Chapter 11 Expressions and Calculations

1. Unit Objectives

- To master the skills of calculation and improve the ability of application. (4.1.5.d)
- To understand mathematical expression which shows mathematical relationship. (4.1.5.a,c and d)
- To calculate with 4 mixed operations and operations with parenthesis.(4.1.5.a)
- To deepen understanding of characteristics of 4 operations.(4.1.5.a and d)
- To understand commutative law, associative law and distributive law. (4.1.5.c)

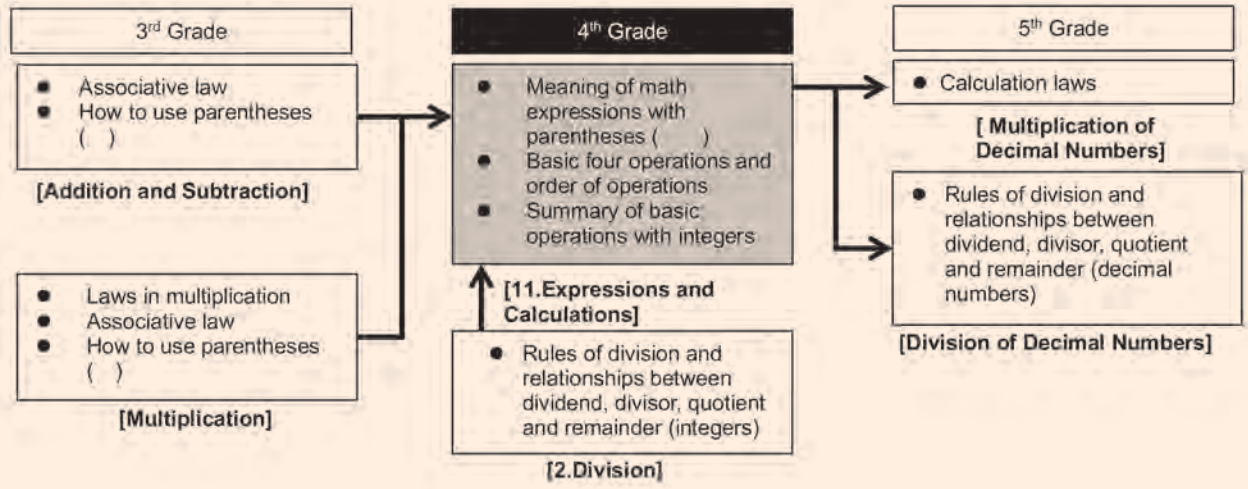
2. Teaching Overview

It is difficult for children to form a mathematical expression with combined operations. In this unit, students will be able to form complicated mathematical expressions by understanding orders of calculations. They gradually acquired some ideas about the order and properties/rules of calculations already.

Representing Expressions: Both teachers and students may sometimes tend to achieve the result of calculations quickly and forget the meaning of the original expressions. Students should develop the behavior of trying to understand the original meaning of the expressions. It will result in the better learning of functions. **Rules of Calculations:** Students already have learned commutative, associative and distributive laws without knowing the names. In this topic, students will learn the names and organise the known ideas for better utilisations.

Calculation of Whole Numbers: They expand the ideas of 2-digit × 2-digit to 3-digit × 3-digit by utilising the rules of calculations.

3. Related Learning Contents



Unit 11

Unit: Expressions and Calculations
Sub-unit: 1. Represent the Expressions
Lesson 1 of 3 (Double Period)

Textbook Page : p.121~p.122
Actual Lesson 74

Sub-unit Objectives

- To express mathematical relationships in one mathematical sentence using parenthesis.
- To understand how to calculate operations with parenthesis.
- To understand the order of calculation of 4 mixed operations with parenthesis.

Lesson Objectives

- To express mathematical relationships in one mathematical sentence using parenthesis.
- To understand how to calculate operations with parenthesis.

Prior Knowledge

- Calculation skill of 4 operations
- Rules of calculation (G3 and 4)

Preparation

- Pictures with price for making stories

Assessment

- Think about how to express mathematical relationships in one operation using parenthesis. F
- Understand how to calculate operations with parenthesis. F
- Do the exercises correctly. S

• Teacher's Notes •

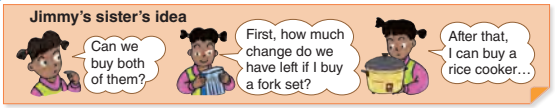
3 Examples: 700 − (500 + 180)
There is a 700 cm long rope. 500 cm was cut out by Jaydan to tie his pig fence. The other 180 cm was used to tie his house step. How much rope in cm is left?
500 − (450 − 40)
Janice bought a 500 mL coke. Her smaller brother drank 450 mL. Her older brother felt sorry and added 40 mL from his drink. How much coke in mL does she have left for her to drink?

11 Expressions and Calculations

1 Represent the Expressions

1 Jimmy's mother and sister went shopping with 500 kina. They bought a fork set for 120 kina and a rice cooker for 360 kina at a supermarket. How much change do they have left?

1 **Jimmy's sister's idea**



Let's write Jimmy's sister's idea as a mathematical sentence.

2 500 − 120 = 380 380 − 360 = 20

Jimmy's mother's idea

Let's write his mother's idea as a mathematical sentence.

120 + 360 = 480 500 − 480 = 20

Let's think about how to represent an expression and the order of calculations.

3 Let's write Jimmy's sister's idea as a mathematical sentence.

500 − 120 − 360 = 20

4 Let's write Jimmy's mother's idea as a mathematical sentence.

500 − (120 + 360) = 20
(The money that you have / Total cost / Change)

We use ( ) to show a section that is **calculated first**, like the total cost.

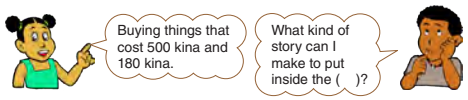
500 − (120 + 360) = 500 − 480
500 − (120 + 360) = 20 Answer: 20 kina

2 Head sets that cost 35 kina are sold at a 3 kina discount. If uncle David pays 100 kina, how much change will he get? Let's find the answer by representing this question as a mathematical sentence.

100 − (35 − 3) = 68
(Amount paid / Cost of Head set / Change)

3 Let's make a mathematical story for the following expressions.

1 700 − (500 + 180) 2 500 − (450 − 40)



Exercise

Let's make mathematical stories for the following expressions.

① 400 − (50 + 300) 50 ② 600 − (150 − 110) 560

□ ÷ □ = 121 122 = □ × □

Lesson Flow

1 ① ① Read the problem and make a mathematical sentence.

T Introduce the main task.

T How much did Jimmy's mother and sister have? What did Jimmy's sister buy first? Make a mathematical expression and calculate it.

S Answer: 500 − 120 = 380 380 kina

T What did she buy next and how much change was left?

S Make mathematical expression and solve.

S Answer: 380 − 360 = 20 20 kina

2 ② Think about Jimmy's mother's idea and make a mathematical sentence.

T Let's write Jimmy's mother's idea as a mathematical sentence.

S 120 + 360 = 480, 500 − 480 = 20

3 Express Jimmy's mother and sister's idea in one mathematical sentence.

T ③ How can we express Jimmy's sister's idea in a mathematical sentence?

S 500 − 120 − 360 = 20

S ④ Jimmy's mother's idea is shown like this: 500 − (120 + 360) = 20.
500 kina is the money that she had. '120 + 360' is the total cost. 20 kina is the change.

T We have to calculate the expression in parenthesis first (120 + 360) .

S Realise that the answer is same when calculating parenthesis first.

TN Summarise how to use parenthesis and how to calculate operations with parenthesis.

4 ② Solve the problem, ① and ②.

TN Teacher and students read and understand the given situation and make mathematical sentences using parenthesis.

S 100 − (35 − 3) = 68

T Confirm the amount paid, cost of head sets and change.

5 ③ Solve the problem.

TN Refer to the TN.

6 Do the exercise.

TN Give some time for students to work individually, after that students can share ideas with their friends and whole class.

Sample Blackboard Plan

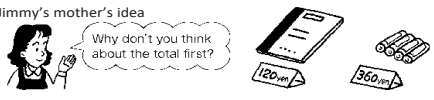
Date: **Chapter:** 11 Expressions and Calculations **Topic:** Represent the Expressions **Lesson N°:** 1/3

MT Let's think about how to represent an expression and the order of calculation

1 Jimmy's big sister went shopping with K500. She bought a fork set for 120 kina and a rice cooker for 360 kina at a supermarket. How much kina does Jimmy's sister have left?

1 Let's write Jimmy's sister's idea as a mathematical sentence.

500 − [120] = [380] [380] − 360 = [20]



2 Let's write his mother's idea as a mathematical sentence.

120 + 360 = [480] 500 − [480] = [20]

3 Let's write Jimmy's sister as a mathematical sentence

500 − [120] − [360] = [20]

4 Let's write Jimmy's mother's idea a mathematical sentence.

500 − ([120 + 360]) = [20]

The money that you have / Total cost / Remainder

Important point

We use ( ) to show a section that is calculated first, like the total cost.

2 Head sets that cost 35 kina are sold at a 3 kina discount. If uncle David pays 100 kina, how much change does he get? Let's find the answer by representing this question as a mathematical sentence.

[100] − ([35 − 3]) = [68]

Amount paid / Head sets / Change

3 Let's make a mathematical story for the following expressions:

1 700 − (500 + 180)

2 500 − (450 − 40)

Unit 11

Unit: Expressions and Calculations
Sub-unit: 1. Represent the Expressions
Lesson 2 of 3 lessons (Double Period)

Textbook Page : p.123
Actual Lesson 75

Lesson Objectives

- To understand that mathematical expression of multiplication and division represent one amount.
- To understand how to calculate four mixed operations.

Prior Knowledge

- How to calculate operations with parenthesis (Previous lesson)

Preparation

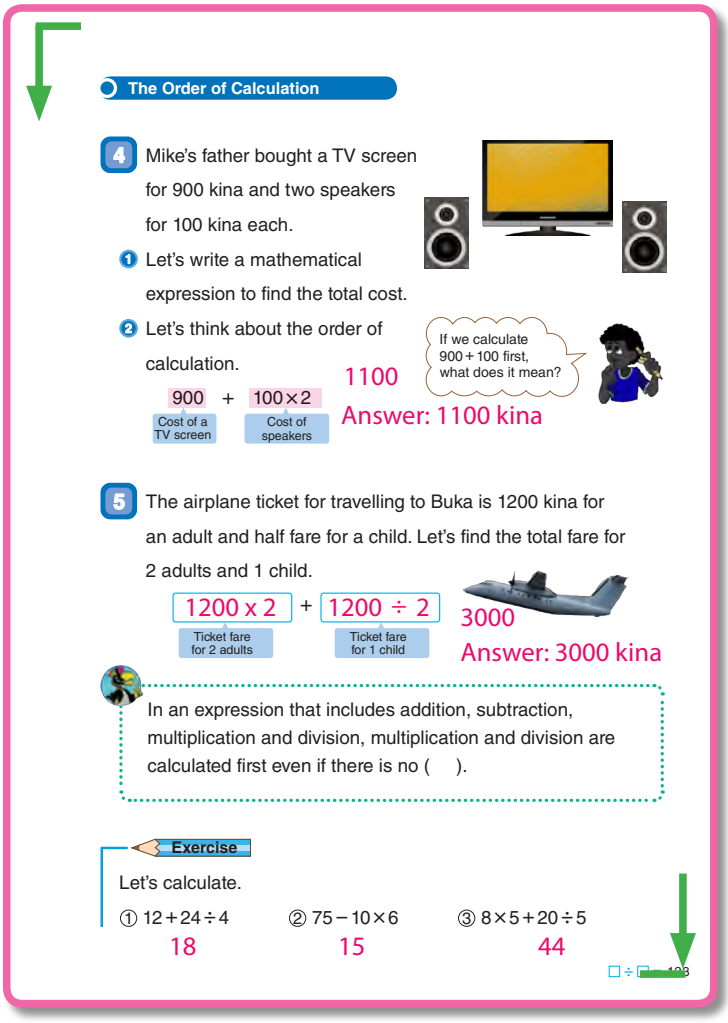
- Order of calculation chart

Assessment

- Think about how to calculate four mixed operations. F
- Practice to master the skills of calculation of four mixed operations. F
- Do the exercise correctly. S

• Teacher's Notes •

Be aware of the order of calculation before teaching the actual lesson.
You may want to use the idea of BODMAS to help students remember the order of calculation.



The Order of Calculation

4 Mike's father bought a TV screen for 900 kina and two speakers for 100 kina each.

1 Let's write a mathematical expression to find the total cost.

2 Let's think about the order of calculation.

900 (Cost of a TV screen) + 100×2 (Cost of speakers)

1100

Answer: 1100 kina

If we calculate 900 + 100 first, what does it mean?

5 The airplane ticket for travelling to Buka is 1200 kina for an adult and half fare for a child. Let's find the total fare for 2 adults and 1 child.

1200 x 2 (Ticket fare for 2 adults) + 1200 ÷ 2 (Ticket fare for 1 child)

3000

Answer: 3000 kina

In an expression that includes addition, subtraction, multiplication and division, multiplication and division are calculated first even if there is no ( ).

Exercise

Let's calculate.

① 12+24÷4 = 18 ② 75−10×6 = 15 ③ 8×5+20÷5 = 44

Lesson Flow

1 ④ Read and understand the situation and make a mathematical expression.

T Introduce the main task.

S ① Write a mathematical expression to find the total cost.

TN If you do not mention anything, students will write '900 + (100 × 2)', so inform them that multiplication is seen as one amount and calculated before addition so that we do not have to use parenthesis for multiplication.

T 900 + 100 × 2

2 ② Think about the order of calculation and find the answer.

T Which one do we have to calculate first?

S Multiplication. '100 × 2'

T 900 + 100 × 2 = 900 + 200 = 1100 1100 kina.

3 ⑤ Think about calculation order of mixed operations with multiplication and division.

S Read and understand the problem and write a mathematical expression.

T Confirm each expression to find the total fee for adult and children, and put the two operations together.
1200 × 2 + 1200 ÷ 2

S Solve the mathematical expression.

T Confirm that the order of calculation. Multiplication and division must be calculated first.
1200 × 2 + 1200 ÷ 2 = 2400 + 600 = 3000

4 Summarise the important point in the box .

5 Do the exercise to master the calculation of four mixed operations.

Sample Blackboard Plan

Date: **Chapter:** 11 Expressions and Calculations **Topic:** Represent the Expressions **Lesson N°:** 2/3

MT Let's think about how to calculate mixed operation of addition, multiplication and division.

④ Mr. Mike bought a TV screen for 900 kina and two speakers for 100 kina each.

① Let's write an expression to find the total cost.

900 + 100 × 2

Cost of a TV / Cost of speakers

② Let's think about the order of calculation.
900 + 100 × 2 → Multiplication first
900 + 200 → Then addition
1100
Answer: 1 100 kina.

⑤ The air plane ticket for travelling to Buka is 1200 kina for an adult and half for a child. Let's make the total fee for two adults and a child.

1200 × 2 + 1200 ÷ 2

Ticket fee for 2 adults / Ticket fee for 1 child

2400 + 1200 ÷ 2 × first from left
2400 + 600 ÷ from left
3000 + from left
Answer: 3000 kina

Important point

In an expression that includes addition, subtraction, multiplication and division, multiplication and division are calculated first even if there is no ( ).

Exercise

Let's calculate.

① 12+24÷4 = 12 + 6 = 18

② 75−10×6 = 75 − 60 = 15

③ 8×5+20÷5 = 40 + 4 = 44

Unit 11

Unit: Expressions and Calculations
Sub-unit: 1. Represent the Expressions
Lesson 3 of 3 (Single Period)

Textbook Page : p.124
Actual Lesson 76

Lesson Objectives

- To understand the calculation order of four mixed operations and operations with parenthesis.

Prior Knowledge

- Order of calculation (Previous lesson)

Preparation

- Order of calculation chart

Assessment

- Think about how to calculate the 4 mixed operations with parenthesis. F
- Do the exercise correctly. F

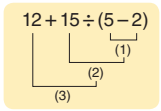
• Teacher's Notes •

- Even though there may not be brackets or parenthesis in a mathematical expression, we still have to follow the order of calculation (BODMAS) from left to right.
  For example, in $1+4\times3$, calculate 4×3 first then add the answer to 1.
- Students are familiar with the term 'brackets' however, the term 'parenthesis' can be used as it's the synonym of brackets.
- Use (BODMAS) from left to right to confirm calculation in a mathematical expression.
  For example, in $15\div5+2\times3$, we look at $15\div5$ as one group and 2×3 as the second group to calculate. After calculation of the two groups, then we can add.

6 Let's find the number, but we must be careful about the order of calculation.

$12+15\div(5-2)$

Let's calculate this expression in numerical order (1), (2) and (3).



$$12 + 15 \div \overset{(1)}{(5-2)} = 12 + \overset{(2)}{15 \div 3}$$
$$= \overset{(3)}{12+5}$$
$$= 17$$

If you write the expressions in order using an equal sign like the above, the calculations can be easier.

The Order of Calculation

① An expression is usually calculated in order from the left.
② If a ( ) is included, do the calculation inside the ( ) first.
③ If the +, −, × and ÷ are mixed, do multiplication and division first.

Exercise

Let's calculate.

① $12\div2+3$ 18
② $12\div(2+3)$ 2
③ $(5+4)\times(6-2)$ 36
④ $5+4\times(6-2)$ 21
⑤ $90-50\div(4+6)$ 85
⑥ $(90-50)\div4+6$ 16

$124 = \square\times\square$

Lesson Flow

1 **⑥ Think about how to calculate 12 + 15 ÷ (5 − 2).**

- T: Introduce the main task.
- S: Read and understand the given situation and make a mathematical expression.
- T: Let's think about which operation should be calculated first.
- S: Parenthesis (Brackets) is first.
- T: 12 + 15 ÷ (5 − 2) = 12 + 15 ÷ 3, What is next, '12 + 15' or '15 ÷ 3' ?
- S: 15 ÷ 3 is next because it's division.
- T: 12 + 15 ÷ 3 = 12 + 5 = 17.

2 **Summarise the order of calculation.**

- S: Explain the correct order of calculation as practiced in the lesson.
- T: Emphasise the correct order of calculation.

3 **Do the exercise.**

Sample Blackboard Plan

Date: **Chapter:** 11 Expressions and Calculations **Topic:** Represent the Expressions **Lesson Nº:** 3/3

MT: Let's calculate 12 + 15 ÷ (5 − 2) considering the order of calculation.

Let's find the number, but we must be careful about the order of calculations.
12 + 15 ÷ (5 − 2)

12 + 15 ÷ (5 − 2)
(1) (2) (3)

Let's calculate this expression in numerical order (1), (2) and (3).

12 + 15 ÷ (5 − 2) = 12 + 15 ÷ 3 (1), (2)
= 12 + 5 (3)
= 17

If you write the expression in order using an equal sign like above, the calculations can be easier.

The Order of Calculation

(1) An expression is usually calculated in order from the left.
(2) If a ( ) is included, do the section inside the ( ) first.
(3) If the +, −, ×, and ÷ are mixed, do multiplication and division first.

Exercise

Let's calculate.

① 12 ÷ 2 × 3
= 6 × 3
= 18

② 12 ÷ (2 × 3)
= 12 ÷ 6
= 2

③ (5 + 4) × (6 − 2)
= 9 × 4
= 36

④ 5 + 4 × (6 − 2)
= 9 × 4
= 5 + 16
= 21

⑤ 90 − 50 ÷ (4 + 6)
= 90 − 50 ÷ 10
= 90 − 5
= 85

⑥ (90 − 50) ÷ 4 + 6
= 40 ÷ 4 + 6
= 10 + 6
= 16

Unit 11

Unit: Expressions and Calculations
Sub-unit: 2. Rules for Calculations
Lesson 1 of 1 (Double Period)

Textbook Page : p.125 – p.126
Actual Lesson 77

Sub-unit Objectives

- To understand the commutative law, associative law and distributive law.
- To use the commutative law, associative law and distributive law for calculation.

Lesson Objectives

- To confirm rules of calculation for commutative law and associative law.
- To understand rule of calculation for distributive law using concrete examples.

Prior Knowledge

- Calculation skill of four individual operations.
- Order of calculation of four mixed operation and calculation with parenthesis.

Preparation

- Chart of rules for calculations
- Chart of task 2

Assessment

- Think about why commutative law and associative law work in any operation. F
- Think about the meaning of distributive law. F
- Do the exercise correctly. S

• Teacher's Notes •

Distributive Law is when we remove parenthesis. For example in $(2+1)\times 3$ we distribute as

$$(2+1)\times 3 = 2\times 3+1\times 3$$

(1×3 and 2×3)

2 Rules for Calculations

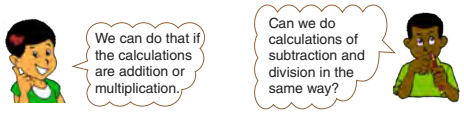
1 Calculate the following expressions Ⓐ, Ⓑ, Ⓒ and Ⓓ in an easier way. Let's think about why we can calculate them as shown below.

Ⓐ $5+397 \rightarrow 397+5$ 402

Ⓑ $389+234+266 \rightarrow 389+(234+266)$ 889

Ⓒ $55\times 248 \rightarrow 248\times 55$ 13640

Ⓓ $18\times 25\times 4 \rightarrow 18\times(25\times 4)$ 1800



Addition

① When 2 numbers are added, the sum is the same even if the order of numbers is reversed.

$\square+\triangle=\triangle+\square$

② When 3 numbers are added, the sum is the same even if the order of addition is changed.

$(\square+\triangle)+\bigcirc=\square+(\triangle+\bigcirc)$

Multiplication

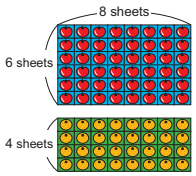
① When 2 numbers are multiplied, the product is the same even if the multiplicand and the multiplier are reversed.

$\square\times\triangle=\triangle\times\square$

② When 3 numbers are multiplied, the product is the same even if the order of multiplication is changed.

$(\square\times\triangle)\times\bigcirc=\square\times(\triangle\times\bigcirc)$

2 There are 2 sheets of stickers shown on the right.
How many stickers are there altogether?



Mero's idea

$6\times$ 8 $+4\times$ 8 $=48+$ 32
$=$ 80

Yamo's idea

$(6+$ 4 $)\times 8=$ 10 $\times 8$
$=$ 80

3 A store sold mattresses for 200 kina each and gives a 20 kina discount for each mattress, so I bought 6 mattresses.
How much is the total cost? Let's represent this as expressions using 2 methods.

Ⓐ (200 x 6) – (20 x 6) = 1080
(Original cost of 6 mattresses; Total discount for 6 mattresses)

Ⓑ (200 − 20) × 6 = 1080
(Discount cost for each mattress; Number of mattress)

Answer: 1080 kina

$(\square+\triangle)\times\bigcirc=\square\times\bigcirc+\triangle\times\bigcirc$
$(\square-\triangle)\times\bigcirc=\square\times\bigcirc-\triangle\times\bigcirc$

Exercise

Let's calculate.

① $(4+16)\times 3$ 60
② $5\times(14-9)$ 25
③ $25\times 4+15\times 4$ 160
④ $30\times 7-28\times 7$ 14

$\square\div\square=125$ $126=\square\times\square$

Lesson Flow

1 ① Think about how operations A to D are calculated.

T Introduce the main task.
T Confirm how operations A to D are calculated.
TN A: Order of addition is changed.
B: Order of addition is changed by using parenthesis.
C: Multiplicand and multiplier are changed.
D: Order of multiplication is changed by using parenthesis.

2 Understand rules of addition and multiplication.

S Read and understand the important points in the box .
T Which rule is applied to A, B, C and D?
S A is (1), B is (2), C is (3) and D is (4).

3 ① Think about the number of stickers in 2 ways.

S Think about the ideas of Mero and Yamo.
i. Mero calculates the number of stickers by sheets and adds the two numbers.
ii. Yamo adds the vertical number of 2 sheets and multiplies the horizontal number.
T What will be the answer? Are they the same or different?
S They are the same.
T Which is easier to calculate?
S Yamo's is easier because you multiply only once.

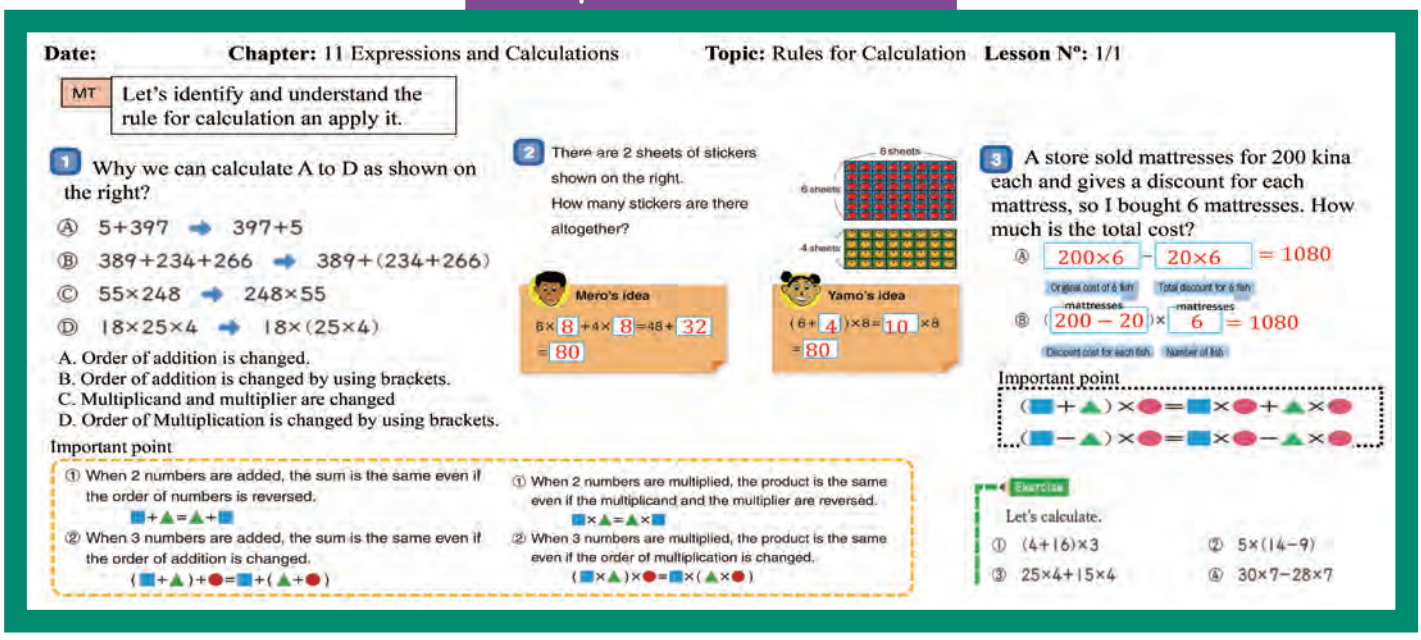
4 ③ Think about how to find the cost of 6 mattresses in 2 different ideas.

S Think about Mero and Yamo's ideas and use them.
TN A: Calculate the total cost of 6 mattress and total discount separately.
B: Calculate cost of a mattress after discount, and multiply the number of mattress.
T What will be the answer? Are they same or different?
S They are the same.
T Which is easier to calculate?
S B is easier because you multiply only once.
S Read the summary point .

5 Do the exercise.

S Do the exercise confirming the rules of calculation.

Sample Blackboard Plan



Unit 11

Unit: Expressions and Calculations
Sub-unit: 3. Calculation of Whole Numbers
Lesson 1 of 2 (Double Period)

Textbook Page : p.127~p.128
Actual Lesson 78

Sub-unit Objectives

- To deepen the understanding on the calculation of the four operations of whole numbers.
- To calculate large numbers using the four operations.

Lesson Objectives

- To deepen the understanding on the calculation of the four operations for whole numbers.
- To think about how to calculate large numbers using the four operations.

Prior Knowledge

- Calculation skills of four operations and the order of operations.

Preparation

- Chart for multiplicaiton

Assessment

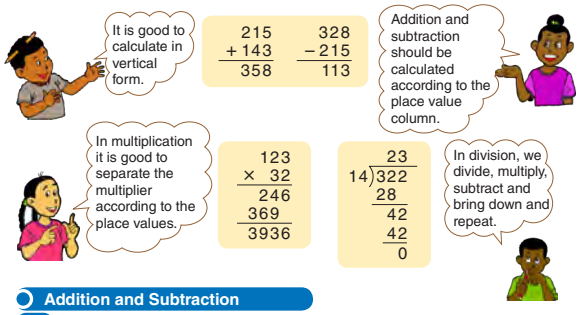
- Remember and summarise how to calculate whole numbers using the four operations. F
- Think about how to calculate large numbers using four operations. F
- Understand how to calculate large numbers using the four operations. S

• Teacher's Notes •

Even if a whole number is a large number, the method of calculation is the same.
For example, if adding or subtracting larger whole numbers, align the digits in their place value or in division we still apply the method,
Divide → Multiply → Subtract → Bring down

3 Calculation of Whole Numbers

Let's summarise how to do calculations of whole numbers.



Addition and Subtraction

1 There are 613681 boys and 586534 girls in grade 4.

How many ten thousand students are there approximately?

(1) What is the total number of children in the fourth grade?

Expression : 613681 − 586534

	6	1	3	6	8	1
+	5	8	6	5	3	4
1	2	0	0	2	1	5

There are many place values. So you should calculate by order according to their place values.

(2) Which is the largest number, boys or girls? What is the difference? Answer: Boys number is larger

Expression : 613681 − 586534 = 27147(Difference)

Multipication and Division

2 Boat fares were given to all 315 children during the school excursion. One return boat fare costs 436 kina for each member.

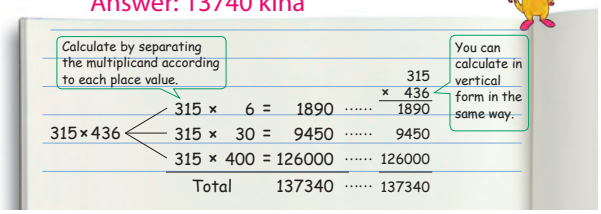
(1) How much is the total cost?

Expression 1 : 513 x 436

Expression 2 : 436 x 513

Answer: 13740 kina

Calculate by separating the multiplicand according to each place value in the same way as multiplying 2-digit numbers.



(2) Let's find the product for 436×315.

3 A principal wants to buy as many library books as possible with 5000 kina. One science book is sold at 68 kina at a discount store. How many science books can the principal buy? Expression : 5000 ÷ 68

			7	3
6	8	5	0	0
		4	7	6
			2	4
			2	0
				4

How many science books can he buy?

For the quotient which place value should I begin?

I should calculate in the same way as before.

Answer: 73 books

□ ÷ □ = 127 128 = □ × □

Lesson Flow

1 Summarise how to do calculation of whole numbers.

S Summarise how to calculate using the four operations.
T Introduce the main task.

2 ① ① Read the problem, make mathematical expressions and calculate in vertical form.

T What is the mathematical expression?
S 613681 + 586534
T How can we calculate?
S We can calculate in vertical form.
TN The method of calculation is the same even if it is a large number. Let the students write the numbers according to the place values.
S Being aware of 'carrying over' when calculating.

3 ① ② Understand the problem, make mathematical expressions and calculate in vertical form.

S Being aware of 'borrowing' when calculating.

4 ② Read the problem, make mathematical expressions and calculate in vertical form.

T ① What is the mathematical expression?
S 315 × 436
T ② Let's think about how to calculate 315 × 436.
S Separate 436 by each digit and relate each calculation to multiplication in vertical form.
S Notice that (3-digit) × (3-digit) can be calculated by applying the same method of (3-digit) × (2-digit).

5 ③ Read the problem, make mathematical expression and calculate in vertical form.

