed in the following formula using length, width and height.

**Volume of rectangular prism = length × width × height**

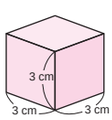
2 Let's find the volume of the following prisms below.




3 Let's find the volume of this cube.

3×3×3=27
Answer: 27 1cm cubes

1 How many 1 cm³ cubes are there in this cube?
2 What is the volume?
Volume is 27 cm³



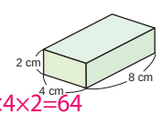

Since the size of length, width and height of cube are equal, its formula is the following:

**Volume of cube = side × side × side**

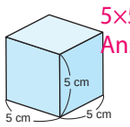
□ − □ = 79

**Exercise**

1 Let's find the volumes of the rectangular prism and the cube below.



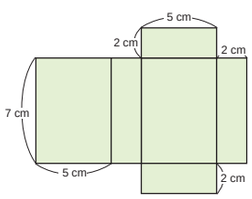

8×4×2=64
Answer: 64 cm³




5×5×5=125
Answer: 125 cm³

2 Let's find the volumes of rectangular prisms and cubes from your surroundings.

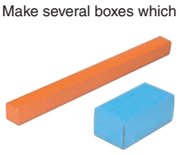
4 Fold the development below and find the volume.

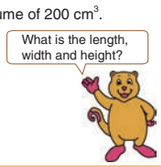



7×5×2=70
Answer: 70 cm³

**Let's Make a Box of 200 cm³**

Make several boxes which have a volume of 200 cm³.






80 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 3 Finding the volume of a cube

T Introduce the Main Task. (Refer to the BP)
T ❶ How many 1 cm³ are there in the cube given?
S 3×3×3=27.
There are 27 of 1 cm cubes.
T ❷ What is the volume?
S Volume is 27 cm³.

### 3 Important Point

T/S Explain the important point in the box .

### 4 Complete the Exercise

T Guide students on how to find the volume of rectangular prism.
S Explain ① and ② by applying the previous knowledge.
(Formula for finding rectangular prism and cube)
T Get the students to find the volumes of rectangular prisms and cubes from their surroundings.
S Find the volume of rectangular prisms and cubes from the surroundings.

### 5 Apply the formula for finding the volume.

T 4 Ask the students to fold the development of the net given and find the volume.
TN The position and the measurements can be switched however the volume remains the same.
S Fold the development and switch the position and measurements.
Find the length, the width and the height to calculate the volume. The volume will be 70 cm³.

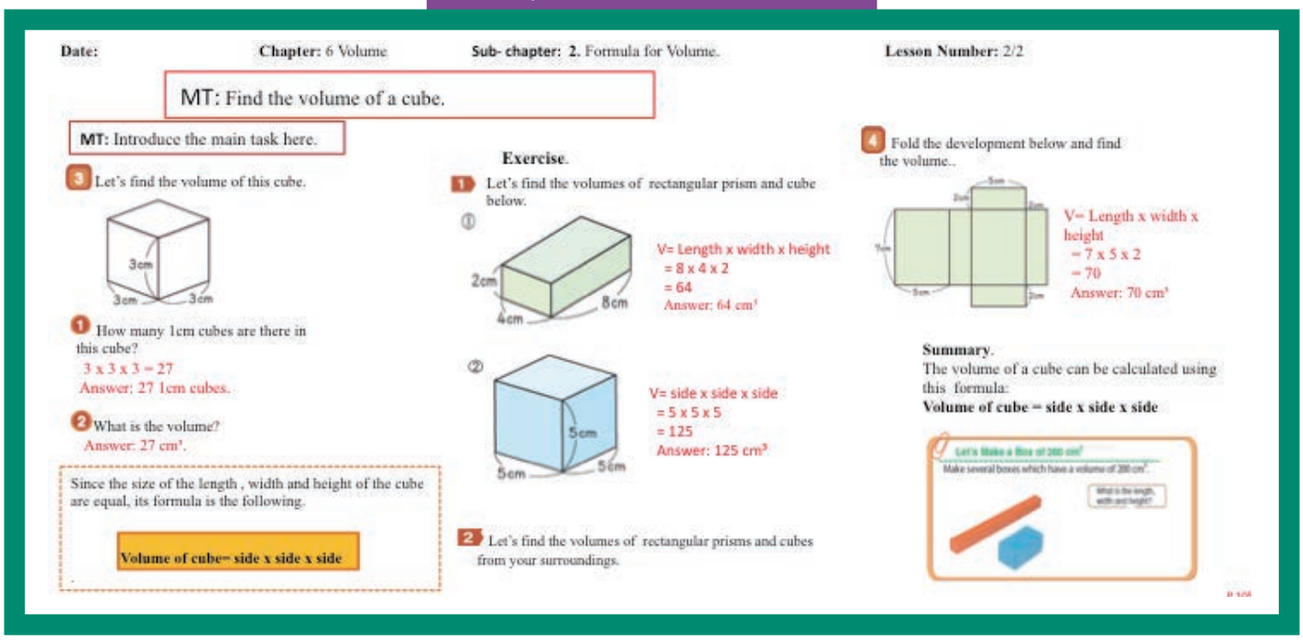
### 6 Let's make a box of 200 cm³.

S Find the length, width and height to make the box of 200 cm³.
S Share their ideas on net development and display their boxes.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 3: Large Volumes
## Lesson 1 of 5

Textbook Page : 081
Actual Lesson 053

### Sub-unit Objectives

- To understand the relationship between $cm^3$ and $m^3$.
- To understand the relationship between capacity and volume.
- To understand how to find the volume and capacity of combined shapes.

### Lesson Objectives

- To understand the unit $m^3$.
- To understand the relationship between cubic centimetre and metre.
- To get the sense of large volume.

### Prior Knowledge

- Drawing nets of rectangular prisms and cubes in cm
- Unit of volume
- Formula for finding volume of rectangular prism and cube

### Preparation

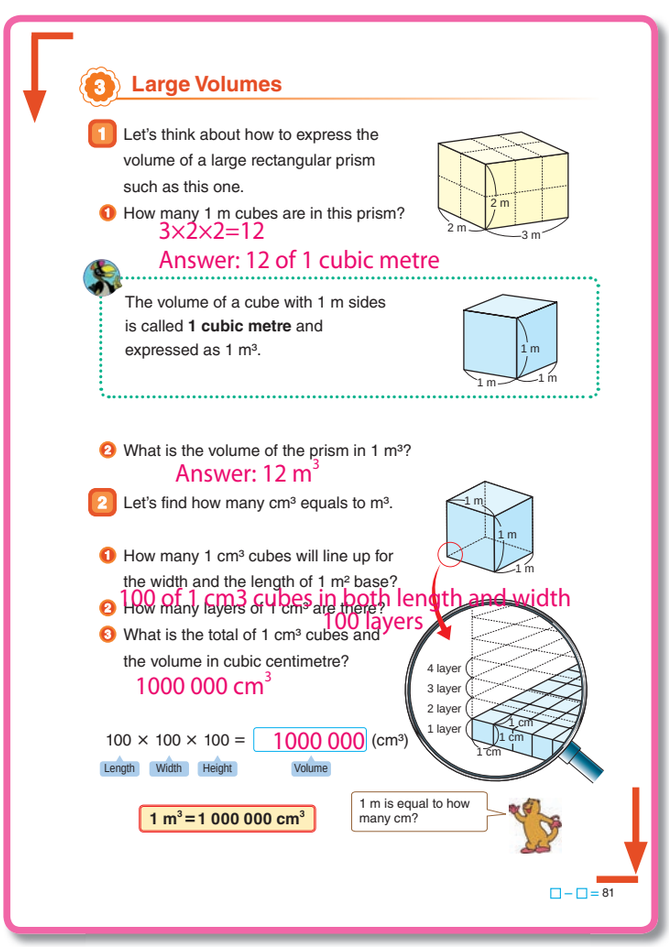
- Diagrams for 1 and 2
- Chart for the Important point

### Assessment

- Think about the relationship between 1 $m^3$ and 1 $cm^3$. F
- Understand 1 $m^3$ as a unit of volume. S
- Find the volume of shapes. S

### Teacher's Notes

Use the conversion of 1 m = 100 cm to help students to identify the length, width and height in cm.



## Lesson Flow

### 1 Review the previous lesson.

### 2 ❶ Think about how to express the volume of a large rectangular prism.

TN The volume can be expressed using the formula for rectangular prism focused on the larger volume from cubic centimetre (smaller volume) to cubic metre (larger volume).

S Read the task and observe the large rectangular prism and think about how to express its volume.

S Write the answer for ❶. $3 \times 2 \times 2 = 12$.
Answer: 12 of 1 $m^3$.

### 3 Important Point

T/S Explain the important point in the box ⬚.

### 4 ❷ Finding the volume of prism in $m^3$.

S The volume of the prism in $m^3$ is 12 $m^3$.

T Introduce the Main Task. (Refer to the BP)

### 5 ❷ Find how many cubic centimetres is equal to 1 cubic metre.

T Ask the students to observe the magnified diagram representation and think about how many cubic centimetres will make up 1 cubic metre.

TN Assist the students to understand that cubic centimetre is smaller volume that will make the larger volume cubic metre.

S Observe the magnified diagram representation and discuss to make sense of larger volume.

S Observe the magnified diagram representation and answer ❶ as 100 of 1 $cm^3$.

TN For ❶ explain the relationship 1 m = 100 cm therefore for the length and width the measurement is 1 m respectively then it is 100 cm for the length and 100 cm for the width.

S Answer ❷ as 100 layers.

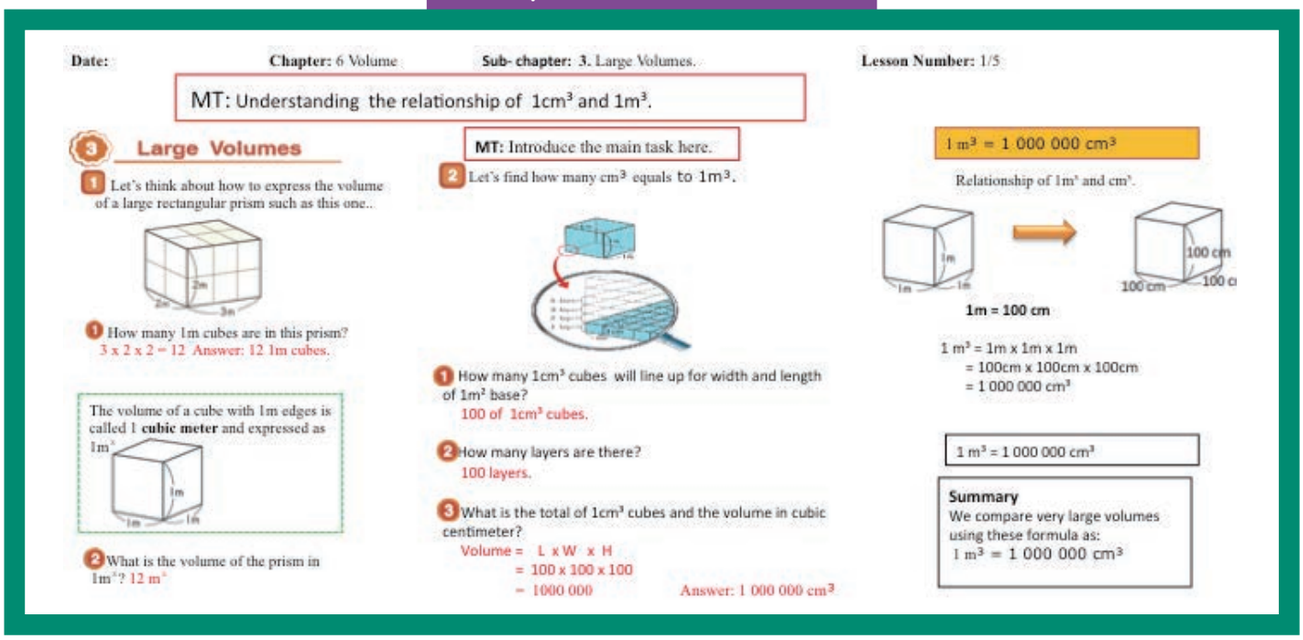
S Write the answer to ❸ by applying the formula for volume to calculate and fill in the box ⬚.

### 6 Summary

T Explain the relationship of 1 $m^3$ and cm3 as prepared in the blackboard plan.

S Understand 1 $m^3$ = 1 000 000 $cm^3$ and realise that 1 cubic metre is very large compared to 1 $cm^3$.
They feel the sense of larger volume.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 3: Large Volumes
## Lesson 2 of 5

Textbook Page : 082
Actual Lesson 054

### Lesson Objective

- Find the volume of prism of which the sides are expressed in both metres (m) and centimetres (cm).

### Prior Knowledge

- Unit of $m^3$
- Relationship between cubic metre and cubic centimetre

### Preparation

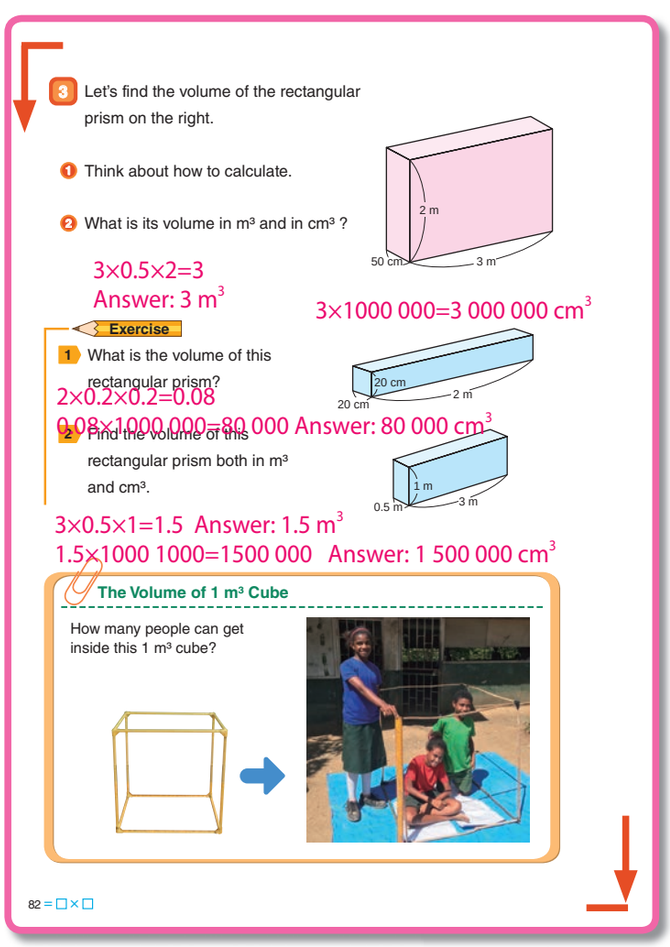
- Diagrams for 3 and Exercise

### Assessment

- Think about how to find the volume of prisms with sides expressed in both metres (m) and centimetres (cm). F
- Solve the exercises correctly. S

### Teacher's Notes

In task 3, remember to do conversion for all given measurements to a common unit before calculating.



3 Let's find the volume of the rectangular prism on the right.

1 Think about how to calculate.

2 What is its volume in $m^3$ and in $cm^3$ ?



$3 \times 0.5 \times 2 = 3$
Answer: 3 $m^3$

$3 \times 1000\,000 = 3\,000\,000$ $cm^3$

Exercise

1 What is the volume of this rectangular prism?



$2 \times 0.2 \times 0.2 = 0.08$
$0.08 \times 1000\,000 = 80\,000$ Answer: 80 000 $cm^3$

2 Find the volume of this rectangular prism both in $m^3$ and $cm^3$.



$3 \times 0.5 \times 1 = 1.5$ Answer: 1.5 $m^3$
$1.5 \times 1000\ 1000 = 1500\ 000$ Answer: 1 500 000 $cm^3$

**The Volume of 1 $m^3$ Cube**

How many people can get inside this 1 $m^3$ cube?





82 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 ③ Find the volume of a rectangular prism of which sides are expressed in metre and centimetre.

T Introduce the Main Task. (Refer to the BP)
T ① Unit of length and width are different. How can we find the volume?
S Recognise that they cannot multiply directly because of the different units of sides of the prism.
S Change m to cm or vice versa to use the same unit for length, width and height.
T How many metres is 50 cm?
S Convert 50 cm to 0.5 m by dividing 50 by 100.
T ② What is its volume in $m^3$ and $cm^3$?
S Convert 2 metres and 3 metres to centimetres so that 2 m is equal to 200 cm and 3 m is equal to 300 cm.
S Calculate: $300 \times 50 \times 200 = 3\,000\,000\ cm^3$
S Convert 50 cm to metres so that 50 cm is 0.5 m and calculate $0.5 \times 3 \times 2$
Answer: $3\ m^3$
TN Students can also convert 3 000 000 cm to $3\ m^3$ by dividing with 1 000 000 to get $3\ m^3$.

### 4 Complete the Exercise.

S ① Calculate the volume of the rectangular prism by using either $m^3$ or $cm^3$.
S ② Calculate the volume of the rectangular prism using both $cm^3$ and $m^3$.
T Confirm students' answers.

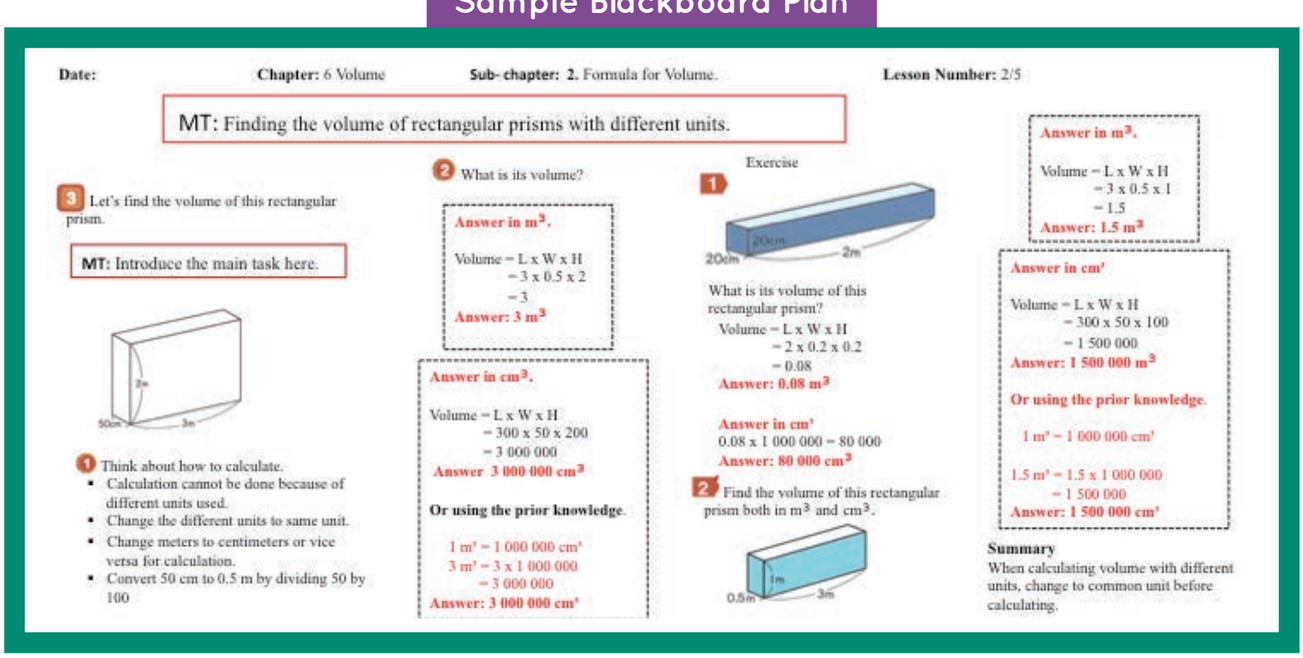
### 5 The sense of volume of one cubic metre ($1m^3$).

T How many people can get inside this 1 $m^3$ cube?
TN This activity improves students sense of the smaller volume compared to the larger volume.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 3: Large Volumes
## Lesson 3 of 5

Textbook Page : 083
Actual Lesson 055

### Lesson Objective

- To understand the relationship of centimetres ($cm^3$), cubic metres ($m^3$), millilitres (mL) and litres (L).

### Prior Knowledge

- Unit of centimetres ($cm^3$) and cubic metres ($m^3$)
- How to find the volume which has different units of measurement

### Preparation

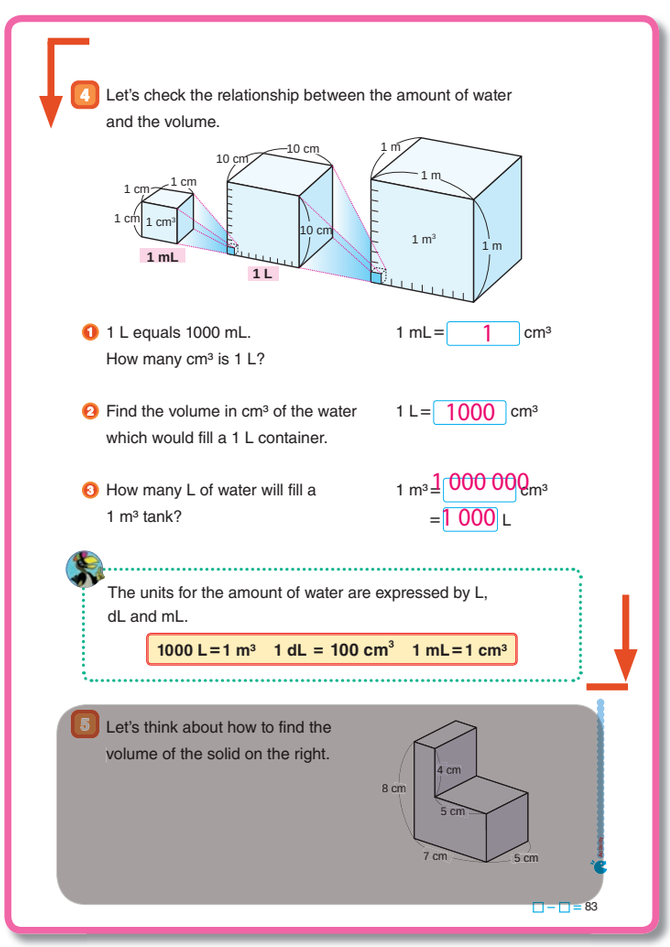
- Diagram for 4

### Assessment

- Enjoy finding the relationship between the amount of water and the volume. F S

### Teacher's Notes

Be careful in explaining the diagrams in task 4 because the colour of the small box must be clearly identified.
Make sure that the magnified box is clearly identified and explained well to help students visualise the relationship from a smaller unit of volume to a larger unit of a volume.



## Lesson Flow

### 1 Review the previous lesson.

### 2 4 1 Understand the relationship of mL, L, cm³ and m³.

T Introduce the Main Task. (Refer to the Blackboard Plan)
S Read the task and observe the diagram in order to make meaning of the relationship between the amount of water and the volume.
T Explain the relationship of mL, L, cm³ and m³ as in the blackboard plan.
S Understand and make meaning of the relationship of mL, L, cm³ and m³ explained by the teacher.
TN For 1, 2 and 3, ask students to make reference to the relationship of mL, L, cm³ and m³ to confirm their answers.
T 1 Refer to the explanation of the relationship of mL, L, cm³ and m³ and think about how many cm³ is equal to 1 mL.
S Write the answer to 1 by filling in the box ☐. (1)

### 3 Understand the relationship between the 1 Litre (L) and cubic centimetres (cm³)

S Write the answer to 2 by filling in the box ☐. (1 000)

### 4 Understand the relationship between the Litre (L) and 1 cubic metre (1 m³).

S Write the answer to 3 by filling in the box ☐. (1 000 000), (1 000)

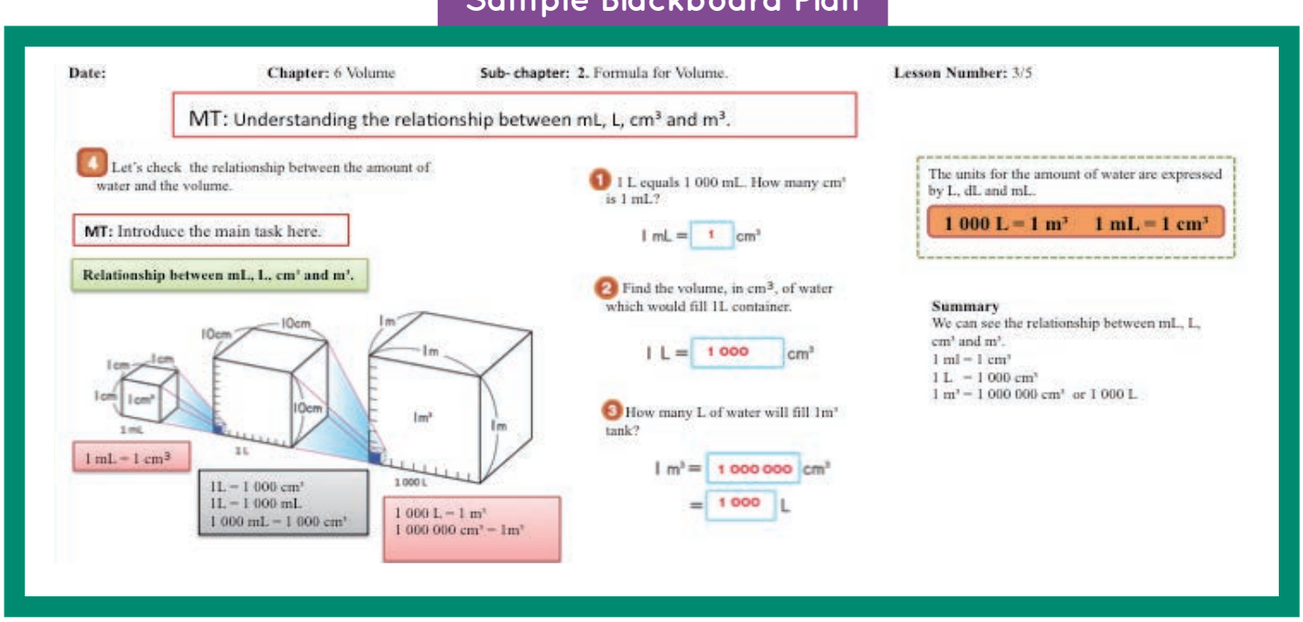
### 5 Important Point

T/S Explain the important point in the box ☐.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 3: Large Volumes
### Lesson 4 of 5

Textbook Page :
083 and 084
Actual Lesson 056

## Lesson Objective

- To think about how to find the volume of combined solid shapes.