T What is the mathematical expression?
S 5000 ÷ 68
TN It looks difficult because the number is large, but let the students notice that the same method can be applied even when the number of digit increased.
TN Let the students remember how to calculate division in vertical form.
Divide → Multiply → Subtract → Bringing down.

Sample Blackboard Plan

Date: **Chapter:** 11 Expressions and Calculations **Topic:** Rules for Calculation **Lesson N°:** 1/2

Let's calculate whole numbers using the rule for calculation and apply it.

▶▶ Let's summarize how to do calculations of whole numbers.

1. 215 + 143 = 358 ; 328 − 215 = 113

- It is good to calculate in vertical form.
- Addition and subtraction should be calculated according to the place column.

2. 123 × 32 = 246 + 369 = 3936 ; 322 ÷ 14 = 23 remainder 0 (28, 42, 42, 0)

- In multiplication it is good to separate the multiplier according to the place values
- In division, we divide, multiply, subtract, bring down and repeat.

MT **Addition and Subtraction**

1 There are 613 681 boys and 586 534 girls in grade 4.

① What is the total number of children in the fourth grade?
Expression: 613 681 + 586 534

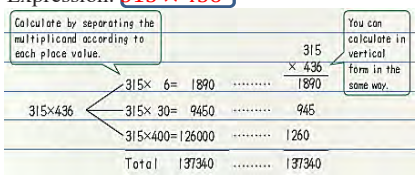
	6	1	3	6	8	1
+	5	8	6	5	3	4
1	2	0	0	2	1	5

② Which is the largest number, boys or girls? And what is the difference?
Answer: Boys number is larger
Expression: 613 681 − 586 534
= 27 147 (Difference)

2 **Multiplication and Division**

Boat fares were given to all 436 children during the school excursion. On return boat fares cost 315 kina from their member. How much is the total cost?

Expression: 315 × 436



3 Principal wants to buy as many library books as possible with 500 kina. One science book sold at 68 kina at a discount store. How many science books can principal buy?
Expression: 500 ÷ 68

				7	3
6	8	5	0	0	0
	−	4	7	6	
			2	4	0
		−	2	0	4
				3	6

Answer: 73 books

Unit 11

Unit: Expressions and Calculations
Sub-unit: 3. Calculation of Whole Numbers
Lesson 2 of 2 (Double Period)

Textbook Page : p.129
Actual Lesson 79

Lesson Objectives

- To make various problems(questions) from the story.
- To enjoy exchanging stories among friends and solve them.

Prior Knowledge

- Calculation of large numbers using the four operations

Preparation

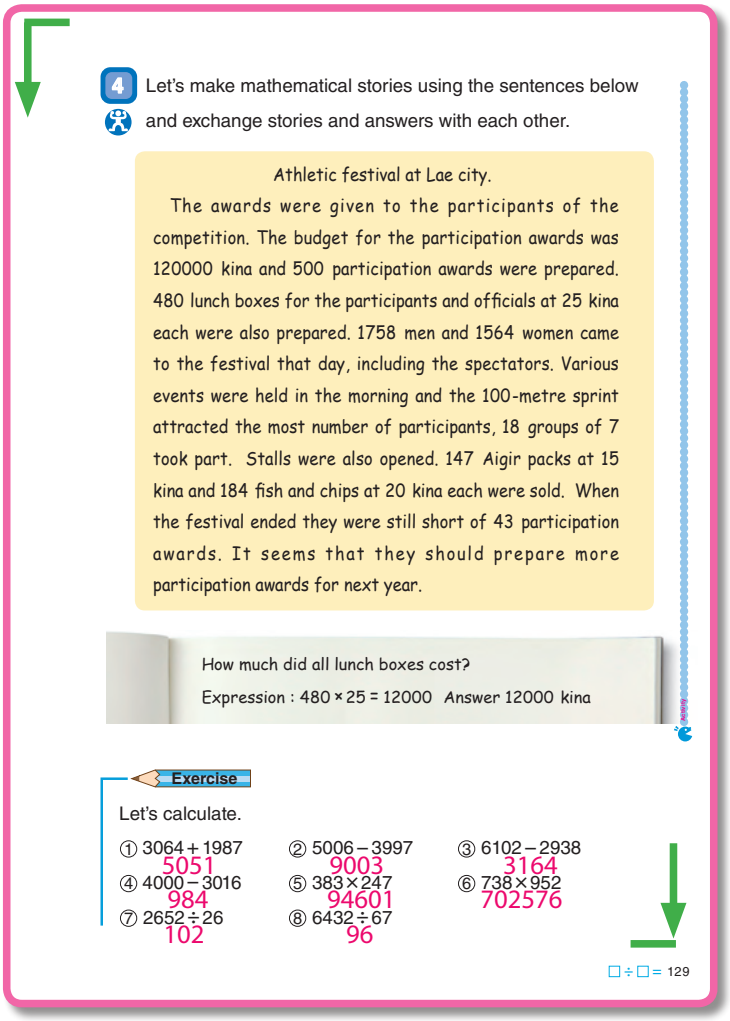
- The story for task 1

Assessment

- Make various problems(questions) from the story. F
- Enjoy exchanging stories among friends and solving them. F
- Do the exercise correctly. S

• Teacher's Notes •

- The skills applied in daily life situations.
- Students can recall back to previous lessons for making various situation problems.



4 Let's make mathematical stories using the sentences below and exchange stories and answers with each other.

Athletic festival at Lae city.

The awards were given to the participants of the competition. The budget for the participation awards was 120000 kina and 500 participation awards were prepared. 480 lunch boxes for the participants and officials at 25 kina each were also prepared. 1758 men and 1564 women came to the festival that day, including the spectators. Various events were held in the morning and the 100-metre sprint attracted the most number of participants, 18 groups of 7 took part. Stalls were also opened. 147 Aigir packs at 15 kina and 184 fish and chips at 20 kina each were sold. When the festival ended they were still short of 43 participation awards. It seems that they should prepare more participation awards for next year.

How much did all lunch boxes cost?

Expression : 480 × 25 = 12000 Answer 12000 kina

Exercise

Let's calculate.

① 3064 + 1987 = 5051
② 5006 − 3997 = 9003
③ 6102 − 2938 = 3164
④ 4000 − 3016 = 984
⑤ 383 × 247 = 94601
⑥ 738 × 952 = 702576
⑦ 2652 ÷ 26 = 102
⑧ 6432 ÷ 67 = 96

□ ÷ □ = 129

Lesson Flow

1 4 Read the story and think about what kind of problem we can make.

T Introduce the main task.

T/S Read and understand the story.

S Focus on the numbers and how the numbers are related to the situation.

TN Let students who have difficulty of understanding the story separate the story into paragraphs and focus on one topic such as the number of lunch boxes, the price of the lunch boxes or the numbers of participant etc.

TN Examples

- How much is the total cost of all lunch boxes?
  480×25=1200 1200 kina
- How many people came to the festival in total?
  1758+1564=3322 3322 people
- If all the Aigir packs are sold, how much will be the amount of sales?
  147×15=2205 2205 kina
- What is the difference in men and women participants?
  1758−1564=194 194 participants
- How much will each participant receive from total budget?
  120000÷500=240 240 kina

T Ask students to share the problems among friends and solve.

S Exchange the problems with friends and solve each others problems.

2 Do the exercise.

S Solve each operation confirming the steps.

Sample Blackboard Plan

Date: **Chapter:** 11 Expressions and Calculations **Topic:** Rules for Calculation **Lesson N°:** 2/2

MT Let's make various problems from the story using four operations.

4 Let's make math stories using the sentences below, and exchange stories and answer each other.

An athletic festival was held at Lae city. Participation awards were given to the participants of the competition. The budget for the participation awards was 120000 kina and 500 participation awards were prepared. And 480 lunch boxes for the participants and officials at 25 kina each were also prepared. 1758 men and 1564 women came to the festival that day, including the spectators. Various events were held in the morning and the 100-meter sprint attracted the most number of participants, 18 groups of 7 took part. Stalls were also opened. 147 Aigir packs at 15 kina and 184 fish and ships at 20 kina were sold. When the festival ended they were still short of 43 participation awards. It seems that they should prepare more participation awards for next year.

Example:
How much did all lunch boxes cost?
Expression: 480 × 25
480 × 25 = 12 000 Answer: K12 000.

Let few students to share their math stories with the class and teacher write them on the board.

Exercise

Let's calculate.

① 3064+1987 ② 5006+3997 ③ 6102−2938
④ 4000−3016 ⑤ 383×247 ⑥ 738×952
⑦ 2652÷26 ⑧ 6432÷67

Unit 11

Unit: Expressions and Calculations
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.130~p.131
Actual Lesson 80

Lesson Objectives

- To deepen the understanding of what you learned in this unit.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheets for the students.

Assessment

- Solve the exercise correctly. F S

• Teacher's Notes •

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

Exercise

1 Let's calculate. Pages 121 ~ 129

① 500 − (80 + 250) = 170
② 650 − (430 − 60) = 280
③ (40 + 50) × 7 = 630
④ 6 × (18 − 3) = 90
⑤ 120 ÷ (12 − 4) = 15
⑥ (37 + 18) ÷ 5 = 11
⑦ (11 − 4) × (8 + 7) = 105
⑧ (14 + 22) ÷ (9 − 5) = 9
⑨ 18 × 8 ÷ 4 = 36
⑩ 18 × (8 ÷ 4) = 36
⑪ 28 − 3 × (13−8) = 13
⑫ (32 − 18) + 4 × 5 = 34
⑬ 1549 + 79328 = 80877
⑭ 45625 − 3088 = 42537
⑮ 351 × 205 = 71955
⑯ 9792 ÷ 34 = 288

2 Let's express the following questions as one expression and find the answers. Pages 121 ~ 129

① There were 60 sheets of paper. I used 15 sheets of paper yesterday and 20 sheets of paper today. How many sheets of paper are left?
60 − (15 + 20) 25 sheets

② There were 5 dozens of pencils. The children used 40 pencils. How many pencils were left?
12 × 5 − 40 20 pencils

③ There are 100 sheets of coloured papers. 18 students received 4 sheets of papers each. How many sheets of papers are left?
100 − 4 × 18 28 sheets

④ Father paid 500 kina for 150 soft drinks that costed 3 kina each. How much is the change in kina?
500 − 150 × 3 50 kina

⑤ Pain killer medicine that costs 20 kina each and a cough medicine that costs 50 kina each make one set. There are 15 sets. How much is the total cost?
(20 + 50) × 15 1050 kina

130 = □ × □

Problems

1 Let's find the answers by expressing these problems as one expression.
● Representing a sentence as an expression.

① There were 1000 sheets of paper. Phyl used 250 sheets of paper yesterday and 320 sheets of paper today. How many sheets of paper are left?
1000 − (250 + 370) = 430
Answer: 430 sheets

② Mother is going to buy 150 orange juice that cost 2 kina each and 120 boxes of cookies that cost 2 kina each. If she pays with 600 kina, how much is the change?
1000 − (120 + 150) = 190
Answer: 190 kina

2 Let's calculate.
● Considering the order of calculations

① 8 + 12 × 3 = 44
② 40 − 12 ÷ (6 ÷ 2) = 36
③ 40 × 8 − 5 × 24 = 200
④ 36 + 6 × 8 ÷ 12 = 40

3 Fill in the □ with a number.
● Considering how to simplify calculations.

① 25 × 98 = 25 × (100 − 2)
= 25 × 100 − 25 × 2
= 2450

② 25 × 24 = 25 × 4 × 6
= 100 × 6
= 600

③ 105 × 6 = (100 + 5) × 6
= 100 × 6 + 5 × 6
= 630

④ 99 × 9 = 100 − 1 × 9
= 100 × 9 − 1 × 9
= 891

4 Make mathematical stories for the following expressions.
● Making a mathematical story for an expression.

① (1000 + 2000) × 4
② (3500 − 350) ÷ 3

□ ÷ □

Lesson Flow

1 ① Complete the Exercise.

T Let the students analyse the questions carefully from ① to ⑯ and calculate using the correct order of operation.

S Calculate applying the correct order of operation.

2 ②Complete the Exercise.

S Express questions ① to ⑤ then calculate to find the answer.

3 ①Solve the problems.

S Solve problems ① and ② by expression them as one.

4 ②Solve the problems.

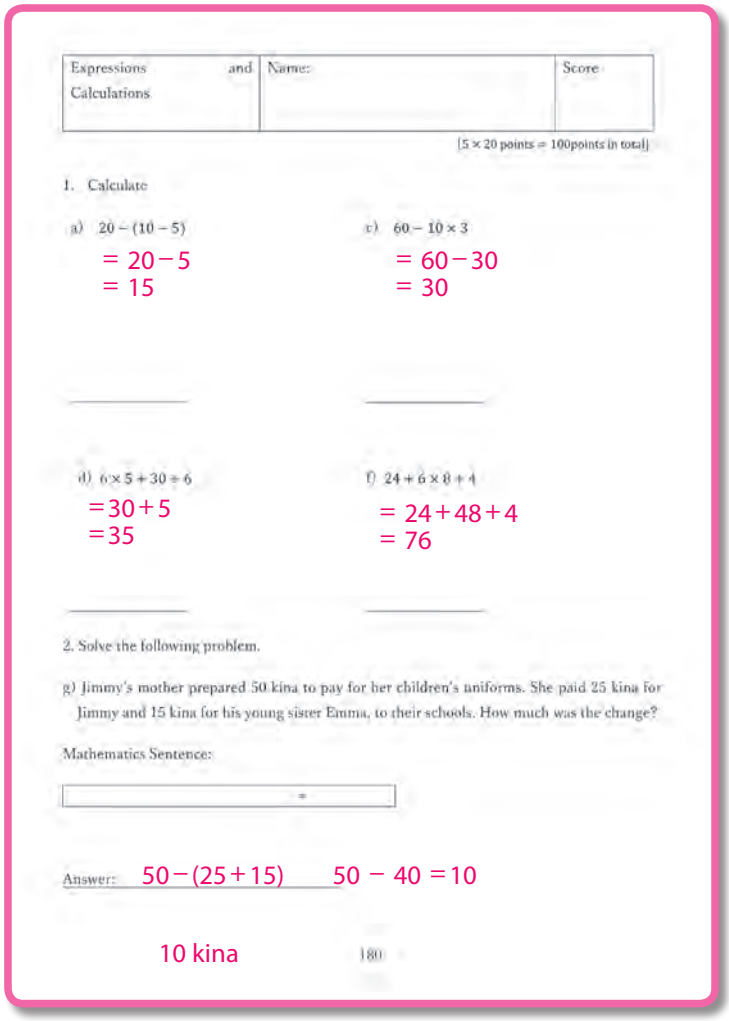
S Solve by calculating ① to ④.

5 ③Solve the problems.

S Solve the problems by filling in the ☐ with a number.

6 ④Solve the problems.

S Make math stories from the given expressions in ① and ②.



Expressions and Calculations | Name: | Score

[5 × 20 points = 100points in total]

1. Calculate

a) 20 − (10 − 5)
= 20 − 5
= 15

c) 60 − 10 × 3
= 60 − 30
= 30

d) 6 × 5 + 30 ÷ 6
= 30 + 5
= 35

f) 24 + 6 × 8 + 4
= 24 + 48 + 4
= 76

2. Solve the following problem.

g) Jimmy's mother prepared 50 kina to pay for her children's uniforms. She paid 25 kina for Jimmy and 15 kina for his young sister Emma, to their schools. How much was the change?

Mathematics Sentence:

Answer: 50 − (25 + 15) 50 − 40 = 10

10 kina

180

End of Chapter Test: Chapter 11 **Date:**

Expressions and Calculations	Name:	Score

[5 × 20 points = 100points in total]

1. Calculate

a) $20 - (10 - 5)$

c) $60 - 10 \times 3$

d) $6 \times 5 + 30 \div 6$

f) $24 + 6 \times 8 + 4$

2. Solve the following problem.

g) Jimmy's mother prepared 50 kina to pay for her children's uniforms. She paid 25 kina for Jimmy and 15 kina for his young sister Emma, to their schools. How much was the change?

Mathematics Sentence:

	=

Answer:

Chapter 12 Area

1. Unit Objectives

- To understand the meaning of unit and measurement of area and how to calculate. (4.2.1 a)
- To understand cm^2, m^2 and km^2
- To think about how to calculate square and rectangle. (4.2.1 a)
- To understand and apply the formula of area for finding the area. (4.1.2 b)
- To understand unit of a and ha. (4.1.2 c)

2. Teaching Overview

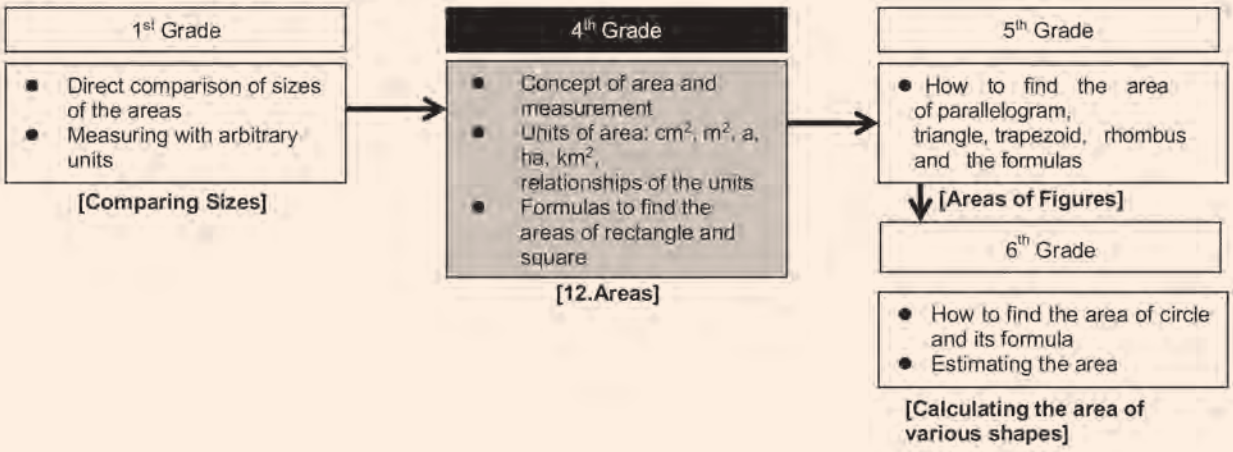
Students have the fundamental ideas of area by direct comparison of papers or paving the same tiles/papers in Grade 1 and 2. In this unit, students are to be introduced universal units to capture areas to compare indirectly.

Area : They study the meaning of area and measuring area. Firstly they quantify areas using the same tiles. Then they quantify the area using tiles of 1 cm squares. They also learn that areas are not changed even though the shape get cut off and put on other part (Conservation of Area).

Area of Rectangles and Squares : The formulae should be found and understood through enough experimental experiences such that they struggle to find out the number of 1 cm squares without dropping or skipping. Teachers should not just give the formulae. If they learn any formulae without knowing the reasons, they cannot easily recall them.

Unit for Large Area : They learn m^2, km^2, a and ha and their relationships. Since it is difficult for us to remember how to convert areas to another unit. Therefore, visualisation of conversion will be so effective for students to remember and recall it. They also should know what units are used for e.q. field, park, garden, classroom, province, etc.

3. Related Learning Contents



Unit 12

Unit: Area
Sub-unit: 1. Area
Lesson 1 of 2 (Double Period)

Textbook Page : p.132~p.134
Actual Lesson 81

Sub-unit Objectives

- To understand how to compare area using arbitrary units.

Lesson Objectives

- To think about how to compare area and to express the area using arbitrary units.

Prior Knowledge

- Study of area in Grade 1
- Direct comparison of quantities
- Comparing quantities using arbitrary units.

Preparation

- Square (5 cm×5 cm) and rectangle (6 cm×4 cm) paper for all students.

Assessment

- Think about how to compare the size of shapes. F
- Understand the meaning of area. S

• Teacher's Notes •

Direct comparison

When comparing the size of objects, sometimes one can move objects. As for comparing area, when you can overlay one object to another, if one object is completely covered by the other, you can see which is larger.

When comparing the size of objects, sometimes it is difficult to move objects in order to compare them directly. In this case, you can compare the size by using another object as a reference.

Indirect comparison

When you cannot overlay one object to another, you can still compare area by covering the objects with colour tiles and counting the number of the tiles. It is important to make students aware of the meaning of area through such activities as covering with colour tiles or shading individual squares on grid paper.

In this way, we can quantify the attribute of objects using everyday items as units and represent clearly the difference in sizes.

12 Area

Direct comparison

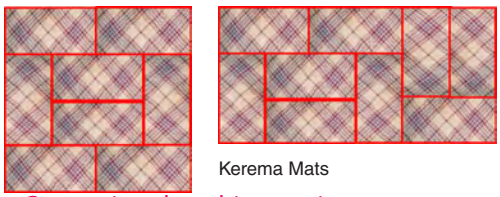
Which one is larger?

1

Scarfs

Comparison by arbitray unit.

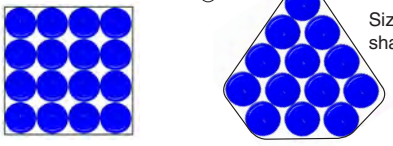
2 Ⓐ Ⓑ



Kerema Mats

Comparison by arbitray unit.

3 Ⓐ Ⓑ



Sizes of two shapes

132 = □ ÷ □

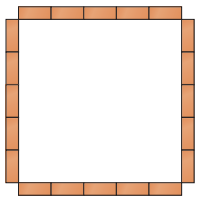
Comparing the area which have the same perimeter.

1 Area

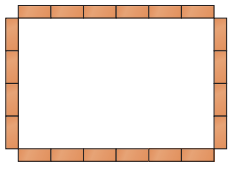
1 We are going to make rectangular and square flower beds with 20 blocks around the edges.

Are the areas same or different?

(a)



(b)



(a) and (b) have 20 blocks around the edges, but are they the same size?

How can we compare the sizes of the rectangles?

Lengh of (a) is longer than the length of (b), but the width of (b) is longer than that of (a).

Let's think about how to compare the areas of rectangles and squares and how to represent the areas with numbers.

□ + □ = 133

Lesson Flow

1 ▶▶ Comparing objects

T Ask students to compare the pictures ①, ② and ③ and make comparison of which is larger.

S Discuss and share ideas.

2 Report and Confirm of ①, ② and ③.

S ① B is bigger than A because B covers more space.

T/S A is bigger because B is smaller than A in size.

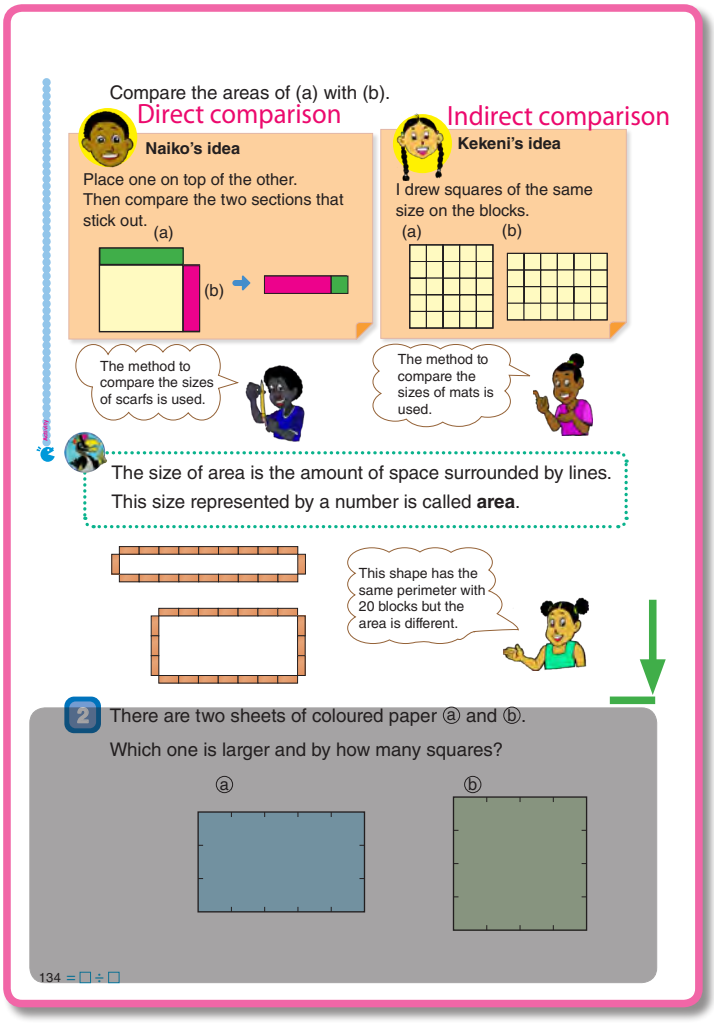
TN Remind students that this is an example of direct comparison based on observation.

T Demonstrate direct comparison using different size of paper.

S ② B is bigger becase the number of rectangles is more than A.

TN Remind students that the comparisons can be done based on the number of units, for example; ② number of rectangles and ③ number of bottle tops as arbitrary units.

T Show other examples of indirect comparison.



3 ① Think about and understand the situation of the problem.

T Introduce the main task.

T What do you notice about the flowerbeds?

S Both flowerbeds have 20 blocks.

T Are they the same size?

S Discuss with friends.

4 Think about how to compare (a) and (b).

T How can we compare to find which is bigger?

T Distribute square(a) and rectangle(b) papers to all students.

S Think individualy about how to compare the size of area by using prior knowledge.

S Share the ideas with their friends.

5 Compare the 2 ideas of Naiko and Kekeni.

S Explain how Naiko compared (a) and (b).

T Based on her explanation, tell the students that Naiko has done direct comparison by superimposing(comparing the 2 parts sticking out).

S Explain how Kekeni compared (a) and (b)?

T Based on their explanation, emphasise that Kekeni did her comparison using arbitrary units by drawing squares of the same size.

TN Students also notice that even the perimeter is the same, the area is different.
(Refer to Teacher's Note)

6 Summarise by defining Area as shown in the textbook .

Sample Blackboard Plan

Sample blackboard plan refer to page 187.

Unit 12

Unit: Area
Sub-unit: 1. Area
Lesson 2 of 2 (Double Period)

Textbook Page : p.134~p.136
Actual Lesson 82

Lesson Objectives

- To understand the unit cm² and find the area using the unit.
- To understand that shape changes but area does not.
- To draw various shapes with same area.

Prior Knowledge

- Comparing area using arbitrary units. (Previous lesson)

Preparation

- 1 cm² squares, 1 cm² square grid paper

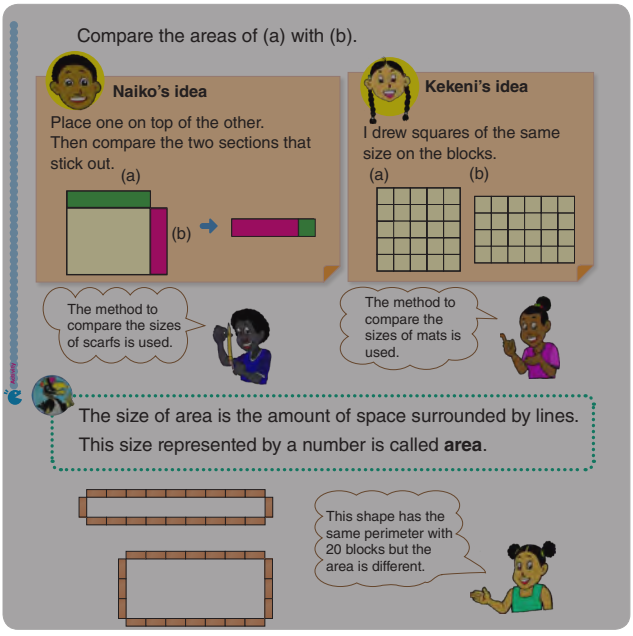
Assessment

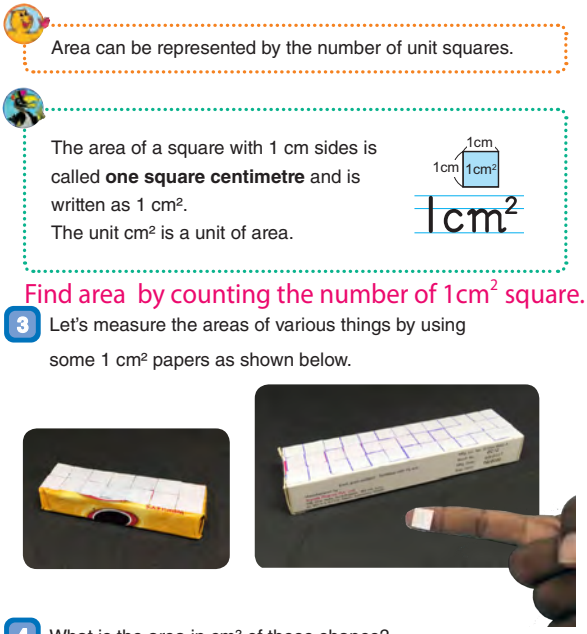
- Understand the unit cm² and find the area using the unit. F
- Draw different shapes with same area in cm² S

• Teacher's Notes •

Teach students to quantify the size of an area by deciding on a basic unit and counting how many units are there. For example, when measuring area, it is convenient to use a square whose side is 1 centimetre as a unit.

Arbitrary units are samples of things around the environment that can be used to get measurements of certain objects.





2 There are two sheets of coloured paper ⓐ and ⓑ.
Which one is larger and by how many squares?

Comparison by the number of 1cm² square.

ⓐ 15 squares

ⓑ 16 squares

4 What is the area in cm² of these shapes?

Find area by counting the number of 1cm² square.

1 18 cm²

2 15 cm²

134 = □ ÷ □

□ + □ = 135

Lesson Flow

1 Review previous lesson.

2 2 Compare the 2 figures.

T Introduce the main task.

T Let students draw squares and count the squares.

S Draw squares and count the squares.

T Which one is bigger and by how many squares?

S Explain that (b) is bigger than (a) because (b) has more squares compared to (a) by 1 square.

3 Understand how to express area by defining it.

T Explain important point in the boxes ☐ and ☐.

4 3 Measure areas by placing 1cm² squares to find area.

T Get students to measure the area of different items using 1 cm².

S Measure using 1 cm² squares and give their answers in cm² based on the total number of cm² squares.

TN Use different items inside the classroom.

5 4 Complete activity by finding the area of the given shapes in cm².

T Ask students to count the number of squares and write the total in cm² .

S Find the areas of 1 as 18 cm² and 2 as 15 cm²

6 5 Complete activity by thinking about the area of figures a,b,c and d.

S Determine the area of the figures by looking at the 1 cm² squares.

S Figure b,c and d can make 1 cm² when combined to fill a 1 cm² square.

TN All shapes are 1 cm².

7 6 Find the areas of 1, 2 and 3 in cm².

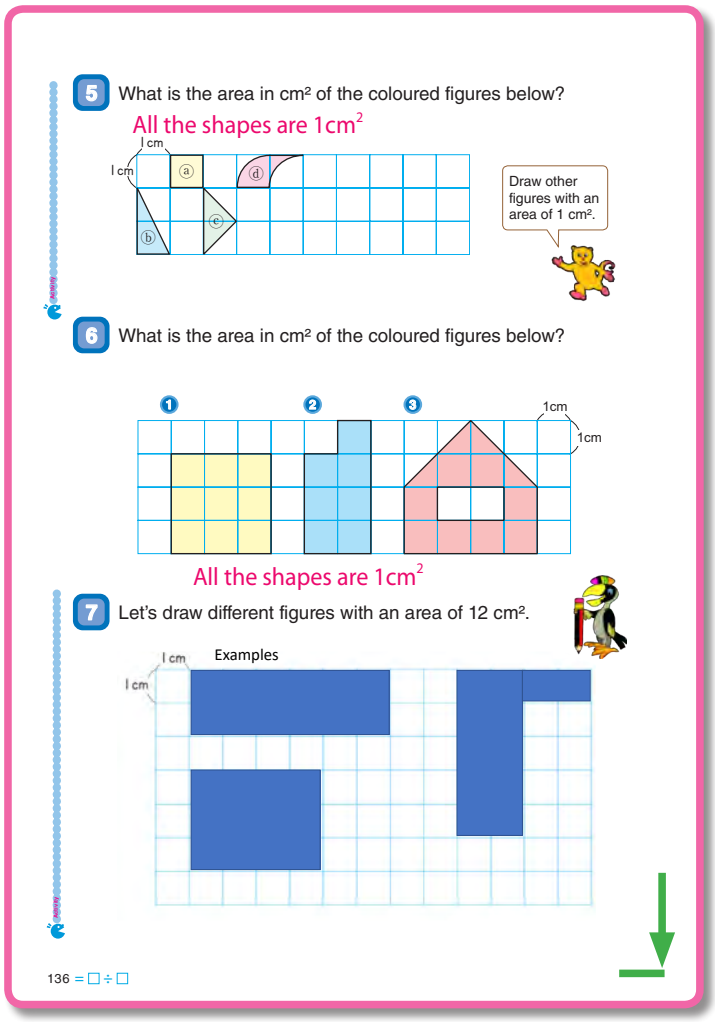
S Use learnt ideas to find the area and share ideas of how to find the area.

8 7 Draw different figures with an area of 12 cm².

S Draw any figures that have an area of 12 cm² on the grid paper.

T Allow students to explore other shapes apart from squares and rectangles as well.

S Share their drawings with others.



Sample Blackboard Plan

Sample blackboard plan refer to page 187.

Unit 12

Unit: Area
Sub-unit: 2. Area of Rectangles and Squares
Lesson 1 of 3 (Double Period)

Textbook Page : p.137~p.138
Actual Lesson 83

Sub-unit Objectives

- To understand how to find the area of rectangle & square and its formula.
- To measure the necessary sides of rectangles and squares and calculate the area.
- To find a side of a rectangle when the area and one side is known.
- To find the area of combined shapes.

Lesson Objectives

- To think about how to find the area of a rectangle and square.
- To understand the meaning of the formula for the area of rectangles and squares.

Prior Knowledge

- Direct comparison of quantities
- Comparing quantities using arbitrary units
- Unit squares (1cm²) as arbitrary units to compare

Preparation

- Images for blackboard display.

Assessment

- Think about how to find the area of rectangles and squares using multiplication. F
- Understand the formula for the area of rectangle and square. S

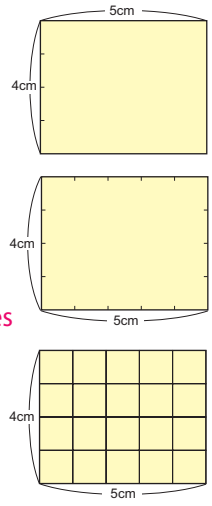
• Teacher's Notes •

Help the students to understand that the area of the rectangle and square can be calculated if the lengths of its sides are known. To know the area of a rectangle and square, think about the meaning of area and count the number of unit squares(1cm²).
When the length and width of a rectangle or square are measured using 1 centimetre as a unit, the area is represented by **(width)×(length)** or **(length)×(width)** with the unit cm².
This is how we get the formula,
Area of rectangle = length × width (or width × length)

Area of square = 1 side (length) × 1 side (width).

2 Area of Rectangles and Squares

1 What is the area in cm² of the rectangles on the right?



① The length is 4 cm. How many 1 cm² are lined up vertically? 4 squares

② The width is 5 cm. How many 1 cm² are lined up horizontally? 5 squares

③ How many 1 cm² are there in this rectangle? 20 squares
What is the area in cm² of the rectangle?

④ Find the area of the rectangle using multiplication. 20 cm²

In the mathematical sentence on the right, 4 represents the width and 5 represents the length.

Number of 1 cm² squares... 5 × 4 = 20
(Number of length, Number of width, Total number)

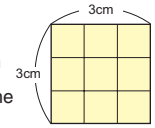
5 × 4 = 20
(Length (cm), Width (cm), Area (cm²))

The area of a rectangle is found using length and width.

Area of a rectangle = length × width

The area of any rectangle is expressed as **"Area of a rectangle = length × width"**.
A mathematical sentence like this is called a **formula**.
The area of a rectangle is also expressed as **"width × length"**.

2 How many square centimetres are there in the area of a square with 3 cm sides? Let's think about this in the same way as with a rectangle.

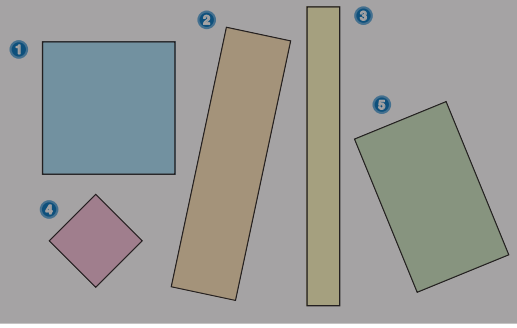


3×3=9 Answer: 9 cm²

The area of a square is expressed in the following formula.

Area of a square = Side × Side

3 Let's find the area of the following squares and rectangles by measuring the lengths of their sides.



□+□=137 138=□÷□

Lesson Flow

1 **Review previous lesson.**

2 **1 Think about how to find the area of the rectangle in cm².**

T Based on the previous lesson, ask students how they can find the area of the rectangle.
S "Divide the rectangle into 1 cm² squares"

3 **1 Find the number of 1 cm² squares drawn vertically.**

T "How many 1 cm² squares are drawn vertically?"
S Four(4) 1 cm squares

4 **2 Find the number of 1 cm² squares drawn horizontally.**

T "How many 1 cm² are drawn horizontally?"
S Five(5) 1 cm squares

5 **3 Find the area using the total number of 1 cm² squares.**

T "How many 1 cm² are there in the rectangle? What is the area in cm²?
S 20 squares so the area is 20 cm²

6 **4 Find the area of the rectangle by multiplying length × width.**

T Think about finding the area of the rectangle.
S Realise that by multiplying the sides **4 × 5** they get the area **20 cm²**.
T Explain the important point in the 2 boxes [ ] and [ ].

7 **2 Calculate the area of the square.**

T Ask the students to calculate the area of the square using the same principal as that of rectangles.
S Calculate the area of the square by multiplying similar to the rectangle.
T Explain the important point [ ].

8 **Summary**

T Confirm the formula for calculating rectangles and squares.
S Understand and remember the formula for rectangles and squares as;
Area of rectangle = length × width and Area of square = side × side

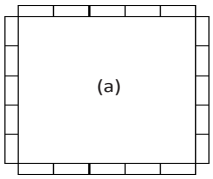
Sample Blackboard Plan (Lesson 82)

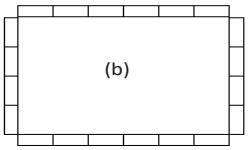
Date: **Chapter:** 12 Area **Topic:** Area **Lesson N°:** 1/2

MT Let's think about how to compare the areas of the rectangle and square and how to represent them with same numbers.

Which one is larger?
1 A or B ? B > A (Direct comparison)
2 A or B ? B > A (Comparing by arbitrary units)
3 A or B ? A > B (Comparing by arbitrary units)

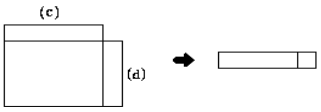
1 We are going to make rectangular and square flower beds with 20 blocks around the edges. Which is larger, (a) or (b)?





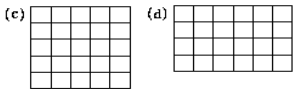
Naiko's idea

Place one on top of the other and then compare the two sections that stick out.



Kekeni's idea

I drew squares of the same size on the blocks.



Summary

Important point

The size of area is the amount of space surrounded by lines. The size represented by the number is called **area**.

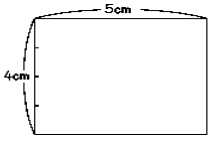
Sample Blackboard Plan (Lesson 83)

Date: **Chapter:** 12 Area **Topic:** Area of Rectangles and Squares **Lesson N°:** 1/3

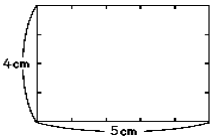
MT Let's think about how to calculate the area of rectangle and squares using **one square centimeter**.

1 What is the area in cm^2 of the rectangle on the right?

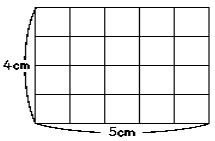
1 How many 1 cm^2 are lined up vertically?
4 1 cm^2 squares.



2 How many 1 cm^2 are lined up horizontally?
5 1 cm^2 squares.



3 How many 1 cm^2 are there in this rectangle?
20 1 cm^2 squares



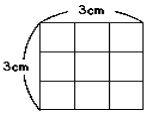
4 Find the area of the rectangle using multiplication.

⋯	4	×	5	=	20
	Number of length		Number of width		Total number
	4	×	5	=	20
	Length (cm)		Width (cm)		Area (cm^2)

Important point

The area of any rectangle is expressed as **"area of a rectangle = length × width".**
The mathematical sentence like this is called a **formula.**
The area of a rectangle is also expressed as **"length × width.**

2 How many cm^2 are there in the area of a square with 3 cm sides?
3 × 3 = 9
Answer: 9 cm^2



Important point

The area of a square is expressed in the following formula:
area of a square = one side × one side

Unit 12

Unit: Area
Sub-unit: 2. Area of Rectangles and Squares
Lesson 2 of 3 (Single Period)

Textbook Page : p.138~p.139
Actual Lesson 84

Lesson Objectives

- To measure the sides of shapes and calculate the area.
- To find the length of a side when the area and 1 side is known.

Prior Knowledge

- Unit squares (1cm²) as arbitrary units to compare
- Formula for calculating area **(A = length × width)**
- Relationship of Multiplication and Division.

Preparation

- Rulers

Assessment

- Calculate area using formula (Area = length × width) or (Area = 1 side × 1 side). F
- Find an unknown side using 1 given side and the area by dividing. F
- Do the exercise correctly. S

• Teacher's Notes •

Help the students to understand that the unknown side of a rectangle can be calculated by doing the inverse of multiplication which is, dividing the area (product) by the known side (multiplicand/multiplier).

For example; Area of rectangle=length × width (or width × length)

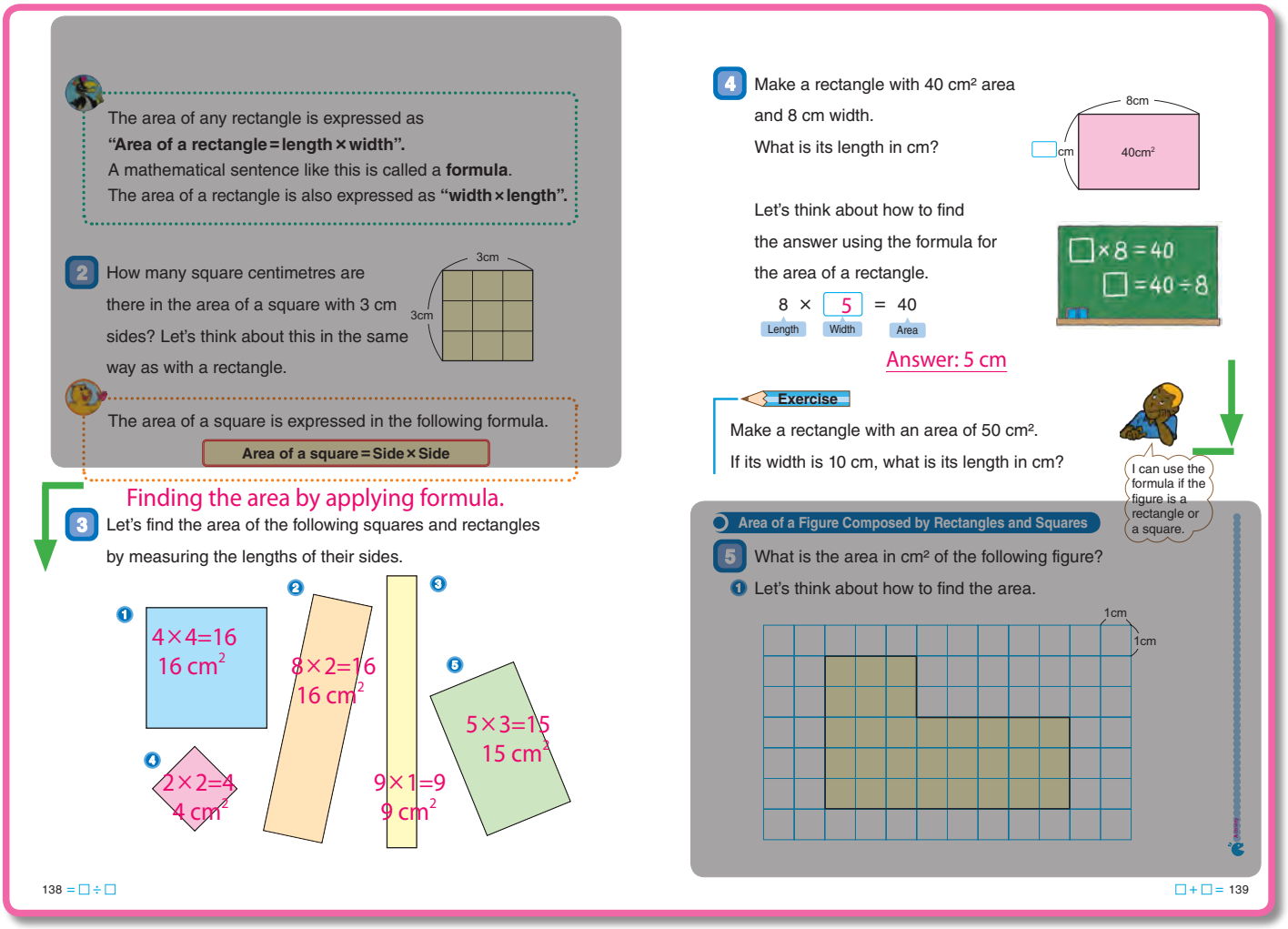
4 × ? = 20

? = 20 ÷ 4

? = 5

5 (Lenght of unknown side)

*The 2 sides (multiplier or multiplicand) are also the factors of the area (product).



Lesson Flow

1 Review previous lesson.

2 3 Measure the side lengths of the rectangles and squares 1 - 5.

T Introduce the main task.
T Ask the sutdents to measure the length and calculate the area.
S Measure 2 sides only to represent the lengths and width using a ruler.
S "Find the area of the shapes using the formula for calculating area of a rectangle and square."
TN Remind the students that their answers should be given in cm² when calculating area.
S Calculate answers by multiplying length × width or 1 side × 1 side to get the answers;

1 4×4=16 Area: 16 cm²
2 8×2=16 Area: 16 cm²
3 9×1=9 Area: 9 cm²
4 2×2=4 Area: 4 cm²
5 5×3=15 Area: 15 cm²

T Get the students to present their work on the board and correct the answers.

3 4 Complete the activity to find the length of the unknown side.

S Read the problem.
T Emphasise the word problem with the diagram presentation.
T "How can we find the unknown length □ cm? "
S Think about and find □ using the formula for the area, □(length) × 8(width) = 40(area).
S Discuss and find □ by dividing to find the answer

□ = 40 ÷ 8
□ 5

T Emphasise that division as the inverse of multiplication can be used to find the factors (multiplicand × multiplier) of a product, so we divide the product 40 by the factor (multiplier) 8 to find the unknown factor (multiplicand) 5, 8 and 5 are factors (multiplicand or multiplier) of the product 40.

4 Do the exercise.

Sample Blackboard Plan (Lesson 83)

Date: **Chapter:** 12 Area **Topic:** Area **Lesson N°:** 1/2

MT Let's represent area using 1 cm^2.

2 There are two sheets of coloured paper (a) and (b). Which one is larger and by how many squares?

(a) 15 squares (b) 16 squares

Answer: (b) is larger by 1 square.

Important point
Area can be represented by the number of unit squares.

Important point
The area of a square with 1 cm side is called **one square centimeter** and is written as 1 cm^2. cm^2 is a unit of area.

3 Let's measure the areas of various things by using some 1cm^2.

4 What is the area in cm^2 of theses shapes?

❶ 18 cm^2 ❷ 15 cm^2

5 What is the area in cm^2 of the coloured figure below?

Al the shapes are 1 cm^2

6 What is the area in cm^2 of the coloured figure below?

6 cm^2 7 cm^2 10 cm^2

7 Let's draw different figures, each with an area of 12cm^2.

Sample Blackboard Plan (Lesson 84)

Date: **Chapter:** 12 Area **Topic:** Area of Rectangles and Squares **Lesson N°:** 2/3

MT Let's find the area and side lengths by applying the formulae for rectangles and squares

3 Let's find the area of the following squares and rectangles by measuring the lengths of their sides.

❶ ❷ ❸ ❹ ❺

Make a rectangle with 40 cm^2 and 8 cm width. What is the length in cm?

8cm, □cm, 40cm²

Using the formula for the area of a rectangle:

□ × 8 = 40
Length Width Area

□ × 8 = 40
□ = 40 ÷ 8
= 5

Answer: Length is 5 cm.

Exercise
Make a rectangle with an area of 50cm².
If its width is 10cm, what is its length in cm?

10 cm, □cm, 50cm²

□ × 10 = 50
□ = 50 ÷ 10
□ = 5

Answer: Length is 5 cm.

1
2
3
4
5

Unit 12

Unit: Area
Sub-unit: 2. Area of Rectangles and Squares
Lesson 3 of 3 (Double Period)

Textbook Page : p.139~140
Actual Lesson 85

Lesson Objectives
- To find the area of combined shapes composed of rectangles and squares.

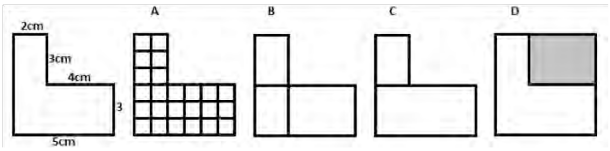
Prior Knowledge
- Formula for calculating area (**A = length × width**)

Preparation
- Grid paper, rulers

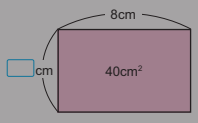
Assessment
- Think about how to calculate the area of combined shapes using area formula. F
- Find the area of combined shapes accurately. S

• Teacher's Notes •
Students should be able to use prior knowledge and the formula for the area of rectangles and squares to find the area of figures composed of rectangles and squares, and explain using words, numbers or diagrams.

Examples of how to find the area of figures composed of rectangles and squares;

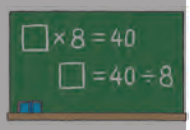


4 Make a rectangle with 40 cm² area and 8 cm width.
What is its length in cm?



Let's think about how to find the answer using the formula for the area of a rectangle.

8 × □ = 40
Length Width Area



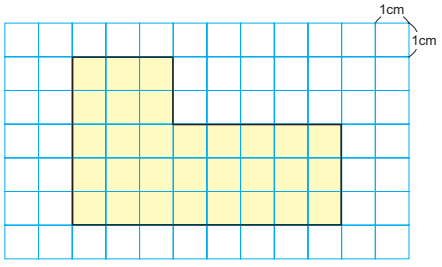
Exercise
Make a rectangle with an area of 50 cm².
If its width is 10 cm, what is its length in cm?

I can use the formula if the figure is a rectangle or a square.

Area of a Figure Composed by Rectangles and Squares
How to find the area of composite shape.

5 What is the area in cm² of the following figure?

❶ Let's think about how to find the area.




Yamo's idea
I count the number of 1 cm² squares.
30 suquares, 30cm²


Sare's idea
I calculate the area by dividing the figure into 2 rectangles.
5×3+3×5=30 30cm²


Gawi's idea
I imagine this as one large rectangle and then subtract the missing section.
5×8-2×5=30, 30cm²


Vavi's idea
I cut away one section and moved it to make a rectangle.
3×10=30, 30cm²

❷ Let's talk about which of the ideas in ❶ can be used for a shape like this.

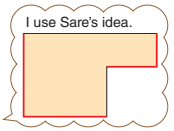
6 Let's trace the sides of the figure on the right with any colour pencil that is needed to find its area.
Then find the area.

- 5×5+2×3=31
- 2×8+3×5=31
- 5×8-3×3=31

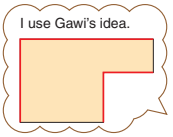
Answer : 31cm²

Which sides are needed?

I use Sare's idea.



I use Gawi's idea.



□+□=139 140=□÷□

Lesson Flow

1 Review previous lesson.

2 5 1 Think about finding the area of the shape using various strategies while thinking of the characteristics of the shape.

T Introduce the main task.
T "What is this shape?"
S Realise that it is a composition of 2 shapes.
T Instruct the students to think about and discuss their own ways to find the area of the shape.
S Think of the characteristics of the shapes and find its area.

3 Present ideas of how to find the area of this shape on the blackboard.

T Get the students to realise that the shape consists of squares and rectangles and that the formulae (**Area = length × width**) can be used to calculate the area.
S Think about 2 or 3 different ways and explain how to find the area.

4 Compare the 4 ideas and discuss how each of them is used.

T Display each idea and ask the students to discuss and explain.
- Yamo's idea: Counting the number of 1 cm² squares (30 cm²)
- Sare's idea: Calculate the area by dividing the figure into 2 rectangles. (5×3)+(3×5)=30 (30 cm²)
- Gawi's idea- Imagine and calculate it as one large rectangle and subtract the missing part. (5×8)−(2×5)=30 (30 cm²)
- Vavi's idea- Cut away one section and move it to make a rectangle and calculate the area. 3×10=30 (30 cm²)

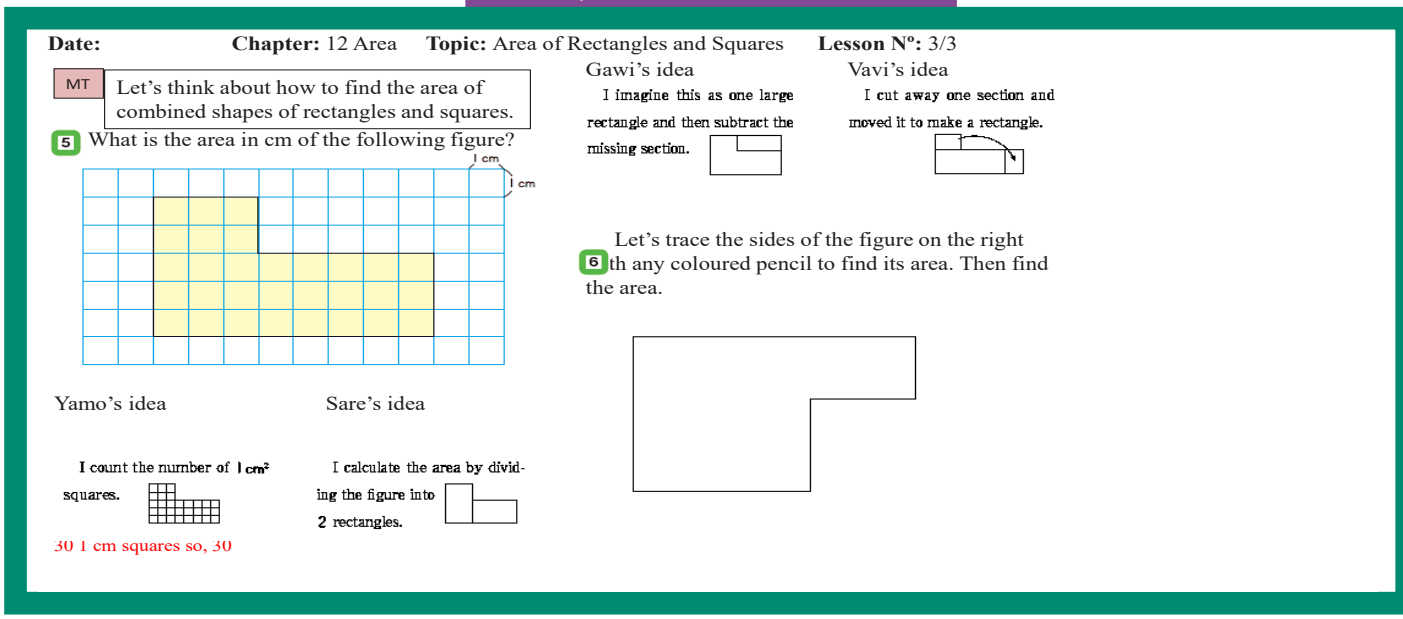
5 2 Think about and identify the ideas that can be used to find the area of similar shapes.

T "Who has the same idea/s as the 4 discussed?"
S Understand that there are many ways to find area based on their knowledge and what they have learnt.

6 6 Complete the activity by identifying the necessary sides and find the area.

T Get the students to trace the figure indicating the area needed and calculate the area using the ideas discussed.
S Think about which sides to use.
S Divide the figure into a square and rectangle and calculate the area. (5×5)+(2×3)=31 (31 cm²)
S Divide the figure into 2 rectangles and calculate the area. (2×8)+(3×5)=31 (31 cm²)
S Imagine and calculate it as one large rectangle and subtract the missing part. (5×8)−(3×3)=31 (31 cm²)

Sample Blackboard Plan



Unit 12

Unit: Area
Sub-unit: 3. Units for Large Areas
Lesson 1 of 3 (Double Period)

Textbook Page : p.141~p.142
Actual Lesson 86

Sub-unit Objectives

- To know unit of m^2, a, ha, km^2 and use these units to find area.
- To choose appropriate unit depending on the area.
- To understand the relationship between m^2, a, ha, km^2.

Lesson Objectives

- To know the unit of m^2.
- To find the area using unit of m^2.
- To understand the relationship between m^2 and cm^2.

Prior Knowledge

- How to find the area using unit of cm^2.

Preparation

- Area of 1 m^2

Assessment

- Find the area using unit of m^2. F
- Think about the relationship between m^2 and cm^2. F
- Find the areas using various units. S

• Teacher's Notes •

- Have students to understand and compare the realistic size of 1 m^2 with 1 cm^2.
- Visualise the comparison of cm^2 to m^2 by looking at the example.
- Students should have a sense of 1 m^2 so teacher must prepare 1 m^2 using newspaper or drawing on floor.

Unit of m^2

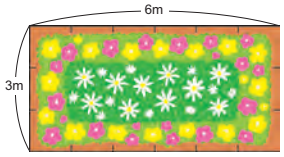
3 Units for Large Areas

1 Let's make a square with 1 m sides.
Let's see how many children can stand on this square.

The area of a square with a side of 1 m is called **one square metre** and is written as **1 m²**.
The unit m² is also a unit of area just like cm².

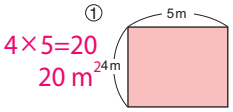
2

① What is the area in m^2 of a flower garden with a length of 3 m and a width of 6 m?

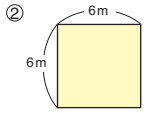


3×6=18, 18 m^2

② Let's find the area of the figures below.



4×5=20
20 m^2



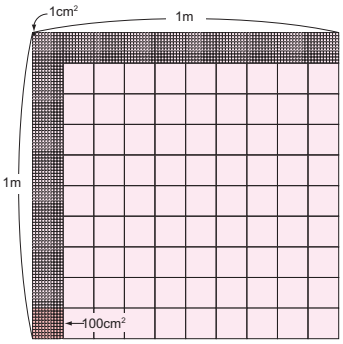
6×6=36
36 m^2

Relationship between 1 m^2 and 1 cm^2

3 Let's see how many cm^2 are there in 1 m^2.

① How many 1 cm^2 can be lined up vertically?
How about along the width? Length 100, Width 100
10000 cm^2

② What is 1 cm^2 in m^2 ?



1 m = 100 cm
100×100=10000

1 m^2 = 10 000 cm^2

Find the area of different unit.

4 Make a newspaper poster with a length of 2 m and a width of 80 m.
What is the area of the poster in cm^2?
To find the area, we need to express all the lengths using the same unit.
200×80=16000 Answer: 16000 cm^2

□+□=141 142=□÷□

Lesson Flow

1 Review previous lesson.

2 ① Show the 1 m^2 and find how many students can stand on the square.

T Introduce the main task.
T Show the 1 m^2 cardboard and ask how many students can stand on the square by prediction.
TN Use 1 m ruler to draw the square on the floor in the classroom if you do not have a mat.
S Do experiment and confirm how many can stand on the cardboard.
TN This activity is very important to help students to enhance the sense of large areas. (Refer to TN)

3 Understand 1 m^2 and practice to read and write m^2.

T Let students read the main point about m^2.
T Let students practice writing m^2 on their notebook.

4 ② ① Find the area of the flower bed.

S Read the problem and understand the situation.
T Let students know that the same formula of the unit of cm^2 can be used even if the unit is m^2.
S 3×6=18 18 m^2 Answer: 18 cm^2

5 ② Find the area of (1) and (2).

T Confirm to use formula of area of rectangle and square.

6 ③ Investigate 1 m^2 is equal to how many cm^2.

TN Show the relationship of the diagram to the students and explain.
T ① How many 1 cm^2 blocks are drawn vertically and horizontally?
S 1 m is equal to 1 cm so 100 blocks.
T 1 m=100 cm, 100×100=10000, 1 m^2=100 cm^2
S ② 1 m^2=10000 cm^2

7 ④ Solve the problem.

S Read the problem and understand the situation.
T Can we multiply 80 cm×2 m directly?
S No, because the units are different.
T Confirm that you must have the same unit when you use a formula to calculate.
S 2 m=200 cm, 80 cm×200 cm=16000
Answer: 16000 cm^2

Sample Blackboard Plan

Date: **Chapter:** 12 Area **Topic:** Unit For Large Areas **Lesson N°:** 1/3

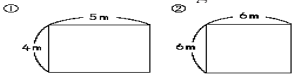
MT Let's think about the relationship between cm^2 and m^2 and calculate the area.

① Let's make a square with 1m side and see how many children can stand on the square.

The area of a square with a side of 1m is called one meter square and is written as 1 .
The unit is also a unit of area just like .

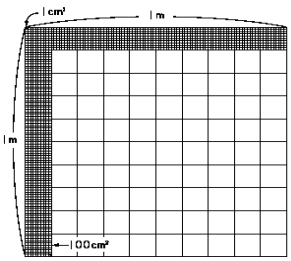
What is the area in of a flower garden with a length of 3m and a width of 6m? How many 1 m can be placed in the flower bed?

② Let's find the area of the figure on the right.



③ Let's see how many cm^2 are there in 1 m^2.
① How many 1 cm^2 can be lined up vertically? How about along the width?
Both ways we have 100 1 cm^2 squares.

② What is 1 cm^2 in m^2?



1 m = 100 cm
100×100=10 000 1 m^2 = 10000 cm^2

④ Make a newspaper poster with a length of 80 cm and a width of 2m. What is the area of the poster in cm^2?
To find the area, we need to express all the lengths using the same unit.

80×200=16 000 *Answer: 16 000 cm^2*

Unit 12

Unit: Area
Sub-unit: 3. Units for Large Areas
Lesson 2 of 3 (Double Period)

Textbook Page : p.143-p.144
Actual Lesson 87

Lesson Objectives

- To know the unit of 'a' and use 'a' to find area.
- To know 'ha' and use 'ha' to find area.
- To think about relationship between 'a' and 'ha'.

Prior Knowledge

- How to find the area using unit of m^2
- Relationship between m^2 and cm^2.

Preparation

- Chart of area

Assessment

- Find the area using unit of a. F
- Think about the relationship between (m^2 and a) and (a and ha). F
- Understand relationship between a and ha. S

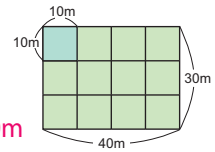
• Teacher's Notes •

- Realistic aerial view pictures of oil palm plantation for students to visualise on the size of the unit hectare (ha) and compare it with the unit 'a' and 'm^2'.
- If there are magazines around, find also pictures of 1ha to the students for enhancing their imagination of the relationship of '1 a' and '1 ha'.

How to show the area using the unit a.