## Prior Knowledge

- How to find the volume (Formula for finding volume)

## Preparation

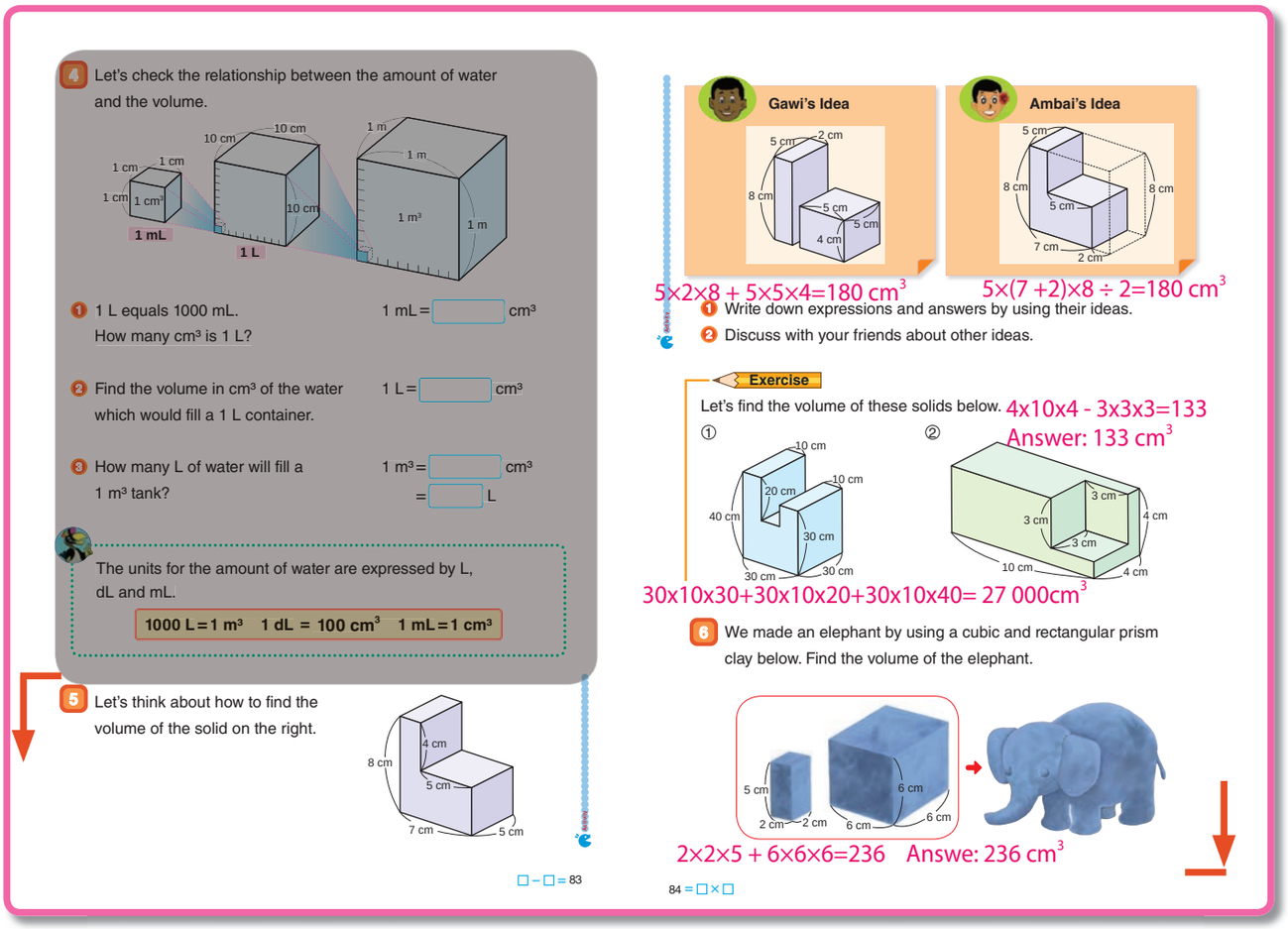
- Diagrams for 5 and 6
- Chart of student ideas and exercises

## Assessment

- Think about how to find the volume of combined solid shapes. S
- Find the volume of combined solid shapes. F

## Teacher's Notes

Guide students to solve task 5 by themselves because that is where they will think of ways on how to find the volume of combined solid shapes.



## Lesson Flow

### 1 Review the previous lesson.

### 2 ⑤ Thinking about how to find the volume of a combined shape.

T Introduce the Main Task. (Refer to the BP)
T Ask the students to observe the combined solid shape and think about how to calculate its volume.
S Observe the combined solid shape and think about how to calculate its volume.
TN Give time for discussion and allow students to express their ideas.
Write their ideas on the blackboard.

### 3 Understanding Mero's and Ambai's Ideas

T Explain the two ideas.
Mero's Idea:
The combined solid shape is divided into 2 solid shapes to calculate their areas separately.
Then add up the two areas to find the total area.
Ambai's Idea:
The shape is combined with the other same half of the shape to make a complete rectangular prism then the area is calculated and divided by 2 to get the final area.

### 4 ① Write down expressions and answers using the two ideas.

S Use explanations done by the teacher on the two ideas and write the expressions and find the volume of the combined solid shape.
S ② Discuss with friends about other ideas and present to the class.
T Confirm students' ideas presented.

### 5 Complete the Exercise

S Calculate the volume of the solid shapes in ① and ②.
T Confirm students' answers.

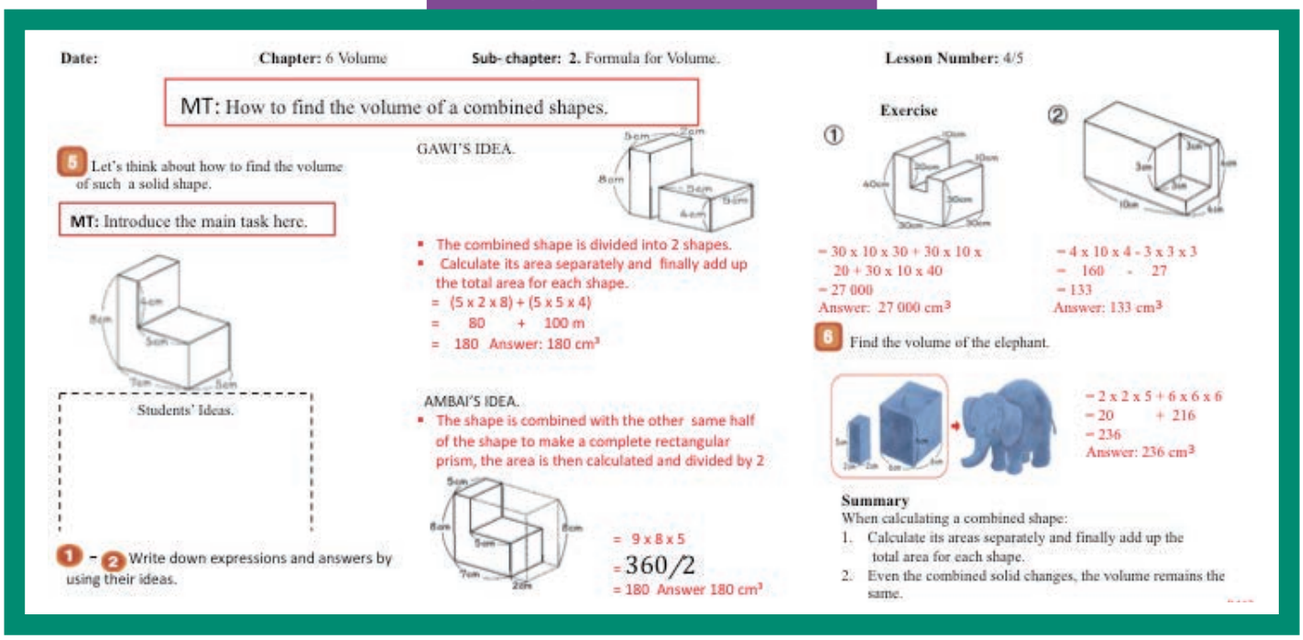
### 6 ⑥ Calculate the volume of an elephant.

S Observe the diagram and calculate the volume of the elephant by finding the area of the two solid figure when combined.
TN When the two solids figures are combined they make up the volume of the elephant (solid A + solid B = the volume of the elephant.).
Even the shape changes the volume remains the same.

### 7 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Sub-unit 3: Large Volumes
## Lesson 5 of 5

Textbook Page : 085
Actual Lesson 057

## Lesson Objective

- To understand how the volume of uneven shapes or irregular shapes such as rocks can be calculated by putting the objects in water.

## Prior Knowledge

- To think about how to find the volume of combined solid shapes

## Preparation

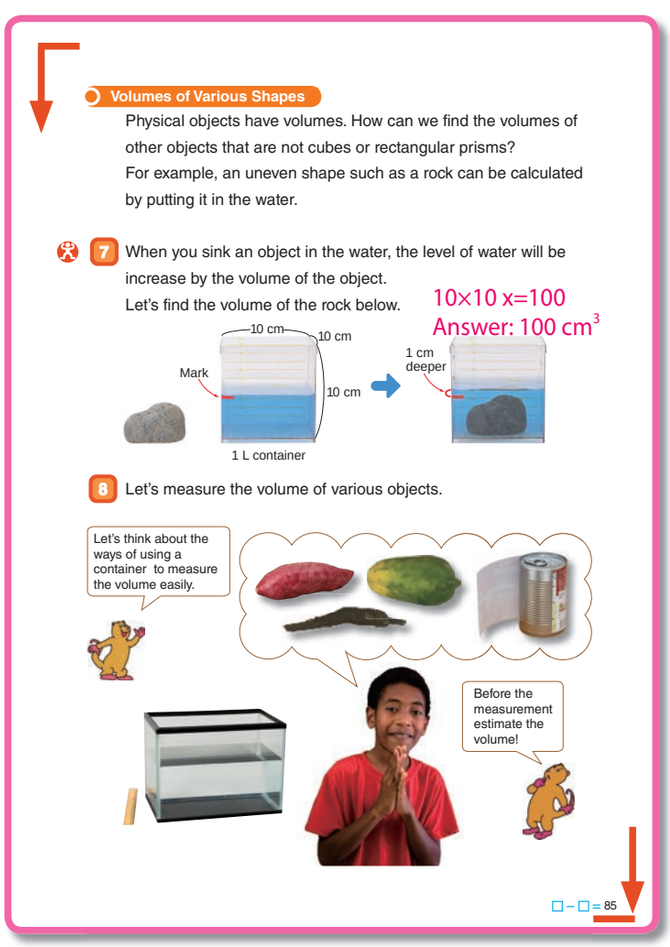
- Rocks or stones, yam, sweet potato, water, ruler and 1 transparent container

## Assessment

- Investigate the volume of uneven or irregular shapes using containers to measure the volume easily. F
- Think about how to find the volume of uneven or irregular shapes using containers. S

### Teacher's Notes

The container can be of any size, however, the height of the water in the container must be even.



## Lesson Flow

### 1 Review the previous lesson.

### 2 7 Think about how to find the volume of shapes that are not cubes or rectangular prisms.

T Introduce the Main Task. (Refer to the Blackboard Plan)
T Without opening the textbook show a rock or stone to the students and ask them on how to find its volume.
S Discuss and share ideas on how they can measure the volume of the stone or rock.
S Turn to page 85 of the textbook and read the paragraph on Volumes of Various Shapes.
S Estimate the volume of the rock before submerging it into the water.
T Explain the task and how to find the volume of the rock when submerged in the water.
1. Take note of the water level before submerging the object into the water and record it.
2. Put the stone in the water and observe carefully.
3. Measure the water level after the stone was put in the water and record it.
4. Do subtraction: Water Level After − Water Level Before = Increased Depth (How much Deeper)
5. Apply the formula and calculate. Volume = side × side × height (Increased depth)

S Use the steps to calculate for the volume of the stone.
Water level before: 4 cm Water level after: 5 cm (5 cm − 4 cm = 1 cm)
Volume = side × side × height (Increased depth)
= 10 cm × 10 cm × 1 cm
= 100 cm³ (volume of the stone)

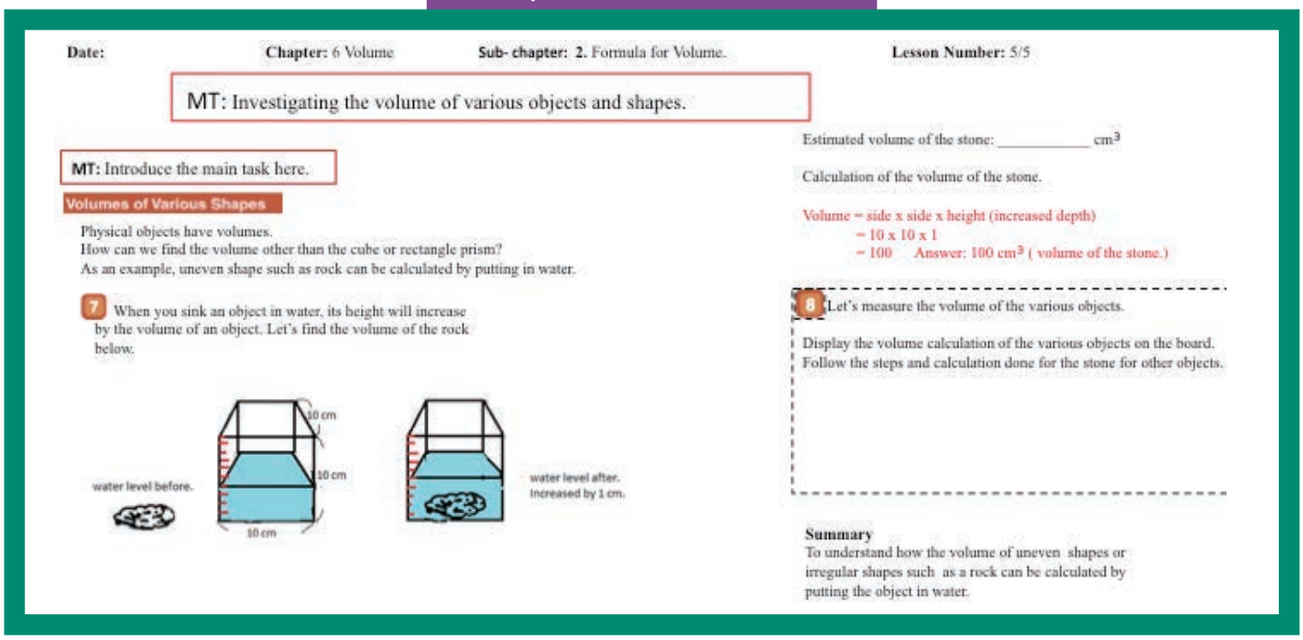
### 3 8 Investigate the volume of various object.

S Estimate the volume of various objects individually before submerging in the water.
T/S Find the volume of various objects using the steps above.

### 4 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 6

# Unit: Volume
## Exercise, Problems and Evaluation
### Lesson 1 and 2 of 1

Textbook Page :
086 and 087
Actual Lesson 058 and 059

## Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

- Evaluation test copy for each student

## Assessment

- Complete the Exercise and Problems correctly. S

## Teacher's Notes

This is the last lesson of Chapter 6. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.

### EXERCISE

1 Let's find the volume of the rectangular prism and the cube below.

Pages 72, 78 and 79

① 12 cm, 6 cm, 7 cm — 504 cm$^3$

② 9 cm, 9 cm, 9 cm — 207 cm$^3$

2 What is the volume in cm³ and m³ for the rectangular prism on the right?

Pages 81 and 82

3 m, 6 m, 60 cm

10 800 000 cm$^3$
10.8 m$^3$

3 What is the volume of 400 L water in cm³ and m³?

Page 83

400 000 cm$^3$ 0.4 cm$^3$

4 Let's find the volume of the object on the right.

Pages 84 and 85

6 cm, 4 cm, 3 cm, 8 cm, 6 cm

216 cm$^3$

Let's calculate. Grade 5 Do you remember?

① 30×1.2 = 36 ② 5.4×1.2 = 6.48 ③ 2.13×5.4 = 11.502 ④ 0.12×0.5 = 0.06

⑤ 9÷1.5 = 6 ⑥ 4.5÷2.5 = 1.8 ⑦ 6.12÷7.2 = 0.85 ⑧ 1.61÷0.7 = 2.3

86 = □×□

### PROBLEMS

1 Let's find the volume of the following rectangular prism and cube.

● Using the formula.

① 12 cm, 5 cm, 9 cm — 540 cm$^3$

② 5 m, 5 m, 5 m — 125 cm$^3$

2 Let's find the volumes below.

● Considering the ways.

① 3 cm, 3 cm, 3 cm, 4 cm, 4 cm, 9 cm, 5 cm — 225 cm$^3$

② 1 m, 1 m, 2 m, 5 m, 5 m — 48 m$^3$

3 Let's find the volume of a prism which could be made by the development on the right.

● Calculating the volume from its development.

4.8 cm, 2.3 cm, 6.2 cm

68.448 cm$^3$

4 Let's fill the rectangular prism tank below with water. How many times do you need to pour water with a 10 L bucket?

● Representing the volume of water by various units.

60 cm, 20 cm, 30 cm, 10 L

36 L

□ − □ = 87

## Lesson Flow

### 1 Complete the Exercise

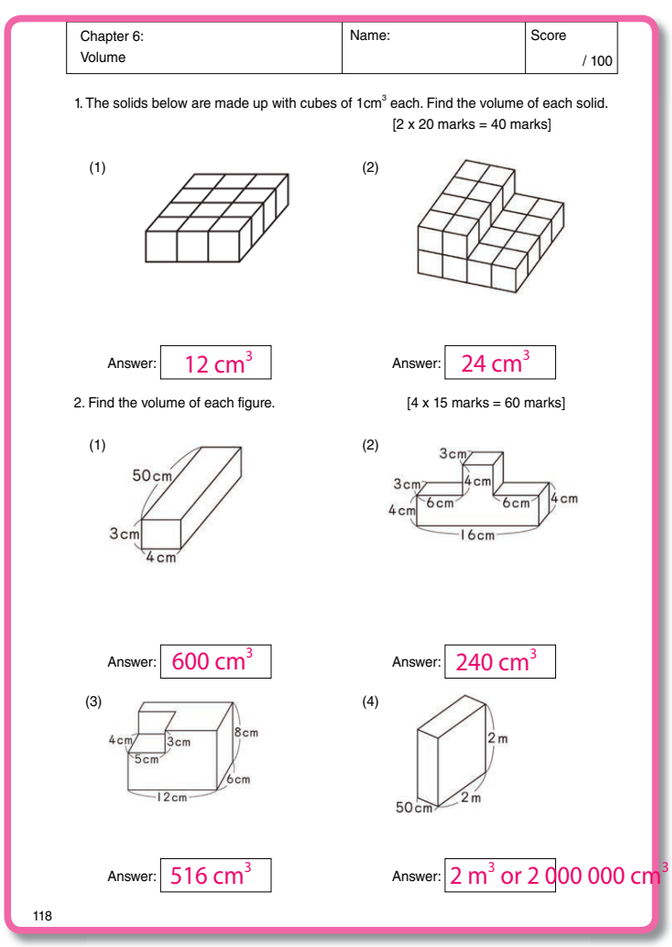
S Solve all the exercises.
T Confirm students' answers.
TN 1 Finding volume of prism and cube.
2 and 3 Expressing same volume with different units.
4 Finding the volume of a complex shape.

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN 1 Finding volume using formula.
2 Finding the volume in considering different ways.
3 Calculating the volume from its development or net.
4 Representing the volume of water by various units.

### 3 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.



| Chapter 6: Volume | Name: | Score / 100 |
|---|---|---|

1. The solids below are made up with cubes of $1cm^3$ each. Find the volume of each solid. [2 x 20 marks = 40 marks]

(1)

Answer: $12\ cm^3$

(2)

Answer: $24\ cm^3$

2. Find the volume of each figure. [4 x 15 marks = 60 marks]

(1)



Answer: $600\ cm^3$

(2)



Answer: $240\ cm^3$

(3)



Answer: $516\ cm^3$

(4)



Answer: $2\ m^3$ or $2\ 000\ 000\ cm^3$

118

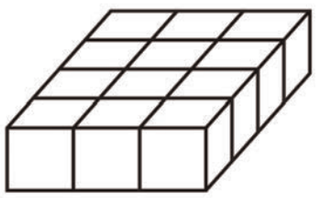
**End of Chapter Test** **Date:**

| Chapter 6:<br>Volume | Name: | Score<br>/ 100 |
|---|---|---|

1. The solids below are made up of cubes of 1 $cm^3$ each. Find the volume of each solid.

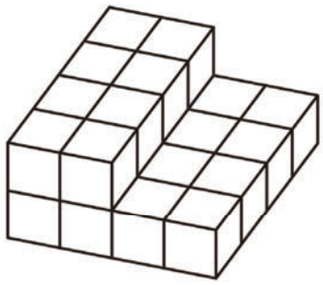
[2 × 20 marks = 40 marks]

(1)



Answer:

(2)

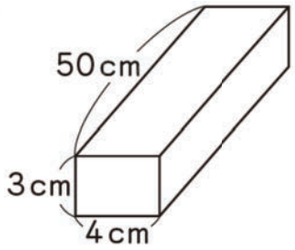


Answer:

2. Find the volume of each figure.

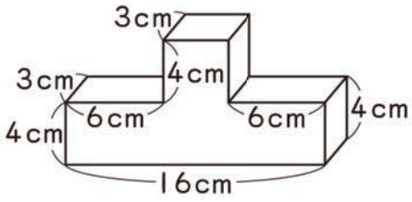
[4 × 15 marks = 60 marks]

(1)



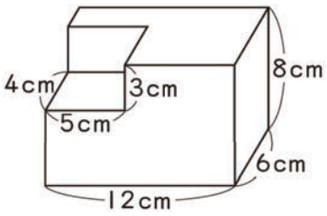

Answer:

(2)



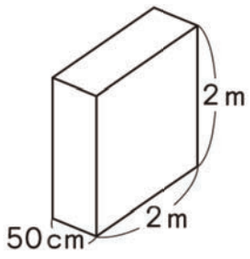

Answer:

(3)




Answer:

(4)




Answer:

# Chapter 7 Multiples and Divisors

## 1. Content Standard

5.1.8 Understand the properties of numbers and apply such properties to identify the component of numbers.

## 2. Unit Objectives

- Apply components of multiples and common multiples for finding the number patterns.
- To understand that whole numbers are classified into even numbers and odd numbers if we decide on a perspective.
- To understand and apply components of multiples and divisors for finding number patterns.
- Explain the relationship between multiples and divisors using the idea of prime numbers.

## 3. Teaching Overview

In this unit, students will understand whole numbers as elements of sets for which are multiples or divisors of certain numbers.

Students have some experiences of composing and decomposing numbers already. The learning in this unit will be utilised in the calculation of fractions.

**Multiples and Common Multiples :**

Teachers encourage students to enjoy playing with multiples and common multiples by finding some patterns. They will find some patterns that pay attention to numbers on a specific number place. They can also enjoy finding a pattern of design when they paint some multiples and common multiples using specific colours of a number table.

They notice that multiples and common multiples are infinite. Some examples of utilisation in real life situations should be emphasised.

**Divisors and Common Divisors :**

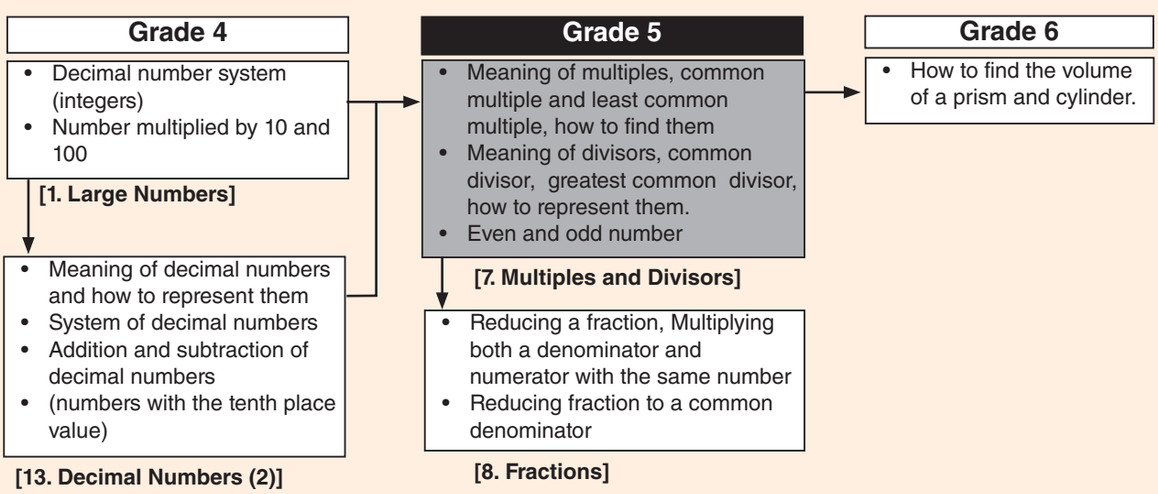
Divisors and Common divisors will be used in canceling fractions, study of square root, etc.

They are finite. Teachers should not impart how to find it, however students are supposed to be encouraged to find out divisors and common divisors by their motive, own initiative, independently and through motivational activities.

**Even Numbers and Odd Numbers :**

Students understand the meaning of even and odd numbers such as even numbers are divisible by 2 and odd numbers have 1 as the remainder when divided by 2. They also look for some examples of using even and odd numbers in their daily lives.

## 4. Related Learning Contents



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 1: Multiples and Common Multiples
### Lesson 1 of 3

Textbook Page : 088 to 090
Actual Lesson 060

## Sub-unit Objectives

- To understand multiples, common multiples and least common multiple and identify them.
- To understand the meaning of the least common multiple and use it for various situations.
- To deepen the understanding about rules for multiples by looking at how multiples are lined up.

## Lesson Objectives

- To understand the meaning of multiples.
- To notice that multiples exist to infinite.

## Prior Knowledge

- Multiplication table

## Preparation

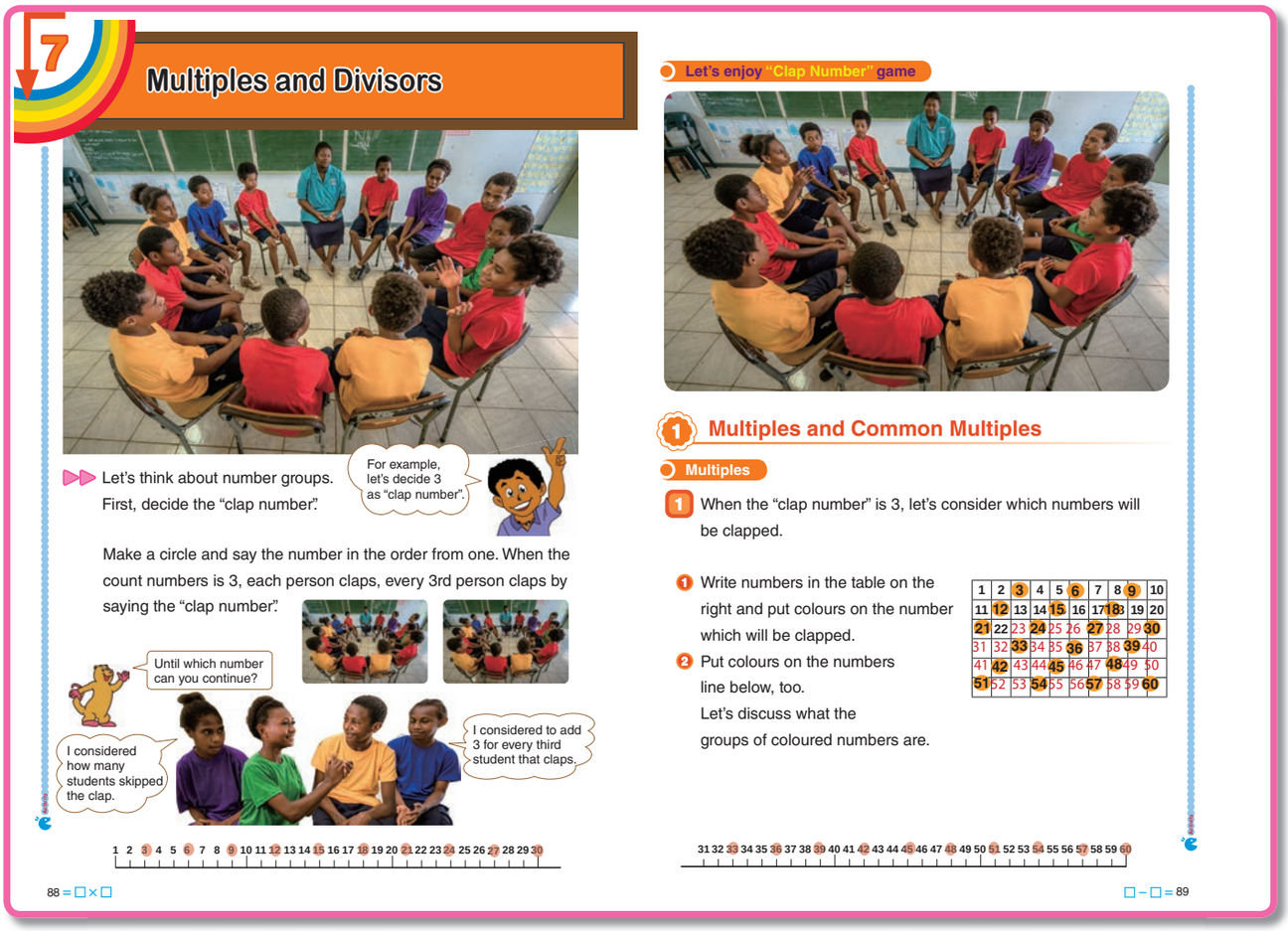
- Chart for the number lines in 1 and 2, 1 m ruler, table

## Assessment

- Enjoy the 'Clap number game' considering multiples of 3. F
- Demonstrate the understanding of the meaning of multiples. S
- Solve the exercises correctly. S

## Teacher's Notes

Multiples are the numbers that we get after multiplying a same number by any integer.



## Lesson Flow

### 1 Play the "clap number" game.

T Explain the rule for "clap number" game and play the game making 3 a clap number.

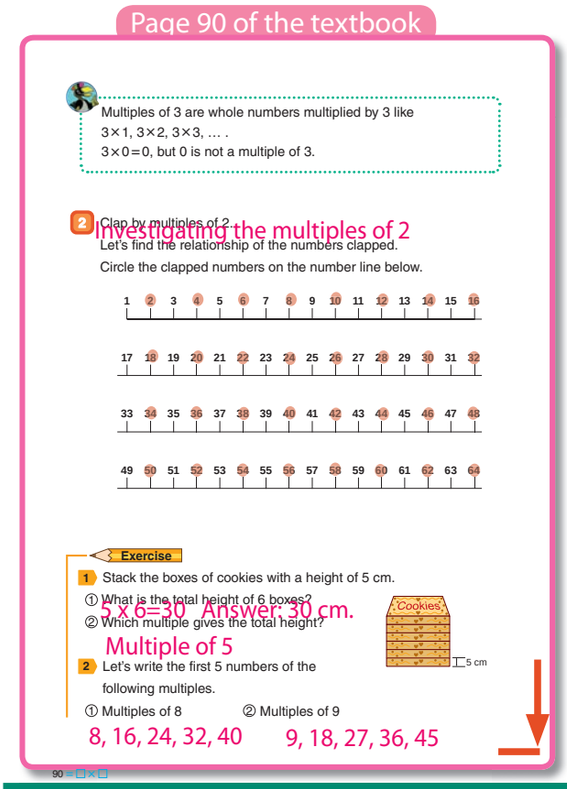
TN Rule for the clap number game:
- Call a number from 1.
- When it comes to 3, clap your hand calling the number.
- Do the same for every third number.

S Understand that the number to be clapped after 3 is 6 then 9, 12 15 etc...

TN Adjust the speed for counting numbers according to the students pace.

T Introduce the Main Task. (Refer to the BP)

Page 90 of the textbook




### 2 1 Investigate what kind of numbers they clapped.

T If the clap number is 3, what kind of number will we clap?

S It is using the three times table.

S 1 2 Write number table in the exercise book and circle on the numbers to clap.

T Let's present the rules for the numbers to clap.

S It is the number added by 3 each time. It is using the three times table.

### 3 Important Point

T/S Explain the important point in the box .

### 4 2 Investigate multiples of 2.

T Let students to play the number game to investigate the multiples of 2.

S Put circles on the number line for the numbers clapped and explain the rules for the multiples of 2.

S They are from the two times table.
They are the numbers added by 2 each time.

### 5 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

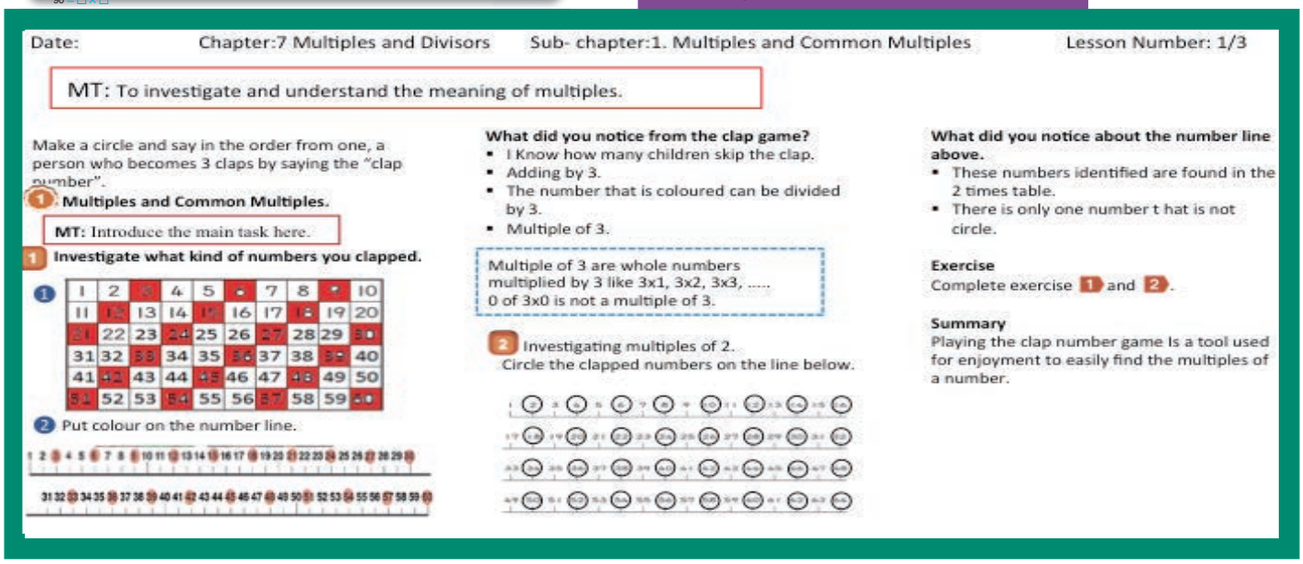
### 6 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 1: Multiples and Common Multiples
### Lesson 2 of 3

Textbook Page :
091 to 093
Actual Lesson 061

## Lesson Objectives

- To understand the meaning of common multiples and how to find them.
- To understand the meaning of the least common multiple and how to find it.

## Prior Knowledge

- Multiplication table

## Preparation

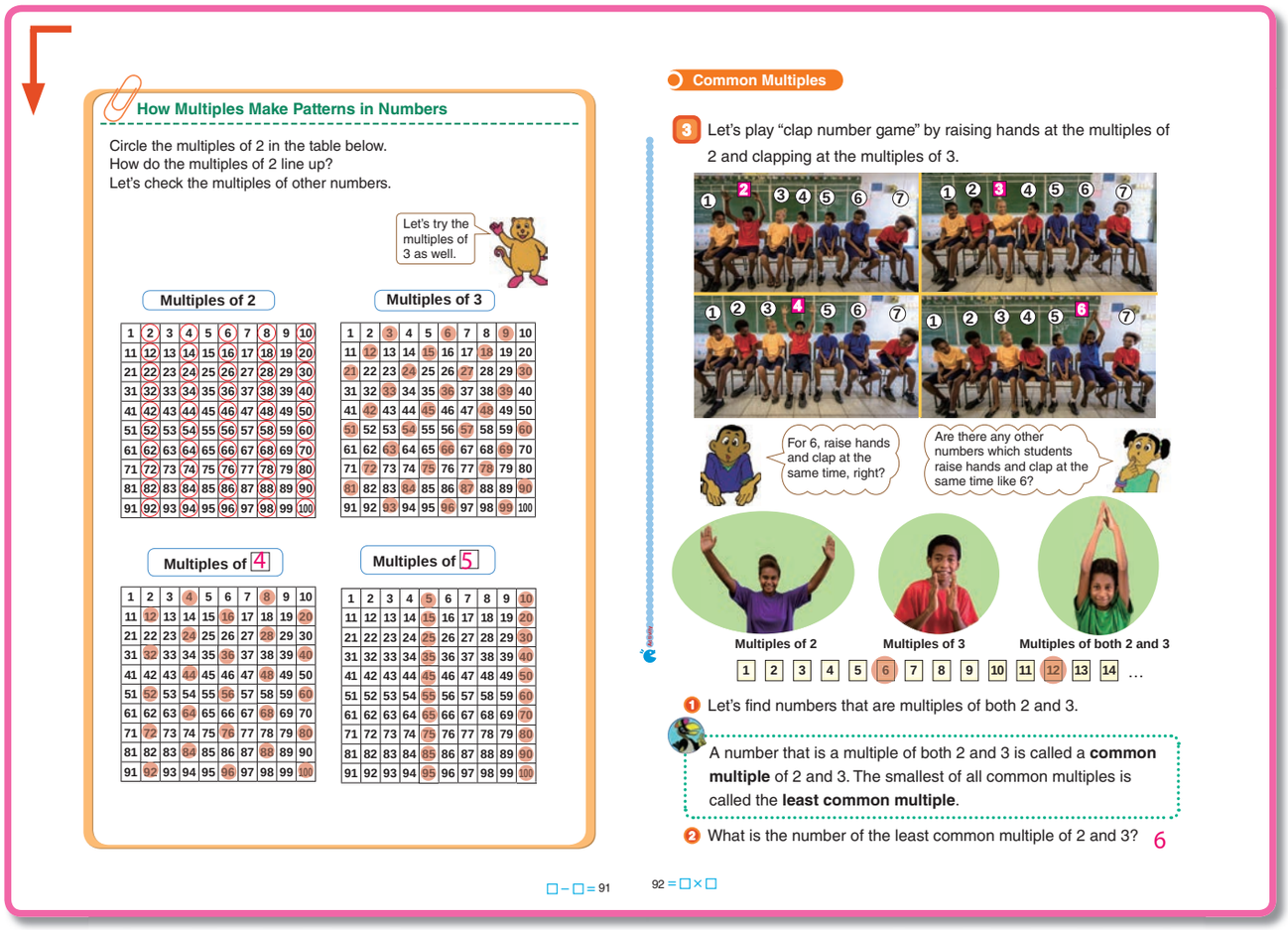
- Table of multiples of 2, 3, 4 and 5.
- Chart showing Mero's, Yamo's, Sare's and Vavi's Ideas

## Assessment

- Enjoy the 'Clap number game' considering multiples of 2 and 3. F
- Demonstrate the understanding of the meaning of common multiples and least common multiple. S

## Teacher's Notes

In playing the clap game, the students should be reminded of the main focus on the idea of identifying common multiples.



How Multiples Make Patterns in Numbers

Circle the multiples of 2 in the table below.
How do the multiples of 2 line up?
Let's check the multiples of other numbers.

Let's try the multiples of 3 as well.

Multiples of 2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Multiples of 3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Multiples of 4

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Multiples of 5

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Common Multiples

3 Let's play "clap number game" by raising hands at the multiples of 2 and clapping at the multiples of 3.

For 6, raise hands and clap at the same time, right?

Are there any other numbers which students raise hands and clap at the same time like 6?

Multiples of 2 | Multiples of 3 | Multiples of both 2 and 3

1 2 3 4 5 6 7 8 9 10 11 12 13 14 …

1 Let's find numbers that are multiples of both 2 and 3.

A number that is a multiple of both 2 and 3 is called a **common multiple** of 2 and 3. The smallest of all common multiples is called the **least common multiple**.

2 What is the number of the least common multiple of 2 and 3? 6

□ − □ = 91

92 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 How multiples make patterns in numbers.

S Circle the multiples of 2, 3 and others in the tables.

### 3 ③ Play "clap number" game

T What rule was used in the clap game in yesterday's lesson?

S Clap once for every multiple.

T ① We are going to do clap number game again. We have a new rule today, raise both hands for the multiples of 2 and clap hands for the multiples of 3. Let's see if you can do this well.

S Play the game several times and notice that the multiples of 2 and 3 are 6, 12, 18. 24, ...., etc.

T Introduce the Main Task. (Refer to the BP)

### 4 Important Point

T/S Explain the important point in the box .

### 5 Find the least common multiple for 2 and 3

S ② For 6, raise both hands and clap at the same time.

S When overlapping multiples of 2 and 3, raise hands and clap at the same time.

### 6 ④ Find the common multiples of 3 and 4.

S Think about the common multiple based on four friends' ideas.

T What are the common multiples of 3 and 4? Let's explain how the four friends found the common multiples.

S Mero circled the same numbers among the multiples of 3 and 4.

S Yamo used the multiples of 3, Sare used the multiples of 4 and Vavi found the least common multiple, 12 and then found the multiples of 12.

T Confirm students' ideas.

### 7 Making tapes of Multiples

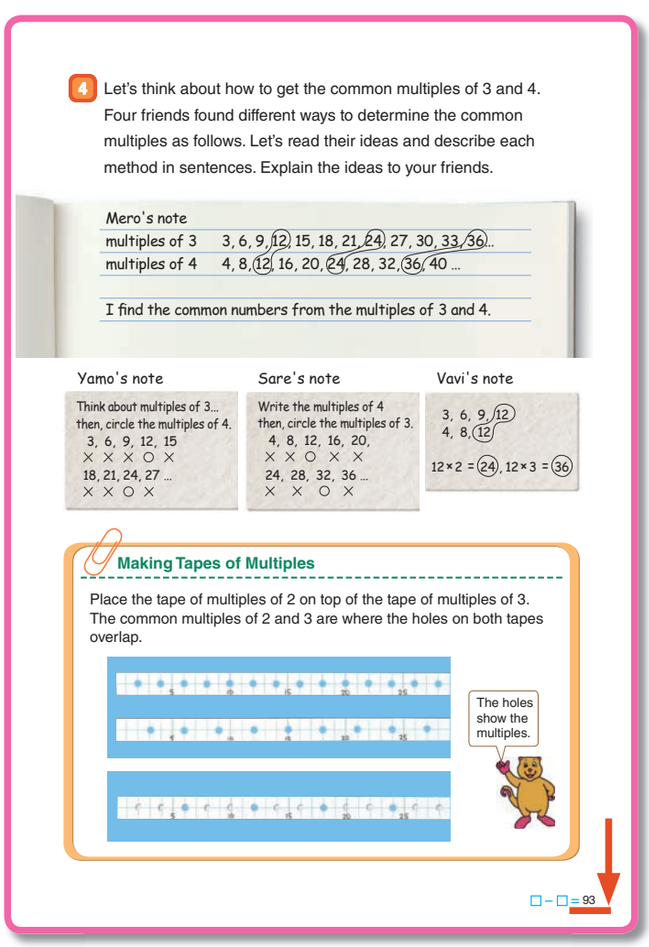
TN Students may complete the activity if time permits or do it as homework.

### 8 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.




## Sample Blackboard Plan

Lesson 061 Sample Blackboard Plan is on page 125.

# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 1: Multiples and Common Multiples
### Lesson 3 of 3

Textbook Page : 094
Actual Lesson 062

## Lesson Objectives

- To understand how to solve problems which require the least common multiple.
- To think about the concrete situations of using the least common multiple and deepen their understanding about common multiples and the least common multiple.

## Prior Knowledge

- Common multiples and least common multiple (Previous lesson)

## Preparation

- Diagram for 5

## Assessment

- Solve the problem using multiple and least common multiple. F
- Solve the exercises correctly. S

## Teacher's Notes

For this lesson, use the picture of cookies and chocolates to get the idea of identifying multiples and common multiples.
As the number of boxes increase, the common multiples can be easily identified.

The least common multiple of 3 and 4 is 12. All common multiples of 3 and 4 are multiples of 12.

5 Stacked are boxes of cookies with a height of 6 cm each and chocolate boxes with a height of 8 cm each.


1. The total height of the boxes of cookies are multiples of which number? Multiple of 6.
2. The total height of the chocolate boxes are multiples of which number? Multiple of 8.
3. What will be the least height that the cookie boxes and chocolate boxes be equal? How many boxes are in each stack? 6 x 4=24 Answer: 24 cm. 4 cookie boxes and 3 chocolate boxes
4. Write the first 3 numbers where the height of both stacks are equal. 24, 48, 72

**Exercise**

1. Write the first 4 common multiples for each of the following groups of numbers. Find the least common multiples.
① (5, 2) 10, 20, 30, 40 LCM = 10
② (3, 9) 9, 18, 27, 36 LCM = 9
③ (4, 6) 12, 24, 36, 48 LCM = 12
2. Stack boxes with heights of 6 cm and 9 cm. What is the smallest number where the total heights of the two stacks are equal?
6cm box: 6, 12, 18
9cm box: 9, 18, 27 Answer: 18 cm

94 = □ × □

## Lesson Flow

### 1 Review previous lesson

### 2 Important Point

T/S Explain the important point in the box ( ).

T Introduce the Main Task. (Refer to the BP)

### 3 Think about the heights of cookie and chocolate boxes.

T/S 5 Read and understand the situation.
T 1 The total height of boxes of cookies is the multiples of which number?
S The multiples of 6.
T 2 The total height of chocolate boxes is the multiples of which number?
S The multiples of 8.
T 3 What will be the least height of the cookie boxes and chocolate boxes be equal?
S 24 cm high.
T How many boxes are there in each stack?
S 1. Cookies: $\frac{24}{6} = 4$
Answer: 4 boxes of cookies

## Lesson Flow

2. Chocolates: $\frac{24}{8}=3$
Answer: 3 boxes of chocolates.

### 4 ④ Find the common height of the 2 boxes.

T Let's find the first three heights where the height of both stacks are equal.
S 24 cm, 48 cm and 72 cm high.

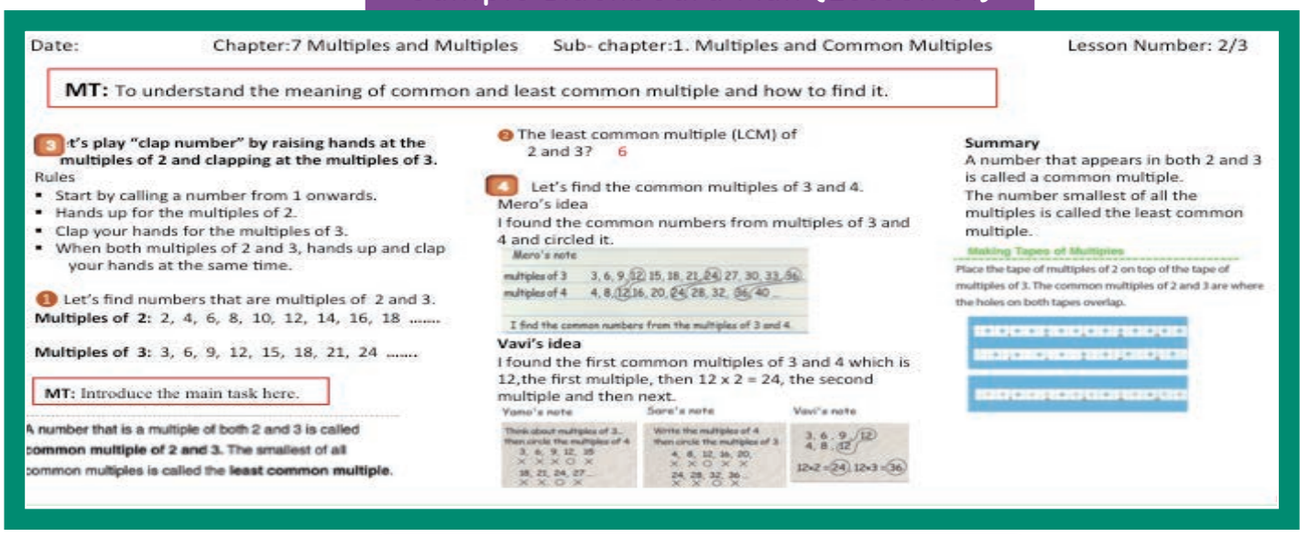
### 5 Complete the Exercise

S Solve the selected exercises.
T Confirm students' answers.

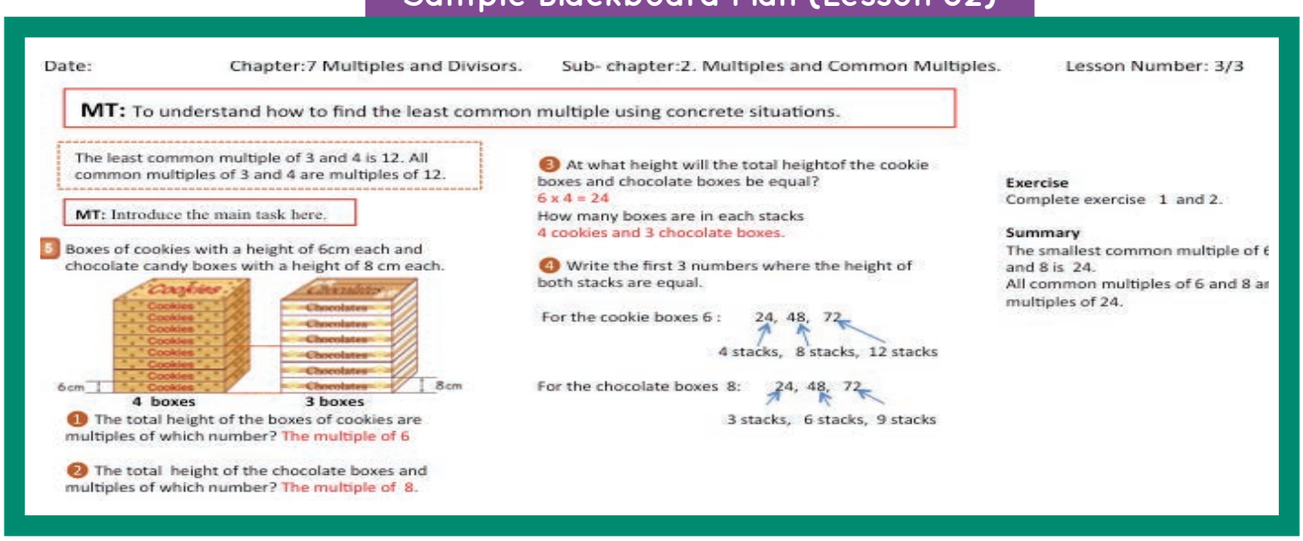
### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 61)




## Sample Blackboard Plan (Lesson 62)



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 2: Divisors and Common Divisors
### Lesson 1 of 4

Textbook Page : 095 to 097
Actual Lesson 063

## Sub-unit Objectives

- To understand divisors, common divisors and the highest common divisor and how to find it.
- To find the highest common divisor according to the various concrete situations.

## Lesson Objective

- To understand the meaning of divisors and find them.

## Prior Knowledge

- Common multiples and least common multiples

## Preparation

- Square papers of 1 cm², 2 cm², 3 cm², 4 cm², 6 cm², 9 cm², 18 cm²

## Assessment

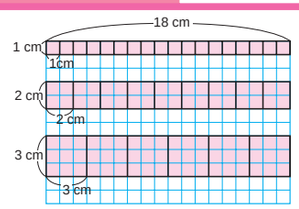
- Investigate and explain the meaning of divisor through activity. F
- Demonstrate the understanding of the meaning of divisor. S

## Teacher's Notes

Prepare at least a square such as square of 5 cm² to show that there are some squares that cannot fit exactly in the 12 cm and 18 cm square length.

### Page 97 of the textbook

The lengths of the sides of the squares when lined up horizontally over a 18 cm length without any gaps are 1 cm, 2 cm, 3 cm, 6 cm, 9 cm and 18 cm.

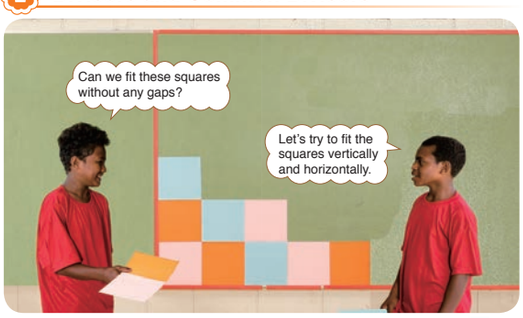




18 cm is included because we think only horizontally.

1, 2, 3, 6, 9, 18 .....Divisors of 18

## 2 Divisors and Common Divisors



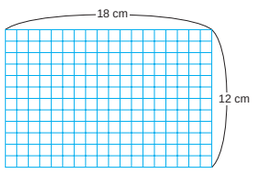


We want to put squares in this frame so there are no gaps.

Let's find out which squares can fit in the frame without any gaps.

**Divisor**

1 Place squares of the same size in a 12 cm × 18 cm rectangle.
How long is each side of the square?




Think of the length of the sides of the squares when the squares are lined up vertically without any gaps.

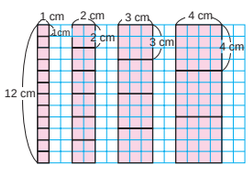
1 How many cm is each side of the squares when they are lined up vertically over a 12 cm length without any gaps?

1cm, 2cm, 3cm, 4cm =, 6cm, 12cm

□ − □ = 95

96 = □ × □

The lengths of the sides of the squares when lined up vertically over a 12 cm length without any gaps are 1 cm, 2 cm, 3 cm, 4 cm, 6 cm and 12 cm.




2 Divide 12 by 1, 2, 3, 4, 6 and 12 one by one to confirm that there are no gaps. Are they divisible by 12?

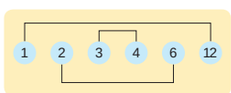
Yes, the numbers are divisible by 12


The whole numbers by which 12 can be divided with no remainder are called **divisors** of 12.

1, 2, 3, 4, 6, 12 .....Divisors of 12

3 What can you find when divisors of 12 are grouped as shown below?

multiplying in each group gives us 12.




1 × 12 = 12
2 × 6 = 12
3 × 4 = 12

Any number is divisible by 1 and itself.

Think about the length of the sides of the squares when the squares are lined up horizontally without any gaps.

4 How many cm is each side of the squares when they are lined up horizontally over a 18 cm length without any gaps?

1cm, 2cm, 3cm, 6cm, 9cm, 18cm

## Lesson Flow

### 1 ❶ Investigate and understand the meaning of divisors.

T Can we place squares without any gaps in a rectangle from the frame?

S 1. I think we cannot because the sizes of the length and the width are different.
2. I think we can if we think carefully on how to place them.

T What length of the side of squares can be placed without any gaps?

S It seems we can place squares with the side of 1 cm or 2 cm in length but there seem to be more.

T Introduce the Main Task. (Refer to the BP)

### 2 ❶ Think of squares that can be lined up vertically without any gaps.

T Ask the students to place squares vertically on a 12 cm chart to see how many can fit without any gaps.
(1 $cm^2$, 2 $cm^2$, 3 $cm^2$, 4 $cm^2$, 6 $cm^2$ and 12 $cm^2$ squares).

T How many cm is each side of the squares when they are lined up vertically over a 12 cm length without any gaps?

TN This activity should be done by the students before leading them to the next page for confirmation.

S The side lenghts of the squares are: 1 cm, 2 cm, 3 cm, 4 cm, 6 cm and 12 cm.