5 There is a rectangular field with a length of 30 m and a width of 40 m.

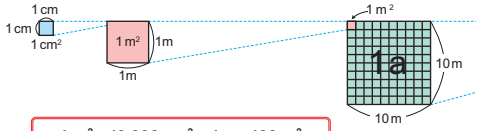
1. How many m^2 is the field? $30 \times 40 = 1200$, $1200 m^2$
2. How many 10 m squares can be placed in the field? $3 \times 4 = 12$, 12 squares of 10m



The area of square with a side of 10 m is called **are** and is written as 1 **a**.
The unit "**are**" is used to show the area of a vegetable garden and field.

1a

3. What is the area in a of the field?



$1\ m^2 = 10\ 000\ cm^2$, $1\ a = 100\ m^2$

Relationship between m^2 and a.

6 What is the area in m^2 of the rectangular plaza with a length of 60 m and a width of 80 m? What is this in a?

$60 \times 80 = 4800$ Answer: 4800 m^2, 48 a

Unit of ha

7 There is a square farm with 600 m sides.

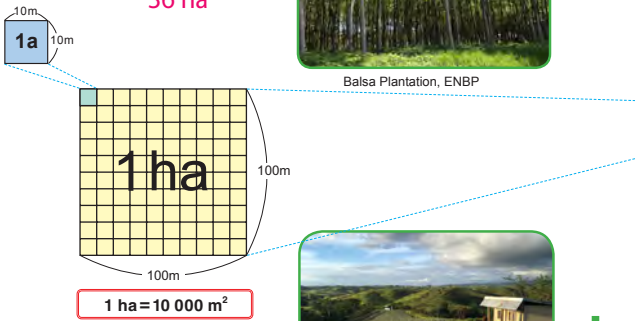
1. What is the area of the farm in m^2? $600 \times 600 = 360000$, $360000\ m^2$
2. How many squares with 100 m sides can be placed in the farm? $6 \times 6 = 36$ 36squares with 100 msides

The area of a square with a side of 100 m is called **one hectare** and is written as **1 ha**.
The unit **ha** is used to show large areas of plantations, farms and forests.

1ha

3. What is the area in ha of the plantation? 36 ha

Balsa Plantation, ENBP



$1\ ha = 10\ 000\ m^2$

8. What is 1 ha in a? 100 a

Pineapple Plantation, Sogeri Central Province

□ + □ = 143 144 = □ ÷ □

Lesson Flow

1 Review previous lesson.

2 5 Find the area of a field.

T 1 Confirm that the unit 'm' is in both width and length so calculate the area.
S 30×40=1200 Answer: 1200 m^2
S 2 12 squares of 10 m^2.

3 Understand the unit 'a' and think about how to express 'm^2' into 'a'.

T Let students know that 1200 m^2 is quite big so it is useful if there is another larger unit to express.
T Explain important point in the box ( ).
S 3 Realise that 1 m^2=10000 cm^2, 1 a=100 m^2 by using diagram.

4 6 Find the area using m^2 and change m^2 to 'a'.

S 60×80=4800 Answer: 4800 m^2, 48 a

5 7 Solve the problem.

T Confirm that unit 'm' is in both width and length so calculate directly the area.
S 1 600×600=360000 m^2.
T 2 600 m=6 of 100 m, so 6×6=36, 36 squares of 100 m sides are placed in this area.
T Explain the important point in the box ( ).

6 3 Understand the unit 'ha' change 'm^2' to 'ha'.

S Understand 1 ha=10000 m^2.
T 360000 m^2 is equal to how many ha?
S 36 ha.

7 8 Think about and understond that 1 ha is equal to how many a.

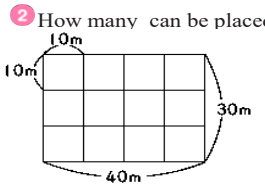
T 1 ha=10000 m^2 and 1 a=100 m^2, so 1 ha is equal to how many 'a'?
S Think about the relationship between 'ha' and 'a' based on m^2.
S 1 ha=100 a.

Sample Blackboard Plan

Date: **Chapter:** 12 Area **Topic:** Unit For Large Areas **Lesson N°:** 2/3

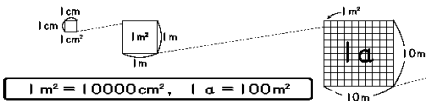
MT Let's compare the relationship between **are** and **hectare** based on m^2.

5 There is a rectangular field with a length of 30 m and a width of 40 m.
1 How many is the field?
2 How many can be placed in the field?



The area of square with a side of 10 m is called **are**, and is written as **1 a.**
The unit **are** is used to show the area of vegetable garden and field. 1a

3 What is the area in **a** of the field?



1 m^2 = 10000 cm^2, 1 a = 100 m^2

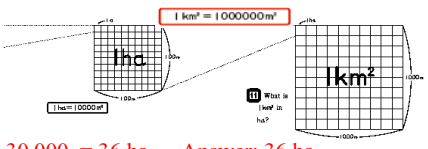
6 What is the area in of the rectangular plaza with a length of 60 m and a width of 80 m? What is this in **a**?

There is a square farm with 600 m side.
7 What is the area in of the farm?
1

2 How many squares with 100 m sides can be placed in the farm?

The area of a square with a side of 100 m is called **one hectare** and is written as **1 ha**.
The unit **ha** is used to show large areas of plantations, farms and forests. 1ha

3 What is the area in ha of the plantation?



30 000 = 36 ha Answer: 36 ha
8 What is 1 ha in a?
1 ha = 10 000 and 1 a = 100
So, 10 000100 = 100 answer: 100 a in 1 ha

Unit 12

Unit: Area
Sub-unit: 3. Units for Large Areas
Lesson 3 of 3 (Single Period)

Textbook Page : p.145-p.146
Actual Lesson 88

Lesson Objectives

- To know the unit 'km^2' and use 'km^2' to find area.
- To deepen understanding of cm^2, m^2, a, ha and km^2.

Prior Knowledge

- Relationship between ha and m^2

Preparation

- Diagram of 1 km^2

Assessment

- Find the area using unit of km^2. F
- Think about the relationship among cm^2, m^2, a, ha and km^2. F
- Investigate the area using appropriate unit. S

• Teacher's Notes •

It is important that students are able to imagine the size of 1 km^2. Therefore, teahcer introduce various examples of 1 km^{2}in your surroundings.

How to represent the area using km^2

9 The photograph below shows PNG LNG site at Papa village in Central Province.

The white line area is a square with 3 km sides.

1 How many squares with 1 km sides can be placed inside the figure?

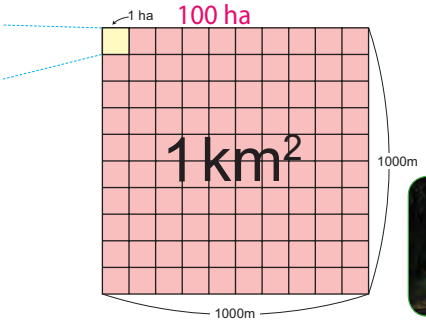
3×3=9 9 squares

LNG Plant, Papa, Central Province

The area of a square with a side of 1 km is called **one square kilometre** and is written as **1 km²**.
The unit km² is used to show large areas such as islands, provinces and countries.

2 What is the area in km² of the photograph?

Relationship between km^2 = ha

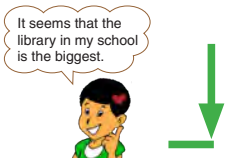


1 km² = 1 000 000 m²

Palm oil Plantation, Kimbe, WNBP

10 Which room is the biggest in our school? Let's estimate and investigate.

11 Let's investigate the areas of various places where we live.



Exercise

Pages 135, 141, 143~135

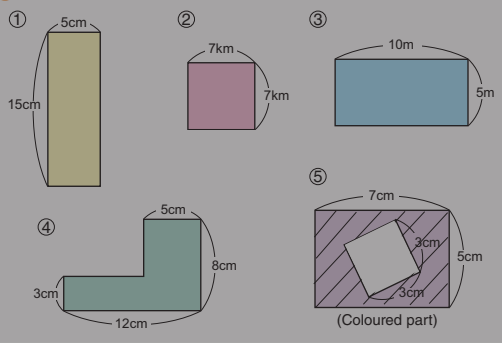
1 Which of the units in ☐ should you use to represent the following areas? cm^2, m^2, a, ha, km^2

① The area of a school yard ② The area of an exercise book

③ The area of PNG ④ The area of a coffee plantation

Pages 139~147

2 Let's find the areas of the following figures.



□+□=145 146=□÷□

Lesson Flow

1 Review previous lesson.

2 9 Find the area of PNG LNG site which has sides of 3 km.

S 1 Think about how many 1 km squares can be placed inside the figure.
S $3 \times 3 = 9$ Answer: 9 squares.
T Explain the important points in the box .

3 2 Think about the area of PNG LNG site in km^2.

S There are 9 squares of 1 km a side, so 9 km^2.
S PNG LNG site in papa village is 9 km^2.

4 Think about how many 1 km^2 is equal to how many m^2.

T Let students think based on 1 km = 10000 m.
S $1000 \times 1000 = 1\,000\,000$, so 1 km = 1 000 000 m^2.
TN Picture in the textbook is Kimbe oil Palm Plantation. Use the picture to imagine the area for 1 ha.

5 10 Think about 1 km^2 is equal to how many 'ha'.

T Let students think based on the figure and previous knowledge of 1 ha = 10000 m^2.
T 1000 m × 1000 m = 1000000 m^2.
1 km^2 = 1000000 m^2, 1 ha = 10000 m^2, 1 km^2 = 100 ha.

6 11 Find the area around us.

T Let students predict the area before measuring.
T Remind students that it is important to use appropriate units.

Sample Blackboard Plan

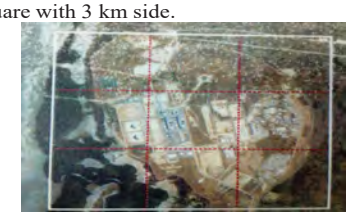
Date: **Chapter:** 12 Area **Topic:** Unit For Large Areas **Lesson N°:** 3/3

MT Let's think about how to express larger numbers using km^2.

The area of a square with a side of 1km side is called **one square kilometer** and is written as . The unit km is used to show large areas such as islands, provinces, and countries

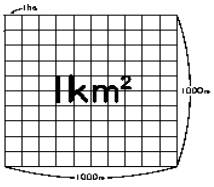
2 What is the area in of the photograph?

9 The photograph shows PNG LNG site at Papa village in Central Province. The white line area is a square with 3 km side.



1 How many squares with 1 km sides can be placed inside the figure?

Relationship between 1 and 1 ha.



10 Which room is the biggest in our school?

11 Let's investigate the areas of various places where we live.

Unit 12

Unit: Area
Sub-unit: Exercise and Evaluation.
Lesson 1 of 1 (Double Period)

Textbook Page : p.146-p.147
Actual Lesson 89

Lesson Objectives

- To deepen the understanding on contents learned in this unit.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheets for the students

Assessment

- Solve the exercise correctly. F S

• Teacher's Notes •

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

10 Which room is the biggest in our school? Let's estimate and investigate.
11 Let's investigate the areas of various places where we live.

It seems that the library in my school is the biggest.

Exercise

Choose the appropriate unit.

Pages 135, 141, 143~135

1 Which of the units in ☐ should you use to represent the following areas? cm^2, m^2, a, ha, km^2

① The area of a school yard m^2 ② The area of an exercise book cm^2
③ The area of PNG km^2 ④ The area of a coffee plantation a

2 Let's find the areas of the following figures.

Pages 139~147

① 5cm, 15cm: 15×5=75, 75 cm^2
② 7km, 7km: 7×7=49, 49 km^2
③ 10m, 5m: 5×10=50, 50 cm^2
④ 5cm, 8cm, 3cm, 12cm: 61 cm^2
⑤ 7cm, 3cm, 5cm, 3cm (Coloured part): 5×7-3×3=26, 26 cm^2

146 = ☐ ÷ ☐

Problems

1 Let's find the areas of the following figures.

● Getting areas using the formula

① 6cm, 10cm: 10×6=60, 60 cm^2
② 4m, 4m: 4×4=16, 16 m^2
③ 5km, 8km: 8×5=40, 40 km^2

2 There are paths with 1 m width in this rectangle. What is the area of the fields?

● Easier way to find the areas

7m, 4m, 1m, 1m

3 Fill in the ☐ with a number.

● Finding the length of a side by using the formula of area.

① ☐ cm, 8cm, 96cm^2: (4-1)×(7-1)=18, 18 cm^2; 8×☐=96, ☐=96÷8, ☐=12
② 33cm^2, 5cm, 3cm, ☐ cm, 2cm: 33-5×(3+2)=8, ☐×2=8, ☐=8÷2, ☐=4

4 Let's answer the following questions.

● Understanding the area formula.

① 1 m^2 is equal to 10 000 cm^2. Let's explain the reason.
1m=100cm so the area is 100×100=10000
② The area of a rectangle with a length of 3 cm and a width of 5 cm can be found by 3×5. Let's explain the reason.
Because there are 12 square of 1cm^2 in the rectangle

☐+☐= 147

Lesson Flow

1 ① Select appropriate unit.

T Let students imagine how big the given area and select the unit.

2 ② Find the area.

T Concerning question ④, there are several ways to find area so let the students explain the way.

3 ① Find the area of rectangle and square using formula.

4 ② Think about the area using various ways.

T Let students explain their way to find area and compare them.

S Compare the way of finding area and understand the difference.

5 ③ Find a side from the area.

T ① Confirm applying the formula of area to find a side.

$8 \times \square = 96$, $\square = 96 \div 8$, $\square = 12$

T There are mainly two ways.

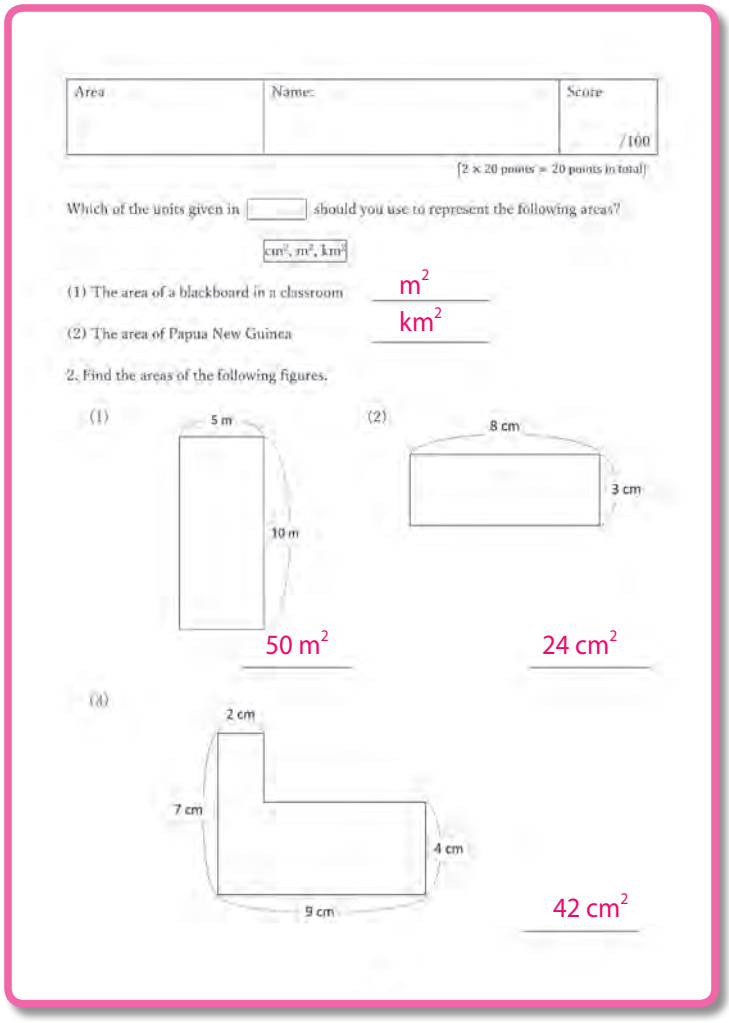
① Separate the diagram into two diagram.

② Subtract the small rectangle the from big rectangle.

6 ④ Find a side from the area.

T ① Let students explain using 100 cm square.

T ② Let students explain by drawing a rectangle of 3 cm × 5 cm and how many 1 cm^2 can be placed in the rectangle.



Area | Name: | Score /100

(2 × 20 points = 20 points in total)

Which of the units given in ☐ should you use to represent the following areas?

cm^2, m^2, km^2

(1) The area of a blackboard in a classroom m^2

(2) The area of Papua New Guinea km^2

2. Find the areas of the following figures.

(1) 5 m, 10 m — 50 m^2

(2) 8 cm, 3 cm — 24 cm^2

(3) 2 cm, 7 cm, 4 cm, 9 cm — 42 cm^2

End of Chapter Test: Chapter 12 **Date:**

Area	Name:	Score /100

[2 × 20 points = 20 points in total]

Which of the units given in [ ] should you use to represent the following areas?

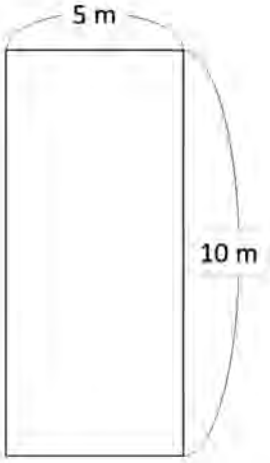
[cm^2, m^2, km^2]

(1) The area of a blackboard in a classroom _____

(2) The area of Papua New Guinea _____

2. Find the areas of the following figures.

(1)



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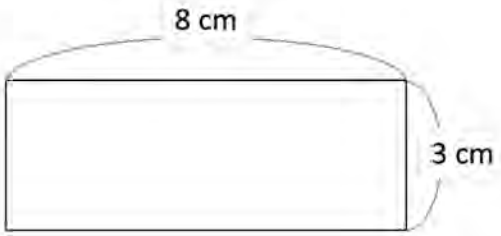

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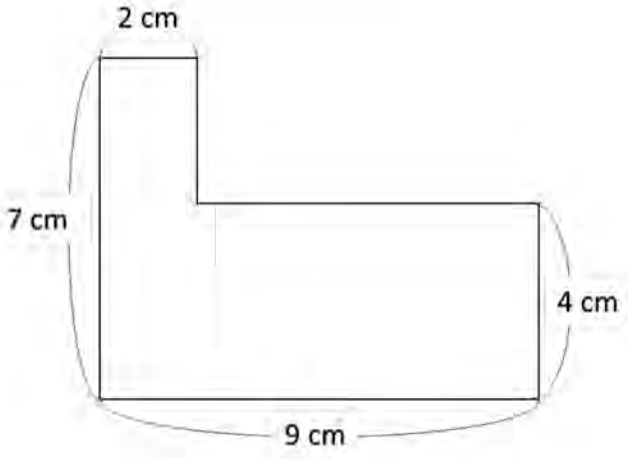
(3)



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Chapter 13 Decimal Numbers 2
Chapter 14 Thinking about How to Calculate

1. Unit Objectives

- To recognise the structure of decimal number is the same as the structure of the whole number. (4.1.6a)
- To deepen the understanding of relative size of decimal number. (4.1.6b,c and d) (4.1.7a,b and c)
- To deepen the understanding of addition and subtraction of decimals and apply them. (4.1.6e and f)
- To think about how to calculate addition and subtraction of decimal numbers. (4.1.6f) (4.1.7d)

2. Teaching Overview

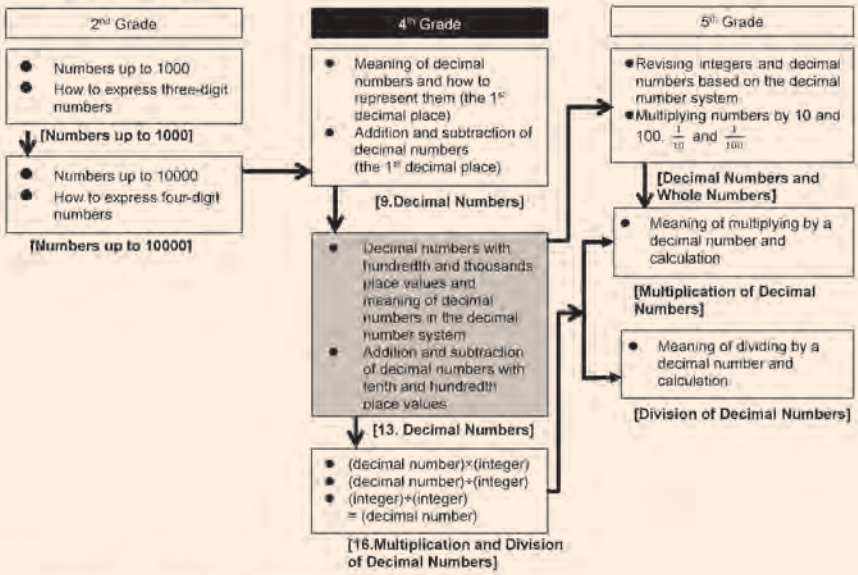
Students are introduced decimals with tenths place only in the earlier part of Grade 4. In this unit, they are to introduced decimals with hundredths ad thousandths places and learn that decimals are also binary (base 10) numbers like whole numbers.

How to Represent Decimal Numbers : Students should understand the size of decimal numbers with 100ths and 1000ths relatively such as expressing on number lines or in the manners of addition or multiplication .

Structure of Decimal Numbers : They should understand why 0.01 are called hundredth and 0.001 are called thousandth, and also the relationship between them. Teachers should make the newly introduced numbers meaningful for students.

Addition and Subtraction of Decimal Numbers : They should know that they can calculate decimal numbers as they learned for whole numbers and decimals with tenths.

3. Related Learning Contents



Unit 14: Thinking about How to Calculate

1. Unit Objectives

- To think about how to calculate 'decimal number' x 'whole numbers' and 'decimal number ÷ 'whole numbers' by using prerequisite knowledge.

2. Teaching Overview

Students are to find out the meaning of given multiplication and division in discovery manner in this unit. They can use rules of multiplications and divisions learned earlier. In short, they can make multiplier, multiplicand, divisor, dividend 10 times or $\frac{1}{10}$.

In discovery-learning, students should be encouraged to ask classmates questions or try to explain well to convince them. The role of teachers is to facilitate the discussion to make it fruitful to get to the learning points/objectives.

Unit 13

Unit: Decimal Numbers 2
Sub-unit: 1. How to Represent Decimal Numbers
Lesson 1 of 3 (Double Period)

Textbook Page : p.148~150
Actual Lesson 90

Sub-unit Objectives

- To understand how to read and write decimal numbers up to hundredths position.

Lesson Objectives

- To understand how to read and write 0.1 L separated into 10 parts, expressed as 0.01 L.

Prior Knowledge

- How to represent the remaining parts using the unit decilitres.
- Unit of the smaller scales is 0.1 dL. 0.1 dL is one of the 10 equal parts of 1 dL. 0.6 dL is 6 sets of 0.1 dL.
- How to represent 1 L and remaining part.
- Structure of decimal numbers using sets of 0.1 dL.
- Addition and subtraction of decimal numbers in vertical form. Example (2.5 + 1.3 and 2.5 − 1.2)

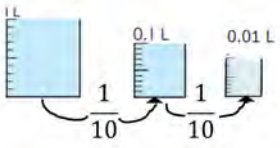
Preparation

- Refer to the blackboard plan.

Assessment

- Think about how to represent remaining part using decimal numbers. F
- Express and write 0.1 L into ten parts as 0.01 L. S
- Express the decimal unit idea. S

• Teacher's Notes •



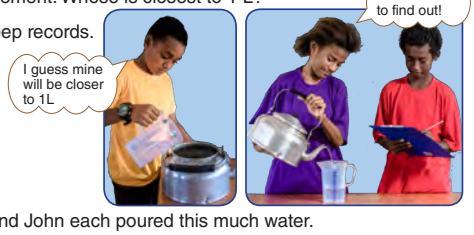
The relationship among 1 L, 0.1 L and 0.01 L. 1 L is broken down into 10 equal parts to make the amount of 1 small unit scale as 0.1 L. To obtain 0.1 L we multiply 1 L times $\frac{1}{10}$.0.1 L is broken down into smaller unit scale by dividing 0.1 L into 10 equal parts to make the amount of 1 samll unit scale as 0.01 L. To obtain 0.01 L we multiply 0.1 L times $\frac{1}{10}$.

13 Decimal Numbers 2

▶▶ How can we express two units as one unit?

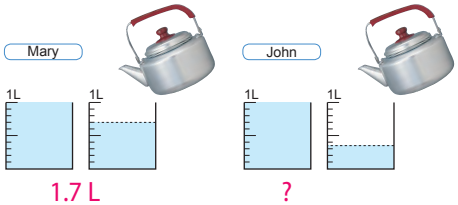
▶▶ Let's try to pour 1 L of water into a kettle without any measurement. Whose is closest to 1 L?

Let's keep records.



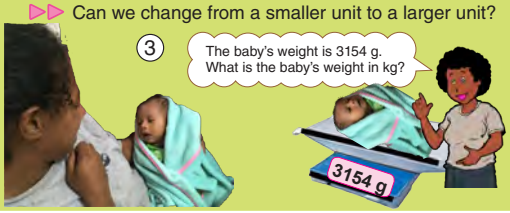
Mary and John each poured this much water.

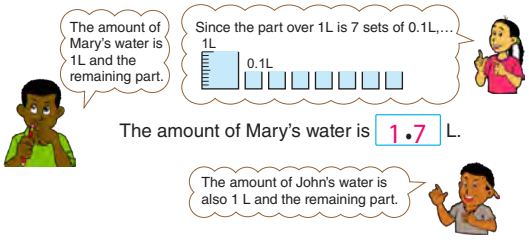
How many litres is in each kettle?



148 = □ + □

▶▶ Can we change from a smaller unit to a larger unit?

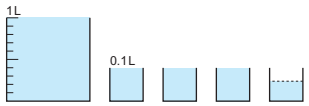


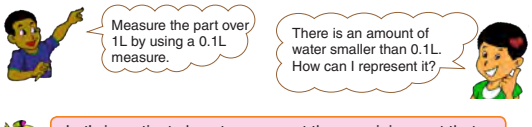


1 How to Represent Decimal Numbers

The necessity of decimal in hundredths place

1 Let's write the amount of John's water using litre as the unit.





Let's investigate how to represent the remaining part that is smaller than 0.1 L.

□ − □ = 149

Lesson Flow

1 Review decimal number in Unit 9.

2 Look at the three pictures and discuss.

T Pose lead up questions about the 3 pictures to guide the discussion to learn decimal numbers.
① How many metres?
② How many kg?
③ How much is the weight of the baby in kg?

T/S discuss the pictures.

3 ▶▶ Observe the experiment done by the two students to investigate the amount of water in the kettle.

T Explain the experiment done by the two students focusing on how to express remaining part.

S Discuss and find the amount of water in the kettle when poured into the measuring container.

S (Mary) Identify the amount of water as 1 L and the remaining part by using the unit of Litre and write it as 1.7 L.

S (John) The amount of remaining part is between 0.3 and 0.4 L.

4 ❶ Investigate how to represent the remaining part that is smaller than 0.1 L.

T Introduce the main task.

S ❶ Observe the diagram and think about how to write the scale of 0.1 L and find the remaining part.

TN The remaining part is changed to smaller scale of 0.1 L cup.

S Do ❷ and ❸.

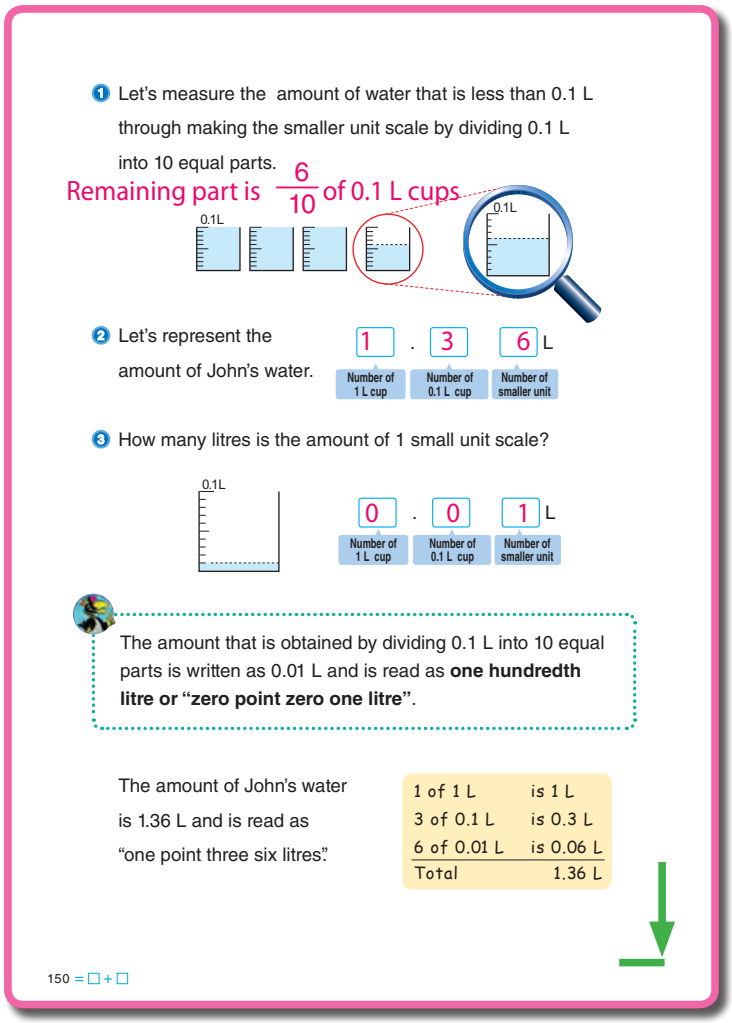
S Read the important point in the box .

S Understand the decimal unit of 1.36 L.

1 of 1 L	is 1 L
3 of 0.1 L	is 0.3 L
6 of 0.01L	is 0.06 L
Total	1.36 L

S Read 1.36 as “one point three six litres”.

TN Emphasise to students that the digits after the decimal point is read individualy and not read as thirty six.



Sample Blackboard Plan

Sample blackboard plan refer to page 205.

Unit 13

Unit: Decimal Numbers 2
Sub-unit: 1. How to Represent Decimal Numbers
Lesson 2 of 3 (Double Periods)

Textbook Page : p.151
Actual Lesson 91

Lesson Objectives

- To understand, read and write 1 metre separated into 10 parts where one part is called 0.1 metre and 0.1 metre separated into 10 parts where one part is called 0.01 metre.

Prior Knowledge

- Structure of decimal numbers using sets of 0.1 dL. (Previous lesson)

Preparation

- Tape diagram

Assessment

- Think about how to read and write 1 metre separated into 10 parts. F
- Do the exercise correctly. S

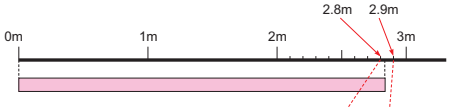
• Teacher's Notes •

2 m and 83 cm has two units. The two units are separated to make only one unit as metres by putting the ' . ' between 2 m and 83 cm that is read as "two point eight three metres".

For the exercise using the number line, the scale division is divided into 10 equal parts therefore 1 small scale is 0.01.

How to express the distance using decimal up to hundredths place.

2 Noko flies her paper plane. The length of flying the paper plane is 2 m 83 cm. Write this length by using only metre as the unit.

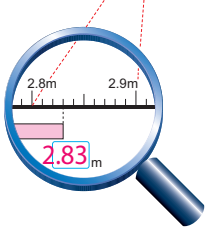


2 of 1 m is 2 m

8 of 0.1 m is 0.8 m

3 of 0.01 m is 0.03 m

Total 2.83 m

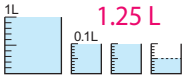


Since 10 cm = 0.1 m, 1 cm = 0.01 m, right?