T Confirm by lining the squares vertically on a 12 cm chart on page 96.

T ❷ Are the side lengths of the squares divisible by 12?

S All the numbers are divisible by 12 without any remainder.

### 3 Important Point

T/S Explain the important point in the box .....

### 4 Finding divisors of 12

T ❸ How can we find the divisor of 12 without missing any number.

S It is good to find the pair of two numbers for multiplication like 1 and 12 of $1 \times 12$, 2 and 6 of $2 \times 6$.

### 5 Think of squares that can be lined up horizontally without any gaps.

T Ask students to place squares horizontally on a 18 cm chart to see how many can fit without any gaps.
(1 $cm^2$, 2 $cm^2$, 3 $cm^2$, 6 $cm^2$, 9 $cm^2$ and 18 $cm^2$ squares).

T ❹ How many cm is each side of the squares when they are lined up horizontally over a 18 cm length without any gaps?

S The side lenghts of the squares are: 1 cm, 2 cm, 3 cm, 6 cm, 9 cm and 18 cm.

T Confirm by lining the squares horizontally on a 18 cm chart on page 97.

TN 1, 2, 3, 6, 9 and 18 are divisors of 18.

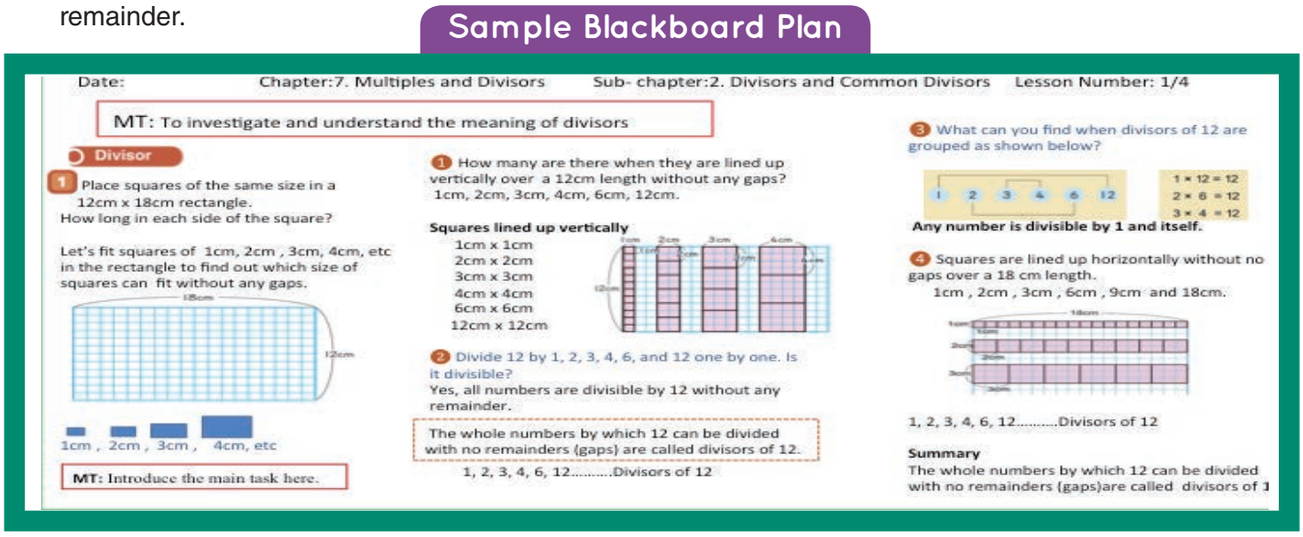
### 6 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 2: Divisors and Common Divisors
### Lesson 2 of 4

Textbook Page : 097 and 098
Actual Lesson 064

## Lesson Objective

- To understand the meaning of common divisors and the greatest common divisor and how to find them.

## Prior Knowledge

- Divisor

## Preparation

- Chart of numbers in 5
- Chart of Important Point

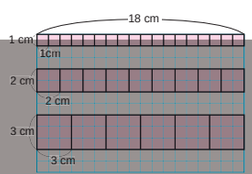
## Assessment

- Think about the meaning and how to find common divisors and greatest common divisors. F
- Solve the exercises correctly. S

## Teacher's Notes

Pairing of numbers can be used to confirm common divisors.
We get squares when the width and height are equal.

The lengths of the sides of the squares when lined up horizontally over a 18 cm length without any gaps are 1 cm, 2 cm, 3 cm, 6 cm, 9 cm and 18 cm.





18 cm is included because we think only horizontally.

1, 2, 3, 6, 9, 18 .....Divisors of 18

### Common Divisors

5 How many cm can the sides of the squares be, when lined up vertically and horizontally without any gaps?

Height..... 1 2 3 4 6 12 (cm)
Width..... 1 2 3 6 9 18 (cm)


We get squares when the width and height are equal.

1cm, 2cm, 3cm and 6cm.


The numbers that are divisors of both 12 and 18 are called **common divisors** of 12 and 18. The largest of all common divisors is called **greatest common divisor**.

6 The common divisors of 12 and 18 are 1, 2, 3 and 6.
What is the greatest common divisor of 12 and 18?

6

### Exercise

1 Find all the divisors of 6, 8 and 36 respectively.
For 6: 1, 2, 3, 6 For 8: 1, 2, 4, 8
For 36: 1, 2, 3, 4, 6, 8, 9, 12, 18, 36

2 Write all the common divisors of 8 and 36.
1, 2, 4

□ − □ = 97

2 Let's think about how to find the common divisors of 18 and 24.
Two friends calculated common divisors in different ways in their exercise books but did not complete.
Complete their ideas by considering their thinking.

Divisors of 18, ① ② ③ ⑥ 9, 18
Divisors of 24, ① ② ③ 4 ⑥ 8 12 24

Common divisors: 1, 2, 3 and 6

Divisors of 18 1, 2, 3, 6, 9, 18
24÷1=24, 24÷2=12, 24÷3=8, 24÷6=4,
24÷9=2 r 6, 24÷18=1 r 6

'x' means wrong. not a common divisor

3 Let's find all the common divisors and then find the greatest common divisors.

① (8, 16) 1, 2, 4, 8 1, 2, 4, 8, 16
② (15, 20) 1, 3, 5, 15 1, 5
③ (12, 42) 1, 2, 3, 4, 6, 12 1, 2, 3, 6
④ (13, 9) 1, 13 1, 3, 9

There are some pairs of numbers like ④, that have only 1 as a common divisor.

### Exercise

1 We want to divide 8 pencils and 12 exercise books equally amongst the students.
What should be the appropriate number of students for distribution? 1, 2, 4, 8 1, 2, 3, 4, 6, 12 Answer: 4 children

98 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

S We studied divisors of 12 and 18.
T Today let's find squares which can be placed vertically as well as horizontally.
T Introduce the Main Task. (Refer to the BP)

### 2 Investigate and understand the meaning of common divisors.

T ❺ How many cm can the sides of the squares be, when lined up vertically and horizontally without any gaps?
S Squares with the side length of 1 cm, 2 cm, 3 cm and 6 cm can be placed without any gaps.

### 3 Important Point

T/S Explain the important point in the box .

### 4 Find the greatest common divisor

T ❻ What is the greatest common divisor of 12 and 18?
S The greatest common divisor is the greatest number among the common divisors, so it is 6.

### 5 Complete the Exercise

S Solve the exercises.
T Confirm students' answers.

### 6 ❷ Find the common divisors of 18 and 24.

T Study the two students' ideas and complete their thinking in your exercise books.
S 1. Pair the common divisors of 18 and 24 then identify the greatest common divisor which is 6.
2. Divide all the divisors of 18 into 24 and realise that 1, 2, 3, and 6 are divisible while 9 and 18 have remainders, therefore 9 and 18 are not common divisors.
T Confirm that divisors that are common are divisible and divisors that are not common are not divisible.

### 7 ❸ Find the greatest common divisor.

T Ask the students to complete ❶ to ❹.
S Complete the activities by finding all the common divisors and the greatest common divisor.
TN In activity ❹, 1 is the only common divisor.

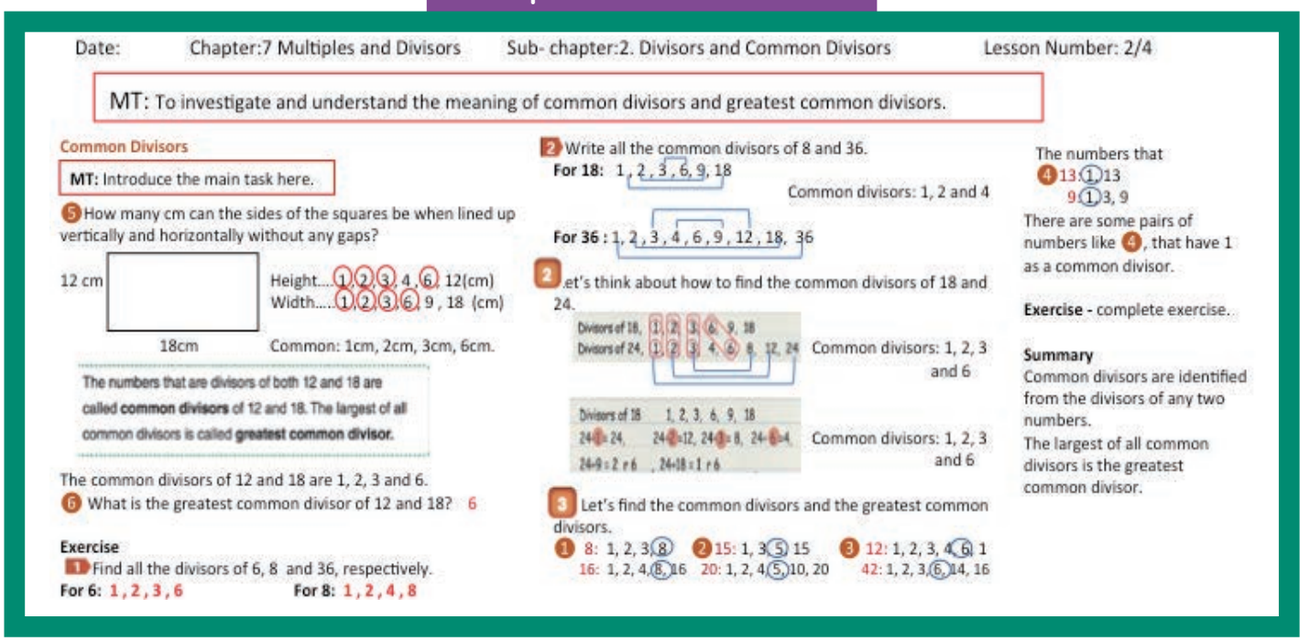
### 8 Complete the Exercise

S Solve the exercise.
T Confirm students' answers.

### 9 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 2: Divisors and Common Divisors
### Lesson 3 of 4

Textbook Page : 099 and 100
Actual Lesson 065

## Lesson Objectives

- To understand the relationship between multiples and divisors.
- To investigate about prime numbers.

## Prior Knowledge

- Multiples and least common multiples
- Divisors and greatest common divisors

## Preparation

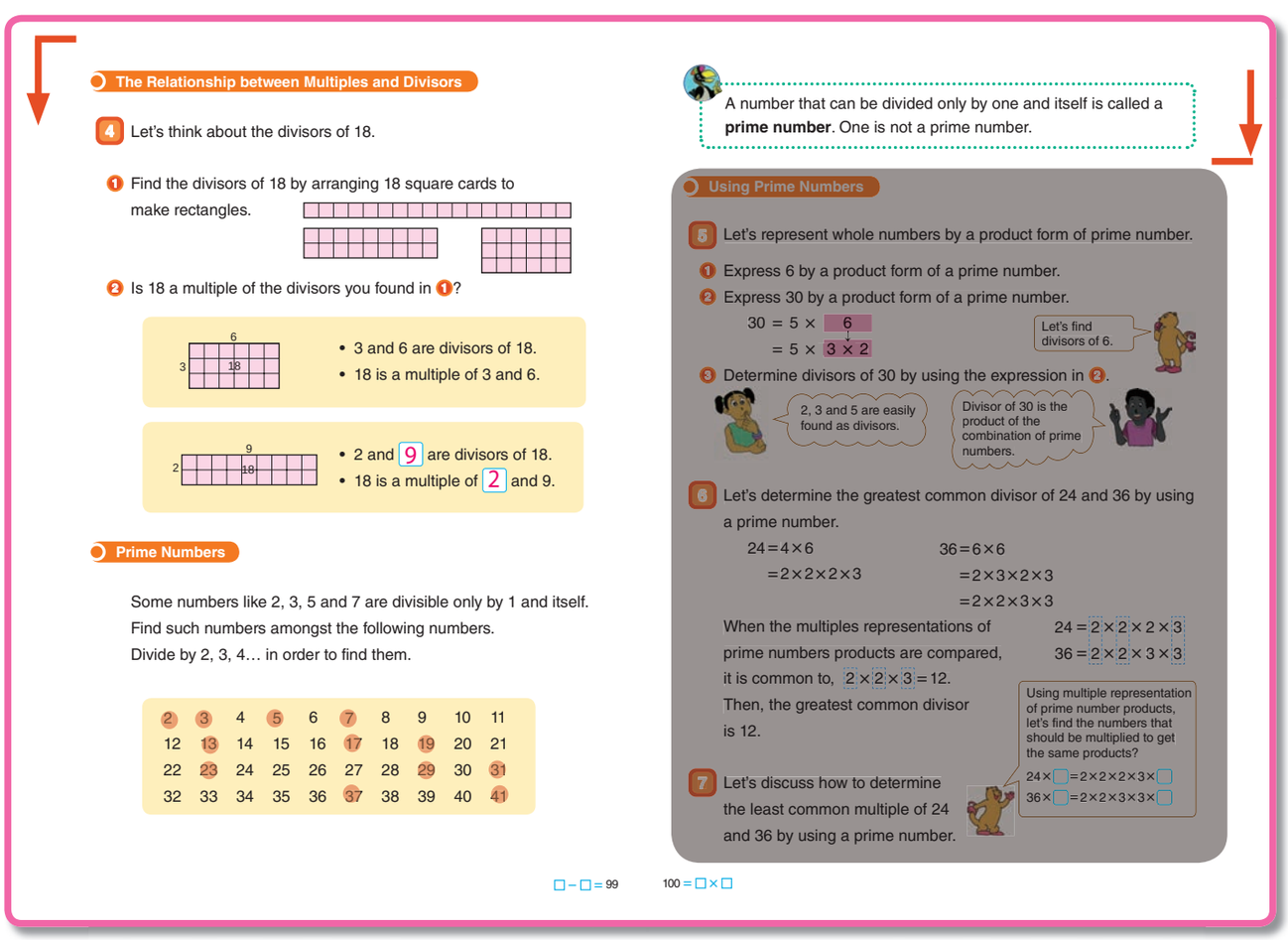
- Square cards

## Assessment

- Investigate the relationship between multiples and divisors. F
- Investigate prime numbers. S
- Explain the meaning of prime numbers. S

## Teacher's Notes

1 is not a prime number because it is always the divisor as stated in the definition.



The Relationship between Multiples and Divisors

4 Let's think about the divisors of 18.

1 Find the divisors of 18 by arranging 18 square cards to make rectangles.

2 Is 18 a multiple of the divisors you found in 1?

6 × 3 = 18
- 3 and 6 are divisors of 18.
- 18 is a multiple of 3 and 6.

9 × 2 = 18
- 2 and 9 are divisors of 18.
- 18 is a multiple of 2 and 9.

Prime Numbers

Some numbers like 2, 3, 5 and 7 are divisible only by 1 and itself.
Find such numbers amongst the following numbers.
Divide by 2, 3, 4… in order to find them.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

□ − □ = 99

A number that can be divided only by one and itself is called a **prime number**. One is not a prime number.

Using Prime Numbers

5 Let's represent whole numbers by a product form of prime number.

1 Express 6 by a product form of a prime number.

2 Express 30 by a product form of a prime number.

30 = 5 × 6
= 5 × 3 × 2

Let's find divisors of 6.

3 Determine divisors of 30 by using the expression in 2.

2, 3 and 5 are easily found as divisors.

Divisor of 30 is the product of the combination of prime numbers.

6 Let's determine the greatest common divisor of 24 and 36 by using a prime number.

24 = 4 × 6 = 2 × 2 × 2 × 3

36 = 6 × 6 = 2 × 3 × 2 × 3 = 2 × 2 × 3 × 3

When the multiples representations of prime numbers products are compared, it is common to, 2 × 2 × 3 = 12.
Then, the greatest common divisor is 12.

24 = 2 × 2 × 2 × 3
36 = 2 × 2 × 3 × 3

Using multiple representation of prime number products, let's find the numbers that should be multiplied to get the same products?

24 × □ = 2 × 2 × 2 × 3 × □
36 × □ = 2 × 2 × 3 × 3 × □

7 Let's discuss how to determine the least common multiple of 24 and 36 by using a prime number.

100 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 ④ Investigate and understand the relationship between divisors and multiples.

T Introduce the Main Task. (Refer to the Blackboard Plan)
T ① Let's find divisors of 18 by arranging squared cards to a rectangle.
S Think by arranging cards.
S Divisors of 18 are 1, 2, 3, 6, 9, and 18.

### 3 ② Think about how to find the multiples of divisors.

T Is 18 a multiple of the divisors you found in ①?
S They are all divisors of 18 because they are $1 \times 18$, $2 \times 9$, and $3 \times 6$.
T What kind of rules are there between multiples and divisors?
S If we multiply the pairs for finding the divisors like 1 and 18, 2 and 9, all the answers are 18.
S All the divisors of 18 are multiples of 18.

### 4 Investigate and understand prime numbers .

T/S Read and understand the meaning of having only 1 and the number itself as divisors by using 2, 3, and 5.
T Let's find the numbers that can be divided only by 1 and itself.
S They are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, and 41.

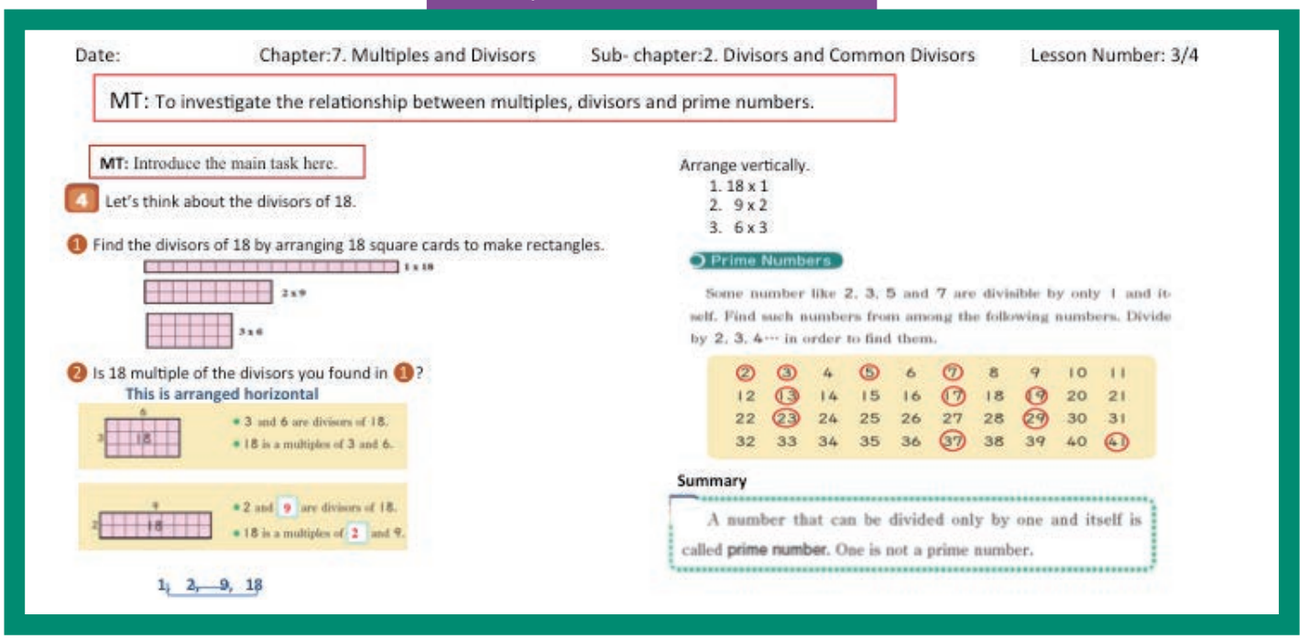
### 5 Important Point

T/S Explain the important point in the box .

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 2: Divisors and Common Divisors
### Lesson 4 of 4

Textbook Page : 100 and 101
Actual Lesson 066

## Lesson Objectives

- To represent whole numbers as a product of prime numbers.
- To find the greatest common divisor and the least common multiple.

## Prior Knowledge

- Multiple and least common multiple
- Divisor and greatest common divisor
- Prime number

## Preparation

- Chart of Kapul call out in task 7

## Assessment

- Apply prime numbers to find the greatest common divisor and the least common multiple. F
- Find the greatest common divisor and the least common multiple by using prime numbers. S

## Teacher's Notes

- Sieve of Eratosthenes is a process of straining numbers leaving prime numbers.
- To find the least common multiple of 24 and 36, multiply 24 by 3 and 36 by 2 to get 72 as the least common multiple.

A number that can be divided only by one and itself is called a **prime number**. One is not a prime number.

## Representing whole numbers as a product of prime numbers

### Using Prime Numbers

5 Let's represent whole numbers by a product form of prime number.

1 Express 6 by a product form of a prime number. $2 \times 3$ or $3 \times 2$

2 Express 30 by a product form of a prime number.

$30 = 5 \times 6$
$= 5 \times 3 \times 2$

Let's find divisors of 6.

3 Determine divisors of 30 by using the expression in 2. 1, 2, 3, 5, 6, 10, 15, 30

2, 3 and 5 are easily found as divisors.

Divisor of 30 is the product of the combination of prime numbers.

## Finding greatest common divisors using prime numbers

6 Let's determine the greatest common divisor of 24 and 36 by using a prime number.

$24 = 4 \times 6 = 2 \times 2 \times 2 \times 3$

$36 = 6 \times 6 = 2 \times 3 \times 2 \times 3 = 2 \times 2 \times 3 \times 3$

When the multiples representations of prime numbers products are compared, it is common to, $2 \times 2 \times 3 = 12$. Then, the greatest common divisor is 12.

$24 = 2 \times 2 \times 2 \times 3$
$36 = 2 \times 2 \times 3 \times 3$

Using multiple representation of prime number products, let's find the numbers that should be multiplied to get the same products?

$24 \times \square = 2 \times 2 \times 2 \times 3 \times \square$
$36 \times \square = 2 \times 2 \times 3 \times 3 \times \square$

7 Let's discuss how to determine the least common multiple of 24 and 36 by using a prime number.

$100 = \square \times \square$

## Sieve of Eratosthenes

Determine a prime number that is less than 100 by the next procedure.

① Erase 1.
② Leave 2 and erase multiple of 2.
③ Leave 3 and erase multiple of 3.

Leave the first numbers and erase its multiples.
Using this method, a prime number like 2, 3, 5, 7, 11, etc, are left.

Using this method, find a prime number until 100.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (2) | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

How many prime numbers are there?

Sieve of Eratosthenes is a method that was discovered by a mathematician named Eratosthenes in ancient Greece. He was born in BC (Before Christ) 276 and died BC 194.

$\square - \square = 101$

## Lesson Flow

### 1 Review the previous lesson.

### 2 5 Represent whole numbers by a product form of prime numbers.

T Introduce the Main Task. (Refer to the BP)
T ❶ Express 6 as a product form of a prime number.
S 3×2
T ❷ What about 30?
S 5×6=5×3×2

### 3 Think about how to find divisors of 30.

T ❸ Determine divisors of 30 by using the expression in ❷.
S 30=5×3×2
TN 2, 3, 5 can be found easily from 2×3 abd 5×3. 6 and 15 can be found from 6×5 and 15×3. Remember 1×30=30 so 1 can be a divisor of 30. So, the divisors of 30 are 1, 2, 3, 5, 6, 15 and 30.

### 4 6 Think about how to find the greatest common divisor of 24 and 36 by using a prime number.

T Show 24 as a product form of prime numbers?
S 24=2×2×2×3
T Show 36 as a product form of prime numbers?
S 36=2×2×3×3
T Which number is common for both 24 and 36?
S 2×2×3
S Greatest common divisor is 2×2×3=12.

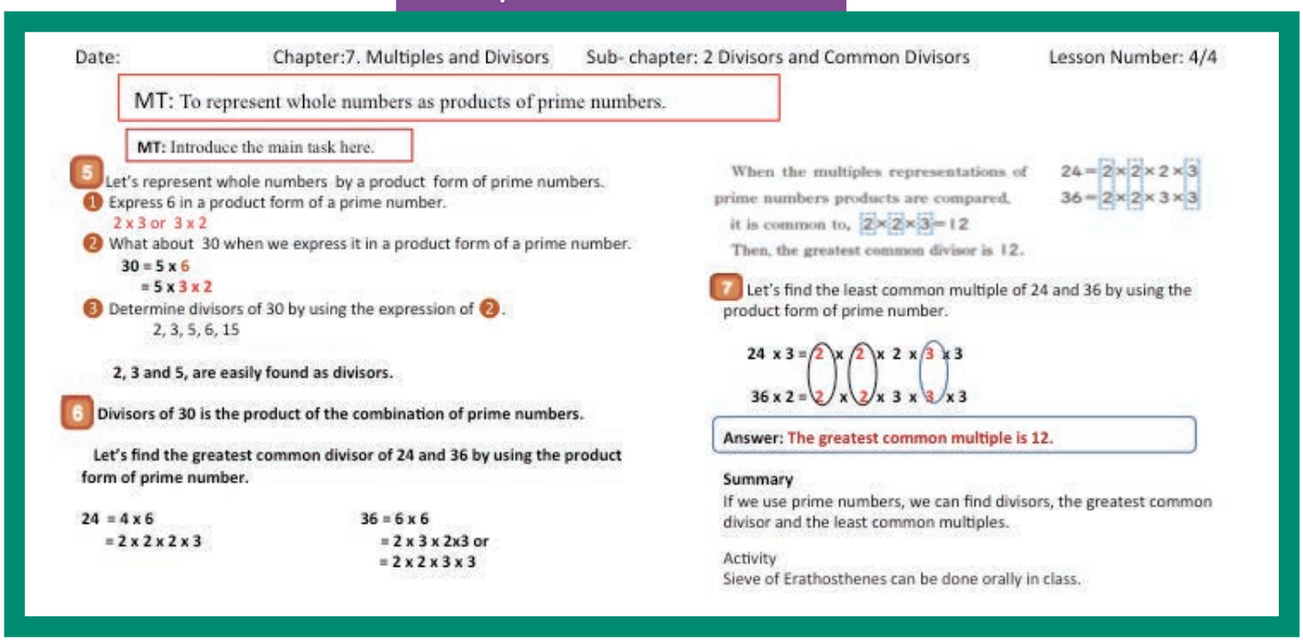
### 5 Think about how to find the least common multiple of 24 and 36 by using a prime number.

T ❼ How can we find the least common multiple using the product form of prime numbers?
S 24× ③ =2×2×2×3× ③
36× ② =2×2×3×3× ②.
To find the least common multiple of 24 and 36, multiply 24 by 3 and 36 by 2 to get 72 as the least common multiple.
T Let students know that prime numbers are useful in finding divisors, greatest common divisors and least common multiples.