Exercise

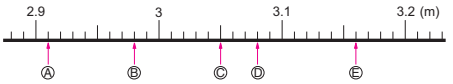
1 How many litres are the following amounts of water?

① 1.25 L



② 0.42 L

2 Let's read the following numbers marked by ↑.



Ⓐ 2.91 Ⓑ 2.98 Ⓒ 3.05 Ⓓ 3.08 Ⓔ 3.16

□ – □ = 151

Lesson Flow

1 Review previous lesson.

2 ② Observe the picture, think and discuss how to express the distance using unit (metres or centimetres)/numbers.

T Introduce the main task.

S Observe and discuss the picture.

T Help the students with guided questions for discussion such as
What can you observe from the picture?
Which units are used in the situation?
How can we express the distance in metres only?

3 Express 2 m 83 cm using only metre as the unit.

S Understand 2 m 83 cm is expressed using two units.

TN It is important for the student to use the unit idea and write 2 m 83 cm using metre as the unit.

T Help students to understand the important point 10 cm = 0.1 m, 1 cm = 0.01 m.

S Students complete the answers to the spaces in the ☐.

4 Complete the exercise for more practice and understanding.

TN ② Identiy the scale divison. 1 scale is 0.01

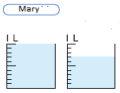
Sample Blackboard Plan

Date:
Chapter: 13 Decimal Numbers 2.
Topic: How to Represent Decimal Numbers. Lesson No: 1/3

Main Task: Let's think about how to represent the remaining part that is smaller than 0.1 L.

MT: Introduce the main task here.

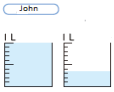
Mary



The amount of Mary's water is 1L and the remaining part.

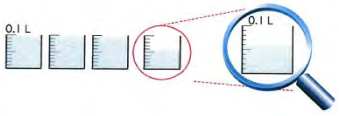
The remaining part is 7 sets of 0.1L so the amount of Mary's water is 1.7 L

John



The amount of John's water is also 1L and the remaining part. Remaining part is between 0.3 and 0.4 L.

[1] ❶ How to represent the remaining part that is smaller than 0.1L.



The remaining part is $\frac{6}{10}$ of 0.1L cups = 0.06L

❷The amount of John's water.

1	.	3	6	L
Number of 1 L cup		Number of 0.1 L cup	Number of smaller unit	

❸How many liters is the amount of 1 small unit scale?.

0	.	0	1	L
Number of 1 L cup		Number of 0.1 L cup	Number of smaller unit	

Important Point.

The amount that is obtained by dividing 0.1 L into 10 equal parts is written as 0.01 L and is read as **one hundred liter** or **"zero point zero one liter"**.

The amount of John's water is 1.36 L and is read as "one point three six liters".

1 of 1L	is 1 L
3 of 0.1L	is 0.3L
6 of 0.01L	is 0.06L
Total	1.36L

Sample Blackboard Plan

Date:
Chapter: 13 Decimal Numbers 2.
Topic: How to Represent Decimal Numbers. Lesson No: 2/3

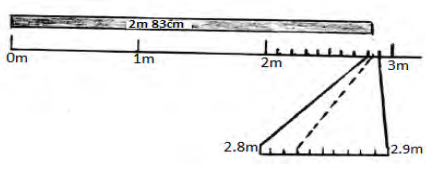
Main Task: Let's think about how to express the distance using decimal up to hundredths place.

MT: Introduce the main task here.

[2] Discussion questions.

- What can you observe from the picture?
- Which units are used in the situation?
- How can we express the distance in meters only?

How to express 2m 83cm in meters.



2 of 1 m	is	2	m
8 of 0.1 m	is	0.8	m
3 of 0.01m	is	0.03	m
Total		2.83	m

Exercise.

1 How many liters are the following amount of water?

(1) 

(2) 

2 Let's read the following numbers marked by ↑.

Unit 13

Unit: Decimal Numbers 2
Sub-unit: 1. How to Represent Decimal Numbers
Lesson 3 of 3 (Single Period)

Textbook Page : p.152
Actual Lesson 92

Lesson Objectives

- To understand that 0.01divided by 10, 1 part is called 0.001.
- Read and write the decimal number up to thousandths place.

Prior Knowledge

- Represent, read and write decimal numbers up to hundredth place.

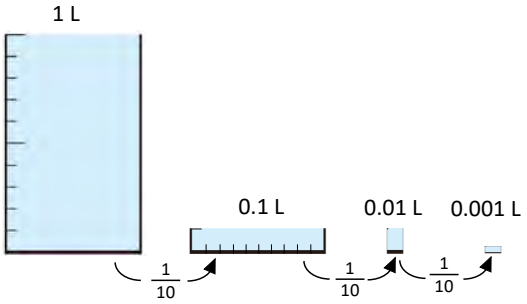
Preparation

- Chart for task 3

Assessment

- Think about how to express decimal number up to thousandths place. F
- Do the exercise correctly. S

• Teacher's Notes •



The relationship among 1 L, 0.1 L and 0.01 L

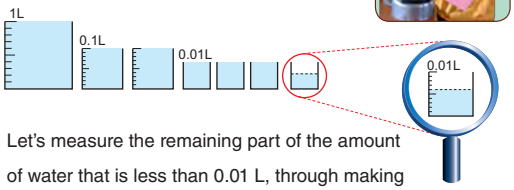
1 L is broken down into 10 equal parts to make the amount of 1 small unit scale as 0.1 L. To obtain 0.1 L we multiply 1 L times $\frac{1}{10}$.

0.1 L is broken down into smaller unit scale by dividing 0.1 L into 10 equal parts to make the amount of 1 small unit scale as 0.01 L. To obtain 0.01 L we multiply 0.1 L times $\frac{1}{10}$.

0.01 L is broken down into smaller unit scale by again dividing 0.01 L into 10 equal parts to make the amount of 1 small unit scale as 0.001 L. To obtain 0.001 L we multiply 0.01 L times $\frac{1}{10}$.

How to express the volume using decimal up to thousandths place.

3 Let's represent the amount of water that Tukana poured into a water container by using litre as the unit.



Let's measure the remaining part of the amount of water that is less than 0.01 L, through making the smaller unit scale by dividing 0.01 L into 10 equal parts.

1 . 2 3 6 L

Number of 1 L measuring cup | Number of 0.1 L measuring cup | Number of 0.01 L measuring cup | Number of smaller unit scale

The amount that is obtained by dividing 0.01 L into 10 equal parts is written as 0.001 L and is read as one thousandths litre or "zero point zero zero one litre."

How to express weights using decimal up to thousandths place.

Let's represent 1 kg 264 g by using kilogram as the unit.

1.264 kg

100 g is $\frac{1}{10}$ of 1 kg → 0.1 kg
10 g is $\frac{1}{10}$ of 0.1 kg → 0.01 kg
1 g is $\frac{1}{10}$ of 0.01 kg → 0.001 kg

Exercise

Let's represent the following quantities by using the unit shown in ( ).

① 1435 cm (m) 14.35 m
② 42195 m (km) 42.195 km
③ 875 g (kg) 0.875 kg

152 = □ + □

Lesson Flow

1 Review previous lesson.

2 ③ Think about and discuss the remaining part of the water less than 0.01 L.

T Introduce the main task.

T Teacher and students discuss about the remaining part of the water less than 0.01 L through making the smaller unit scale by dividing 0.01 L into 10 equal parts.

S Refer to the diagram which is magnified to help students understand that the remaining part or 0.01 L is divided into 10 parts and show the smaller unit scale with the blue colour.

S Fill in the ☐ after the discussions when they have understood.

3 How to read and write 0.001 L.

S Read and understand the important point ☐.

T Emphasise to the students that numbers after the decimal point are read individually.

4 How to represent and express the weight of tomatoes using kg only.

T Let students to understand 1 kg 264 g is expressed using two units. It is important for the student to use the unit idea and write 1 kg 264 g using kilogram only as the unit.

S 1.264 kg

TN Explain the relationship of 1, 0.1, 0.01 and 0.001 using the unit of kg and g.

5 Complete the exercise for more practice and understanding.

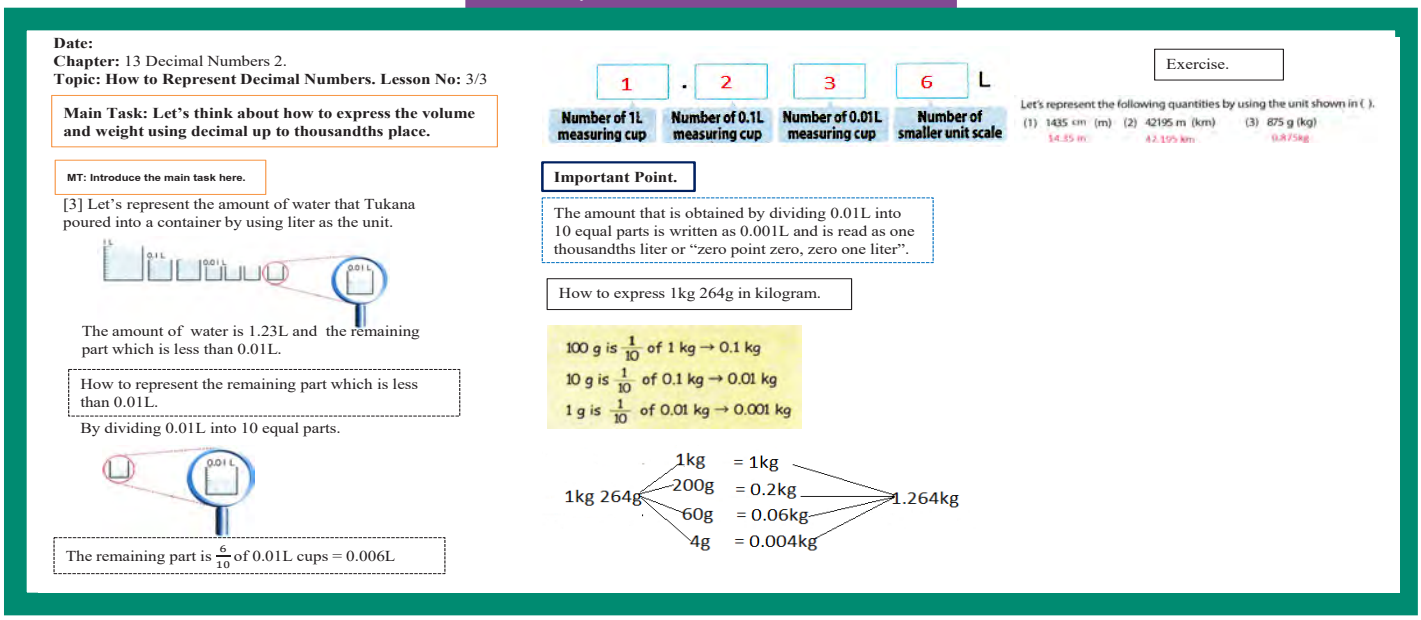
TN Emphasise the following points.

① 100 cm = 1 m

② 1000 m = 1 km

③ 1000 g = 1 kg

Sample Blackboard Plan



Unit 13

Unit: Decimal Numbers 2
Sub-unit: 2. Structure of Decimal Numbers
Lesson 1 of 1 (Double Periods)

Textbook Page : p.153~p.154
Actual Lesson 93

Sub-unit Objectives

- To understand the structure of the decimal number system in decimal numbers.
- To understand the relative size of decimal numbers.

Lesson Objectives

- To understand the decimal number system in decimal numbers.
- To understand the relative size of decimal numbers.

Prior Knowledge

- How to read and write decimal numbers up to thousandths. (Previous lesson)
- How to read and write 0.1 and 0.01 separated into 10 parts.

Preparation

- Place value chart

Assessment

- Understand the structure and relative size of decimal number.
- Do the exercise correctly.

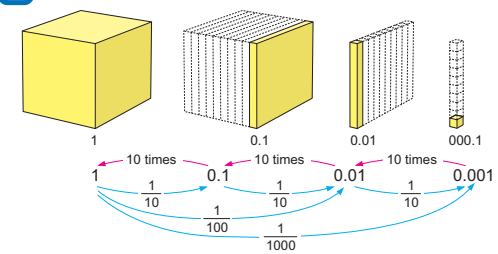
• Teacher's Notes •

In grade 3 we saw that the the numbers move but the decimal point remains fixed. That was the meaning of what happens to decimal numbers when multiplied or divided by 10, 100 and 1000.
In this lesson, you will notice that the decimal point is moving. However, this is just a technique of solving. You have to remind the students that decimal point still remains fixed.

Relationship of the unit of decimal numbers.

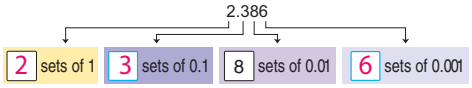
2 Structure of Decimal Numbers

1 Let's look at the relationship among 1, 0.1, 0.01 and 0.001.



Structure of decimal numbers.

2 Let's investigate the structure of the number 2.386.



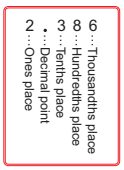
The Place Value in Decimal Numbers from the first place to the right of the decimal point are as follows;

Tenths place ($\frac{1}{10}$ place),

Hundredths place ($\frac{1}{100}$ place),

Thousandths place ($\frac{1}{1000}$ place)

Decimal numbers are represented by setting their places by ten times or $\frac{1}{10}$ of the place values as in whole numbers.



Structure of decimal numbers.

3 Let's investigate the number 3.254.

1. 3.254 is the sum of 3 sets of 1, 2 sets of 0.1, 5 sets of 0.01 and 4 sets of 0.001.
2. 3.254 is the sum of 3254 sets of 0.001.

Comparing size of decimal numbers.

4 Arrange the following numbers from the largest to the smallest.

0.5 5 0.005 0 0.05

5 , 0.5 , 0.05 , 0.005 , 0

Numbers of 10 times

5 What is the number which is 10 times of 0.039?

Numbers of $\frac{1}{10}$

1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	
0	0	3	9	×10
0	3	9		

6 What is the number which is $\frac{1}{10}$ of 0.58?

1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	
0	5	8		$\frac{1}{10}$
0	0	5	8	

Every number multiplied by 10 moves to the next higher place and $\frac{1}{10}$ of every number moves to the next lower place.

Exercise

1 Let's write the number that the sum of 7 sets of 1, 3 sets of 0.1 and 5 sets of 0.001. How many sets of 0.001 make this number?

7.305 7305

2 Multiply the following numbers by 10 and find $\frac{1}{10}$ of them.

① 0.74 7.4 (×10) 0.074 ($\frac{1}{10}$)
② 1.58 15.8 (×10) 0.158 ($\frac{1}{10}$)
③ 26.95 26.95 (×10) 2.695 ($\frac{1}{10}$)

□ − □ = 153 154 = □ + □

Lesson Flow

1 **Review previous lesson.**

2 **1 Investigate the relationship among 1, 0.1, 0.01 and 0.001.**

S Discuss to find the relation among 1, 0.1, 0.01 and 0.001 and how the size of the block changes.

3 **2 Find the structure of 2.386.**

T Introduce the main task.
S Investigate the number 2.386 to find the structure of decimal number as 2 sets of 1, 3 sets of 0.1, 8 sets of 0.01, 6 sets of 0.001.
T Explain the important point in the box .....

4 **3 Find the structure of 3.254.**

S Investigate the structure of the number 3.254 by completing 1 and 2.

5 **4 Compare and arrange the numbers in descending order.**

T Let students focus on the place value to compare the numbers and arrange them in descending order.

6 **5 Find the number or answer to 10 times 0.039.**

S Observe the place value chart to find the answer and explain their understanding of the place value chart.
T Use the chart to explain 10 times 0.039 as 0.039 multiplied by 10. Each number moves to the next higher place as indicated in the place value chart.

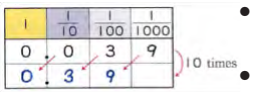
7 **6 Find the number or answer to $\frac{1}{10}$ of 0.58.**

S Study the place value chart and find the answer.
T Did you find any rule?
S Explain $\frac{1}{10}$ of 0.58 as 0.058 divided by 10.
Each number moves to the next lower place as indicated in the place value chart.
T/S Explain the important point in the box .....

8 **Complete the exercises 1 and 2.**

TN For exercise 2 advice the students to draw and use the place value chart to find their answers.

◊ KEY IDEA- Dividing by 10 moves every digit one place to the RIGHT. ◊

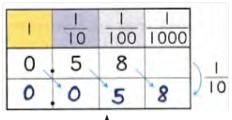


- The place value does not change the number changes.
- Each number divided by 10 moves to the next lower place to the right.
- The answer becomes smaller.

$10 \times 0.039 = 00.39 = 0.39$
Move the decimal point one place to the right. (10 has one zero)

The entire number moved one place to the left on the place value chart.

◊ KEY IDEA- Multiplying by 10 moves every digit one place to the LEFT. ◊



- The place value does not change the number changes.
- Each number multiplied by 10 moves to the next higher place to the left.
- The answer becomes bigger.

$0.58 \div 10 = 0.058$
Move the decimal point one place to the left. (10 has one zero)

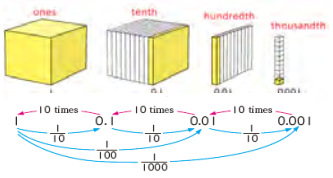
The entire number moved one place to the right on the place value chart.

Sample Blackboard Plan

Date:
Chapter: 13 Decimal Numbers 2.
Topic: Structure of Decimal Numbers. Lesson No: 1/1

Main Task: Let's investigate the structure of decimal numbers and represent their place value by ten times or $\frac{1}{10}$

[1] Relationship among 1, 0.1, 0.01 and 0.001.



The relationship among 1, 0.1, 0.01 and 0.001 is to get to the next higher place value we multiply by 10 and to get to the next lower place value we divide by 10.

MT: Introduce the main task here.

[2] Structure of the number 2.386

Important Point.

The Place Value in Decimal Numbers

From the first place to the right of the decimal point, the places are as follows.

Tenths place ($\frac{1}{10}$ place),
Hundredths place ($\frac{1}{100}$ place),
Thousandths place ($\frac{1}{1000}$ place)

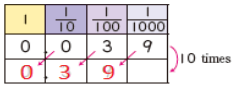
Decimal numbers are represented by setting their places by ten times or $\frac{1}{10}$ of the place values as with whole numbers.

[3] Let's investigate the number 3.254

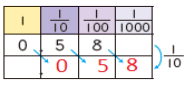
1 3.254 is the sum of 3 sets of 1, 2 sets of 0.1, 5 sets of 0.01 and 4 sets of 0.001.
2 3.254 is the sum of 3 254 sets of 0.001.

[4] Arrange the following numbers from the largest to the smallest.
5, 0.5, 0.05, 0.005, 0

[5] What is the number 10 times 0.039?



[6] What is the number $\frac{1}{10}$ of 0.58?



Important Point.

Every number multiplied by 10 moves to the next higher place, and $\frac{1}{10}$ of every number moves to the next lower place.

Exercise

1. The number is 7.305 and 7305 sets of 0.001 make that number.

2. (1) 7.4 (x10) 0.074 ($\frac{1}{10}$)
(2) 15.8 (x10) 1.58 ($\frac{1}{10}$)
(3) 26.95 (x10) 2.695 ($\frac{1}{10}$)

Unit 13

Unit: Decimal Numbers 2
Sub-unit: 3. Addition and subtraction of decimal numbers
Lesson 1 of 2 (Double Periods)

Textbook Page : p.155-p.156
Actual Lesson 94

Sub-unit Objectives

- To understand how to add and subtract decimal numbers in vertical form.

Lesson Objectives

- To think about how to add decimal numbers.
- To understand how to add decimal numbers up to hundredths place.

Prior Knowledge

- How to read and write decimal numbers up to thousandths place. (G4,U13)
- How to read and write 0.1 and 0.01 separated into 10 parts. (G4, U13)
- Addition and subtraction of decimal numbers (G4,U9)

Preparation

- Place value chart

Assessment

- Think about and understand how to add decimal numbers in vertical form.
- Do the exercises correctly.

• Teacher's Notes •

0 (zero) at the end of decimal number is not significant.
Remove the 0 (zero). Mathematically its ok to keep zero.
Example: 9.23 + 0.47 = 9.70
Answer: 9.7 (zero) at the end of decimal number is not significant. However, Mathematically its ok to keep zero.
In addition of decimal numbers in vertical form the numbers are aligned according to their place values in the same way as in the calculation of addition for whole numbers in vertical form.

Addition of decimal numbers up to hundredths place.

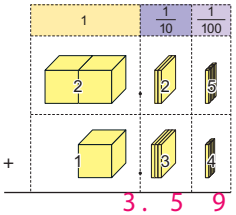
3 Addition and Subtraction of Decimal Numbers

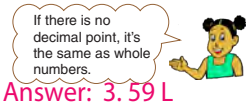
1 There is 2.25 L of water in a tank. When 1.34 L of water is poured, how much water is there altogether?

① Write a mathematical expression.

2.25 + 1.34

② Let's think about how to add.





3 . 5 9 Answer: 3.59 L

Addition Algorithm for 2.25 + 1.34 in Vertical Form

2.25 1.34	2.25 + 1.34 3.59	2.25 + 1.34 3.59
Align the numbers according to their place values.	Calculate each place value in the same way as whole numbers.	Put the decimal point of the sum in the same position as the decimal points above.

For adding decimal numbers in vertical form, we align the numbers according to their place values in the same way as whole numbers.

2 Let's think about how to add the following.

① 2.16 + 0.73

	2.16	
+	0.73	
	2.89	

If the decimal points are lined up vertically, the other places are also lined up.

② 5.74 + 2.63

	5.74	
+	2.63	
	8.37	

③ 9.23 + 0.47

	9.23	
+	0.47	
	9.70	

How should I treat 0 in the hundredths place of the answer in ③.

④ 4.05 + 3.1

	4.05	
+	3.1	
	7.15	

Exercise

Let's calculate.

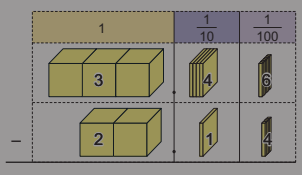
① 6.27 + 3.51 (9.78) ② 8.46 + 0.32 (8.78) ③ 1.54 + 2.38 (3.92) ④ 4.72 + 3.49 (8.21)
⑤ 9.62 + 0.18 (9.8) ⑥ 4.25 + 2.75 (7) ⑦ 3.21 + 2.5 (5.71) ⑧ 2.8 + 0.54 (3.34)

3 Raka's older brother threw a paper plane at 3.46 m and Raka threw it at 2.14 m.

How many m more did Raka's brother throw than Raka?

① Write a mathematical expression.

② Let's think about how to subtract.



For subtracting decimal numbers in vertical form, we arrange the numbers according to their place value in the same way as in whole numbers.

	3.46	
−	2.14	
	1.32	

□ − □ = 155　　156 = □ + □

Lesson Flow

1 Review the previous lesson.

2 ❶ Read and understand the problem.

T Introduce the main task.
S ❶ Read the problem and write the mathematical expression.
S 2.25 + 1.34

3 ❷ Think about how to calculate 2.25 + 1.34.

T/S Explain that the calculation according to the place value is the same as the whole numbers.
TN Emphasise to put decimal point of the answer in the same position of augend and addend.

4 Summarise how to add decimal numbers.

T/S Explain how to add decimal numbers step by step in vertical form using the box [ ].
T Explain the important point in the box [ ].

5 ❷ Complete the task.

S Do the exercise ❶, ❷, ❸ and ❹.
T Explain that even addition with carrying, calculate using same method as whole numbers.
TN ❸ 0 at the end of decimal number is not significant.
❹ When changing to vertical calculation line up the numbers in its place value.
Hundredths place: Calculate each place value so if there is no number add 0 to the number so 5 + 0 = 5.

6 Do the exercise.

TN Complete the highlighted problems in class for consolidation. The rest can be for homework.

Sample Blackboard Plan

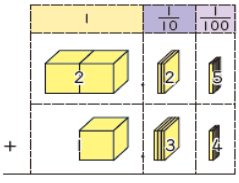
Date:
Chapter: 13 Decimal Numbers 2.
Topic: Addition and Subtraction of Decimal Numbers. Lesson No: 1/2

MT: Introduce the main task here.

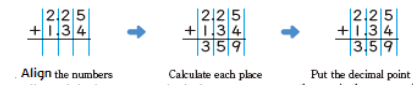
Main Task: Let's think about how to add decimal numbers in vertical form up to hundredths place.

[1] There is 2.25L of water in a tank. When 1.34L of water is poured, how much water is there altogether?
❶ Mathematical Expression: 2.25 + 1.34

❷ Let's think about how to add.



How to Add 2.25+1.34 in Vertical Form



Align the numbers according to their place values.

Calculate each place value in the same way as whole numbers.

Put the decimal point of the sum in the same position as the decimal points above.

Important Point.

For adding decimal numbers in vertical form, we align the numbers according to their place values in the same way as whole numbers.

[2] Let's think about how to add the following.

❶ 2.16+0.73

	2	. 1	6
+	0	. 7	3
	2	. 8	9

❷ 5.74+2.63

	5	. 7	4
	2	. 6	3
	8	. 3	7

❸ 9.23+0.47

	9	. 2	3
	0	. 4	7
	9	. 7	0

❹ 4.05+3.1

	4	. 0	5
	3	. 1	
	7	. 1	5

Exercise

① 6.27+3.51 ② 8.46+0.32 ③ 1.54+2.38
④ 4.72+3.49 ⑤ 9.62+0.18 ⑥ 4.25+2.75
⑦ 3.21+2.5 ⑧ 2.8+0.54

Unit 13

Unit: 13 Decimal Numbers 2
Sub-unit: 3. Addition and subtraction of decimal numbers
Lesson 2 of 2 (Double Periods)

Textbook Page : p.156~p.157
Actual Lesson 95

Lesson Objectives

- To think about how to subtract decimal numbers.
- To understand how to subtract decimal numbers up to hundredths.

Prior Knowledge

- How to read and write decimal numbers up to thousandths place. (G4,U13)
- How to read and write 0.1 and 0.01 separated into 10 parts. (G4, U13)
- Addition and subtraction of decimal number (G4,U9)

Preparation

- Place value chart

Assessment

- Think about how to subtract decimal numbers in vertical form. F
- Do the exercise correctly. S

• Teacher's Notes •

In subtraction of decimal numbers in vertical form the numbers are aligned according to their place values in the same way as in the calculation of subtraction for whole numbers in vertical form.

The rule of calculation in whole numbers can also be applied to decimal numbers.

2 Let's think about how to add the following.

① 2.16+0.73

	2	.	1 6
+	0	.	7 3

If the decimal points are lined up vertically, the other places are also lined up.

② 5.74+2.63

	5	.	7 4

③ 9.23+0.47

④ 4.05+3.1

How should I treat 0 in the hundredths place of the answer in ③.

Exercise

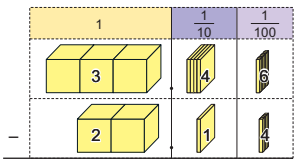
Let's calculate.

① 6.27+3.51 ② 8.46+0.32 ③ 1.54+2.38 ④ 4.72+3.49
⑤ 9.62+0.18 ⑥ 4.25+2.75 ⑦ 3.21+2.5 ⑧ 2.8+0.54

3 Raka's older brother threw a paper plane at 3.46 m and Raka threw it at 2.14 m.
How many m more did Raka's brother throw than Raka?

① Write a mathematical expression. 3.46−2.14

② Let's think about how to subtract.



For subtracting decimal numbers in vertical form, we arrange the numbers according to their place value in the same way as in whole numbers.

	3	.	4 6
−	2	.	1 4
	1	.	3 2

4 Let's think about how to subtract 1.25−0.67.

	1	.	2 5
−	0	.	6 7
	0	.	5 8

Exercise

Let's calculate.

① 5.78−3.44 2.34 ② 1.54−0.23 1.31 ③ 8.37−2.09 6.28 ④ 6.48−1.92 4.56

5 Let's think about how to subtract the following.

Subtraction of decimal number up to hundredths place

① 2.32−1.82

	2	.	3 2
−	1	.	8 2
	0	.	5 0

② 6.71−3.9

	6	.	7 1
−	3	.	9
	2	.	8 1

③ 6−0.52

	6		
−	0	.	5 2
	5	.	4 8

④ 5.03−4.25

	5	.	0 3
−	4	.	2 5
	0	.	7 8

6 There is a 2.15 m tape. Cut off 85 cm of the tape.
How much tape is left? 2.15−0.85= 1.3 A. 1.3m

7 Let's explain the rules of calculations in decimals and why the following method is appropriate,
when ■=3.8, ▲=2.3 and ●=2.7.

① ■+▲=▲+■ 3.8+2.3 =6.1 2.3+3.8=6.1
② ■+▲+●=■+(▲+●) (3.8+2.3)+2.7=8.8 3.8+(2.3+2.7)=8.8

Exercise

Let's calculate.

① 0.54−0.34 0.2 ② 1.96−0.56 1.4 ③ 7.28−2.4 4.88
④ 9.15−8.6 0.55 ⑤ 4−1.26 2.74 ⑥ 3.4−1.84 1.56
⑦ 7.08−0.29 6.79 ⑧ 4.07−1.98 2.09 ⑨ 2.03−1.65 0.38

156 =□+□ □−□= 157

Lesson Flow

1 Review previous lesson.

2 3 Read and understand the problem.

T Introduce the main task.

T 1 Read the problem and write the mathematical expression.

S 3.46 − 2.14

3 2 Think about how to calculate 3.46 − 2.14.

T/S Explain that the calculation according to the place value is the same as the whole number.

TN Emphasise to put decimal point of the answer in the same position of subtrahend and minuend.

4 Summarise how to subtract decimal numbers.

T Explain the main point in the box .....

5 4 Calculate1.25 − 0.67.

S Calculate 1.25 − 0.67.

TN Emphasise that ones place becomes 0 after subtraction. You have to write 0 in ones place and put decimal point, otherwise it becomes a different number.

6 Do the exercise.

TN Ask students to do ① and ③.

7 5 Calculate 1 − 4.

TN The numbers must be placed according to place values when changing to vertical form. Take care especially when the digit of two numbers are different.

TN For 2 and 3 calculate each place value if there is no number place in 0 in that place.

8 6 Solve the word problem.

S 2.15 − 0.85 = 1.3 Answer: 1.3 m

9 7 Think about the rules of calculation.

S Substitute the shapes for the numbers to calculate 1 and 2.

S Recognise that the rules of calculation can be applied to decimal numbers.

10 Do the exercise.

T Give the exercise ①, ③, ⑤ and ⑦ and the rest are given as homework.

Sample Blackboard Plan

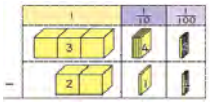
Date:
Chapter: 13 Decimal Numbers 2.
Topic: Addition and Subtraction of Decimal Numbers. Lesson No: 2/2

Main Task: Let's think about how to subtract decimal numbers in vertical form up to hundredths place.

[3] Raka's older brother threw paper plane at 3.46m and Raka threw at 2.14m. How long did Raka's brother throw more than Raka did in m?

❶ Mathematical Expression: 3.46 – 2.14

❷Let's think about how to subtract.



Important Point.

For subtracting decimal numbers in vertical form, we line up the numbers according to their place value in the same way as whole numbers.

	3	4	6
−	2	1	4
	1	3	2

[4] Let's think about how to subtract 1.25 – 0.67

	1	2	5
−	0	6	7
	0	5	8

Exercise.

① 5.78−3.44 ② 1.54−0.23

③ 8.37−2.09 ④ 6.48−1.92

MT: Introduce the main task here.

[5] Let's think about how to subtract the following.

(1) 2.32−1.82

	2	3	2
−	1	8	2
	0	5	0

(3) 6.71−3.9

	6	7	1
-	3	9	
	2	8	1

(2) 6−0.52

	6		
-	0	5	2
	5	4	8

(4) 5.03−4.25

	5	0	3
-	4	2	5
	0	7	8

[6] There is a 2.15 m tape, cut off 85 cm length of the tape. How much tape is left?

2.15
- 0.85
1.3 Answer: 1.3 m

[7] Rules of calculation in decimal and why it is appropriate.

(1) 3.8 + 2.3 = 2.3 + 3.8

(2) 3.8 + 2.3 + 2.7 = 3.8 + (2.3 + 2.7)

Rules of calculation can be applied to decimal numbers.

Exercise

(1) 0.54 – 0.34 = 0.2
(3) 7.28 – 2.4 = 4.88
(5) 4 – 1.26 = 2.74
(7) 7.08 – 0.29 = 6.79

Unit 13

Unit: Decimal Numbers 2
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.158~p.159
Actual Lesson 96

Lesson Objectives

- To deepen the understanding on contents learned in this unit.

Prior Knowledge

- All the contents in this Unit

Preparation

- Evaluation sheets

Assessment

- Students solve the exercises correctly. F S

• Teacher's Notes •

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

Exercise

Pages 148 ~ 150

1 How to read decimal number.
Let's read the following amounts of water, lengths and weights.
(1) Three point nine two L, (2) Five point one seven m
① 3.92 L ② 5.17 m ③ 0.05 L ④ 8.004 kg
(3) zero point zero five L (4) Eight point zero zero four kg

Page 148

2 How much is the amount of water?

① 1L 1L 0.1L 0.1L 0.1L 2.24 L

② 1L 1L 1L 0.1L 3.07 L

Pages 153 ~ 154

3 Structre of decimal number.
Let's write the sum of 6 sets of 1, 4 sets of 0.1, 9 sets of 0.01 and 3 sets of 0.001.
6.493

Page 154

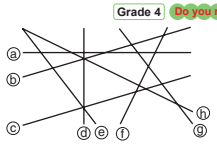
4 Find 10 times and $\frac{1}{10}$ of the following numbers.
① 0.46 4.6, 0.046 ② 2.79 27.9, 0.279 ③ 18.83 188.3,1.883

Pages 155 - 157

5 Let's calculate.
① 2.56+2.42 4.98 ② 5.76+4.28 10.04 ③ 10.8+3.45 14.25
④ 0.87−0.17 0.7 ⑤ 5.34−2.9 2.44 ⑥ 3.4−1.84 1.56

Grade 4 Do you remember?

Let's choose perpendicular lines and parallel lines.



Perpendicular: a and d, f and h Parallel : b and c, e and g

158 = □ + □

Problems

1 Let's fill in the ☐ with numbers.
Understanding the structure of decimals and whole numbers.
① 86.1 is 8 sets of 10, 6 sets of 1 and 1 set of 0.1 combined.
② 19.003 is 1 set of 10, 9 sets of 1 and 3 sets of 0.001 combined.

2 Let's represent the following quantities by using the unit shown in ( ).
Converting units using decimal numbers.
① 8695 g (kg) 8.695 kg ② 320 mL (L) 0.32 L ③ 3.67 km (m) 3670 m

3 Let's fill in the ☐ with an inequality sign.
Comparing decimal numbers.
① 0.21 > 0.189 ② 2.395 < 2.5

4 Let's calculate.
Calculating addition and subtraction of decimal numbers.
① 4.18+0.32 4.5 ② 3.64+2.4 6.04 ③ 9.26−4.12 5.14 ④ 7.05−4.6 2.45

5 Kila's class holds a paper plane competition.
The group with the longest combined distance is the winner.
For group D to win, how long must Nick throw a paper plane in metres?
Calculating decimal numbers.

Group A		Group B		Group C		Group D	
Kila	2.57	Sam	3.26	Vagi	2.85	Risa	2.68
Sane	2.69	Mata	2.85	Ireen	2.96	Rex	3.2
Ben	2.7	Paul	3.17	Raka	2.8	Nick	

9.28 − 5.88 =3.4 Nick have to throw more than 4.3 m

□ − □ = □ 159

Lesson Flow

1 ① Read decimal numbers up to thousandths place.

T Let students read fraction accurately up to thousandths place.

2 ② Express volume using decimal numbers.

T Concerning question ②, tenth place becomes 0 and must write 0 in the place.

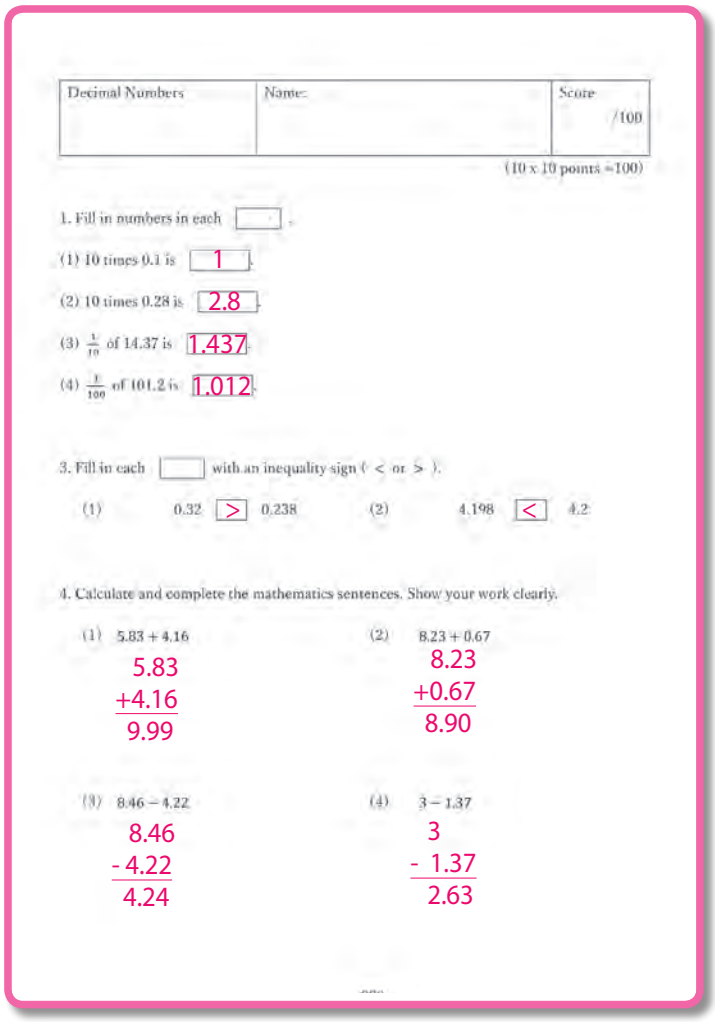
3 ③ Understand the structure of the decimal number.

4 ④ Find the number of 10 times and $\frac{1}{10}$.

T Confirm how to move decimal point when multiplying by 10 or $\frac{1}{10}$.

TN It is important not only teaching the technique of moving decimal point but teaching the reason why using place value chart is also important.

5 ⑤ Calculate addition and subtraction of decimal numbers.



Decimal Numbers	Name:	Score /100

(10 x 10 points =100)

1. Fill in numbers in each ☐.

(1) 10 times 0.1 is 1.

(2) 10 times 0.28 is 2.8.

(3) $\frac{1}{10}$ of 14.37 is 1.437.

(4) $\frac{1}{100}$ of 101.2 is 1.012.

3. Fill in each ☐ with an inequality sign (< or >).

(1) 0.32 > 0.238 (2) 4.198 < 4.2

4. Calculate and complete the mathematics sentences. Show your work clearly.

(1) 5.83 + 4.16
5.83
+4.16
9.99

(2) 8.23 + 0.67
8.23
+0.67
8.90

(3) 8.46 − 4.22
8.46
- 4.22
4.24

(4) 3 − 1.37
3
- 1.37
2.63

T Let students be aware of the place value when changing to vertical form.

TN Concerning ⑤ and ⑥, the number of digits is different so confirm how to write in vertical form with the whole class.

6 Do the exercise 'Do you remember?'

7 ① Structure of decimal number.

T Explain using place value chart for students who do not understand the structure of decimal numbers.

8 ② Change units applying the knowledge of decimal numbers.

T Confirm that ① 1 kg = 1000 g ② 1 L = 1000 mL ③ 1 km = 1000 m, and let students solve the problems.

9 ③ Compare the decimal numbers.

T Let the students confirm how to compare the decimal numbers.

1. Compare the number which is in the same place value.

2. In terms of decimal place, a value of number becomes smaller as the place value goes to the right.

Therefore, you have to compare the number from the left.

10 ④ Calculate addition and subtraction of decimal numbers.

T Let students be aware of the place values when changing to vertical form.

TN Concerning ② and ④, the number of digits is different so confirm how to write in vertical form with whole class.

11 ⑤ Solve the problem ①.

S Read the problem and understand the situation.

T Confirm that the final rank will be decided by Nick's result, and Team D has to be in the first place.

S Calculate each group's total, and recognise the Team B is leading currently.

T How long does Nick have to throw? Make a math expression.

S 9.28 − 5.88

Unit 14

Unit: Thinking about How to Calculate

Lesson 1 of 2 (Double Periods)

Textbook Page : p.160~p.161
Actual Lesson 97

Lesson Objectives

- To think about how to calculate 'decimal number' x whole numbers using a table, tape diagram or math expression.

Prior Knowledge

- Multiplication (2-digit)×(1-digit)
- Decimal number (G4,U13)
- Addition and subtraction of decimal number.

Preparation

- Tape diagram and table

Assessment

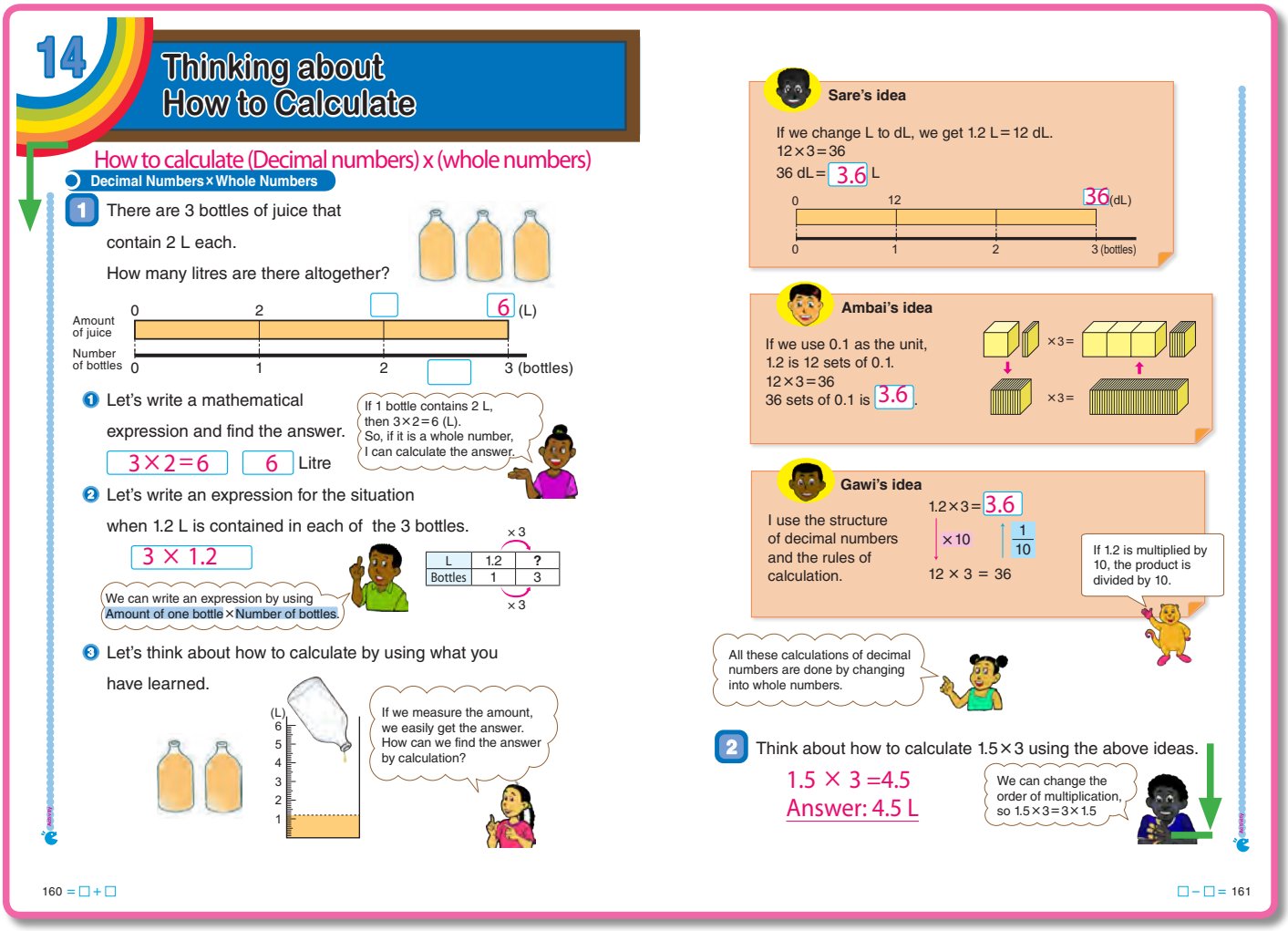
- Think about how to calculate 1.2×3. F
- Solve task ② correctly. F

• Teacher's Notes •

Decimal Numbers×Whole Numbers is calculated using the three ideas;

- Changing the units
- Using 0.1 as the unit and
- Using rules of calculation.

All the three ideas used are done by changing into whole numbers.



Lesson Flow

1 Introduce objective (Close textbook until Task 2).

T How to calculate (Decimal numbers) × (whole numbers).

2 ❶ Read and understand the problem.

T Introduce the main task and explain the situation using the tape diagram.
T ❶ What is the mathematical expression and find the answer?
S 2×3, Answer 6 L
T ❷ If 1.2 L is in each bottle what is the mathematical expression?
S 1.2×3 or 3×1.2
T Explain bubble and table to confirm mathematical expression.

3 Let's think about how to calculate 1.2×3.

T ❸ Allow the students (or group) to share their ideas on how to calculate.
Identify students' ideas that similar to textbook ideas.
S Present their ideas.
T Summarise students ideas with Sare, Ambai and Gawi's ideas.
T Introduce and explain Sare, Ambai and Gawi's ideas.
TN Sare's idea:
Changing the unit liter to dL = > 1.2 L = 12 dL, 12×3 = 36 dL, 36 dL = 3.6 L
Ambai's idea:
Thinking 0.1 as the unit, 1.2 is 12 sets of 0.1 so 12×3 = 36, 36 sets of 0.1 is 3.6 Answer 3.6 L
Gawi's idea:
Using rules of calculation and structure of decimal numbers.
1.2 is multiplied by 10, the product is multiplied by $\frac{1}{10}$ to find the answer.
1.2×10 times = > 12, 12×3 = 36, 36× $\frac{1}{10}$ = 3.6 Answer 3.6 L
T Summarise speech bubble. "All three of these calculations of decimal numbers are done by changing into whole numbers."

4 ❷ Solve the problem

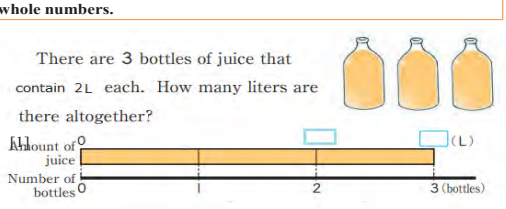
S Let's think about how to calculate 1.5×3.
T Emphasise on the speech bubble "We can change the order of multiplication, so 1.5×3 = 3×1.5".

Sample Blackboard Plan

Date:
Chapter: 14 Thinking About How To Calculate.
Topic:. Thinking About How To Calculate **Lesson No:** 1/2

Main Task: Let's think about how to calculate decimal numbers x whole numbers.

There are 3 bottles of juice that contain 2L each. How many liters are there altogether?



❶Mathematical Expression and answer. 3 x 2 Answer 6L

MT: Introduce the main task here.

❷Let's write an expression for the situation when 1.2 L is contained in each of the 3 bottles.
Mathematical Expression 1.2 x 3

Let's Think About How To Calculate 1.2 x 3

❸Let's think about how to calculate by using what you have learned.

Students discussions and their ideas.
Write down their ideas and discussion points on the board.

3 Ideas in the text book.

Sare's Idea
Changing Liter to dL

1.2 L = 12dL
12 x 3 = 36
36 dL = 3.6 L

Ambai's Idea
0.1 as the unit.

1.2 is 12 sets of 0.1
12 x 3 = 36
Therefore 36 sets of 0.1 is equal to 3.6
Answer is 3.6 L

Gawi's Idea
Structure of Decimal Numbers and Rules of Calculation.

1.2 x 3 = 3.6 Answer 3.6 L
10 times ($\frac{1}{10}$)
12 x 3 = 36

All of the three calculations of decimal numbers are done by changing into whole numbers.

[2] 1.5 x 3 = 4.5

Answer 4.5L

Unit 14

Unit: Thinking about How to Calculate

Lesson 2 of 2 (Double Periods)

Textbook Page : p.162~163
Actual Lesson 98

Lesson Objectives

- To think about how to calculate 'decimal number ÷ 'whole numbers' by using a table, diagram or mathematical expression.

Prior Knowledge

- Division (2-digit) ÷ (1-digit)
- Decimal number
- Addition and subtraction of decimal number

Preparation

- Diagram or picture to show the situation in task 3

Assessment

- Think about how to calculate 5.4 ÷ 4. F
- Solve the task 4. S

• Teacher's Notes •

Decimal Numbers ÷ Whole Numbers is calculated using the three ideas;

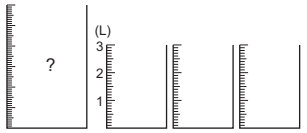
- Changing the units
- Using 0.1 as the unit and
- Using rules of calculation.

All the three ideas used are done by changing into whole numbers.

How to calculate (Decimal numbers) ÷ (Whole numbers)

Decimal Numbers ÷ Whole Numbers

3 When we divide 5.4 L of juice into 3 bottles equally, how many litres will each bottle contain?



1 Write a mathematical expression and find the answer.

When we share 9 L, the amount in each bottle is equal to 9 ÷ 3 = 3 (L). But if we share 5.4 L, how can we calculate the answer?

9 ÷ 3 = 3 Answer: 3 L

2 Let's write a mathematical expression when we put 5.4 L in the blank.

5.4 ÷ 3

Juice(L)	?	5.4
Bottles	1	3

÷3 ÷3

I can calculate the amount of one bottle by Amount of juice ÷ Number of bottles.

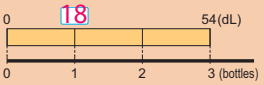
3 Let's think about how to calculate by using what we have learned.

How can we calculate the answer if we convert L to dL?

Can I calculate the answer by using the division of whole numbers?

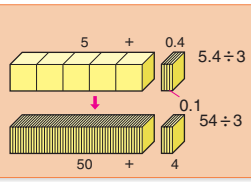
Mero's idea

5.4 L = 54 dL
54 ÷ 3 = 18
18 dL = 1.8 L



Vavi's idea

5.4 is 54 sets of 0.1.
54 ÷ 3 = 18
18 sets of 0.1 is 1.8.



Naiko's idea

I use the structure of decimal numbers and the rules of division.

5.4 ÷ 3 = 1.8
×10 ↑ 1/10
54 ÷ 3 = 18

In division if the dividend is multiplied by 10, the quotient is also multiplied by 10.

All these calculations of decimal numbers are done by changing into whole numbers.

Can you explain these ideas?

4 Think about how to calculate 5.1 ÷ 3 using the above ideas.

5.1 ÷ 3 = 1.7 Answer: 1.7 L

Lesson Flow

1 Review previous lesson.

2 ❸ Read the problem and understand the situation. (Close textbook)

T Introduce the main task and explain the situation using diagram.
T ❶ What is the mathematical expression and find answer?
S 9 ÷ 3, Answer 3 L
T Summarise bubble idea.
T ❷ If 5.4 L is in each bottle what is the mathematical expression?
S 5.4 ÷ 3
T Explain speech bubbles and table to confirm mathematical expression.

3 ❸ Let's think about how to calculate 5.4 ÷ 3.

T Allow the students (or group) to share their ideas on how to calculate. (Identify students' ideas that are similar to textbook ideas. And explain speech bubbles.
S Present their ideas.
T Summarise students ideas with Mero, Vavi and Naiko's ideas.
T Introduce and explain Mero, Vavi and Naiko's ideas.
TN Mero's idea:
Changing the unit litre to dL = > 5.4 L = 54 dL, 54 ÷ 3 = 18, 18 dL = 1.8 L
Vavi's idea:
5.4 is 54 sets of 0.1. 54 ÷ 3 = 18. 18 sets of 0.1 is 1.8 Answer 1.8 L
Naiko's idea:
Using rules of calculation and structure of decimal numbers.
5.4 is multiplied by 10, the quotient is multiplied by $\frac{1}{10}$ to find the answer.
5.4 times 10 is 54, 54 ÷ 3 = 18, $18 \times \frac{1}{10} = 1.8$ Answer 1.8 L
T Summarise the speech bubble. "All three of these calculations of decimal numbers are done by changing into whole numbers."

4 ❹ Solve the problem.

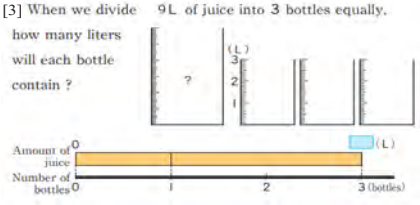
S Think about how to calculate 5.1 ÷ 3.

Sample Blackboard Plan

Date:
Chapter: 14 Thinking About How To Calculate.
Topic:. Thinking About How To Calculate **Lesson No:** 2/2

Main Task: Let's think about how to calculate decimal numbers ÷ whole numbers.

[3] When we divide 9 L of juice into 3 bottles equally, how many liters will each bottle contain ?



❶Mathematical Expression and answer. 9 ÷ 3 Answer 3L

MT: Introduce the main task here.

❷Let's write an expression when we share 5.4 L into 3 bottles equally.
Mathematical Expression and answer. 5.4 ÷ 3

L	?	5.4
Bottles	1	3

(×3, ÷3)

❸let's think about how to calculate by using what we have learned.

Students discussions and their ideas.
Write down their ideas and discussion points on the board.

3 Ideas in the text book.

Mero's Idea
Changing Liter to dL

5.4 L = 54dL
54 ÷ 3 = 18
18 dL = 1.8 L

Vavi's Idea
0.1 as the unit.

5.4 is 54 sets of 0.1
54 ÷ 3 = 18
18 sets of 0.1 is 1.8
Answer: 1.8 L

Naiko's Idea
Structure Decimal Numbers and Rules of Calculation.

5.4 ÷ 3 = 1.8 Answer: 1.8 L
x 10 ($\frac{1}{10}$)
54 ÷ 3 = 18

All of the three calculations of decimal numbers are done by changing into whole numbers.

[4] 5.1 ÷ 3
5.1 L = 51 dL
51 ÷ 3 = 17
17dL = 1.7 L

- Students can use the other two ideas to find their answers. "0.1 as the unit and rules of calculation".

End of Chapter Test: Chapter 13&14 **Date:**

Decimal Numbers	Name:	Score /100

(10 x 10 points =100)

1. Fill in numbers in each $\square$.

(1) 10 times 0.1 is $\square$.

(2) 10 times 0.28 is $\square$.

(3) $\frac{1}{10}$ of 14.37 is $\square$.

(4) $\frac{1}{100}$ of 101.2 is $\square$.

3. Fill in each $\square$ with an inequality sign ($<$ or $>$).

(1) 0.32 $\square$ 0.238 (2) 4.198 $\square$ 4.2

4. Calculate and complete the mathematics sentences. Show your work clearly.

(1) $5.83 + 4.16$ (2) $8.23 + 0.67$

(3) $8.46 - 4.22$ (4) $3 - 1.37$

Chapter 15 Arrangement of Data

1. Unit Objectives

- To collect the data according to the objective. (4.4.3a)
- To arrange the data and the table. (4.4.3b)
- Analyse the data from the table. (4.4.3c)

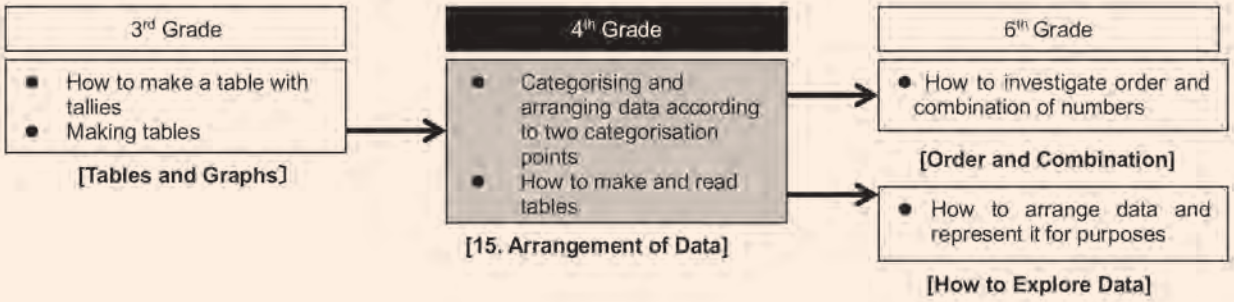
2. Teaching Overview

In Grade 3, students learned how to organise data in a table with a single dimension and generate a bar chart. In this unit, they will learn how to organise data in a double dimensional table and capture the features and tendencies of the data.

Arrangement of Table : They learn how to organise data by 2 perspectives in the same table (2-dimensional table). 2 perspectives by 2 categories make 4 perspectives. Arrangement of data enables us to capture the tendencies of data for better analysis and they will appreciate it.

Arrangement of Data : The utilisation of numbers on the columns for total will be appreciated when students check if the organisation/counting is correct or not.

3. Related Learning Contents



Unit 15

Unit: Arrangement of Data
Sub-unit: 1. Arrangement of Table
Lesson 1 of 2 (Double Period)

Textbook Page : p.164~p.166
Actual Lesson 99

Sub-unit Objectives

- To arrange the table by focusing on the necessary information collected.
- To analyse the points from the table.

Lesson Objectives

- To understand how to arrange the data using the table.

Prior Knowledge

- Arrangement and representation of data in tables. (Grade 3)

Preparation

- Tables

Assessment

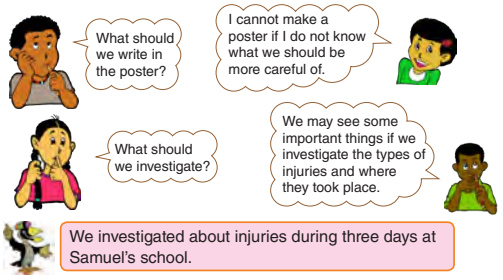
- Arrange the data correctly with correct facts and figures on a table. F S

• Teacher's Notes •

Data is a general term used to describe a collection of facts, numbers, measurements or symbols.
The arrangement of Data using tables in this lesson is based on two objectives.
1. Number of Children and Locations.
2. Number of Children and Injury.

15 Arrangement of Data

Samuel was injured during sports day. He wants to make a poster to tell children to be more careful.



We investigated about injuries during three days at Samuel's school.

Record of Injuries

Grade	Locations	Type of injury
5	Basketball court	Bruise
4	Soccer field	Cut
5	Basketball court	Bruise
7	Volley ball court	Scratch
3	Classroom	Scratch
3	Soccer field	Fracture
6	Classroom	Scratch
5	Volley ball court	Cut
4	Soccer field	Scratch
5	Classroom	Scratch
3	Classroom	Bruise

Grade	Locations	Type of injury
7	Volley ball court	Scratch
8	Soccer field	Scratch
6	Classroom	Cut
6	Soccer field	Sprained finger
5	Volley ball court	Sprain
5	Classroom	Scratch
6	Basketball court	Bruise
4	Classroom	Cut
8	Soccer field	Bruise
6	Volley ball court	Scratch
4	Basketball court	Bruise

Let's think about how to make a table to see the locations and the types of injuries.

Making the table according to the objective

1 Arrangement of Table

1 Let's arrange the data in the above table and check the injuries at the school.

① Check where the injuries happened.

Ⓐ Where do injuries happen most frequently?
Draw a table and check.

Classroom

Ⓑ Tell everyone what you have discovered.

Number of Children and Locations

Locations of injury	Numbers of children	
Soccer field	𝍸 |	6
Basketball court	||||	4
Volley ball court	||||	5
Classroom	||||||	7
Total		22

Ex. The least injuries occured in the Basketball court.

164 = □ − □

□ ÷ □ = 165

Lesson Flow

1 Observe the picture and start the discussion.

T Ask the students to observe the pictures and discuss using the hints and questions in the bubbles.

S Participate in the discussion using the hints and questions in the bubbles.

T Your discussions and opinions will now lead us to the investigation about injuries done at Samuel's school.

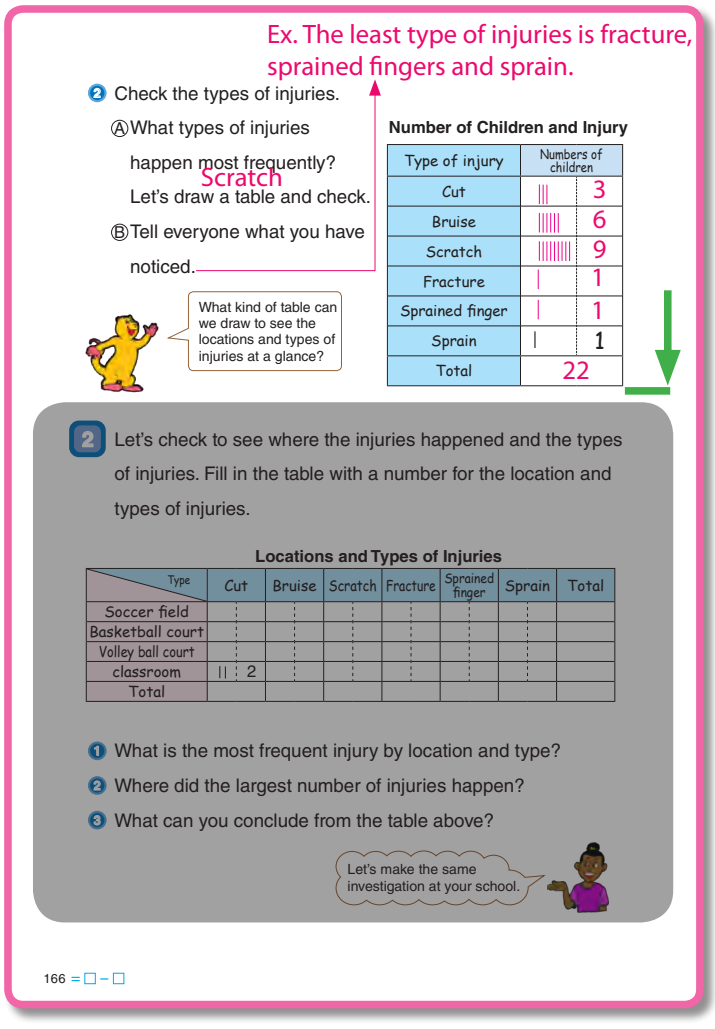
2 Record of data on the table for discussion.

S Observe the data on the table for discussion.

T Pose the questions for discussions?

1. What is the table about?
2. Name some of the locations where injuries occur.
3. What kinds of injuries occur at certain locations?

S Observe the table and answer the questions posed by the teacher.



T Explain what data is. **Data is a general term used to describe a collection of facts, numbers, measurements or symbols.** Refer to the table of Record of Injuries as an example.

T Introduce the main task.

3 1 Think about how to make a table to see the locations and types of injuries using the table "Number of Children and Locations".

T 1 Explain to the students to arrange the data using the 1st table. The objective is focused on the Number of children and Locations.

S Arrange the data in table by drawing the table as in the textbook.

S Answer 1 Ⓐ Ⓑ.

4 Think about how to make a table to see the locations and types of injuries using the table "Number of Children and Injury".