### 6 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 7

# Unit: Multiples and Divisors
## Sub-unit 3: Even Numbers and Odd Numbers
### Lesson 1 of 1

Textbook Page : 102
Actual Lesson 067

## Sub-unit Objective

- To understand the meaning and characteristics of even and odd numbers.

## Lesson Objective

- To understand that whole numbers can be divided into even and odd numbers and know the meaning and characteristics of them.

## Prior Knowledge

- Whole numbers, divisors and Prime numbers

## Preparation

- Chart of important point
- Chart of tasks 1 and 2

## Assessment

- Identify the characteristics of even and odd numbers when dividing by 2. F
- Investigate where even and odd numbers are used in our surroundings. F
- Demonstrate the understanding of the characteristics of even and odd number. S

## Teacher's Notes

- Since odd numbers and even numbers are used in various places around us, searching for "even numbers" and "odd numbers" in our daily lives can be given as a homework.

### 3 Even Numbers and Odd Numbers

**1** Divide numbers from 0 to 20 into 2 groups by writing them alternately in the two rows below. Start with 0 in the upper row and then 1 in lower row, upper row, lower row, ...sequentially.

0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

1. Divide the numbers in each row by 2.
2. What did you notice when dividing numbers in each row?

**2** Arrange the whole numbers into 2 groups as shown below.

Ⓐ 0, 18, 36… 176, 212…

Ⓑ 1, 19, 37… 177, 213 …

3. In which group does 23 belong? How about 98?
4. What rule did you apply when dividing?

23 belongs to group B and 98 belongs to group A

Numbers with remainder to one group and numbers without reminders to another group

For the whole numbers, the numbers that can be divided by 2 without remainder are called **even numbers** and numbers that can be divided by 2 and leaves a remainder 1 are called **odd numbers**.

**3** Identify some situations where we can use even and odd numbers?

| Flight No | Time | Departure | Arrival | Time |
|---|---|---|---|---|
| PX240 | 08:40 | POM | HKN | 09:45 |
| PX241 | 10:15 | HKN | POM | 11:20 |
| PX110 | 12:05 | POM | MAG | 13:05 |
| PX111 | 13:35 | MAG | POM | 14:35 |
| PX186 | 15:20 | POM | HGU | 16:20 |
| PX187 | 16:50 | HGU | POM | 17:50 |
| PX113 | 07:00 | MAG | POM | 08:00 |
| PX120 | 09:00 | POM | WWK | 10:20 |
| PX121 | 10:50 | WWK | POM | 12:10 |
| PX184 | 12:55 | POM | HGU | 13:55 |
| PX185 | 14:25 | HGU | POM | 15:25 |

| | | | | |
|---|---|---|---|---|
| PX102 | 09:25 | POM | LAE | 10:10 |
| PX103 | 10:40 | LAE | POM | 11:25 |
| PX204 | 12:10 | POM | RAB | 13:35 |
| PX207 | 14:05 | RAB | POM | 15:25 |
| PX106 | 16:10 | POM | LAE | 16:55 |
| PX107 | 17:25 | LAE | POM | 18:10 |

The flight numbers such as PX240 and PX110 that depart from POM are even numbers. The flight numbers such as PX241 and PX111 that arrive in POM are odd numbers.

How about the scores in sports?

102 = □ × □

## Lesson Flow

### 1 Divide the numbers from 0 to 20 into even and odd numbers.

T Introduce the Main Task. (Refer to the BP)
T/S 1 Read and understand the situation.
S Fill in the rows with numbers into two groups.
S 1 Investigate by dividing the numbers in each row by 2.
T 2 What did you notice when dividing numbers in each row?
S Numbers divided by 2 on the upper row have no remainder whereas in the lower row, they have remainder of 1.

### 2 Dividing the whole numbers into two groups.

T/S 2 Arrange the whole numbers into two groups as shown in Ⓐ and Ⓑ.
T 3 Which group does 23 and 98 belong to, Ⓐ or Ⓑ?
S 23 belongs to group Ⓑ and 98 belongs to group Ⓐ.
T 4 What rule did you apply for dividing the two numbers into two groups?
S Grouping is done according to dividing by 2 with remainders and without remainders.

### 3 Important Point

T/S Explain the important point in the box .

### 4 3 Think about how even and odd numbers are used in our surroundings.

T/S Discuss the flight schedule to identify even and odd numbers.
T In what other places or situations are even and odd numbers used?
S Possible responses: scores in sports games, temperature, rise and fall of sea levels, etc...

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

Date: Chapter: Multiples and Divisors Sub- chapter : 3 Even Numbers and Odd Numbers Lesson Number:

MT: To understand the meaning of even and odd numbers.

MT: Introduce the main task here.

1 Divide numbers from 0 – 20 into 2 groups by writing them alternately in the two rows below. Start with 0 in the upper row, and then 1 in lower row, ..... sequentially.

1 Divide the numbers in each row by 2.

0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

2 What kind of numbers are divided in these two rows?

Numbers multiplied by 2 can also be divided by 2 without remainder.
Numbers that increases when 2 is added.
Numbers that can be divided by 2 but with remainders.

2 Divide the whole numbers into 2 groups as shown below.

Ⓐ 0, 18, 36, 176, 212, ···

Ⓑ 1, 19, 37, 177, 213, ···

1 In which group does 23 belong? 23 belongs to group B (odd numbers)
How about 98? 98 belongs to group A (even numbers)

2 What rule did you apply for dividing?
**Whether these numbers are divisible by 2 or not.**

For the whole numbers, the numbers that can be divided by 2 without remainder are called **even numbers** and numbers that can be divided by 2 and leave a remainder 1 are called **odd numbers**.

3 Identify some situations where we can use even and odd numbers from the flight schedules from Air Niugini?

Depart from POM are even numbers
Arrive in POM are odd numbers.

**Summary**
**Even Numbers:** Whole numbers that can be divided by 2 without any remainder.
**Odd Numbers:** Whole numbers which can be divided by 2 and leave a remainder 1.

P 135

# Unit 7

# Unit: Multiples and Divisors
## Exercise, Problems and Evaluation
## Lesson 1 and 2 of 2

Textbook Page : 103 and 104
Actual Lesson 068 and 069

## Lesson Objective

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise, Problems and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

- Evaluation test copy for each student

## Assessment

- Complete the Exercise and Problems correctly. S

## Teacher's Notes

This is the last lesson of Chapter 7. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.

### EXERCISE

1 Let's think about numbers up to 50. Pages 88 and 98

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |

① Make a list of the multiples of 3.
② Make a list of the multiples of 7.
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48
③ Make a list of the common multiples of 3 and 7.
7, 14, 21, 28, 35, 42, 49
④ Make a list of the divisors of 28.
1, 2, 4, 7, 14, 28
⑤ Make a list of the divisors of 32.
1, 2, 4, 8, 16, 32
⑥ Make a list of the common divisors of 28 and 32.
1, 2, 4

2 Let's write the first 3 common multiples of the following pairs of numbers. Then, find the least common multiples. Pages 92 to 94

① (3, 6) 6, 12, 18
② (8, 10) 40, 80, 120
③ (3, 5) 15, 30, 45

3 Let's find all the common divisors of the following pairs of numbers. Then, find the greatest common divisors. Pages 95 to 98

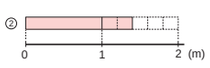
① (6, 12) 1, 2, 3, 6
② (18, 20) 1, 2
③ (32, 42) 1, 2

Express the next volume and length by a mixed fraction and an improper fraction.

Grade 4 Do you remember?

① 

$2\frac{2}{3}$ dL $\frac{8}{3}$ dL

② 

$1\frac{2}{5}$ m $\frac{7}{5}$ m

□ − □ = 103

### PROBLEMS

1 Let's write 3 multiples of the following numbers from the smallest to largest. Find all the divisors for them.
● Finding multiples and divisors.
① 16 16, 32, 48 1, 2, 3, 4, 8, 16
② 13 13, 26, 39 1, 13
③ 24 24, 48, 72 1, 2, 3, 4, 6, 8, 12, 24

2 Let's write 3 common multiples of the following pairs of numbers from the smallest to the largest. Find the least common multiple for them.
● Finding common multiples and least common multiples.
① (3, 7) 21, 42, 63
② (12, 18) 36, 72, 108
③ (10, 20) 20, 40, 60

3 Let's write all the common divisors of the following pairs of numbers.
Find the highest common divisor for them.
● Finding common divisors and the greatest common divisors.
① (9, 15) 1, 3
② (4, 11) 1
③ (12, 24) 1, 2, 3, 4, 6, 12

4 PMV bus A departs every 12 minutes and bus B departs every 8 minutes at 4 mile bus stop. Bus A and B both departed at 9 am. What is the next time that bus A and B will depart at the same time?
● Solving problems by using common multiples or common divisors.
After 72 minutes (1 hour 12 minutes) which is 10:12 am

5 Start with a sheet of graph paper that is 30 cm wide and 12 cm long. Cut out squares of the same size so that no paper is left over. How many cm is each side of the biggest square? How many of these squares can be cut out?
● Solving problems by using common multiples or common divisors.
10 of 6 cm side squares can be cut

6 Let's find the prime number that is bigger than 50 and closest to 50.
● Understanding some numbers can be divided by only 1 and itself.
53 (can be divided by only 1 and itself)

104 = □ × □

## Lesson Flow

### 1 Complete the Exercise

S Solve all the exercises.
T Confirm students' answers.
TN ① Identifying multiples and divisors
② Finding common multiples and least common multiples.
③ Finding common divisors and greatest common divisors.

### 2 Solve the Problems

S Solve all the problems.
T Confirm students' answers.
TN ①Finding multiples and divisors.
②Finding common multiples and least common multiples.
③Finding common divisors and the greatest common divisors.
④and ⑤Solving problems by using common multiples or common divisors
⑥Understanding that some numbers can be divided by only 1 and itself.

### 3 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.
S Complete the Evaluation Test.

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

| Chapter 7: Multiples and Divisors | Name: | Score / 100 |
|---|---|---|

1. Answer the following questions.

[4 x 20 marks = 80 marks]

(1) List 3 consecutive multiples of 8 from the smallest.

Answer: 16, 24 and 32

(2) List 3 consecutive common multiples of 4 and 6 from the smallest.

Answer: 12, 24 and 36

(3) List all the divisors of 36.

Answer: 1, 2, 3, 4, 6, 9, 12, 18 and 36

(4) List all the common divisors of 18 and 24 from the smallest.

Answer: 1, 2, 3 and 6

2. Answer the following questions.

[2 x 10 marks = 20 marks]

(1) For making a smallest square with rectangular papers of 5cm length and 8cm width only, find the side of the smallest square.

Answer: 40 cm

(2) What is the multiple of 7 nearest to 100?

Answer: 98

138

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

| Chapter 7:<br>Multiples and Divisors | Name: | Score<br>/ 100 |
|---|---|---|

1. Answer the following questions.

[4×20 marks=80 marks]

(1) List 3 consecutive multiples of 8 from the smallest.

Answer:

(2) List 3 consecutive common multiples of 4 and 6 from the smallest.

Answer:

(3) List all the divisors of 36.

Answer:

(4) List all the common divisors of 18 and 24 from the smallest.

Answer:

2. Answer the following questions.

[2×10 marks=20 marks]

(1) For making a smallest square with the rectangular papers of 5 cm length and 8 cm width only, find the side of the smallest square.

Answer:

(2) What is the multiple of 7 nearest to 100?

Answer:

# Chapter 8 Fractions

## 1. Content Standard

5.1.1 Apply the process of addition and subtraction to add and subtract the fractions with different denominators.

## 2. Unit Objectives

- To deepen the understanding about fractions.
- To change whole number or decimal number to fraction and vice versa.
- To recognise that when multiplying or dividing both numerator and denominator by the same number the amount of fraction doesn't change.
- To recognise that the quotient of division of whole number can be expressed as a fraction.
- To understand how to compare the fraction with different denominators.

## 3. Teaching Overview

In this unit, students will expand their conception of fractions with the introduction of equivalent fractions.

**Equivalent Fractions :**

There are infinite expressions of a fraction and that is by changing the denominator and the numerator of a fraction. Students will then know that there are always equivalent fractions for any fractions.

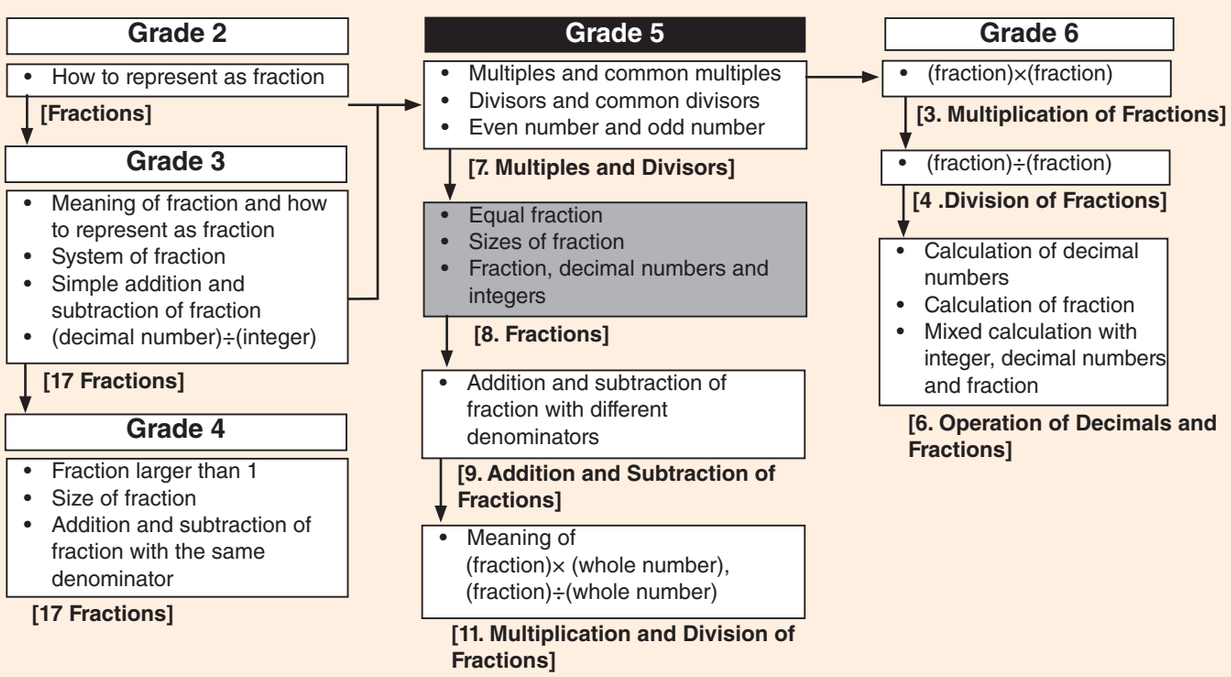
**Comparison of Fractions :**

They will know that they can compare fractions by making the same denominators.
As they experience making denominators bigger by making its equivalent fractions, they also acquire the skill of canceling unconsciously.

**Fractions, Decimals and Whole Numbers :**

They will learn that the result of a division can be expressed as a fraction.
Through doing many divisions, they will also find the relationship among fraction, decimal, and whole number and their correspondences.

## 4. Related Learning Contents



# Unit 8

# Unit: Fractions
## Sub-unit 1: Equivalent Fractions
### Lesson 1 of 1

Textbook Page : 106 to 109
Actual Lesson 070

## Sub-unit Objectives

- To understand that even the denominator or numerator are different, the same amount of fraction can be made.
- To understand that when multiplying or dividing both numerator and denominator by the same number the amount of fraction doesn't change.

## Lesson Objectives

- To express a unit fraction as various fractions.
- To investigate the fractions which have the same amount of quantity.

## Prior Knowledge

- Equivalent fractions using number lines (Grade 4)
- Fraction unit idea (Grade 4)
- Fractions equal to $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{3}{4}$ (Grade 4)

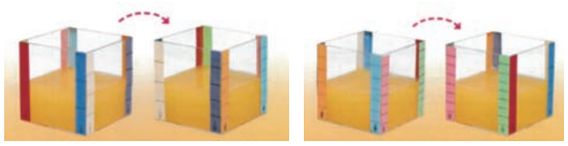
## Preparation

- Fraction measuring container (Prepare fraction measuring container as seen in the textbook), juice (use water or other liquids if juice is not available)

## Assessment

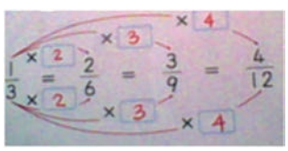
- Think about how same amount of juice can be represented in various fractions. F
- Compare and find the equivalent fraction using unit fraction idea. F S

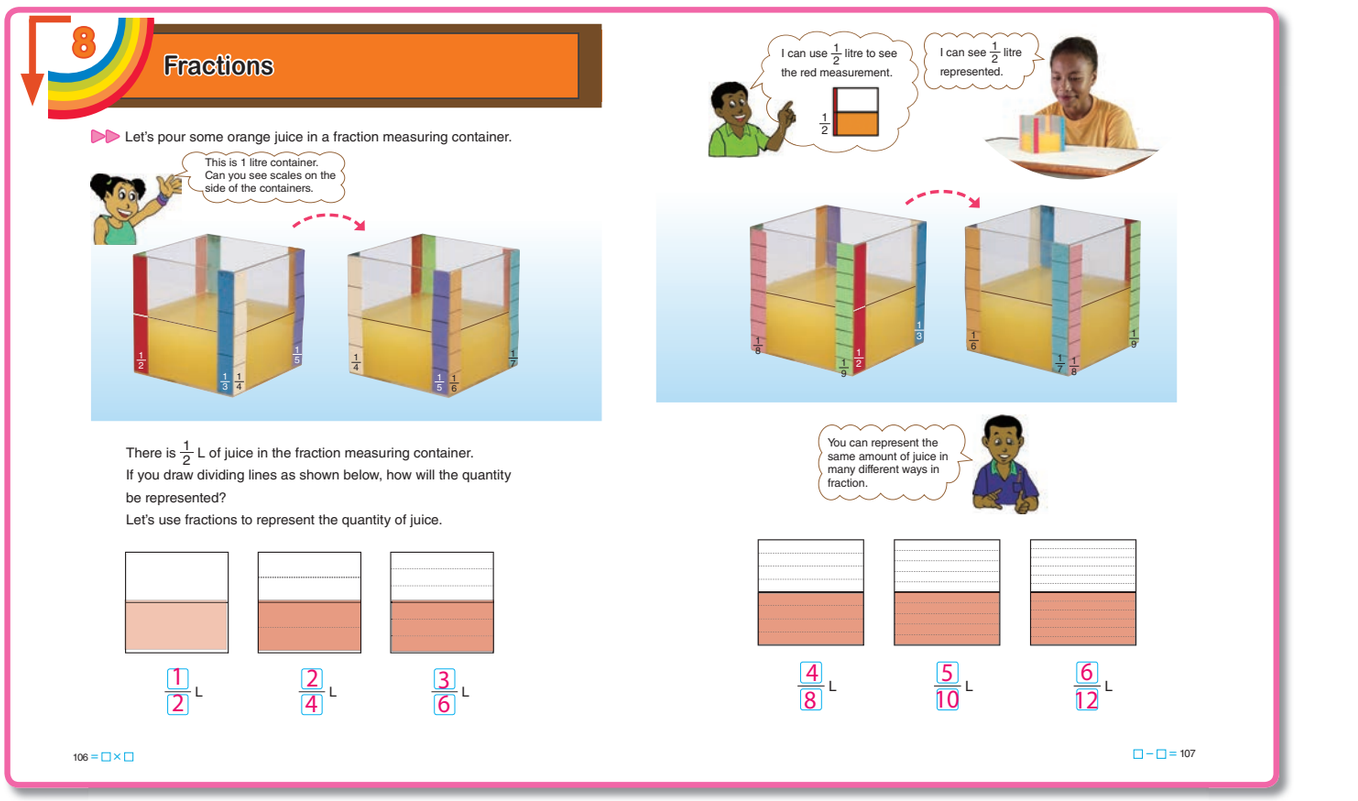
## Teacher's Notes



Students should know that the amount of juice as $\frac{1}{2}$ L does not change. The unit fraction changes to different fractions with the same amount of juice. This leads to the clear understanding of making equivalent fraction for $\frac{1}{2}$ L.

- Making equivalent fractions, the numerator and the denominator are multiplied by the same number.



## Lesson Flow

### 1 Think about equal fraction when using the juice in the measuring container.

T Introduce the Main Task. (Refer to the BP)

T/S Read and understand the situation.

T Ask the students to observe the 1 L juice in the fraction measuring container and discuss about what they can see.

S Express that the juice measure $\frac{1}{2}$ L can also be measured using other fraction containers.

TN Appreciate students' responses and their reasons to what they have observed.

T Confirm students' responses.

T Ask students to shade the portion and write the fraction in Litres.

S Represent the quantity of juice in fraction. ($\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, $\frac{5}{10}$ and $\frac{6}{12}$)

### 2 1 Explore equivalence of fractions using the number line.

T/S Use the number line to explore the equivalence of fractions.

### 3 1 Find the fractions which are equivalent to $\frac{1}{2}$ and $\frac{1}{3}$.

T Let the students use the equivalence of fractions on the number lines for 1 and 2.

S Write the equivalent fractions for $\frac{1}{2}$ and $\frac{1}{3}$ by filling in the box $\square$.

### 4 3 4 Find how many times the numerator and the denominator are multiplied by a number of the fraction $\frac{1}{2}$ and $\frac{1}{3}$.

S Find and write the numbers which are multiplied to each denominator and the numerator of the fraction $\frac{1}{2}$ and $\frac{1}{3}$.

### 5 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

### 6 Summary

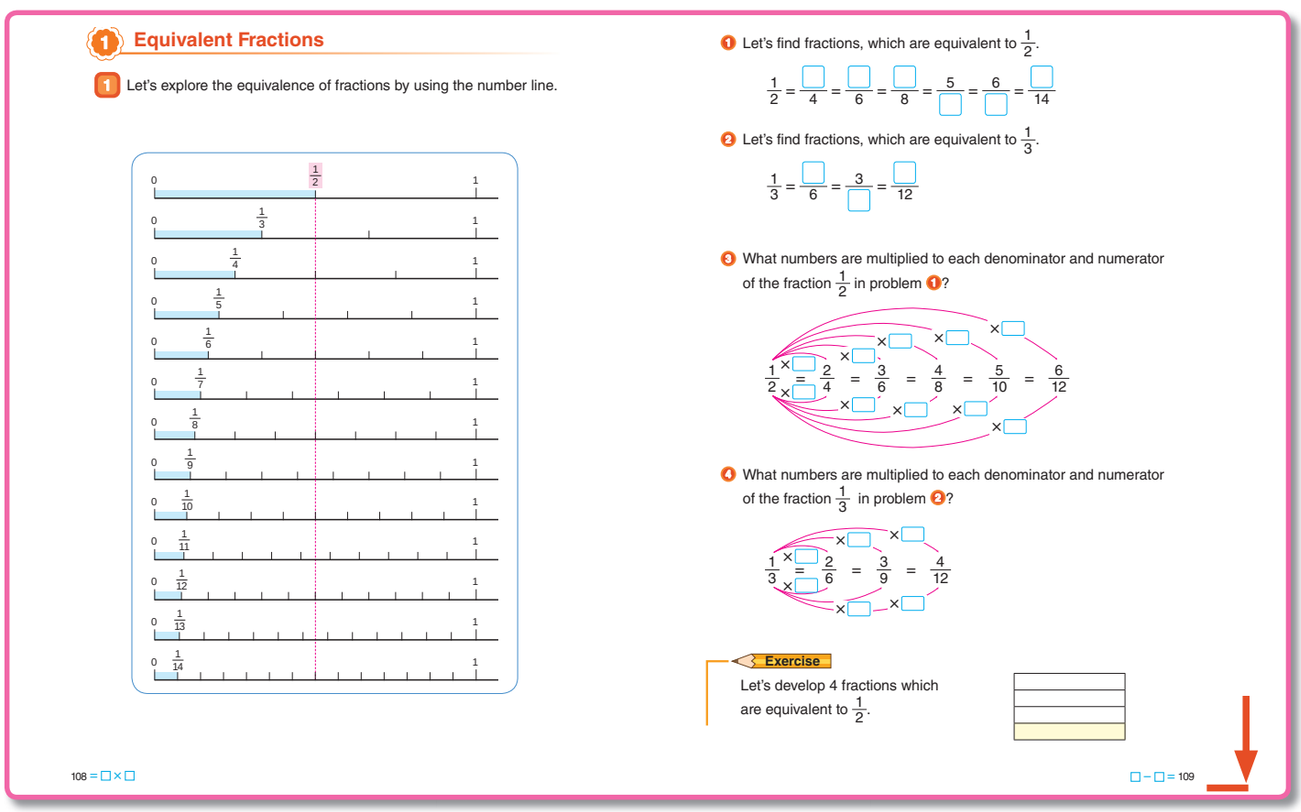
T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

Lesson 070 Sample Blackboard Plan is on page 153.



1 Equivalent Fractions

1 Let's explore the equivalence of fractions by using the number line.



1 Let's find fractions, which are equivalent to $\frac{1}{2}$.

$\frac{1}{2} = \frac{\square}{4} = \frac{\square}{6} = \frac{\square}{8} = \frac{5}{\square} = \frac{6}{\square} = \frac{\square}{14}$

2 Let's find fractions, which are equivalent to $\frac{1}{3}$.

$\frac{1}{3} = \frac{\square}{6} = \frac{3}{\square} = \frac{\square}{12}$

3 What numbers are multiplied to each denominator and numerator of the fraction $\frac{1}{2}$ in problem 1?

$\frac{1}{2} \overset{\times\square}{=} \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

4 What numbers are multiplied to each denominator and numerator of the fraction $\frac{1}{3}$ in problem 2?

$\frac{1}{3} \overset{\times\square}{=} \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$

Exercise

Let's develop 4 fractions which are equivalent to $\frac{1}{2}$.



108 = □ × □

□ − □ = 109

# Unit 8

# Unit: Fractions
## Sub-unit 2: Comparison of Fractions
### Lesson 1 of 4

Textbook Page : 110 and 111
Actual Lesson 071

## Sub-unit Objectives

- To understand how to compare fractions with different denominators.
- To understand how to make equivalent fractions.
- To understand how to reduce fractions.

## Lesson Objectives

- Compare fractions with different denominators by changing their representations using the same denominator.
- To identify and understand the meaning of equivalent fraction.

## Prior Knowledge

- Making equivalent fractions by multiplying the numerator and denominator with the same number

## Preparation

- Chart of diagram representation for 1

## Assessment

- Think about how to compare fractions with different denominators by changing their representations using the same denominator. F
- Understand the meaning of equivalent fractions. S

## Teacher's Notes

This lesson focuses on "How to compare factions with different denominators."
Firstly, treat individual fraction to find the equivalent fraction by multiplying or dividing the numerator and the denominator with the same number.
$\frac{4}{3}=\frac{4}{6}$, $\frac{6}{9}$ and $\frac{8}{12}$
$\frac{3}{4}=\frac{6}{8}$ and $\frac{9}{12}$.
Secondly, make comparisons to identify the same denominator from the equivalent fractions made.
$\frac{2}{3}=\frac{4}{6}$, $\frac{6}{9}$ and $\frac{8}{12}$
$\frac{3}{4}=\frac{6}{8}$ and $\frac{9}{12}$.
Thirdly, change the fractions to the same denominator and compare.
$\frac{2}{3}=\frac{8}{12}$ < less or smaller than $\frac{3}{4}=\frac{9}{12}$.

## 2 Comparision of Fractions

Let's compare the sizes of $\frac{2}{4}$, $\frac{2}{3}$ and $\frac{3}{4}$.

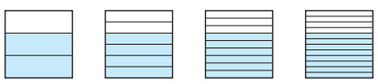
$\frac{2}{4}$ and $\frac{3}{4}$ have same denominator so we can compare them.

How can we compare the sizes of $\frac{2}{3}$ and $\frac{3}{4}$.

**Let's think about how to compare the size of fractions with different denominators.**

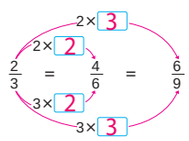
1 Let's think about how to compare $\frac{2}{3}$ and $\frac{3}{4}$.

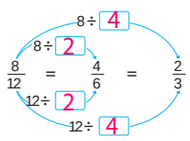
1 Let's represent $\frac{2}{3}$ using various fractions.



Ⓐ Let's represent $\frac{2}{3}$ by $\frac{1}{6}$, $\frac{1}{9}$ and $\frac{1}{12}$ as the units.

Ⓑ What is the relationship between denominators and numerators of equivalent fractions?




The size of fractions does not change even if the numerator and denominator are multiplied or divided by the same number.

$\frac{▲}{●}=\frac{▲\times■}{●\times■}=\frac{▲\div■}{●\div■}$

110 = □×□

## Page 111 of the textbook

2 Let's represent $\frac{3}{4}$ by $\frac{1}{8}$, $\frac{1}{12}$ and $\frac{1}{16}$ as the units.

$\frac{3}{4}=\frac{3\times 3}{4\times 3}=\frac{9}{12}$

The same fraction can be represented in many ways by changing the units.

3 Let's compare $\frac{2}{3}$ and $\frac{3}{4}$ by changing their representation using the same denominator.

$\frac{2}{3}=\frac{8}{12}$, $\frac{3}{4}=\frac{4}{12}$ therefore, $\frac{2}{3}$ < $\frac{3}{4}$

## Lesson Flow

**1 Review the previous lesson.**

**2 Compare the sizes of $\frac{2}{4}$, $\frac{2}{3}$ and $\frac{3}{4}$.**

T Which of these fractions can be compared easily?
S Express that $\frac{2}{4}$ and $\frac{3}{4}$ can be compared.
T Explain why they can be compared easily?
S $\frac{2}{4}$ and $\frac{3}{4}$ have the same denominator so we can compare them and realise that $\frac{2}{3}$ and $\frac{3}{4}$ are difficult to compare because they have different denominators.
T How can we compare $\frac{2}{3}$ and $\frac{3}{4}$?
S Present their ideas.
T Introduce the Main Task. (Refer to the BP)

**3 ① Think about how to compare the size of fractions with different denominators.**

T Emphasise that since $\frac{2}{3}$ and $\frac{3}{4}$ have different denominators, how can we compare them?
S ① Observe the representation of $\frac{2}{3}$ in various fractions using the fraction unit of $\frac{1}{6}$, $\frac{1}{9}$ and $\frac{1}{12}$.
T Let's represent $\frac{2}{3}$ by units of $\frac{1}{6}$, $\frac{1}{9}$ and $\frac{1}{12}$. (Refer to diagram)
S Ⓐ Identify $\frac{2}{3}$ by fraction unit of $\frac{1}{6}$ is $\frac{4}{6}$, $\frac{1}{9}$ is $\frac{6}{9}$ and $\frac{1}{12}$ is $\frac{8}{12}$.
TN The quantity remains the same however the fraction (numerator and denominator) changes to make other equal fractions which are equivalent fractions to $\frac{2}{3}$.

**4 ① Ⓑ Finding the relationship between the numerator and denominator of the equivalent fractions.**

S Write the correct answers by filling in the box ☐ to find the relationship between the denominators and numerators of equivalent fractions.

**5 Important Point**

T/S Explain the important point in the box ☐.

**6 ② Represent $\frac{3}{4}$ by using unit fraction of $\frac{1}{8}$, $\frac{1}{12}$ and $\frac{1}{16}$.**

S Write the correct answers by filling in the box ☐ by multiplying the numerator and the denominator with the same number.

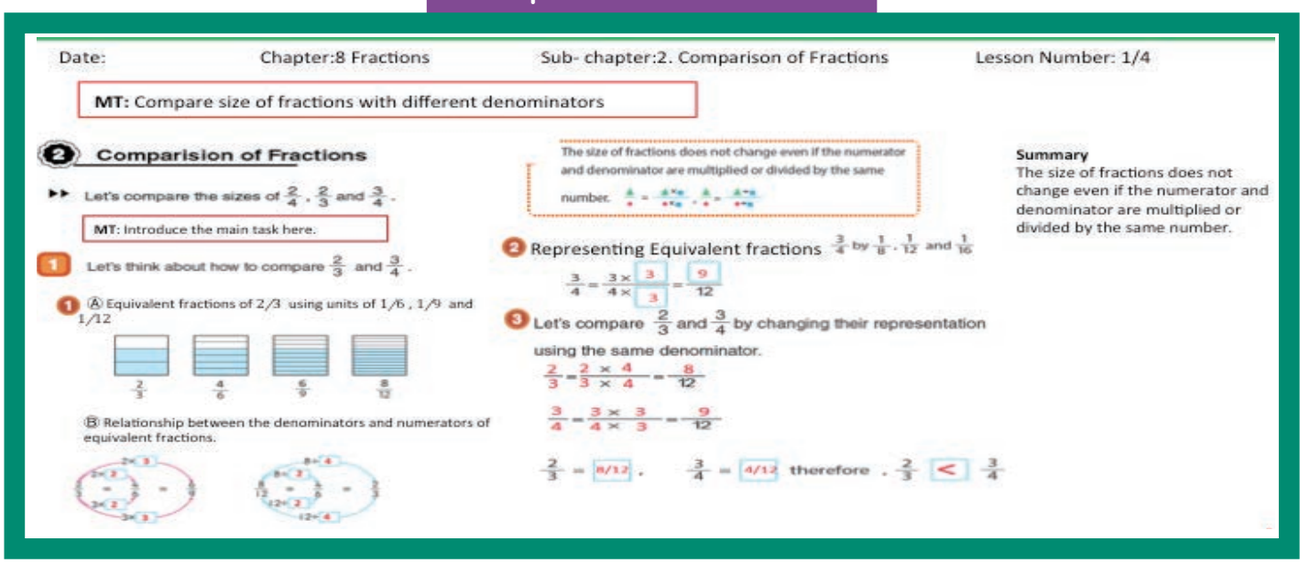
**7 ③ Comparing $\frac{2}{3}$ and $\frac{3}{4}$ by changing their representations using the same denominator.**

T Ask the students to look back when finding the equivalent fractions for $\frac{2}{3}$ and $\frac{3}{4}$.
S Identify the equivalent fractions for $\frac{2}{3}$ and $\frac{3}{4}$.
$\frac{2}{3}=\frac{8}{12}$
$\frac{3}{4}=\frac{9}{12}$ and therefore, $\frac{2}{3}<\frac{3}{4}$.
T What is the same denominator to find the equivalent fraction for $\frac{2}{3}$ and $\frac{3}{4}$?
TN In order to find the same denominator, we use the idea of finding the least common multiple.
S Find the same denominator as 12 and compare the two fractions by filling in the box ☐.

**8 Summary**

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 8: Unit: Fractions
## Sub-unit 2: Comparison of Fractions
### Lesson 2 of 4

Textbook Page : 112
Actual Lesson 072

## Lesson Objective

- Convert the fractions with different denominators to a common denominator and understand the meaning of equivalent fractions.

## Prior Knowledge

- The size of fractions does not change even if the numerator and the denominator are multiplied or divided by the same number.
- Comparing the fractions with different denominators when converting the different denominators to the same denominator.

## Preparation

- Chart of equivalent fractions

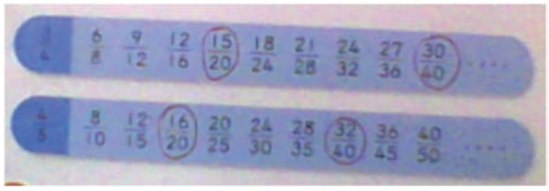
## Assessment

- Think about how to compare the fractions with different denominators to same denominators to make equivalent fraction and compare. F S

## Teacher's Notes

In this lesson the main idea is to find the common denominator for the fractions with different denominators and make comparison. The fractions with different denominators can be compared when the different denominators are made the same.

1. Change the given fractions to equivalent fractions to find the common denominator.




The common denominators are 20 and 40.
Comparing using 20 and 40 as common denominators $\frac{3}{4}$ is smaller than $\frac{4}{5}$.

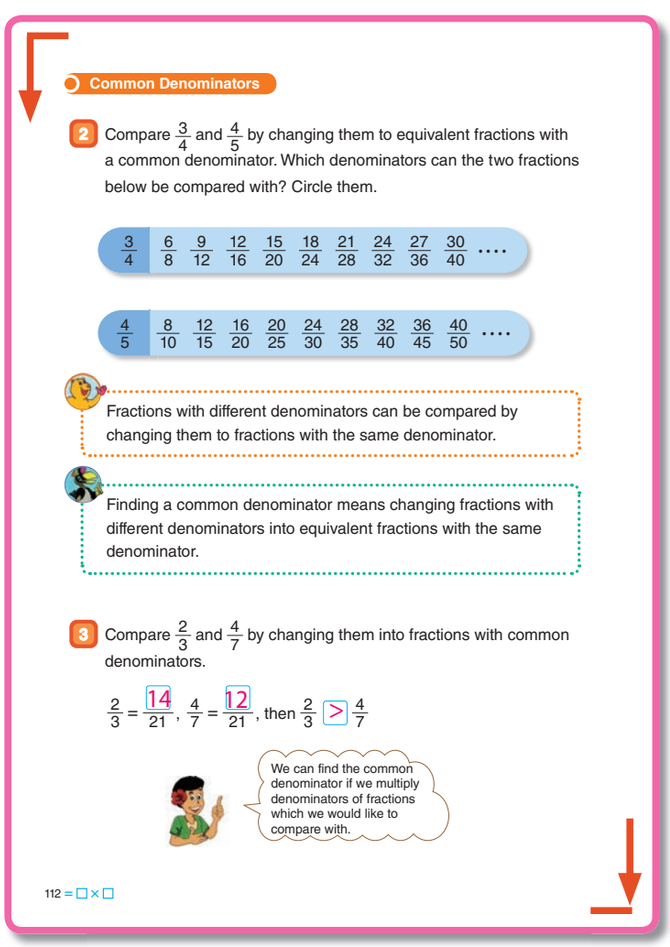
2. To find the common denominator the denominators of fractions to be compared are multiplied.
$\frac{2}{3}$ and $\frac{4}{7}$ ($3\times7$ or $7\times3=21$ becomes the common denominator.)

The common denominator is 21 therefore $\frac{2}{3}$ is greater than $\frac{4}{7}$

$\frac{4\times3=12}{7\times3=21}$

$\frac{2\times7=14}{3\times7=21}$

The numerators and denominators are multiplied by the same number to make equivalent fractions.



Common Denominators

2 Compare $\frac{3}{4}$ and $\frac{4}{5}$ by changing them to equivalent fractions with a common denominator. Which denominators can the two fractions below be compared with? Circle them.

$\frac{3}{4}$ $\frac{6}{8}$ $\frac{9}{12}$ $\frac{12}{16}$ $\frac{15}{20}$ $\frac{18}{24}$ $\frac{21}{28}$ $\frac{24}{32}$ $\frac{27}{36}$ $\frac{30}{40}$ ....

$\frac{4}{5}$ $\frac{8}{10}$ $\frac{12}{15}$ $\frac{16}{20}$ $\frac{20}{25}$ $\frac{24}{30}$ $\frac{28}{35}$ $\frac{32}{40}$ $\frac{36}{45}$ $\frac{40}{50}$ ....

Fractions with different denominators can be compared by changing them to fractions with the same denominator.

Finding a common denominator means changing fractions with different denominators into equivalent fractions with the same denominator.

3 Compare $\frac{2}{3}$ and $\frac{4}{7}$ by changing them into fractions with common denominators.

$\frac{2}{3}=\frac{14}{21}$, $\frac{4}{7}=\frac{12}{21}$, then $\frac{2}{3}$ > $\frac{4}{7}$

We can find the common denominator if we multiply denominators of fractions which we would like to compare with.

112 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 2 Think about how to compare $\frac{3}{4}$ and $\frac{4}{5}$.

T Introduce the Main Task. (Refer to the BP)

T/S Read and understand the situation.

T How can we compare $\frac{3}{4}$ and $\frac{4}{5}$?

S By changing the representations using the same denominator from previous lesson.

T Confirm students' responses.

TN Students realise and understand that to compare $\frac{3}{4}$ and $\frac{4}{5}$, the fractions have to be changed to equivalent fractions with a common denominator.

T Ask students to observe the equivalent fraction for $\frac{3}{4}$ and $\frac{4}{5}$ and circle the denominators that can be used to compare the two fractions.

S $\frac{5}{4}$ $\frac{15}{20}$, $\frac{30}{40}$

$\frac{5}{4}$ $\frac{16}{20}$, $\frac{32}{40}$

TN There are two fractions with common denominators, however, we can compare using the first fractions with a common denominator.

### 3 Important Points.

T/S Explain the important points in the boxes ☐ and ☐.

### 4 3 Compare $\frac{2}{3}$ and $\frac{4}{7}$ by changing them into fractions to common denominators.

S Fill in the box ☐ with equivalent fraction for $\frac{2}{3}$ and $\frac{4}{7}$ by multiplying the denominators then compare with the inequality sign.

$\frac{2}{3} \overset{\times 7}{\underset{\times 7}{}} \frac{\square}{21}$ $\quad \frac{4}{7} \overset{\times 3}{\underset{\times 3}{}} \frac{\square}{21}$ → Compare $\frac{2}{3} \square \frac{4}{7}$

TN We can find the common denominator of $\frac{2}{3}$ and $\frac{4}{7}$ by multiplying the denominators of both fractions that are compared.

### 5 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

Date: Chapter:8 Fractions Sub- chapter:2. Comparison of Fractions Lesson Number: 2/4

**MT:** Compare fractions with different denominators by converting them to fractions with common denominators.

**MT:** Introduce the main task here.

**Common Denominators**

2 Compare $\frac{3}{4}$ and $\frac{4}{5}$ by changing them to equivalent fractions with a common denominator.

**Equivalent fractions for 3/4**

3/4 : 6/8 , 9/12, 12/16, 15/20, 18/24 , 21/28, 24/32 , 27/36, 30/40

**Equivalent fractions for 4/5**

4/5 : 8/10 , 12/15, 16/20, 20/25, 24/30 , 28/35, 32/40 , 36/45, 40/50

Fractions with different denominators can be compared by changing them to fractions with the same denominator.

Finding a common denominator means changing fractions with different denominators into equivalent fractions with the same denominator.

3 Compare $\frac{2}{3}$ and $\frac{4}{7}$ by changing them into fractions with common denominators.

$\frac{2}{3} = \frac{14}{21}$ , $\frac{4}{7} = \frac{12}{21}$ , then, $\frac{2}{3} > \frac{4}{7}$

**Summary**

Fractions with different denominators can be compared by changing them to fractions with common denominators and then calculate.

# Unit 8: Unit: Fractions
## Sub-unit 2: Comparison of Fractions
### Lesson 3 of 4

Textbook Page : 113
Actual Lesson 073

## Lesson Objectives

- Identify and find the least common multiples as common denominators in equivalent fractions to compare sizes of given fractions.
- Identify how to compare mixed fractions and improper fractions using a common denominator.

## Prior Knowledge

- Comparing the fractions with different denominators when converting the different denominators to the same denominator.
- Finding a common denominator means changing fractions with different denominators into equivalent fractions with the same denominator.

## Preparation

- Chart of Mero's and Yamo's Ideas

## Assessment

- Think about how to find the least common multiples as common denominators. F
- Compare mixed fractions and improper fractions using a common denominator. F S

## Teacher's Notes

To find the common denominator for two fractions that are compared, one idea discussed in this lesson is to multiply the two denominators to get a common denominator as shown below:

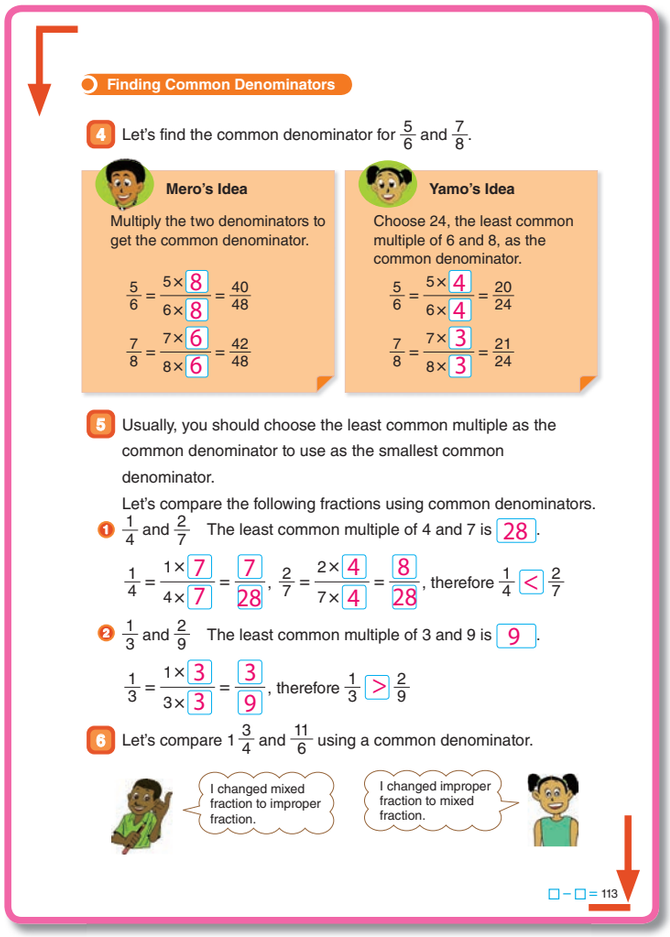
$$\frac{4}{5}=\frac{4\times\square}{5\times\square}=\frac{18}{30}$$

$$\frac{2}{3}=\frac{2\times\square}{3\times\square}=\frac{10}{30}$$

The other idea is to choose the least common multiple of 5 and 3 as the common denominator.

$$\frac{4}{5}=\frac{4\times\square}{5\times\square}=\frac{12}{15}$$

$$\frac{2}{3}=\frac{2\times\square}{3\times\square}=\frac{10}{15}$$



Finding Common Denominators

4 Let's find the common denominator for $\frac{5}{6}$ and $\frac{7}{8}$.

**Mero's Idea**

Multiply the two denominators to get the common denominator.

$\frac{5}{6}=\frac{5\times 8}{6\times 8}=\frac{40}{48}$

$\frac{7}{8}=\frac{7\times 6}{8\times 6}=\frac{42}{48}$

**Yamo's Idea**

Choose 24, the least common multiple of 6 and 8, as the common denominator.

$\frac{5}{6}=\frac{5\times 4}{6\times 4}=\frac{20}{24}$

$\frac{7}{8}=\frac{7\times 3}{8\times 3}=\frac{21}{24}$

5 Usually, you should choose the least common multiple as the common denominator to use as the smallest common denominator.

Let's compare the following fractions using common denominators.

1 $\frac{1}{4}$ and $\frac{2}{7}$ The least common multiple of 4 and 7 is 28.

$\frac{1}{4}=\frac{1\times 7}{4\times 7}=\frac{7}{28}$, $\frac{2}{7}=\frac{2\times 4}{7\times 4}=\frac{8}{28}$, therefore $\frac{1}{4}<\frac{2}{7}$

2 $\frac{1}{3}$ and $\frac{2}{9}$ The least common multiple of 3 and 9 is 9.

$\frac{1}{3}=\frac{1\times 3}{3\times 3}=\frac{3}{9}$, therefore $\frac{1}{3}>\frac{2}{9}$

6 Let's compare $1\frac{3}{4}$ and $\frac{11}{6}$ using a common denominator.

I changed mixed fraction to improper fraction.

I changed improper fraction to mixed fraction.

□ – □ = 113

## Lesson Flow

### 1 Review the previous lesson.

### 2 4 Find the common denominator for $\frac{5}{6}$ and $\frac{7}{8}$.

T Introduce the Main Task. (Refer to the BP)

TN In the other lessons, fractions with different denominators were converted into equivalent fractions with the same denominator to compare.

T Ask students to find the common denominator for $\frac{5}{6}$ and $\frac{7}{8}$.

S Present their ideas with reasons.

T Let the students discuss and explain the ideas used by Mero and Yamo.

S Observe the two ideas and fill in the box ☐ and share their explanations.

TN Mero's Idea - He multiplied the two denominators to get the common denominator.
6×8 and 8×6 and both gives the common denominator 48.
Yamo's Idea - She chose the least common multiple of 6 & 8 as the common denominator which is 24.

S Identify the least common multiple which is usually used as the lowest common denominator to compare fractions with different denominators.

### 3 5 Find the common denominator for fractions in 1 and 2.

S Compare the following fractions using common denominators for 1 and 2.

S Complete the two activities.

T Confirm students' answers.

### 4 6 Compare mixed fraction and improper fraction using a common denominator.

T Compare $1\frac{3}{4}$ and $\frac{11}{6}$ using a common denominator.

TN Use the hints in the bubbles to find the common denominator.

S Change the fractions to either mixed fractions or improper fractions to find the common denominators for both fractions.

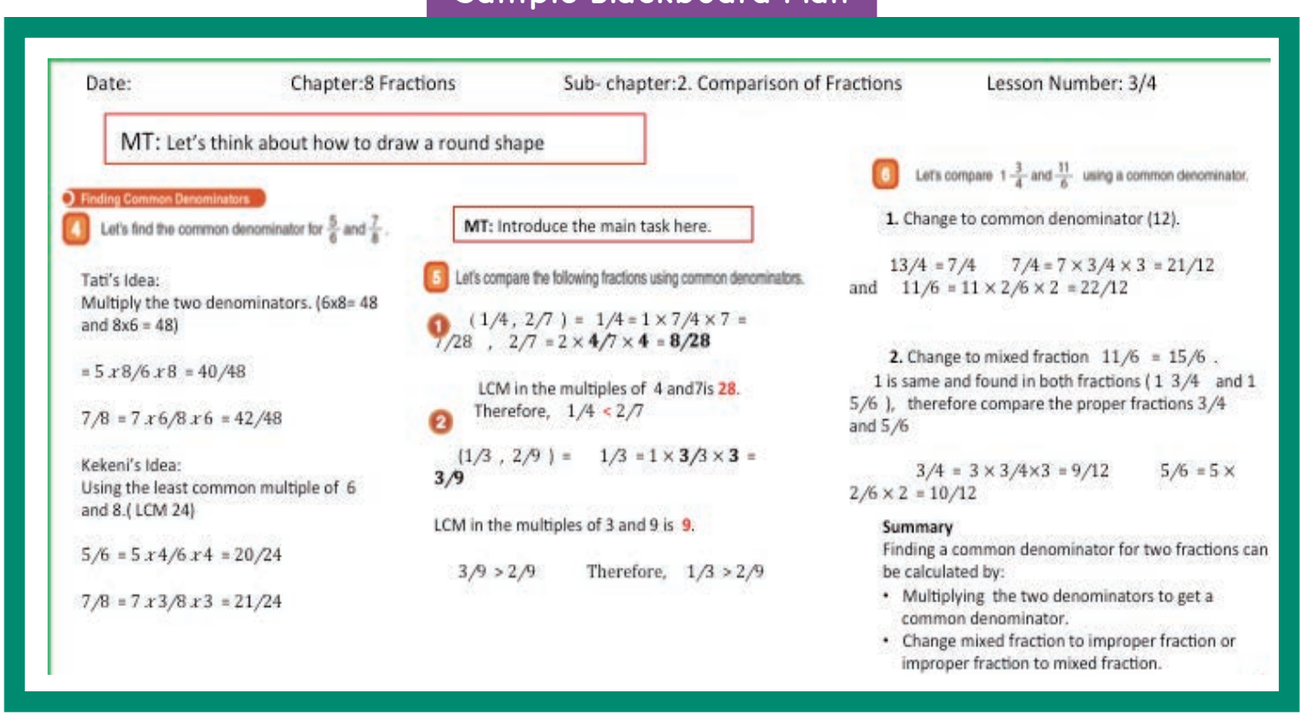
### 5 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 8

# Unit: Fractions
## Sub-unit 2: Comparison of Fractions
### Lesson 4 of 4

Textbook Page : 114 and 115
Actual Lesson 074

## Lesson Objectives

- Define and understand the meaning of reduction of fractions and how to reduce fraction.
- Reduce given fractions by finding and using the Greatest Common Divisor.

## Prior Knowledge

- Meaning of making equivalent fraction and comparing fractions using equivalent fractions.
- How to find the common denominator using least common multiple or multiplying the two denominators in given fractions.

## Preparation

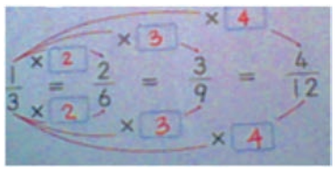
- Chart of Important Point

## Assessment

- Define and understand the meaning of reduction of fraction. F
- Explain how to reduce the fractions using the Greatest Common Divisor. F S
- Solve the exercise correctly. S

## Teacher's Notes

To find Equivalent fractions with the common denominator for comparison, the numerator and denominator are multiplied with the same number that increases the numerators and denominators making them become bigger fractions.

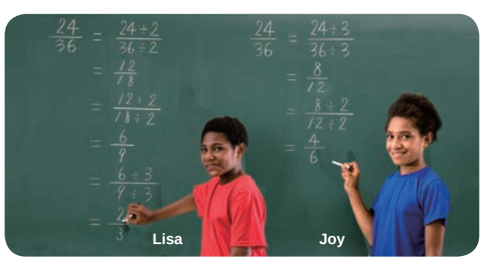



In Reduction of Fraction the numerator and denominator are divided by a number bigger, so the numerator or denominator can be divided with the same common factor by making the denominator as small as possible.

$$\frac{24}{36} \overset{\div 2}{=} \frac{12}{18} \overset{\div 2}{=} \frac{6}{9} \overset{\div 3}{=} \frac{2}{3}$$

### Reducing Fractions

**7** Lisa and Joy are looking for fractions that are equivalent to $\frac{24}{36}$ and with denominators and numerators smaller than 36 and 24.




1. What rule of fraction are they using?
2. Lisa and Joy got different fractions. Explain their reasons.

**Because**

It is a word used to explain, by stating the conclusion first and then explaining why by showing a reason.

" ○○○ is because △△△ ".

For example: We reduce fractions **because** it makes calculation easier.

Reducing a fraction means dividing the numerator and denominator by a common divisor to make a simpler fraction.

When we reduce a fraction, we usually divide until we get the smallest numerator and denominator.

**8** Steven and Alex reduced $\frac{12}{18}$. Let's explain their ideas.


1. What are the similarities in their ideas?
2. What are the differences between their ideas?

When you reduce a fraction, use the greatest common divisor to reduce the denominator and numerator, just like Alex did in 8.

**Exercise**

**1** Let's reduce these fractions to a common denominator and fill in the □ with inequality signs.

① $\frac{2}{3} < \frac{4}{5}$ ② $\frac{1}{2} > \frac{3}{8}$ ③ $\frac{5}{6} < \frac{8}{9}$ ④ $\frac{7}{12} < \frac{5}{8}$

**2** Let's reduce these fractions.

① $\frac{8}{10}$ $\frac{4}{5}$ ② $\frac{3}{21}$ $\frac{1}{7}$ ③ $\frac{16}{20}$ $\frac{4}{5}$ ④ $\frac{18}{24}$ $\frac{3}{4}$

114 = □ × □

□ − □ = 115

## Lesson Flow

### 1 Review the previous lesson.

### 2 7 Think about how to reduce the fraction $\frac{24}{36}$

T/S Read and understand the situation.