T 2 Explain to the students to arrange the data using the 2nd table. The objective is focused on the Number of children and Injury.

S Arrange the data in table by drawing the table as in the text book.

S Answer 2 Ⓐ Ⓑ.

5 What kind of table can be made to see the locations and types of injuries at a glance?

S Think about how to combine the 2 tables and prepare their ideas (Homework).

Sample Blackboard Plan

Refer to Page 225.

Unit 15

Unit: Arrangement of Data
Sub-unit: 1. Arrangement of Table
Lesson 2 of 2 (Single Period)

Textbook Page : p.166
Actual Lesson 100

Lesson Objectives

- To combine two tables to make only one table by filling in the correct information from the data collected.
- To discuss and interpret the information from the table.

Prior Knowledge

- Arrangement of data in a table.
- Read and write information on and from the table.
- Write the figures in number and tally forms.

Preparation

- Tables for task 2

Assessment

- Use the information from the two tables and draw only one table by filling in the correct information. F S
- Think about what is found from the table. F S

• Teacher's Notes •

The two tables from the 1st lesson were drawn according to objectives as mentioned in the 1st lesson vertically. This 2nd lesson is the combination of the two tables and the objectives into only one table in horizontal arrangement for the students to read and interpret the information.
For task 2 especially 3, the answers may vary depending on students reasons after studying the table.

2 Check the types of injuries.
Ⓐ What types of injuries happen most frequently? Let's draw a table and check.
Ⓑ Tell everyone what you have noticed.

What kind of table can we draw to see the locations and types of injuries at a glance?

Number of Children and Injury

Type of injury	Numbers of children
Cut	
Bruise	
Scratch	
Fracture	
Sprained finger	
Sprain	1
Total	

2 Let's check to see where the injuries happened and the types of injuries. Fill in the table with a number for the location and types of injuries.

Locations and Types of Injuries

Type	Cut	Bruise	Scratch	Fracture	Sprained finger	Sprain	Total
Soccer field	1	1	2	1	1		6
Basketball court		4					4
Volley ball court	1		3			1	5
classroom	2	2	3				7
Total	4	7	8	1	1	1	22

Record of Injuries

Grade	Locations	Type of injury
5	Basketball court	Bruise
4	Soccer field	Cut
5	Basketball court	Bruise
7	Volley ball court	Scratch
3	Classroom	Scratch
3	Soccer field	Fracture
6	Classroom	Scratch
5	Volley ball court	Cut
4	Soccer field	Scratch
5	Classroom	Scratch
3	Classroom	Bruise

Grade	Locations	Type of injury
7	Volley ball court	Scratch
8	Soccer field	Scratch
6	Classroom	Cut
6	Soccer field	Sprained finger
5	Volley ball court	Sprain
5	Classroom	Scratch
6	Basketball court	Bruise
4	Classroom	Cut
8	Soccer field	Bruise
6	Volley ball court	Scratch
4	Basketball court	Bruise

1 What is the most frequent injury by location and type?
Scratch in the soccer
2 Where did the largest number of injuries happen?
Classroom
3 What can you conclude from the table above?
Ex. Few injuries that happened were fractures, sprained finger and sprain.

Let's make the same investigation at your school.

166 = □ – □

Lesson Flow

1 Check students' homework and ideas from the 1st lesson.

T Before opening the textbook ask the students to share their ideas and sample of the home work given.

S Share their ideas and sample of the homework.

T Praise their efforts and tell them to turn to page 166.

2 Observe the table and find the information.

T Ask students to work in groups to draw the table.

S Draw the table and fill in the table with correct information.

TN Horizontal for types of injuries and vertical for the location of injuries.
For each injury in a location, it has two columns. First column is for the tally and second column is for the number.

T Let students know about the combination of the two tables into only one table with the information.

S Observe the table and discuss.

3 ② Find answers to ① ② ③.

T Introduce the main task.

S Find answers and share with the others.

Sample Blackboard Plan (Lesson99)

Date:
Chapter: 15 Arrangement of Data.
Topic: Arrangement of Table. **Lesson No:** 1/2

Main Task: Let's think about how to make a table to see the locations and the types of injuries.

MT: Introduce main task here.

[1] Let's arrange the data from the table and check the injuries at the school.
❶Check where the injuries happened.
A. Draw a table and check where do injuries happen most frequently? Classroom

Number of Children and Locations.

Locations of Injury	Numbers of Children	
Soccer field	𝍸	6
Basketball court	𝍸	4
Volley ball court	𝍸	5
Classroom	𝍸	7
Total		22

B What you have noticed.
Example: The least injuries occurred in the Basketball Court.

❷Check the types of injuries.
A. Draw a table and check what type of injuries happen most frequently? scratch

Number of Children and Injury.

Type of Injury	Numbers of Children	
Cut	𝍸	3
Bruise	𝍸	6
Scratch	𝍸	9
Fracture	𝍸	1
Sprained Finger	𝍸	1
Sprain	𝍸	1
Total		22

B What you have noticed.
Example: The least type of injuries occurred were fracture, sprained fingers and sprained.

Use students ideas to fill in the tables and confirm with the answers given in the manual.

Sample Blackboard Plan (Lesson100)

Date:
Chapter: 15 Arrangement of Data.
Topic: Arrangement of Table. **Lesson No:** 2/2

Main Task: Let's think about how to arrange data from 2 (two) separate tables into 1 (one) table.

MT: Introduce main task here.

Students discussions and their ideas.
Write down their ideas and discussion points on the board from what they have done as their home work.

[2] Let's check to see where the injuries happened and the types of injuries. Fill in the table with a number for the location and types of injuries.

Location \ Type	Cut		Bruise		Scratch		Fracture		Sprained Finger		Sprain		Total
Soccer field	𝍸	1	𝍸	1	𝍸	2	𝍸	1	𝍸	1			6
Basketball Court			𝍸	4									4
Volleyball Court	𝍸	1			𝍸	3					𝍸	1	5
Classroom	𝍸	2	𝍸	1	𝍸	4							7
Total		4		6		9		1		1		1	22

❶Where is the most frequent injury by location and time?
Scratch in the soccer field.
❷ Where did the largest number of injuries happen?
Classroom
❸ What can you conclude from the table above?
Example: Few injuries that happened were fracture, sprained fingers and sprained.

Use students responces to fill in the table whilst confirming with the given answers in the manual.

Unit 15

Unit: Arrangement of Data
Sub-unit: 2. Arrangement of Data
Lesson 1 of 1 (Double Periods)

Textbook Page : p.167
Actual Lesson 101

Sub-unit Objectives

- To arrange the collected data for easy understanding of the information.
- To read the table and discuss the information.

Lesson Objectives

- To arrange the data collected and make a table.

Prior Knowledge

- Arrangement of data in a table.
- Read and write information on and from the table.

Preparation

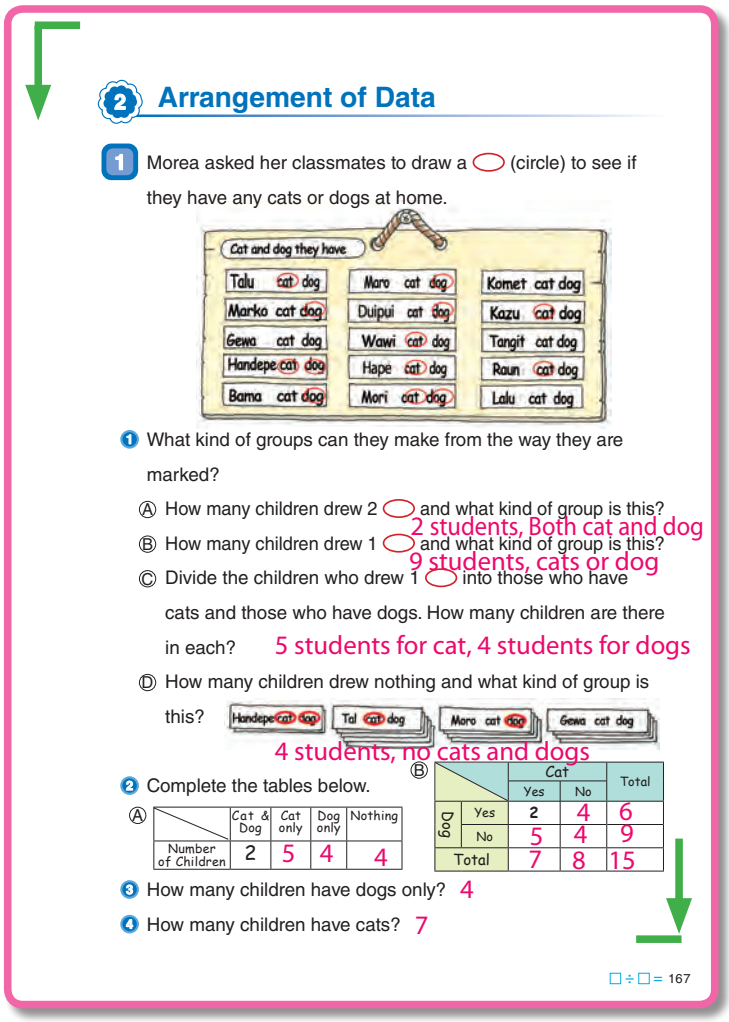
- Table for task 1

Assessment

- Make a table correctly by arranging the collected data. F S

• Teacher's Notes •

For the blackboard plan as planned **do not** write the answers typed in red. The children will give the answers as you write on the board.



2 Arrangement of Data

1 Morea asked her classmates to draw a ◯ (circle) to see if they have any cats or dogs at home.

Cat and dog they have

Talu cat dog	Maro cat dog	Komet cat dog
Marko cat dog	Duipui cat dog	Kazu cat dog
Gewa cat dog	Wawi cat dog	Tangit cat dog
Handepe cat dog	Hape cat dog	Raun cat dog
Bama cat dog	Mori cat dog	Lalu cat dog

1 What kind of groups can they make from the way they are marked?

Ⓐ How many children drew 2 ◯ and what kind of group is this? 2 students, Both cat and dog

Ⓑ How many children drew 1 ◯ and what kind of group is this? 9 students, cats or dog

Ⓒ Divide the children who drew 1 ◯ into those who have cats and those who have dogs. How many children are there in each? 5 students for cat, 4 students for dogs

Ⓓ How many children drew nothing and what kind of group is this? Handepe cat dog, Tal cat dog, Maro cat dog, Gewa cat dog — 4 students, no cats and dogs

2 Complete the tables below.

Ⓐ

	Cat & Dog	Cat only	Dog only	Nothing
Number of Children	2	5	4	4

Ⓑ

Dog \ Cat	Yes	No	Total
Yes	2	4	6
No	5	4	9
Total	7	8	15

3 How many children have dogs only? 4

4 How many children have cats? 7

□ ÷ □ = 167

Lesson Flow

1 Review previous lesson.

2 1 Confirm the data collected.

T Ask the students to read through the information collected and confirm the data.

S Read through the information and confirm the data.

Ex: • Who has a cat and a dog in their home is surveyed.

• There are 4 groups, Cats only, Dogs only, Cats and dogs, none.

3 Answer questions 1 Ⓐ Ⓑ Ⓒ Ⓓ.

S Answer the questions 1 Ⓐ Ⓑ Ⓒ Ⓓ.

T Ask the students to explain their answers for confirmation with the others.

TN Let sudents understand that there are 4 types of information (Cats only, Dogs only, Cats and dogs and none), and confirm one by one. Use the information to complete the table.

4 1 2 Complete the table.

S Complete the table by drawing the table and filling in the correct information.

S Answer activities 3 and 4.

T Check students' work and allow students to share their answers with the others.

Sample Blackboard Plan

Date:
Chapter: 15 Arrangement of Data.
Topic: Arrangement of Data. **Lesson No:** 1/1

Main Task: Let's arrange data collected by Morea from her research and represent them on a table.

MT: Introduce main task here.

[1] ❶What kind of groups can they make from the way they are marked?

Ⓐ How many children drew 2 and what kind of group is this?
2 children and the group is both.
Ⓑ How many children drew 1 and what kind of group is this?
9 children and the group is cats or dogs.
Ⓒ Divide the children who drew 1 into those who have cats and those who have dogs. How many children are there each?
5 children for cats and 4 children for dogs.
Ⓓ How many children drew nothing and what kind of group is this?
4 children and the group is no cats and dogs.

● **Complete the tables.**

A

	Cat & Dog	Cat only	Dog Only	Nothing
Number of children	2	5	4	4

●How many children have only dogs? 4

● How many children have cats? 7

B (children)

		Cat		Total
		Yes	No	
Dog	Yes	2	4	6
	No	5	4	9
Total		7	8	15

Unit 15

Unit: Arrangement of Data
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double period)

Textbook Page : p.168~p.169
Actual Lesson 102

Lesson Objectives

- To deepen their understanding of what they have learned in this unit.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheets for students

Assessment

- Solve the exercise correctly. F S

• Teacher's Notes •

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

Exercises

1 Gima investigated the traffic accidents in her town.
From her data, make the table below and explain what you noticed to your friends.

Pages 164 ~ 166

Accidents with Primary School Children (Gima's City for One Year)

When	Cause	When	Cause
Playing	Running into the street	Playing	Crossing in front of cars
On the way to or from friends house	Outside the crosswalk	On the way to or from friends house	Running into the street
Playing	Running into the street	Shopping	Running into the street
Playing	Running into the street	Playing	Crossing on red light
On the way to or from school	Outside the crosswalk	Playing	Running into the street
Playing	Crossing on red light	On the way to or from school	Crossing in front of cars
Shopping	Crossing in front of cars	On the way to or from school	Running into the street
Playing	Running into the street	Playing	Outside the crosswalk
On the way to or from school	Running into the street	Playing	Running into the street
Shopping	Outside the crosswalk	On the way to or from school	Running into the street
Playing	Crossing on red light	On the way to or from school	Outside the crosswalk

Accidents with Primary School Children

When \ Cause	Running into street	Outside crosswalk	Crossing on red light	Crossing in front of cars	Total
Playing	6	1	3	1	11
On the way to or from friends house	1	1			2
On the way to or from school	3	2		1	6
Shopping	1	1		1	3
Total	11	5	3	3	22

168 = □ – □

Problems

1 The table below is a record of injuries for the grade 4 children in Robert's school. Complete the table below.

● Understanding how to make a table to show two things at once.

Record of Children Who Had Injuries

Name	Place	Type of injury	Name	Place	Type of injury
Kara	Soccer field	Scratch	Sasa	Soccer filed	Bruise
Ted	Classroom	Cut	Yema	Soccer filed	Cut
Wena	Classroom	Scratch	Karo	Volleyball court	Scratch
Ziko	Volleyball court	Sprain	Yaga	Volleyball court	Bruise
Sete	Basketball court	Bruise	Dada	Classroom	Scratch
Nina	Volleyball court	Sprained finger	Manu	Volleyball court	Scratch

Locations and Types of Injuries

Place \ Type of Injury	Scratch	Cut	Sprain	Bruise	Sprained finger	Total
Soccer field	1	1		1		3
Classroom	2	1				3
Volleyball court	2		1	1	1	5
Basketball court				1		1
Total	5	2	1	3	1	12

2 Julie made a record about the brothers and sisters of her classmates. There are 36 children in the class.

● Making and reading a table.

Children who have older brothers…12

Children who have older sisters…6

Children who do not have any older brothers or older sisters…18

Complete the table on the right.

Older sister \ Older brother	Yes	No	Total
Yes	0	6	6
No	12	18	30
Total	12	24	36

□ ÷ □ = 169

Lesson Flow

1 ① Traffic accidents with Elementary School Children.

T Ask students to discuss the traffic accidents as in the table and share what information they find. Pose questions to help and guide the discussions.

S Discuss the traffic accidents and share information with friends in class.

2 Making a table for the traffic accidents for Elementary School Children.

S Draw the table for the traffic accidents by analysing the data collected with correct tally, figure and information to be displayed on the table.

3 ① Record of injuries for the fourth grade children.

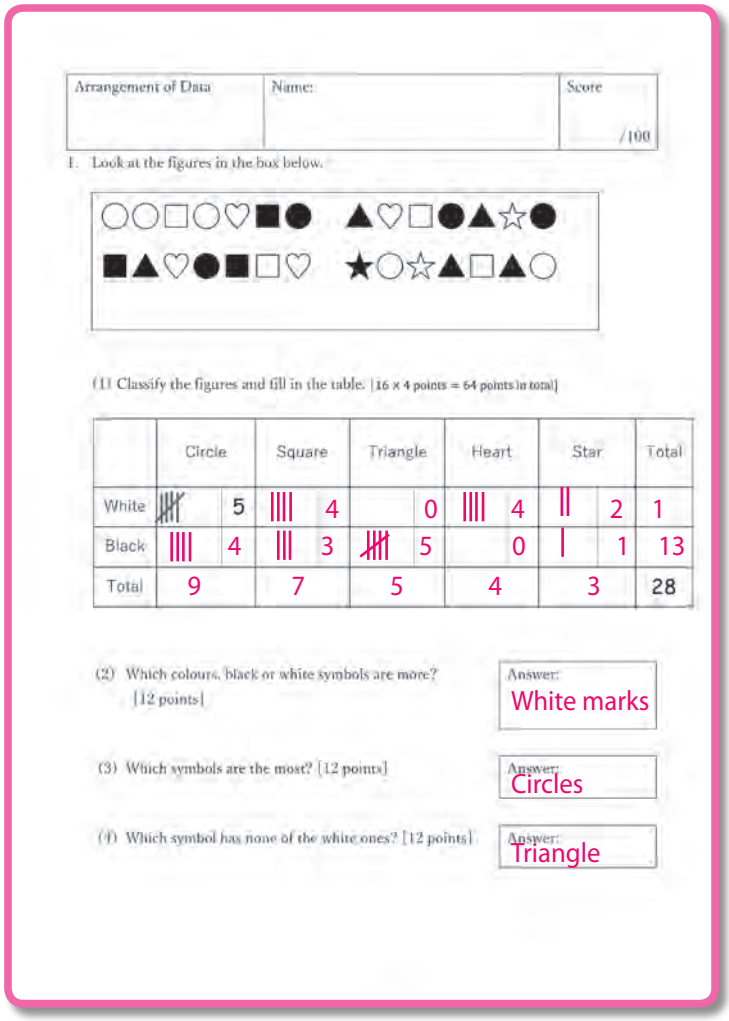
S Discuss the record of injuries for the fourth grade children and share information with friends in class.

S Draw the table by analysing the data collected with correct tally, figure and information to be displayed on the table.

4 ② Making and reading the table for brothers and sisters in a class.

S Draw the table with correct figure and information for brothers and sisters in Julie's class.

T Observe students work for checking, correction and evaluation for the unit.



Arrangement of Data	Name:	Score /100

1. Look at the figures in the box below.

○○□○♡■● ▲♡□●▲☆●
■▲♡●■□♡ ★○☆▲□▲○

(1) Classify the figures and fill in the table. [16 × 4 points = 64 points in total]

	Circle	Square	Triangle	Heart	Star	Total
White	5	4	0	4	2	1
Black	4	3	5	0	1	13
Total	9	7	5	4	3	28

(2) Which colours, black or white symbols are more? [12 points] Answer: White marks

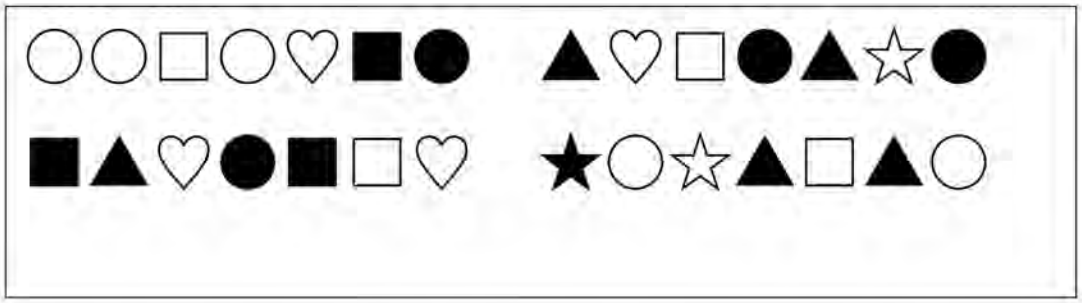
(3) Which symbols are the most? [12 points] Answer: Circles

(4) Which symbol has none of the white ones? [12 points] Answer: Triangle

End of Chapter Test: Chapter 15 **Date:**

Arrangement of Data	Name:	Score /100

1. Look at the figures in the box below.



(1) Classify the figures and fill in the table. [16 × 4 points = 64 points in total]

	Circle	Square	Triangle	Heart	Star	Total
White	5					
Black						
Total						28

(2) Which colours, black or white symbols are more? [12 points]

Answer:

(3) Which symbols are the most? [12 points]

Answer:

(4) Which symbol has none of the white ones? [12 points]

Answer:

Chapter 16 Multiplication and Division of Decimal Numbers

1. Unit Objectives

- To recognise the meaning of multiplication and division of decimal number.(4.1.8a and b)
- To calculate multiplication and division when multiplicand or dividend is a decimal number.(4.1.8c and d)

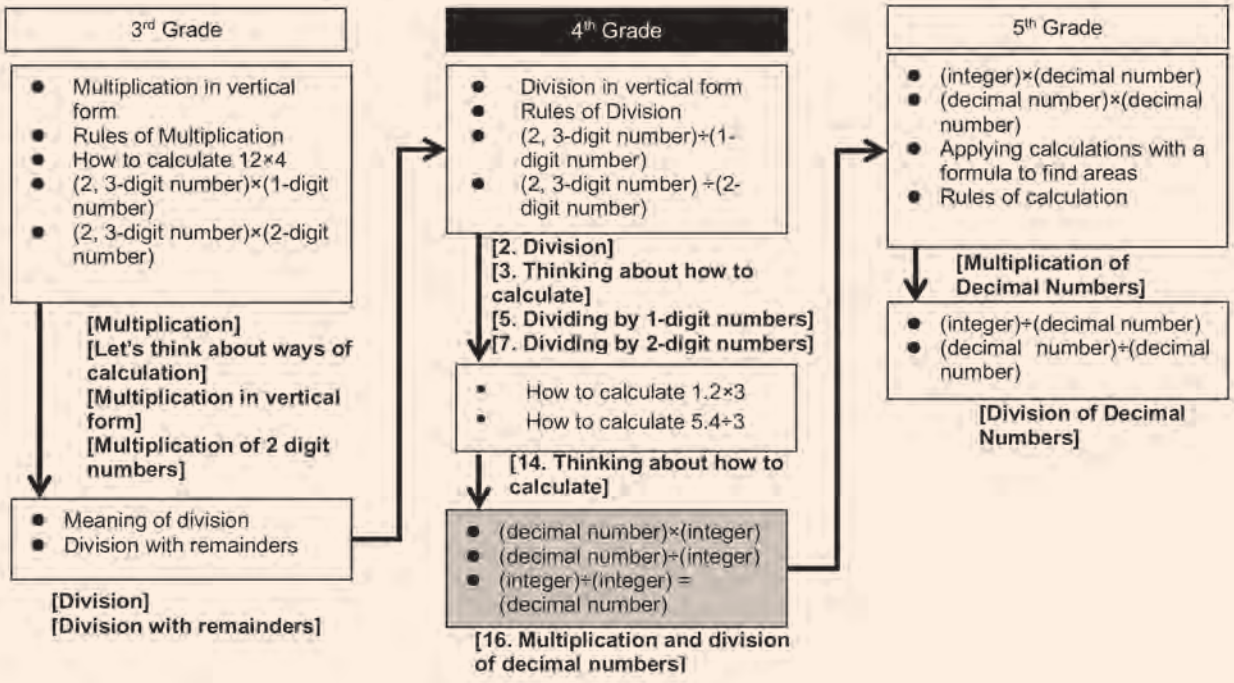
2. Teaching Overview

Calculation of '(Decimal numbers) × or ÷ (Whole numbers)' : In the learning of decimals multiplied by whole numbers, if they learn it as repeated addition of decimal numbers, they will definitely face a problem in the learning of decimals multiplied by decimals. Therefore, this topic is to make the foundation of learning decimal multiplied by decimal with the use of a diagram with a tape and a number line. They should get used to the utilization of the diagrams and explain their ideas using them. Division is also the same.

Division Problems : As they solve word problems, it is important to estimate the quotient before finding accurate answers. They should approximate numbers by rounding numbers before calculating. It may sometimes help them to strategise how to calculate.

What kind of Expression : They can strategise and identify the operations by understanding the situations using the diagram with a number line and a tape.

3. Related Learning Contents



Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 1. Calculations of (Decimal Number)×(Whole Number)
Lesson 1 of 3 (Double Period)

Textbook Page : p.170~p.175
Actual Lesson 103

Sub-unit Objectives

- To understand the meaning of (Decimal number)×(Whole number) based on a number line and table.
- To think about how to calculate (Decimal number)×(Whole number).
- To understand how to calculate (Decimal number)×(Whole number) in vertical form.

Lesson Objectives

- To understand the meaning of (Decimal number)×(Whole number) based on a number line and table.
- To think about how to calculate (Decimal number)×(Whole number) in vertical form.

Prior Knowledge

- Decimal numbers 2
- Multiplication of whole number (2-digit)×(1-digit)
- Addition and subtraction of decimal number.

Preparation

- Refer to the blackboard plan.

Assessment

- Think about how to calculate (Decimal number)×(Whole number) in vertical form. F
- Do the exercise correctly. S

• Teacher's Notes •

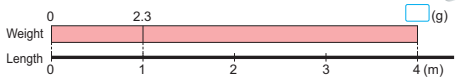
Use the tape diagram and the table of information to explain the concepts. This method will help students to understand better on multiplication and division problems of decimal numbers.

16 Multiplication and Division of Decimal Numbers

1 Calculations of (Decimal Number)×(Whole Number)

Meaning of (Decimal number) × (Whole number)

1 There is a 1 m wire that weighs 2.3 g.
How many grams does 4 m of the same wire weigh?



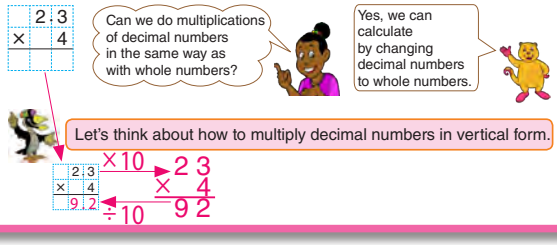
❶ Let's write a mathematical expression.
2.3 × 4

g	2.3	?	×4
m	1	4	×4

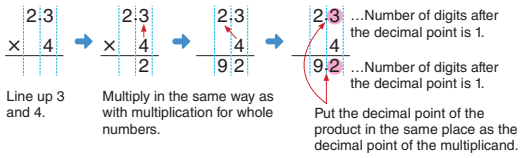
❷ Approximately how many grams does it weigh? 2 × 4=8
❸ Let's think of ways on how to calculate. Approximatelty 8 g

Refer to BB Plan

❹ Let's think about how to multiply in vertical form.

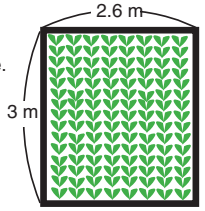


multiplication Algorithm for 2.3×4 in Vertical Form



Understanding (decimal number)×(1-digit whole number)

2 What is the area of a plant nursery that is 2.6 m wide and 3 m long in m²? 2.6 × 3



❶ Write a mathematical expression.
❷ Let's think of ways on how to calculate.
Refer to BB Plan
❸ Let's multiply in vertical form.

	2	6
		3
7	8	

How to calculate (Decimal number) × (1-digit Whole number)

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

❶ 3.2×6=

	3	2	
×		6	
1	9	.	2

❷ 0.8×7=

	0	8	
×		7	
	5	.	6

Exercise

Let's multiply in vertical form.

① 3.2×3 9.6	② 3.3×3 9.9	③ 1.8×2 3.6	④ 1.4×3 4.2
⑤ 2.4×4 9.6	⑥ 4.3×6 25.8	⑦ 0.7×6 4.2	⑧ 0.8×4 3.2

□×□= 171

Lesson Flow

1 ❶ Read and understand the situation and make a mathematical expression.

S ❶ Read the problem and make mathematical a expression.
T ❷ Predict the answer by rounding number.
TN It is important that students predict the answer to improve their number sense.
S ❸ Think of ways on how to calculate 2.3×4.
T Let students think using learned knowledge and come up with different ways.
TN Refer to the blackboard plan for three possible ways.
T ❹ Let's think about how to calculate in vertical form.
T Confirm by calculating same as whole number and put the decimal point in the same place as in the multiplicand.

2 Summarise how to calculate (Decimal number)×(Whole number) in vertical form.

T Explain the steps on calculation using the summary in the textbook.

3 ❷ Solving math problem involving (decimal number)×(whole number).

T ❶ Read and understand the problem in ❷ and make a mathematical expression
T Confirm by using the formula (L×W) to find the area.
S ❷ Calculate 2.6×3 using vertical form.
T ❸ Confirm that the way of calculation is same as the whole number even carrying over.

4 ❸ Practice multiplying decimal numbers with whole numbers in vertical form.

TN Refer to the blackboard plan.

5 Do the exercise.

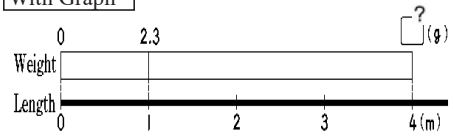
Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 1/3

MT Let's think about how to multiply decimal numbers × 1-digit whole numbers in vertical form.

1 There is a 1 m wire that weigh 2.3 g. How many grams does the 4 m of the same wire weigh?

With Graph



1 Mathematical expression
2.3 × 4

2 Estimate how many grams does it weigh? 2 × 4 = 8…..Approximately 8 g.

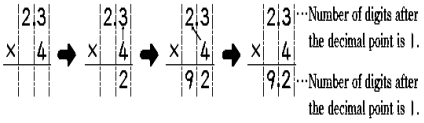
3 Let's think about how to calculate.

By sets
There are 23 sets of 0.1 in 2.3
So, 23 × 4 = 92 sets of 0.1
Hence 92 sets of 0.1 = 9.2 g

By rule of multiplication
2.3 × 4 = 9.2 g
× 10 ↓ ↑ ÷ 10
23 × 4 = 92

By changing units → (optional)
2.3 g = 230 mg
230 mg × 4 = 920 mg.
920 mg = 9.2 g

4 How to multiply 2.3 × 4 in vertical form.



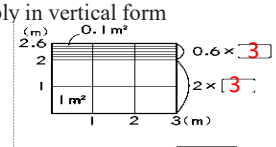
Line up 3 and 4. | Multiply in the same way as with multiplication for whole numbers. | Put the decimal point of the product in the same place as the decimal of the multiplicand.

2 What is the area of a plant nursery that is 2.6 m wide and 3 m long in m^2?

1 Expression: 2.6 × 3

2 Multiply in vertical form

	2	6
×		3
7	8	



6 of 1 m² is 6 m²
18 of 0.1 m² is 1.8 m²
Total 7.8 m²

❶ 3.2×6

	3	2
×		6
1	9	2

❷ 0.8×7

	0	8
×		7
	5	6

Exercise
1. 3.2 × 3 = 9.6 **2.** 1.8 × 2 = 3.6

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 1. Calculations of (Decimal Number)×(Whole Number)
Lesson 2 of 3 (Double Period)

Textbook Page : p.172
Actual Lesson 104

Lesson Objectives

- To think and understand how to calculate (Decimal number)×(2-digit whole number).
- To understand operation of zero (0) at the end of any product after decimal point. (2.0=2)

Prior Knowledge

- Multiplication : (Decimal number)×(Whole number)

Preparation

- Refer to the blackboard plan.