T Ask the students to think of how to get $\frac{24}{36}$ back to a smaller numerator and denominator by referring to Lisa's and Joy's blackboard work.

S Observe Lisa and Joy's blackboard work and discuss 1 and 2.
Possible answers:
1 They are dividing by the same number in which the amount doesn't change.
2 They have different fractions because Lisa is dividing by 2, then by 2 and by 3 while Joy is dividing by 3 and then by 2.

T Pose guided questions for students to identify that to get bigger fraction down to smaller fraction division operation is applied and so the numerator or denominator can be divided with the same common number by making the denominator as small as possible.It is called reducing of fractions.

T Introduce the Main Task. (Refer to the BP)

### 3 Important Point

T/S Explain the important point in the box .

### 4 8 Think about how to reduce the fraction $\frac{12}{18}$

T Ask students to observe Steven's and Alex's board presentations and discuss what they can find from the two presentations by answering 1 and 2.

S Possible answers are: the similarity is they are dividing the same number to get $\frac{2}{3}$ and the difference is Steven is doing two calculations ÷ by 2 and then ÷ by 3 while Alex is doing only one calculation ÷ by 6.

### 5 Important Point

T/S Explain the important point in the box .

### 6 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

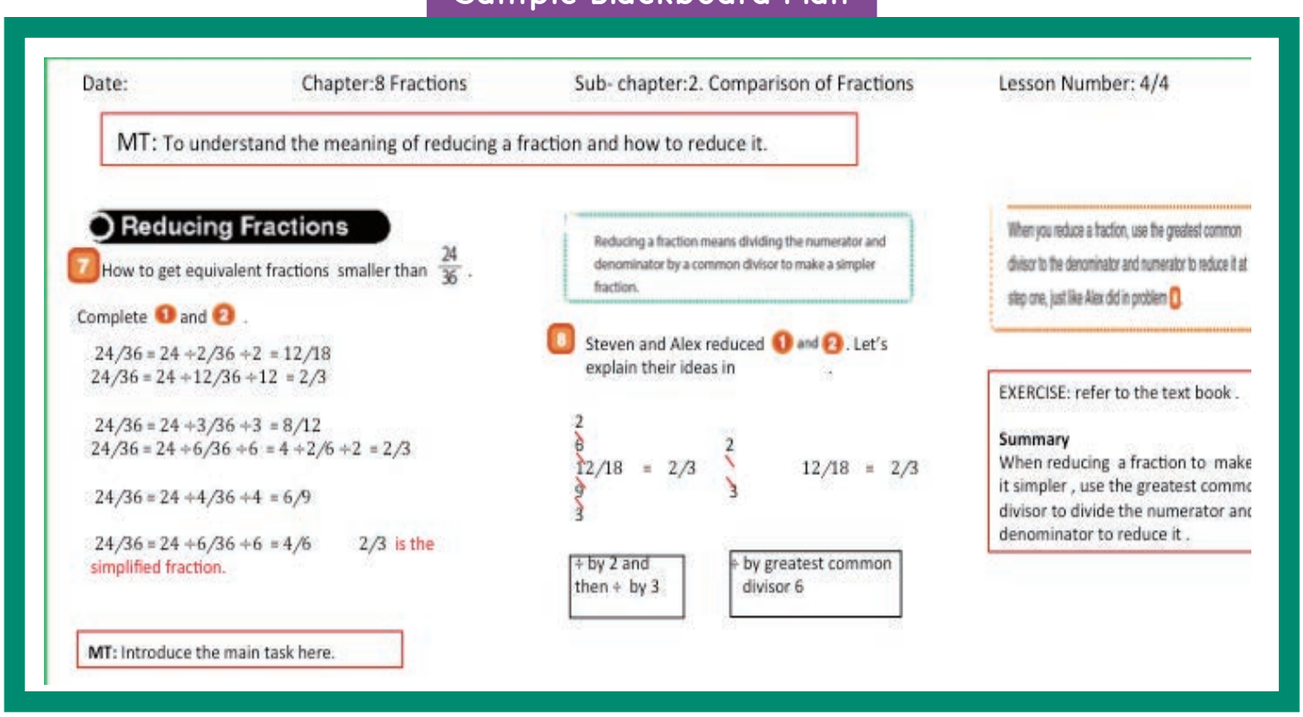
### 7 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 8

# Unit: Fraction
## Sub-unit 3: Fractions, Decimals and Whole Numbers
## Lesson 1 of 5

Textbook Page : 116 and 117
Actual Lesson 075

## Sub-unit Objectives

- To think about how to express quotient by not using the whole number and the decimal number.
- To understand the relationship among fractions, decimal numbers and whole numbers.
- To change fractions to decimals, fraction to whole numbers and vice versa.

## Lesson Objective

- To think about how to express the amount when 2 L is divided into 3 students. (2 ÷ 3)

## Prior Knowledge

- Division of whole numbers and decimal numbers (Grade 4)

## Preparation

- 2 L milk or other available liquid of 2 L

## Assessment

- Think about how to express the quotient of 2 ÷ 3. F
- Understand how to express the quotient of 2 ÷ 3. S

## Teacher's Notes

Refer to Page 151

### 1 Fractions, Decimals and Whole Numbers

#### Quotients and Fractions

1 When we divide 2 L milk amongst ☐ students equally, how many litres of milk will each student receive?

2 ÷ ☐

1 Enter the numbers from 1 to 5 in the ☐ and calculate the answers.

2 ÷ 1 = 2, 2 ÷ 2 = 1, 2 ÷ 3 = 0.67, 2 ÷ 4 = 0.5, 2 ÷ 5 = 0.4

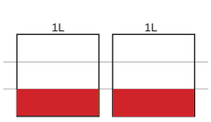
2 Divide the above expressions into 3 groups based on the answers.

Ⓐ Answers that are whole numbers.
( 2 ÷ 1  2 ÷ 2 )

Ⓑ Answers that are expressed exactly as decimal numbers.
( 2 ÷ 4 )

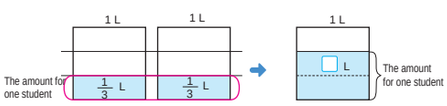
Ⓒ Answers that are not expressed exactly as decimal numbers.
( 2 ÷ 3  2 ÷ 5 )
2 ÷ 3 is 0.666..., so this cannot be expressed exactly as a decimal number because there is no end.

3 When 2 L is divided equally amongst 3 students.




Ⓐ Colour the part for one student in the diagram.
Ⓑ How many L will each student receive?

**Let's see how to express the quotient of a division problem when it cannot be expressed exactly as a decimal number.**



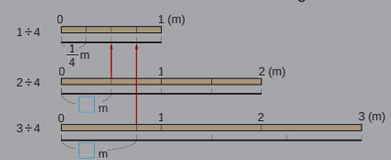

The amount for one student when 1 L is divided into 3 equal parts… 1/3 L.
The amount for one student when 2 L is divided into 3 equal parts… 2/3 L.

I used 1/3 L from the first 1 L container and 1/3 L from the second 1 L container to fill up the empty container.

2 ÷ 3 = 2/3

2 Let's find the length of one section when 1 m, 2 m and 3 m string is divided into 4 equal parts?

1 Let's write mathematical expressions for 1 m, 2 m and 3 m strings.
2 Let's find the answers based on a 1 m string?




The quotient of a division problem in which a whole number is divided by another whole number can be expressed as a fraction. ● ÷ ■ = ●/■

The quotient can be expressed precisely as a fraction.

**Exercise**

Let's represent the quotient using a fraction.
① 1 ÷ 6  ② 5 ÷ 8  ③ 4 ÷ 3  ④ 9 ÷ 7

116 = ☐ × ☐

☐ − ☐ = 117

## Lesson Flow

### 1 ① Think about how many L each student will receive when 2 L is divided among several students.

T Ask the students to have a look at the 2 L of milk or any form of liquid however it must be 2 L and pose the question to the students.
How many litres will each student receive when this 2 L of milk or any form of liquid is divided equally among 1 student, 2 students, 3 students, 4 students and 5 students?

S Think of the question and think about the answer.

T Ask the students to turn to page 114 and read ①
Ask the students to do ① and ②.

S Think about the situation and use the textbook to calculate and answers for ① and ②.

### 2 How to express 2÷3

T Have students to understand that 2÷3 is 0.6666(recurring)

S Understand that 2÷3 is a decimal quotient that is recurring.

T ③ Ask the students to do Ⓐ and Ⓑ.

S Answer by Ⓐ - colouring 1 part for 1 child.
Ⓑ - identify that 1 child will get $\frac{2}{3}$ L.

T Introduce the Main Task. (Refer to the BP)

### 3 How to express the quotient of a division problem when it cannot be expressed exactly as a decimal number.

T Move on to page 117 and explain the diagram representation.

S Fill in the box ☐, identify and express the quotient of the division problem 2÷3 to show that it cannot be expressed exactly as a decimal number.

### 4 Summary

TN Similar to previous lesson summary flow

#### • Teacher's Notes •

2÷1=2, 2÷2=1 } Whole Number answers

2÷4=0.5, 2÷5=0.4 } Exactly Decimal Number answers

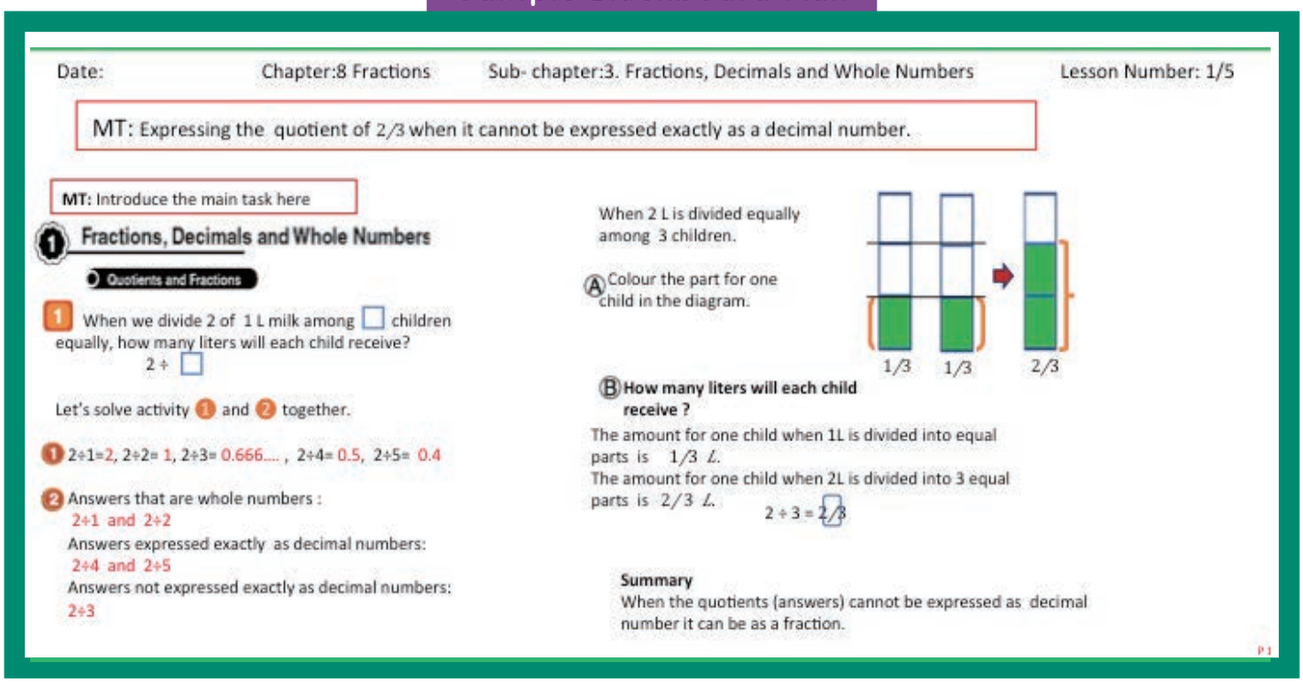
2÷3=0.666.... → Not Exactly Decimal Number answers because there is no end (recurring).

How to express the quotient of a division problem when it cannot be expressed exactly as a decimal number.

2÷3


From 1 L it is known per student will receive $\frac{1}{3}$ L so adding another 1 L makes it 2 L.
2 L÷3 is equal to $\frac{2}{3}$ L per student.

## Sample Blackboard Plan



# Unit 8: Unit: Fraction

## Sub-unit 3: Fractions, Decimals and Whole Numbers

## Lesson 2 of 5

Textbook Page : 117
Actual Lesson 076

### Lesson Objective

- To identify and understand that the quotient of division of whole numbers is always expressed as a fraction.

### Prior Knowledge

- How to express the quotient of a division problem when it cannot be expressed exactly as a decimal number.
- Divided 2 L ÷ 3 is $\frac{2}{3}$ L  $2 \div 3 = \frac{2}{3}$

### Preparation

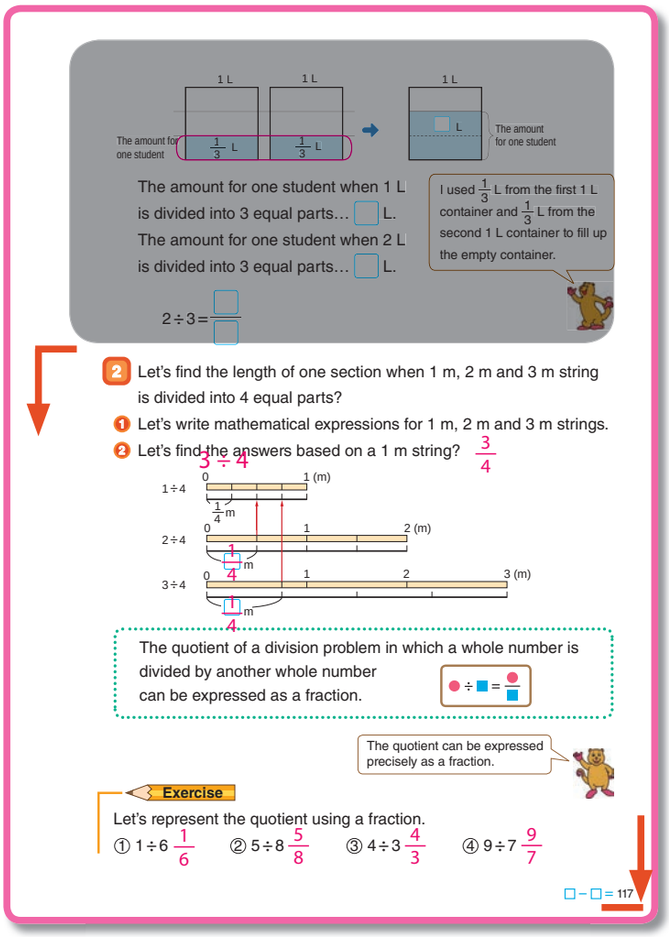
- Tape diagram for 2 2

### Assessment

- Understand that the quotient of division problems can be expressed as a fraction. F S
- Solve the exercise correctly. S

### Teacher's Notes

In this lesson, the answers to 1 ÷ 4, 2 ÷ 4 and 3 ÷ 4 can also be expressed exactly as decimal numbers. However, the focus is on the length of one section for the tape diagram therefore, answers should be expressed as fraction.
Encourage the students to write answers in fractions and not decimal numbers.




### Lesson Flow

**1 Review previous lesson.**

**2 2 Think about how to express one section when 3 m is divided into 4 equal parts.**

T Revise 2 ÷ 3 by posing questions to students to check their understanding and mathematical thinking.
S Respond to teacher's questions.
T Read the question in 2 How many metres.
S Think about how to express one section when 3 m is divided into 4 equal parts and write a mathematical expression 1.
T Introduce the Main Task. (Refer to the BP)

## Lesson Flow

### 3 ② Use the tape diagram to express 3 ÷ 4 as a fraction.

T Ask the students to use the tape diagram and discuss with friends to find and fill in the box ☐.

S Use the tape diagram to find the length of one section in the expression 3 ÷ 4 and fill in the box ☐.

T Allow the students to present their ideas and answers.

T Introduce the Main Task. (Refer to the BP)

### 4 Important Point

T/S Explain the important point in the box ⋯⋯.

### 5 Complete the Exercise

S Solve the exercises.

T Confirm students' answers.

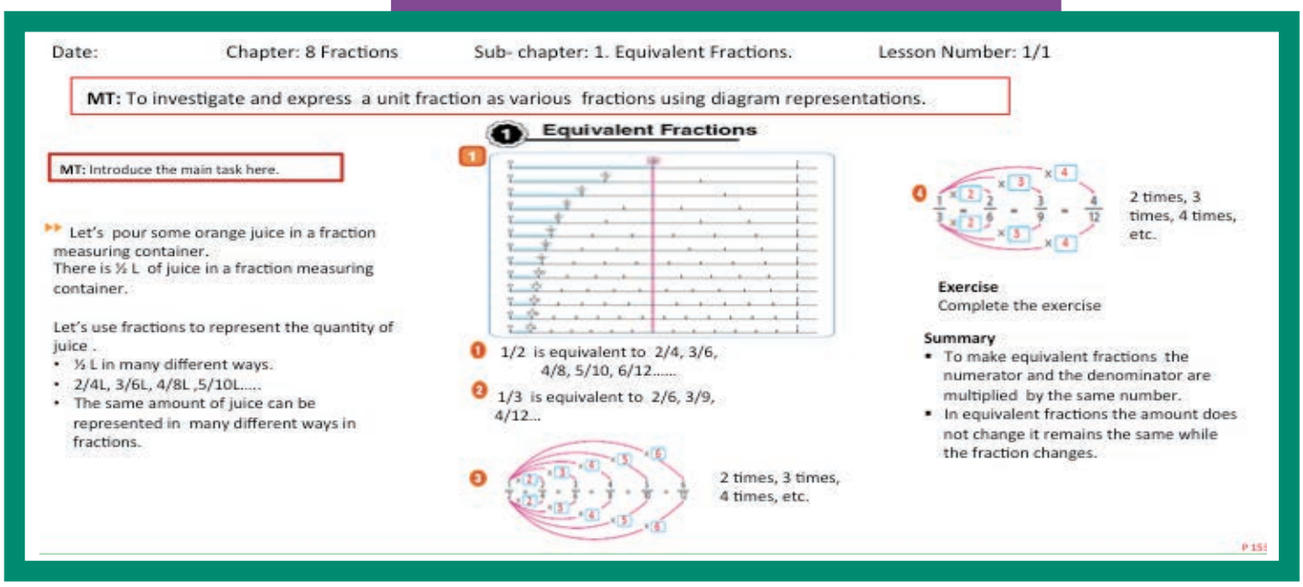
### 6 Summary

T What have you learned in this lesson?

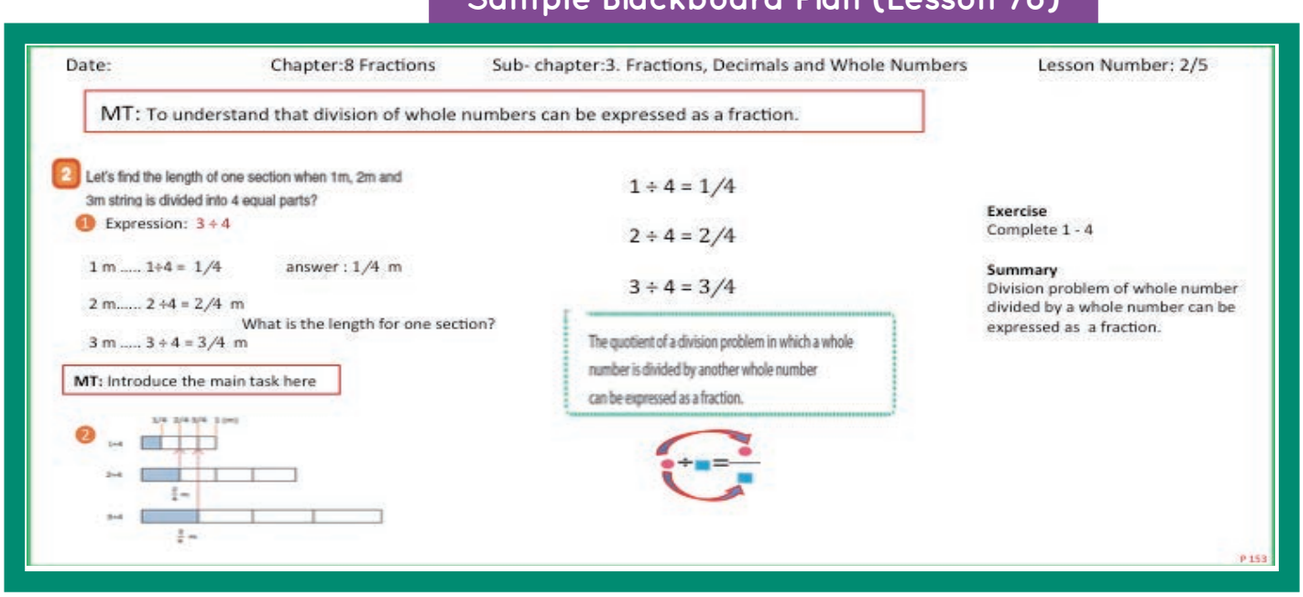
S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan (Lesson 70)




## Sample Blackboard Plan (Lesson 76)



# Unit 8: Unit: Fraction

## Sub-unit 3: Fractions, Decimals and Whole Numbers

## Lesson 3 of 5

Textbook Page : 118
Actual Lesson 077

### Lesson Objective

- Change or convert fractions to decimal numbers or whole numbers.

### Prior Knowledge

- Quotient of division of whole numbers is always expressed as a fraction.
- How to express quotients as whole numbers, exactly as decimal numbers and not expressed exactly as decimal numbers.

### Preparation

- Number lines for avtivity 3 2

### Assessment

- Think about how to convert fractions to decimal numbers or whole numbers. F
- Change or convert fractions to decimal numbers or whole numbers. S

### Teacher's Notes

3 Quotient in fraction or decimal.

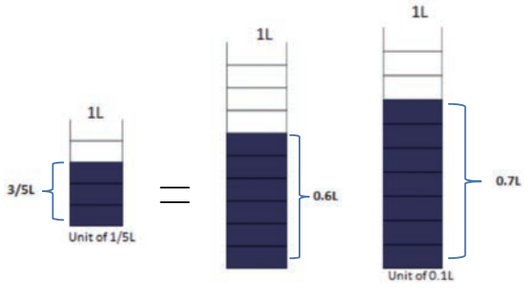
Quotient is in fraction.

$2 \div 5 = \frac{2}{5}$

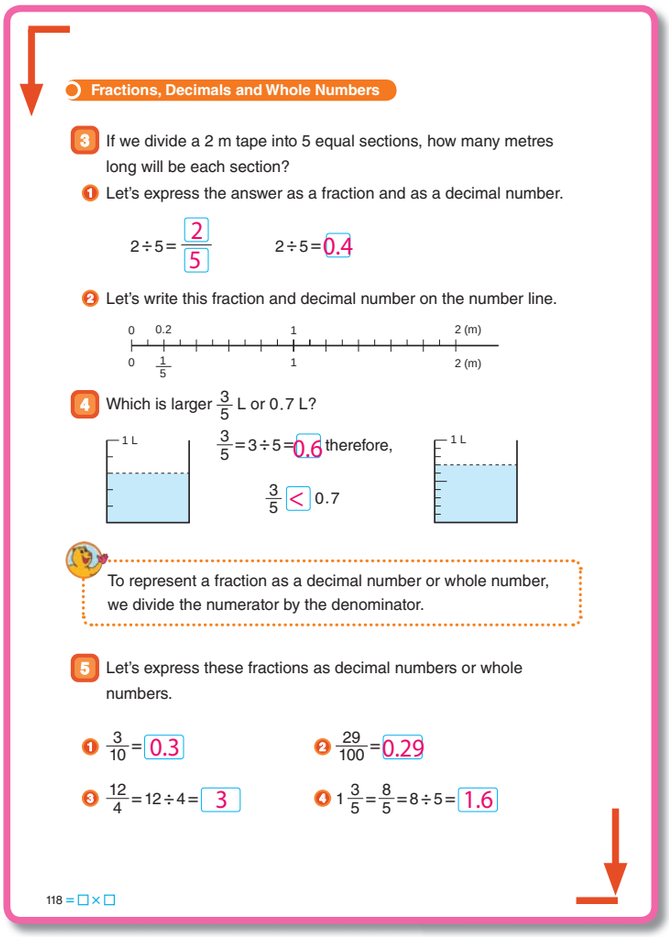
Quotient is in decimal.

$2 \div 5 = 0.4$

4 Comparison of fraction and decimal.




$\frac{3}{5}$ L is equal to 0.6 L. Comparing 0.6 L and 0.7 L
0.6 L < 0.7 L therefore $\frac{3}{5}$ L < 0.7



Fractions, Decimals and Whole Numbers

3 If we divide a 2 m tape into 5 equal sections, how many metres long will be each section?

1 Let's express the answer as a fraction and as a decimal number.

$2 \div 5 = \frac{2}{5}$ $2 \div 5 = 0.4$

2 Let's write this fraction and decimal number on the number line.

0 0.2 1 2 (m)
0 $\frac{1}{5}$ 1 2 (m)

4 Which is larger $\frac{3}{5}$ L or 0.7 L?

1 L

$\frac{3}{5} = 3 \div 5 = 0.6$ therefore,

$\frac{3}{5} < 0.7$

1 L

To represent a fraction as a decimal number or whole number, we divide the numerator by the denominator.

5 Let's express these fractions as decimal numbers or whole numbers.

1 $\frac{3}{10} = 0.3$ 2 $\frac{29}{100} = 0.29$

3 $\frac{12}{4} = 12 \div 4 = 3$ 4 $1\frac{3}{5} = \frac{8}{5} = 8 \div 5 = 1.6$

118 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 ③ Think about dividing 2 m into 5 equal sections.

T Introduce the Main Task. (Refer to the BP)
T Ask the students to think about how to divide 2 m into 5 equal sections.
S Think about how to divide 2 m into 5 equal sections and complete ① and ②.
T Confirm students' answers.

### 3 ④ Compare $\frac{3}{5}$ L and 0.7 L

T Ask the students to compare the fraction $\frac{3}{5}$ L and the decimal 0.7 L by observing the diagram representation and filling in the box ☐.
S Observe the diagram and fill in the box ☐.
T To confirm the answer observe the diagram representation in the unit of $\frac{1}{5}$ L and the unit of 0.1 L and explain to the students. (Refer to teacher's notes)

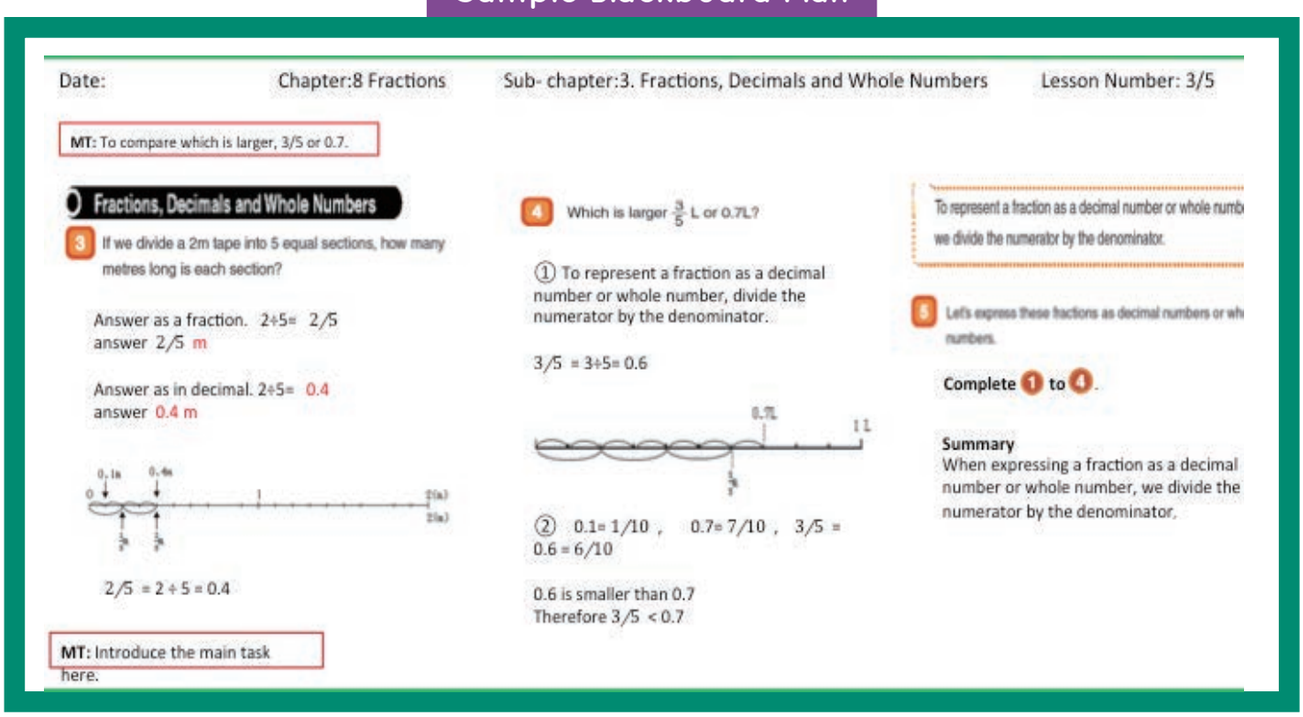
### 4 ⑤ Express fractions as decimal numbers or whole numbers.

S Complete ①, ②, ③ and ④ by expressing the fractions as decimal numbers or whole numbers.
T Check and assist those in need. Give ample time and ask volunteers to share their ideas and answers.

### 5 Summary

T What have you learned in this lesson?
S Present ideas on what they have learned.
T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 8

# Unit: Fraction
## Sub-unit 3: Fractions, Decimals and Whole Numbers
## Lesson 4 of 5

Textbook Page : 119
Actual Lesson 078

### Lesson Objective

- To express whole numbers and decimal numbers as fractions or vice versa.

### Prior Knowledge

- How to express quotient in fraction or decimal.
- How to express fractions as decimal numbers or whole numbers.

### Preparation

- Chart of enlarged number line

### Assessment

- Think about how to express whole numbers and decimal numbers as fractions or vice versa. F
- Convert whole numbers and decimal numbers to fractions or vice versa correctly. F
- Solve the exercise correctly. S

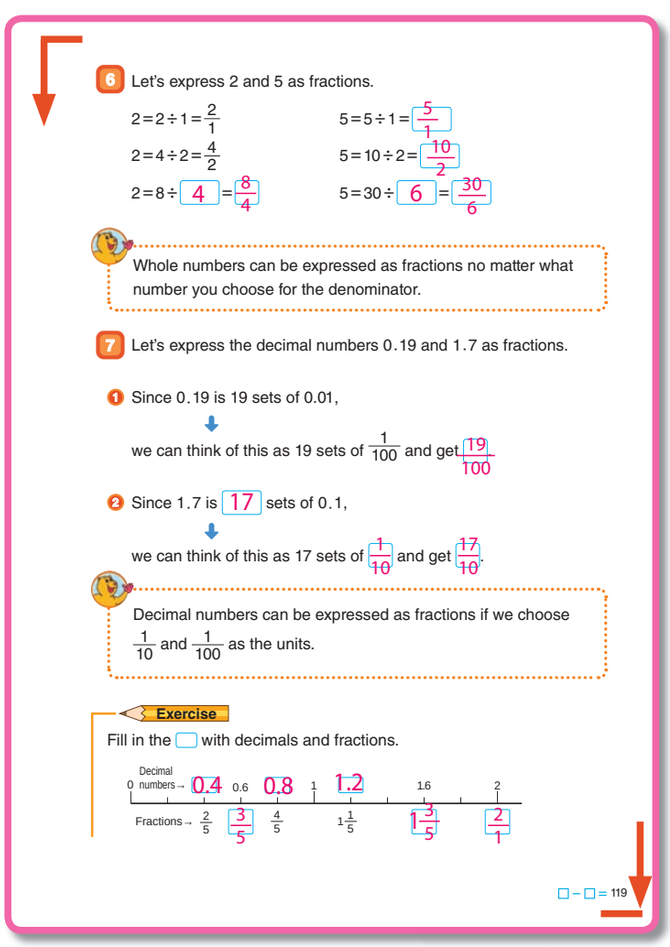
### Teacher's Notes

$\frac{1}{10}$ as the unit → is sets of 0.1

$\frac{1}{100}$ as the unit → is sets of 0.01

1.7 is 17 sets of 0.1 or
17 sets of $\frac{1}{10}$ or $\frac{17}{10}$

0.19 is 19 sets of 0.01 or
19 sets of $\frac{1}{100}$ $\frac{19}{100}$



6 Let's express 2 and 5 as fractions.

$2 = 2 \div 1 = \frac{2}{1}$ $\quad 5 = 5 \div 1 = \frac{5}{1}$

$2 = 4 \div 2 = \frac{4}{2}$ $\quad 5 = 10 \div 2 = \frac{10}{2}$

$2 = 8 \div 4 = \frac{8}{4}$ $\quad 5 = 30 \div 6 = \frac{30}{6}$

Whole numbers can be expressed as fractions no matter what number you choose for the denominator.

7 Let's express the decimal numbers 0.19 and 1.7 as fractions.

1 Since 0.19 is 19 sets of 0.01,
↓
we can think of this as 19 sets of $\frac{1}{100}$ and get $\frac{19}{100}$.

2 Since 1.7 is 17 sets of 0.1,
↓
we can think of this as 17 sets of $\frac{1}{10}$ and get $\frac{17}{10}$.

Decimal numbers can be expressed as fractions if we choose $\frac{1}{10}$ and $\frac{1}{100}$ as the units.

Exercise

Fill in the ☐ with decimals and fractions.

Decimal numbers → 0 | 0.4 | 0.6 | 0.8 | 1 | 1.2 | 1.6 | 2

Fractions → $\frac{2}{5}$ | $\frac{3}{5}$ | $\frac{4}{5}$ | $1\frac{1}{5}$ | $1\frac{3}{5}$ | $\frac{2}{1}$

☐ – ☐ = 119

## Lesson Flow

### 1 Review the previous lesson.

### 2 6 Think about how to express 2 and 5 as fractions.

T Introduce the Main Task. (Refer to the BP)

S Think about how to express 2 and 5 as fractions by filling in the box ☐ and share their answers.

### 3 Important Point

T/S Explain the important point in the box ⋯⋯.

### 4 7 Expressing the decimal numbers 0.19 and 1.7 as fractions.

S Express 0.19 and 1.7 as fractions using sets of 0.01 and 0.1 by filling in the box ☐.

### 5 Important Point

T/S Explain the important point in the box ⋯⋯.

### 6 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

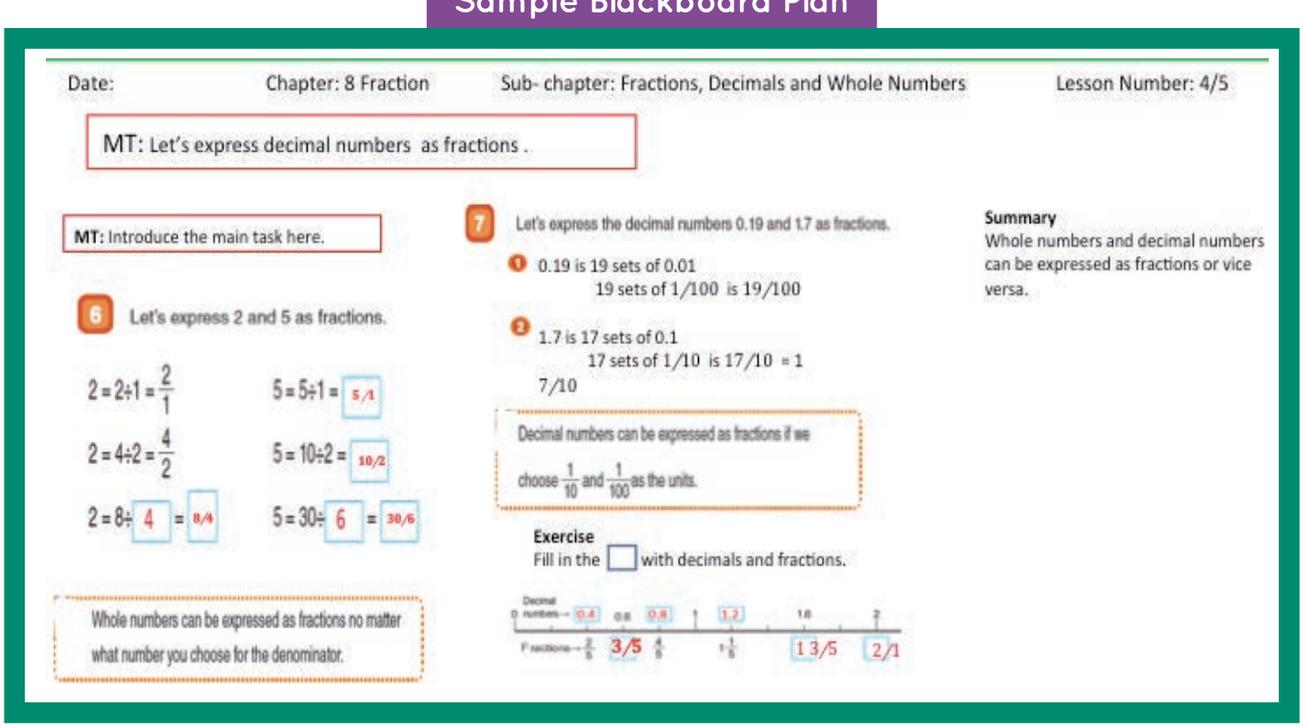
### 7 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan



# Unit 8

# Unit: Fraction
## Sub-unit 3: Fractions, Decimals and Whole Numbers
## Lesson 5 of 5

Textbook Page : 120
Actual Lesson 079

## Lesson Objectives

- To categorise fractions in three groups as whole numbers, actual decimal numbers and other decimal numbers.
- Recognise, identify and represent fractions using the number line.

## Prior Knowledge

- Express fraction as decimal number or whole number.
- Express whole number and decimal number as fraction.

## Preparation

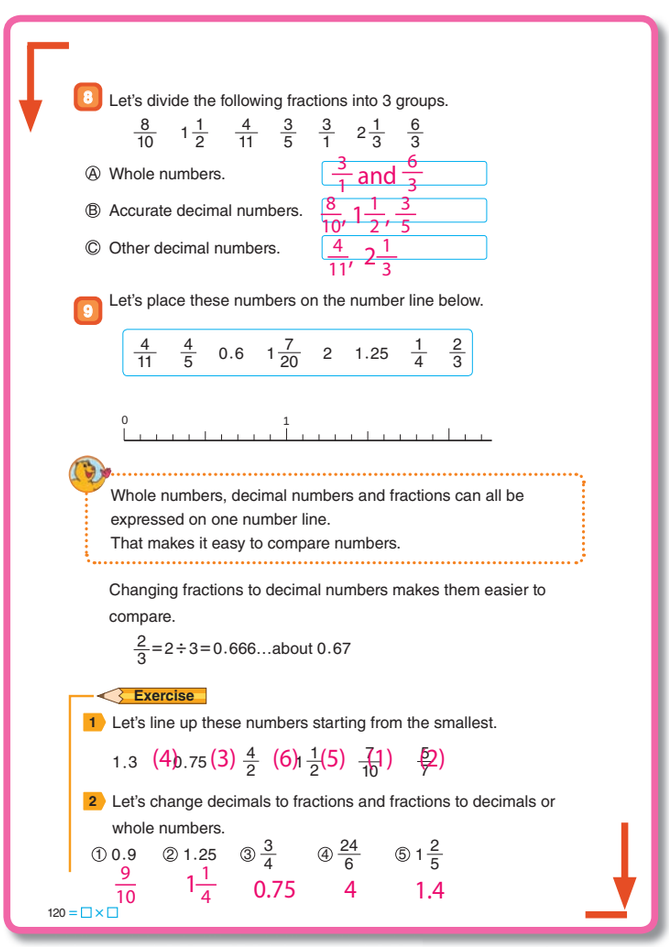
- Number line for 9

## Assessment

- Categorise fraction in three groups as whole number, actual decimal number and other decimal number. F S
- Identify and represent fraction using the number line. F S
- Solve the exercise correctly. S

## Teacher's Notes

Emphasise to students that any number such as whole numbers, fractions and decimal numbers can all be represented in a same number line.



8 Let's divide the following fractions into 3 groups.

$\frac{8}{10}$ $1\frac{1}{2}$ $\frac{4}{11}$ $\frac{3}{5}$ $\frac{3}{1}$ $2\frac{1}{3}$ $\frac{6}{3}$

Ⓐ Whole numbers. $\frac{3}{1}$ and $\frac{6}{3}$

Ⓑ Accurate decimal numbers. $\frac{8}{10}$, $1\frac{1}{2}$, $\frac{3}{5}$

Ⓒ Other decimal numbers. $\frac{4}{11}$, $2\frac{1}{3}$

9 Let's place these numbers on the number line below.

$\frac{4}{11}$ $\frac{4}{5}$ 0.6 $1\frac{7}{20}$ 2 1.25 $\frac{1}{4}$ $\frac{2}{3}$

0 1

Whole numbers, decimal numbers and fractions can all be expressed on one number line.
That makes it easy to compare numbers.

Changing fractions to decimal numbers makes them easier to compare.

$\frac{2}{3}=2\div3=0.666\ldots$about 0.67

Exercise

1 Let's line up these numbers starting from the smallest.

1.3 (4) 0.75 (3) $\frac{4}{2}$ (6) $1\frac{1}{2}$ (5) $\frac{7}{10}$ (1) $\frac{5}{7}$ (2)

2 Let's change decimals to fractions and fractions to decimals or whole numbers.

① 0.9 $\frac{9}{10}$ ② 1.25 $1\frac{1}{4}$ ③ $\frac{3}{4}$ 0.75 ④ $\frac{24}{6}$ 4 ⑤ $1\frac{2}{5}$ 1.4

120 = □ × □

## Lesson Flow

### 1 Review the previous lesson.

### 2 8 Divide the fractions into three (3) groups.

T Introduce the Main Task. (Refer to the Blackboard Plan)

S Observe the different fractions and categorise the given fractions into 3 groups as whole numbers, actual decimal numbers or other decimal numbers by filling in the box ☐ for Ⓐ, Ⓑ and Ⓒ.

### 3 9 Representation of fractions, decimal numbers and whole numbers on the number line.

S Use the number line to place the fractions, decimal numbers and whole numbers correctly with an ↓ and present their answers.

T Confirm students' answers.

### 4 Important Point

T/S Explain the important point in the box ⋯⋯.

### 5 Complete the Exercise

S Solve the selected exercises.

T Confirm students' answers.

### 6 Summary

T What have you learned in this lesson?

S Present ideas on what they have learned.

T Use students' ideas to confirm the important concepts of this lesson.

## Sample Blackboard Plan

Date: Chapter: 8. Fractions Sub- chapter: 3. Fractions, Decimals and Whole Numbers Lesson Number: 5/5

MT: Let's categorize the types of fractions all on a number line.

**MT:** Introduce the main task here.

8 Let's divide the following fractions into 3 groups.

8/10 , 11/2 , 4/11 , 3/5 , 3/1 , 21/3 , 6/3

8/10 = 8÷10 = 0.8 accurate decimal number.

11/2 = 3/2 = 3+2 = 1.5 accurate decimal number.

4/11 = 4÷11 = 0.363636.... other decimal number.

3/5 = 3÷5 = 0.6 accurate decimal number.

3/1 = 3÷1 = 3 whole number.

21/3 = 7/3 = 7÷3 = 2.3333... other decimal number.

6/3 = 6÷3 = 2 whole number.

?/? = ○ ÷ □

To represent fraction as a decimal or whole number divide the numerator by the denominator.

9 Let's express whole numbers, decimal numbers and fractions on the number line.

4/11 , 4/5 , 0.6, 17/20 , 2, 1.25, 1/4 , 2/3

- Decimal unit is 0.1
- Fraction unit is 1/10

Whole numbers, decimal numbers and fractions can all be expressed on one number line.
That makes it easy to compare numbers.

**Exercise**
Complete 1 and 2.

**Summary**
Whole numbers, decimal numbers and fractions can all be expressed on one number line.
That makes it easy to compare numbers.

# Unit 8

# Unit: Fraction
## Exercise and Evaluation
## Lesson 1 and 2 of 2

Textbook Page : 121
Actual Lesson 080 and 081

## Lesson Objectives

- To confirm their understanding on the concepts they learned in this unit by completing the Exercise and the Evaluation Test confidently.

## Prior Knowledge

- All the contents covered in this unit

## Preparation

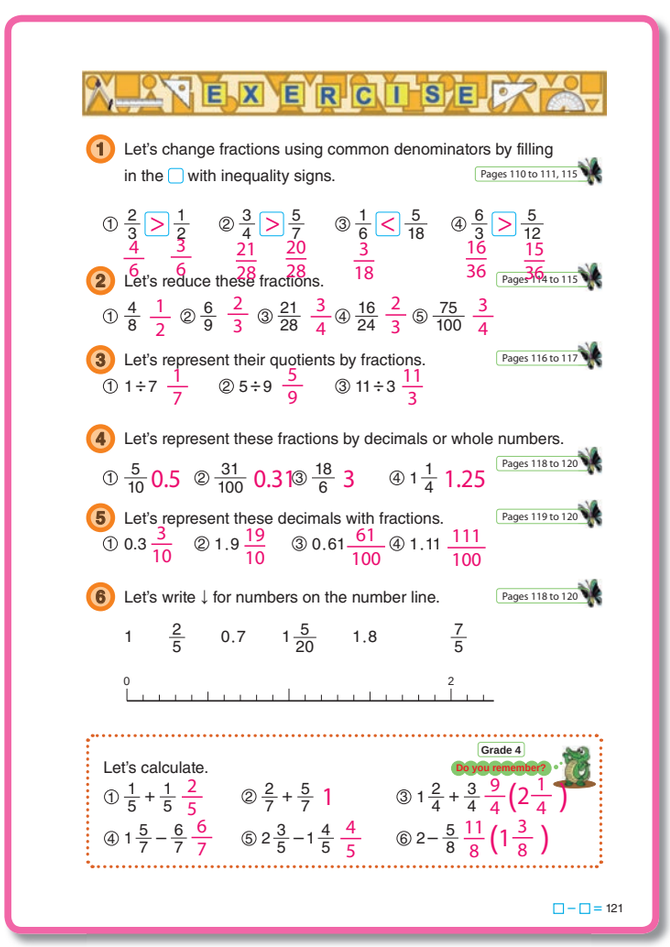
- Copies of evaluation test for each student

## Assessment

- Complete the Exercise correctly. S

## Teacher's Notes

This is the last lesson of Chapter 8. Students should be encouraged to use the necessary skills learned in this unit to complete all the Exercises and solve the Problems in preparation for the evaluation test. The test can be conducted as assesment for your class after completing all the exercises. Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.



EXERCISE

1 Let's change fractions using common denominators by filling in the □ with inequality signs. Pages 110 to 111, 115

① $\frac{2}{3}$ > $\frac{1}{2}$ ($\frac{4}{6}$ > $\frac{3}{6}$) ② $\frac{3}{4}$ > $\frac{5}{7}$ ($\frac{21}{28}$ > $\frac{20}{28}$) ③ $\frac{1}{6}$ < $\frac{5}{18}$ ($\frac{3}{18}$ < $\frac{5}{18}$) ④ $\frac{6}{3}$ > $\frac{5}{12}$ ($\frac{16}{36}$ > $\frac{15}{36}$)

2 Let's reduce these fractions. Pages 114 to 115

① $\frac{4}{8}$ $\frac{1}{2}$ ② $\frac{6}{9}$ $\frac{2}{3}$ ③ $\frac{21}{28}$ $\frac{3}{4}$ ④ $\frac{16}{24}$ $\frac{2}{3}$ ⑤ $\frac{75}{100}$ $\frac{3}{4}$

3 Let's represent their quotients by fractions. Pages 116 to 117

① 1÷7 $\frac{1}{7}$ ② 5÷9 $\frac{5}{9}$ ③ 11÷3 $\frac{11}{3}$

4 Let's represent these fractions by decimals or whole numbers. Pages 118 to 120

① $\frac{5}{10}$ 0.5 ② $\frac{31}{100}$ 0.31 ③ $\frac{18}{6}$ 3 ④ $1\frac{1}{4}$ 1.25

5 Let's represent these decimals with fractions. Pages 119 to 120

① 0.3 $\frac{3}{10}$ ② 1.9 $\frac{19}{10}$ ③ 0.61 $\frac{61}{100}$ ④ 1.11 $\frac{111}{100}$

6 Let's write ↓ for numbers on the number line. Pages 118 to 120

1 $\frac{2}{5}$ 0.7 $1\frac{5}{20}$ 1.8 $\frac{7}{5}$

0 2

Grade 4 Do you remember?

Let's calculate.

① $\frac{1}{5}+\frac{1}{5}$ $\frac{2}{5}$ ② $\frac{2}{7}+\frac{5}{7}$ 1 ③ $1\frac{2}{4}+\frac{3}{4}$ $\frac{9}{4}$ $(2\frac{1}{4})$

④ $1\frac{5}{7}-\frac{6}{7}$ $\frac{6}{7}$ ⑤ $2\frac{3}{5}-1\frac{4}{5}$ $\frac{4}{5}$ ⑥ $2-\frac{5}{8}$ $\frac{11}{8}$ $(1\frac{3}{8})$

□ − □ = 121

## Lesson Flow

### 1 Complete the Exercise

S Solve all the exercises.

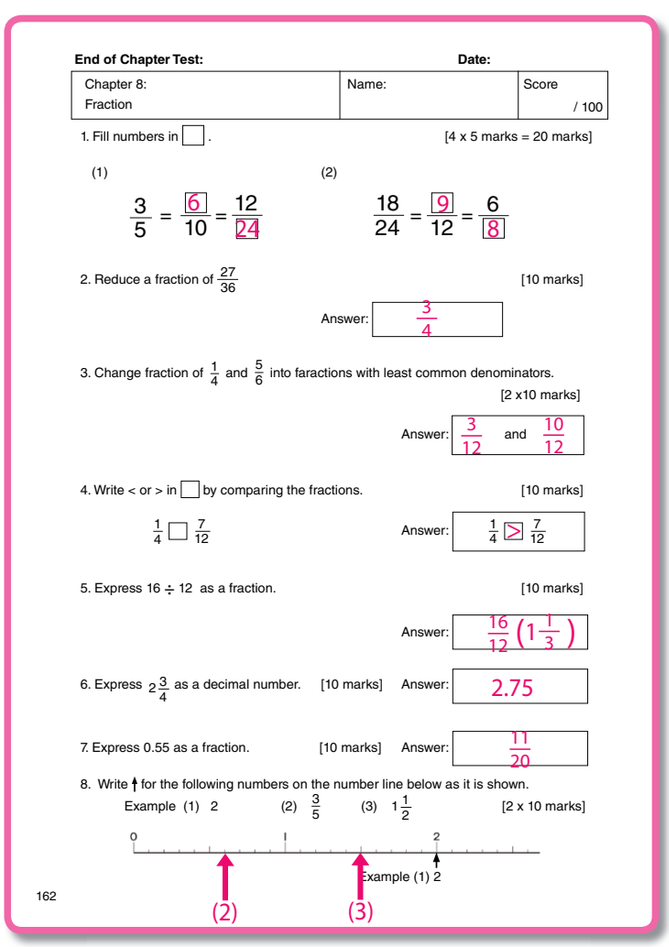
T Confirm students' answers.

TN 1 Changing fractions using common denominators.
2 Reducing fractions.
3 Representing quotients by fractions.
4 Representing fractions by decimals or whole numbers.
5 Represent decimals by fractions.
6 Identifying fractions and decimals on the number line.

### 2 Complete the Evaluation Test

TN Use the attached evaluation test to conduct assesment for your class after finishing all the exercises and problems as a seperate lesson.

S Complete the Evaluation Test.



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

| Chapter 8: Fraction | Name: | Score / 100 |
|---|---|---|

1. Fill numbers in □. [4 x 5 marks = 20 marks]

(1) $\frac{3}{5} = \frac{\boxed{6}}{10} = \frac{12}{\boxed{24}}$

(2) $\frac{18}{24} = \frac{\boxed{9}}{12} = \frac{6}{\boxed{8}}$

2. Reduce a fraction of $\frac{27}{36}$ [10 marks]

Answer: $\frac{3}{4}$

3. Change fraction of $\frac{1}{4}$ and $\frac{5}{6}$ into faractions with least common denominators. [2 x10 marks]

Answer: $\frac{3}{12}$ and $\frac{10}{12}$

4. Write < or > in □ by comparing the fractions. [10 marks]

$\frac{1}{4}$ □ $\frac{7}{12}$ Answer: $\frac{1}{4}$ > $\frac{7}{12}$

5. Express 16 ÷ 12 as a fraction. [10 marks]

Answer: $\frac{16}{12}$ $\left(1\frac{1}{3}\right)$

6. Express $2\frac{3}{4}$ as a decimal number. [10 marks] Answer: 2.75

7. Express 0.55 as a fraction. [10 marks] Answer: $\frac{11}{20}$

8. Write ↑ for the following numbers on the number line below as it is shown.
Example (1) 2 (2) $\frac{3}{5}$ (3) $1\frac{1}{2}$ [2 x 10 marks]



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

| Chapter 8:<br>Fraction | Name: | Score<br>/ 100 |
|---|---|---|

1. Fill in the numbers in the □. [4×5 marks=20 marks]

(1) $\frac{3}{5}=\frac{\square}{10}=\frac{12}{\square}$ (2) $\frac{18}{24}=\frac{\square}{12}=\frac{6}{\square}$

2. Reduce the fraction of $\frac{27}{36}$ [10 marks]

Answer:

3. Change the fractions $\frac{1}{4}$ and $\frac{5}{6}$ into faractions with least common denominators.
[2×10 marks]

Answer: and

4. Write < or > in the □ by comparing the fractions. [10 marks]

$\frac{1}{4}\square\frac{7}{12}$ Answer: $\frac{1}{4}\square\frac{7}{12}$

5. Express 16÷12 as a fraction. [10 marks]

Answer:

6. Express $2\frac{3}{4}$ as a decimal number. [10 marks]

Answer:

7. Express 0.55 as a fraction. [10 marks]

Answer:

8. Draw an ↑ for the following numbers on the number line below as it is shown.
[2×10 marks]

Example (1) 2 (2) $\frac{3}{5}$ (3) $1\frac{1}{2}$


Example (1) 2