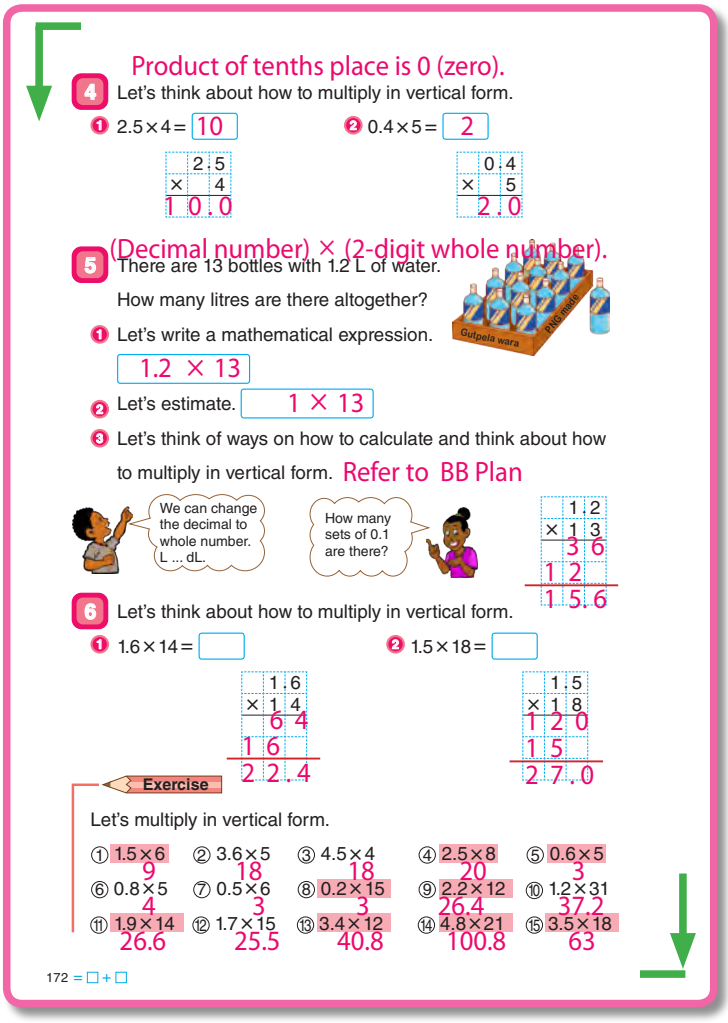
Assessment

- Think about how to calculate (Decimal number)×(2-digit whole number). F
- Do the exercises correctly. S

• Teacher's Notes •

There are three possible ways to solve task 5. Explain all three as students have different understanding for each ways.

It is also best to draw the place value boxes to guide during the calculation.



Product of tenths place is 0 (zero).

4 Let's think about how to multiply in vertical form.

❶ 2.5×4= 10

	2	5
×		4
1	0	0

❷ 0.4×5= 2

	0	4
×		5
	2	0

(Decimal number) × (2-digit whole number).

5 There are 13 bottles with 1.2 L of water.
How many litres are there altogether?

❶ Let's write a mathematical expression.
1.2 × 13

❷ Let's estimate. 1 × 13

❸ Let's think of ways on how to calculate and think about how to multiply in vertical form. Refer to BB Plan

We can change the decimal to whole number. L ... dL.

How many sets of 0.1 are there?

	1	2
×	1	3
	3	6
1	2	
1	5	6

6 Let's think about how to multiply in vertical form.

❶ 1.6×14=

	1	6
×	1	4
	6	4
1	6	
2	2	4

❷ 1.5×18=

	1	5
×	1	8
1	2	0
1	5	
2	7	0

Exercise

Let's multiply in vertical form.

① 1.5×6 9
② 3.6×5 18
③ 4.5×4 18
④ 2.5×8 20
⑤ 0.6×5 3
⑥ 0.8×5 4
⑦ 0.5×6 3
⑧ 0.2×15 3
⑨ 2.2×12 26.4
⑩ 1.2×31 37.2
⑪ 1.9×14 26.6
⑫ 1.7×15 25.5
⑬ 3.4×12 40.8
⑭ 4.8×21 100.8
⑮ 3.5×18 63

172 =□+□

Lesson Flow

1 Review the previous lesson.

2 4 Do the exercise (Decimal number) × (Whole number).

T Introduce the main task.

T Confirm that even if deleting 0 in the last decimal place, the number does not change.
10.0 = 10, 2.0 = 2

3 5 Read the problem, make mathematical expression and solve.

T ❶ What is the mathematical expression.

S 1.2 × 13

T Confirm that the multiplier is 2-digit in this calculation.

T ❷ Let students estimate the value of 1.2 × 13.

S Estimate as multiplying 1 × 13.

S ❸ Think of ways on how to calculate 1.2 × 13.

TN Refer to blackboard plan for possible ways to solve 1.2 × 13.

T Multiply and explain 1.2 × 13 in vertical form on the blackboard.

4 6 Practice (Decimal number) × (2-digit whole number).

T Confirm the process on how to calculate (decimal number) × (2-digit whole number).
1. Calculate same way as whole number.
2. Write decimal point on the same place as multiplicand.

5 Summary

T/S Go through summary together.

6 Do the exercise.

T Give the priority exercises in class and the rest can be for home work if time does not allow.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 2/3

MT Let's think about how to multiply decimal numbers × whole numbers in vertical form when the product of tenths place is 0(zero)

4 Let's think about how to multiply in vertical form.

❶ 2.5×4

	2	5
×		4
1	0	0

= 10

❷ 0.4×5

	0	4
×		5
	2	0

= 2

5 There are 13 bottles with 1.2 L of water. How many liters are there?

❶ Expression 1.2 × 13

❷ Let's think of ways on how to solve 1.2×13

By Changing Units
1.2 L = 1200 mL
1200 L × 13 = 15 600 mL
15 600 mL = 15.6 L

By Sets
There are 12 sets of 0.1 in 2.3
12×13 = 156 sets of 0.1
156 sets of 0.1 = 15.6
Answer 15.6 L

BY Multiplication rule
1.2 × 13 = 15.6
× 10 ↓ ↑ ÷ 10
12 × 13 = 156
Answer 15.6 L

❸ Multiply 1.2 × 13 in vertical form

	1	2
×	1	3
	3	6
1	2	
1	5	6

Multiply in the same way as with multiplication with whole number

Number of digits after decimal point is 1

Put the decimal point of the product in the same place as in the multiplicand

6 Let's think about how to multiply in vertical form.

❶ 1.6×14

	1	6
×	1	4
	6	4
1	6	
2	2	4

❷ 1.5×18

	1	5
×	1	8
1	2	0
1	5	
2	7	0

= 27

Summary
- Even the Multiplier is two digit number, the way of calculation is the same as in whole numbers.
- We put the decimal point of the product in the same place as the decimal point of the multiplicand.

Exercise
(1), (4), (5), (8), (11), (13)

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 1. Calculations of (Decimal Number)×(Whole Number)
Lesson 3 of 3 (Double Period)

Textbook Page : p.173
Actual Lesson 105

Lesson Objectives

- To think about how to calculate (Decimal number of hundredth place)×(Whole number).
- To understand how to calculate (Decimal number of hundredth place)×(Whole number).

Prior Knowledge

- Multiplication : (Decimal number)×(Whole number) (Previous lesson)

Preparation

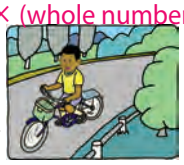
- Refer to the blackboard plan.

Assessment

- Think about how to calculate (Decimal number of hundredth place)×(Whole number). F
- Do the exercises correclty. S

(Hundredths place decimal number) × (whole number)

7 There is a 2.35 km long fence around the Golf course in Lae. Steven goes around the Golf course 3 times by bicycle. How many kilometres did he cycle altogether?



❶ Write a mathematical expression.

2.35 ×3

Let's change the order of multiplication from 3×2.35 to 2.35×3, because it is easier to multiply by a whole number.

❷ Let's think of ways on how to calculate. Refer to BB Plan

We can change the unit from km to m.

We can think about how many sets of 0.01 are there.

We can use rules of multiplication.

(Hundredths place decimal number) × (whole number).

❸ Let's think about how to multiply in vertical form.

	2	3	5
×			3
7	0	1	5

Even if we have hundredth, we can multiply in vertical form in the same way as last time.

8 Let's think about how to multiply.

❶ 0.24×4= ❷ 0.04×5=

	0	2	4
×			4
0	9	6	

	0	0	4
×			5
0	2	0	

Exercise

1 Let's multiply.

① 1.87×2 3.74 ② 2.63×5 13.15 ③ 2.23×4 8.92

④ 0.12×7 0.84 ⑤ 0.08×5 0.4 ⑥ 0.15×6 0.9

2 There is a 1 m iron bar that weighs 1.25 kg.

What is the weight of 4 m of this iron bar in kg?

1.25 × 4 =5 Answer: 5kg

□×□=173

Lesson Flow

1 ⑦ Read the problem and make a mathematical expression.

T Introduce the main task.

S ❶ Read the problem and make a mathematical expression.

T Stress and confirm that multiplicand is a decimal of hundredth place.

2 Think of ways on how to calculate 2.35×3.

S ❷ Think of ways on how to calculate 2.35×3.

TN Refer to black board plan for 3 possible ways to calculate 2.35×3.

T Let students think about how to calculate 2.35×3 in vertical form.

S Calculate the same way as whole number and write the decimal point in the same place as the multiplicand.

3 ⑧ Summary activity on (Decimal number of hundredth place)×(Whole number).

T Confirm the way of calculation in vertical form by solving ❶ and ❷.

1. Calculate same way as whole number.
2. Write a decimal point on the same place as multiplicand.

4 Do the exercise.

T Give the priority exercises in class and the rest can be for home work if time does not allow.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 3/3

MT Let's think about how to calculate hundredths place decimal numbers x whole numbers in vertical form.

⑦ There is a 2.35 km long fence around the golf course in Lae. Steven goes around the golf course 3 times by bicycle. How many kilometers did he cycle altogether?

❶ Write an expression 2.35 × 3

Estimate calculating if Jimmy made 3 rounds.

If 1 km 1 × 3 = 3

If 2 km 2 × 3 = 6

If 2.5 km 2.5 × 3 = 7.5

If 2.35 km 2.35 × 3 =?

❷ Let's think of ways on how to calculate 2.35 × 3.

By changing units
2.35 km = 2350 m
2350 × 2 = 7050 m
7050 m = 7.05 km
Answer 7.05 km

By rule of Multiplication
2.35 × 3 = 7.05
× 100 ↓ ↑ ÷ 100
235 × 3 = 705
Answer 7.05 km

By sets
There are 235 sets of 0.01 in 2.35.
235 × 3 = 705 sets of 0.01
705 sets of 0.01 is = 7.05
Answer 7.05 km

❸ Let's multiply in vertical form.

	$^{1}2.^{1}3$		5
×			3
	7	.0	5

⑧ Let's multiply in vertical form.

❶ 0.24×4

	0.	2	4
×			4
	0.	9	6

❷ 0.04×5

	0.	0	4
×			5
	0.	2	0

Answer 0. 2

Summary
- We write 0 in ones place when the ones place is 0
- We omit the zero as the last number after decimal point.

Exercise 1,3 and 5

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 2. Calculations of (Decimal Number)÷(Whole Number)
Lesson 1 of 3 (Double Period)

Textbook Page : p.174~175
Actual Lesson 106

Sub-unit Objectives

- To understand the meaning of (Decimal number)÷(Whole number) based on the number line and table.
- To think about how to calculate (Decimal number)÷(Whole number).
- To understand how to calculate (Decimal number)÷(Whole number) in vertical form.

Lesson Objectives

- To understand the meaning of (Decimal number)÷(Whole number) based on the number line and table.
- To think about how to calculate (Decimal number)÷(Whole number) in vertical form.

Prior Knowledge

- Decimal number
- Division of whole number (2-digit)×(1-digit)
- Addition and subtraction of decimal number

Preparation

- Refer to the blackboard plan.

Assessment

- Think about how to calculate (Decimal number)÷(Whole number) in vertical form. F
- Do the exercises correctly. S

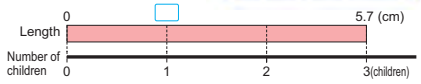
• Teacher's Notes •

Explain carefully in order on how to calculate division in vertical form.
It is also best to draw the place value boxes to guide during calculation.

2 Calculations of (Decimal Number)÷(Whole Number)

(Decimal number) ÷ (whole number)

1 If we divide a 5.7 m rope equally among 3 children, how many metres will each one receive? 1.9



❶ Let's write a mathematical expression.

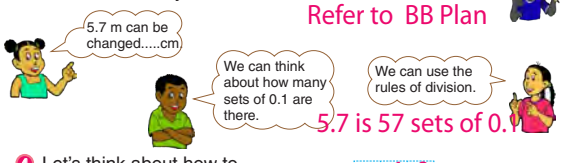
5.7÷3

	÷3		
m	?	5.7	
Children	1	3	
	÷3		

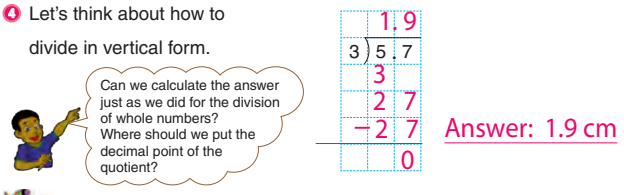
❷ Approximately how many metres is this?

6÷3=2 Answer: 2 m

❸ Let's think of ways on how to calculate.



❹ Let's think about how to divide in vertical form.

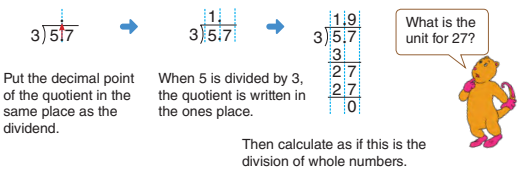



```
   1.9
3)5.7
  3
  2 7
- 2 7
    0
```

Answer: 1.9 cm

Let's think about how to divide decimal numbers in vertical form.

Division Algorithm for 5.7÷3 in Vertical Form



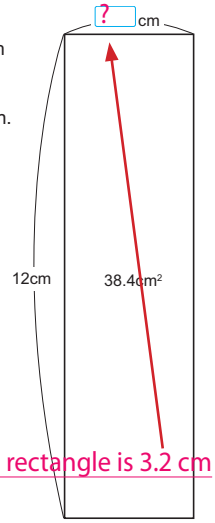
2 Let's find the width of the rectangle with an area of 38.4 cm² and a length of 12 cm.

❶ Let's write a mathematical expression. 38.4÷12

❷ Let's think of some ways of finding the answer.

❸ Let's think about how to divide in vertical form.

```
   3.2
12)38.4
 - 36
    24
  - 24
     0
```



Answer: Width of the rectangle is 3.2 cm

Exercise

Let's divide in vertical form.

① 6.8÷2 3.4 ② 6.4÷4 1.6 ③ 7.5÷5 1.7
④ 52.9÷23 2.3 ⑤ 61.2÷18 3.4 ⑥ 58.8÷42 1.4

Lesson Flow

1 Review the previous lesson.

2 1 Understand the situation and make a mathematical expression.

S ❶ Read the problem in 1 and make a mathematical expression.
T ❷ Predict the answer by rounding number.
TN It is important that students predict the answer before calculating to improve their number sense.
S ❸ Think of ways on how to calculate 5.7 ÷ 3.
T Let students think using learned knowledge.
S ❹ Think about how to calculate 5.7 ÷ 3 in vertical form.
T Confirm that the calculation is same as whole number and put the decimal point in the same place as dividend.

3 Summarise how to calculate (Decimal number) ÷ (Whole number) in vertical form.

T Explain the process on how to calculate in vertical in the box.

4 2 Solve word problem involving (Decimal number) ÷ (Whole number) in vertical form.

S ❶ Read the problem and make a mathematical expression
S ❷ Think about how to divide 38.4 ÷ 12 in vertical form.
T Confirm by the use a formula to find the area.
□ × 12 = 38.4, □ = 38.4 ÷ 12
S ❸ Calculate 38.4 ÷ 12 in vertical form.
T Confirm that the way of calculation is same as the whole number even the divisor is a 2-digit.
T Ask students for the answer of the width of the rectangle.
S Width of the rectangle is 3.2 cm.

5 Do the exercise.

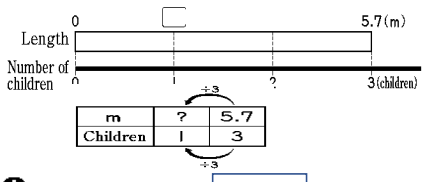
T Let students work on the priority exercises highlighted. The rest can be for homework.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson Nº:** 1/3

MT Let's think about how to calculate hundredths place decimal numbers x whole numbers in vertical form.

1 If we divide a 5.7 m rope equally among 3 children, how many meters will each child receive?



❶ Math expression 5.7 ÷ 3

❷ Approximately how many meters is this?
5.7 is closer to 6 so, 6 ÷ 3 = 2
So each child will receive about 2 meters.

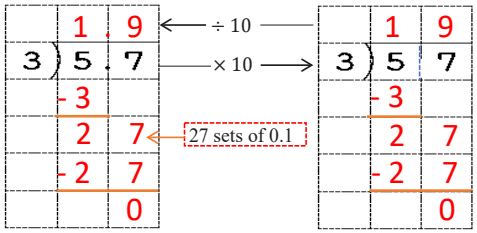
❸ Let's think of ways on how to divide 5.7 ÷ 3.

Changing Units
Answer 1.9 m

Multiplication rule
↓ ↑
Answer 1.9 m

Using the idea of sets
There are 57 sets of 0.1 in 5.7
57 ÷ 3 = 19 sets of 0.1
19 sets of 0.1 is = 1.9
Answer 1.9 m

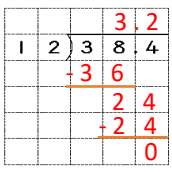
❹ Let's calculate 5.7 ÷ 3 in vertical form.



2 Let's find the width of the rectangle with an area of 38.4 cm^2 and a length of 12 cm.

❶ Mathematical Expression 38.4 ÷ 12

❷ Let's think about how to divide in vertical form.
Let students to solve using 3 methods in ❸



Summary
- When dividing decimal number with a whole number, we divide vertically as dividing whole numbers
- Put the decimal point of the quotient in the same place as the dividend.

Exercises 1,3 and 4

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 2. Calculations of (Decimal Number) ÷ (Whole Number)
Lesson 2 of 3 (Double Period)

Textbook Page : p.176
Actual Lesson 107

Lesson Objectives

- To think about how to calculate division which the divisor is larger than the dividend.
- To understand how to calculate when ones place of quotient is 0.

Prior Knowledge

- Division of whole number
  (Decimal number) ÷ (Whole number)

Preparation

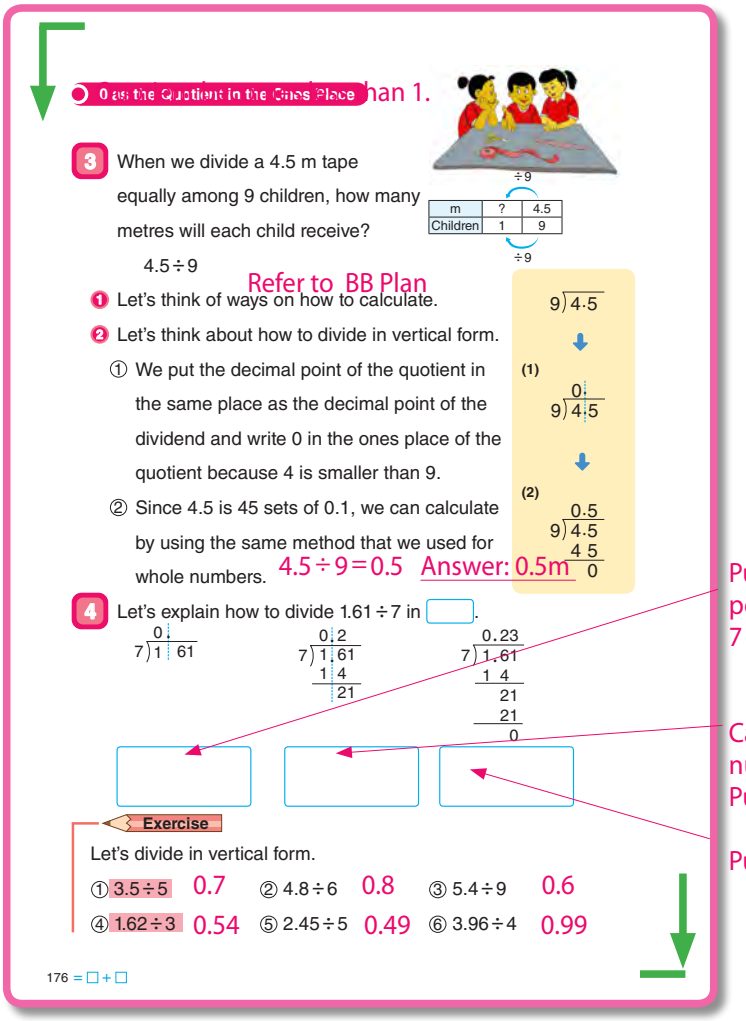
- Refer to the boardplan.

Assessment

- Think about how to calculate a division which the divisor is larger than the dividend. F
- Do the exercises correctly. S

• Teacher's Notes •

Guide the students on how to derive the mathematical expression by using the table.



0 as the Quotient in the Ones Place han 1.

3 When we divide a 4.5 m tape equally among 9 children, how many metres will each child receive?

4.5 ÷ 9

Refer to BB Plan

1 Let's think of ways on how to calculate.

2 Let's think about how to divide in vertical form.

① We put the decimal point of the quotient in the same place as the decimal point of the dividend and write 0 in the ones place of the quotient because 4 is smaller than 9.

② Since 4.5 is 45 sets of 0.1, we can calculate by using the same method that we used for whole numbers.

4.5 ÷ 9 = 0.5 Answer: 0.5m

4 Let's explain how to divide 1.61 ÷ 7 in ☐.

Exercise

Let's divide in vertical form.

① 3.5 ÷ 5 0.7 ② 4.8 ÷ 6 0.8 ③ 5.4 ÷ 9 0.6

④ 1.62 ÷ 3 0.54 ⑤ 2.45 ÷ 5 0.49 ⑥ 3.96 ÷ 4 0.99

176 = □ + □

Put decimal point of the quotient in the same place as the decimal ponts of the dividend.
7 is larger than 1 so put 0 in ones place.

Calculate by using the same method that we used for whole numbers.
Put 2 in tenths place.

Put 3 in hunderedths place.

Lesson Flow

1 Review previous lesson.

2 3 Quotient becomes less than 1.

S 1 Read the problem in 3 and make a mathematical expression.
S 2 Think of ways on how to calculate 4.5 ÷ 9, then calculate in vertical form.
TN Refer to blackboard plan for different ways of solving 4.5 ÷ 9.
T Confirm that the calculation is the same as before considering 0.1 is one unit.
T Where should we place the decimal point?
S Decimal point is written in the same place as the decimal point in the dividend.

3 4 Explain how to calculate 1.61 ÷ 7.

S Explain how to calculate 1.61 ÷ 7 by outlining the steps in the box provided.
TN If it is difficult for the students to write the steps, let them explain verbally and fill in the boxes together.

4 Do the exercise.

T Let students work on the priority exercises highlighted. The rest can be for homework.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 2/3

MT Let's think about how to multiply decimal numbers × whole numbers in vertical form when the quotient is in the ones place is 0(zero)

3 When we divide a 4.5 m rope equally among 9 children, how many meters will each child receive?

1. Math Expression 4.5 ÷ 9

- 4. 5 is too large to divide by 9.
- 9 cannot go into 4.5
- However, we can still divide 4.5 ÷ 9

1 Let's think of ways on how to calculate 4.5 ÷ 9.

By Changing Units
4.5 *m* = 450*cm*
450 ÷ 9 = 50
50 *cm* = 0.5*m*
Answer 0.5 *m*

By Rule f Division
4.5 ÷ 9 = 0.5
× 10 ↓ ↑ ÷ 10
45 ÷ 9 = 5
Answer 0.5 *m*

By concept of sets
There are 45 sets of 0.1 in 4.5
45 ÷ 9 = 5 sets of 0.1
5 sets of 0.1 = 0.5
Answer 0.5 m

2 Let's solve 4.5 ÷ 9 in vertical form

$9\overline{)4.5}$

(1) $9\overline{)4.5}$ → $0.$

(2) $9\overline{)4.5}$ → 0.5, 45, 0

(1) We put the decimal point of the quotient in the same place as the decimal point of the dividend and write 0 in the ones place of the quotient because 4 is smaller than 9.

(2) Since 4.5 is 45 sets of 0.1, we can calculate by using the same method that we used for whole numbers.

4 Let's explain how to divide 1.61 ÷ 7.

$7\overline{)1.61}$ → $0.$

$7\overline{)1.61}$ → 0.2, 14, 21

$7\overline{)1.61}$ → 0.23, 14, 21, 21, 0

Put decimal point of the quotient in the same place as the decimal point of the dividend 7 is larger than 1 so put 0 in ones place

Calculate by using the same method that we use for whole numbers Put 2 in tenths place0

Put 3 in hundredths place

Exercises 1 and 4

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 2. Calculations of (Decimal Number) ÷ (Whole Number)
Lesson 3 of 3 (Single Period)

Textbook Page : p.177
Actual Lesson 108

Lesson Objectives

- To think about how to calculate a division which divides continuously.
- To understand how to calculate (Whole number) ÷ (Whole number) = (Decimal number).

Prior Knowledge

- Division of whole number,
  (Decimal number) ÷ (Whole number)

Preparation

- Charts for activity 2.

Assessment

- Think about how to calculate a division which the divisor is larger than dividend. F
- Do the exercises correctly. S

• Teacher's Notes •

0 is added to the dividend to continue the division.

- 0 is identified as looking at next lowest decimal point as 0.
- E.g. 2.3 becomes 2.30 where 0 added is from the hundredths place making the number as 230 sets of 0.01

Place in additional 0 (for continuous division)

Dividing Continuously

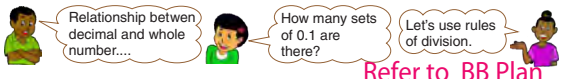
5 We divide a 7.3 m bilum wool equally among 5 children.
How many metres will each one receive?

7.3 ÷ 5

m	?	7.3
Children	1	5

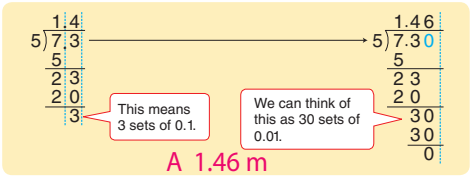
÷5 ÷5

① Let's think of some ways of finding the answer.



Refer to BB Plan

② Let's think about how to divide in vertical form.



A 1.46 m

Division that is continued until the remainder is 0 is called **"dividing continuously".**

6 Let's calculate 6 ÷ 8 in vertical form.


```
  0.75
8)6.0
  56
   40
 - 40
    0
```

Exercise

Let's divide continuously.

① 9.4 ÷ 4 = 2.35 ② 8.6 ÷ 5 = 1.72 ③ 7 ÷ 5 = 1.4 ④ 5 ÷ 8 = 0.625

Lesson Flow

1 Review the previous lesson.

2 5 Adding 0 to continue dividing.

S Read the problem and make a mathematical expression.
S ❶ Think of ways on how to calculate 7.3 ÷ 5.
TN Refer to black board plan for possible ways to calculate 7.3 ÷ 5.
T ❷ Think about how to calculate 7.3 ÷ 5 in vertical form.
T Explain that when you divide continuously, you have to add 0 to the dividend and bring it down to continue the calculation.

3 6 The meaning of 0 in ones place and continuous division.

S Think about how to calculate 6 ÷ 8 applying learned knowledge.
T Calculate 6 ÷ 8 as 6.0 ÷ 8, and write 0 in ones place of quotient.
T Add 0 to the dividend and bring it down for continuing calculation.

4 Summary

5 Do the exercise.

T Let students work on the priority exercises highlighted. The rest can be done for homework.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 3/3

MT Let's divide continuously in vertical form until the remainder is zero.

Changing units
7.3 *m* = 730*cm*
730 ÷ 5 = 146
146 *cm* = 1.46 *m*
Answer 1.46 *m*

The rule of division
7.3 ÷ 5 = 1.46
× 100 ↓ ↑ ÷ 100
730 ÷ 5 = 146
Answer 1.46 *m*

5 When we divide a 7.3 m bilum wool equally among 5children. How many meters will each child receive?

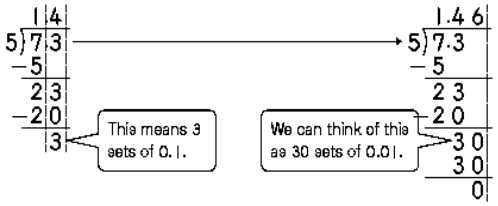
Math Expression 7.3 ÷ 5

❶ Let's think of ways on how we can solve 7.3 ÷ 5.

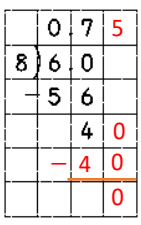
We can use the following methods:
- The idea of sets
- The rule of division
- Changing the unit from m to cm.

The idea of sets
There are 730 sets of 0.01 in 7.3
730 ÷ 5 = 146 sets of 0.01
146 sets of 0.01 = 1.46
Answer 1.46 m

❷ Let's think about how to divide 7.3 ÷ 5 in vertical form



6 Let's calculate 6 ÷ 8 in vertical form



Summary
- The zero added in continuous division is by using the sets idea.

e.g. 7.3 to tenths place becomes 7.30 which is to hundredths place.

Exercises
1,3 and 4

Exercise (1) - (4)

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 3. Division Problems
Lesson 1 of 2 (Double Period)

Textbook Page : p.178-p.179
Actual Lesson 109

Sub-unit Objectives

- To think about how to calculate division with remainder.
- To understand how to confirm the answer of division with remainder.
- To understand how to round the quotient.

Lesson Objectives

- To think about how to calculate division of decimal number with remainder.
- To think about how to calculate (Decimal number) ÷ (Whole number) in vertical form.

Prior Knowledge

- Division of decimal number (previous three lessons.)

Preparation

- Refer to the blackboard plan.

Assessment

- Think about how to calculate (Decimal number) ÷ (Whole number) with remainder. F
- Understand how to calculate (Decimal number) ÷ (Whole number) with remainder. S
- Do the exercises correctly. S

• Teacher's Notes •

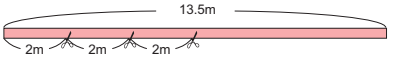
Be careful in explaining the meaning of the remainders. For example, in task 1 the remainder 15 is not exactly 15 as it is. It means 15 sets of 0.1 where it gives 1.5.

3 Division Problems

Meaning of reminder

Division with Remainders

1 There is a 13.5 m nylon. Shama makes grass skirts for singsing by using a 2 m nylon tape. How many grass skirts does she make and how many metres are left?



m	2	÷2	13.5	÷2
Grass skirts	1		?	

① Let's write a mathematical expression.

13.5 ÷ 2

② Let's think of ways on how to calculate.

Refer to BB Plan

③ The calculation is shown on the right.

```
   6.
2)13.5
  12
  15
```

What is the remainder in m?

Ⓐ '15' is 15 sets of what? 0.1

Ⓑ Where should we put the decimal point of the remainder?

Between 1and 5

Dividend = divisor × quotient + remainder

13.5 = 2 × 6 + 1.5

Answer: 1.5m

```
   6
2)13.5
  12
  1.5
```

Until which place value should we calculate?

In division of decimal numbers, the decimal point of the remainder is put at the same place as the original decimal point of the dividend.

178 = □ + □

Exercise

There is a 47.6 m of ribbon. If we cut it into 3 m each, how many 3 m ribbon are there and what is the remainder in m?

47.6 ÷ 3 = 15 r 2.6 Anwer: 15 ribbons

2 We divide a 2.3 L of juice equally among 6 children. How many litres does each one receive?

① Let's write a mathematical expression.

L	?	2.3
Children	1	6

(÷6 above and below)

② Let's think of ways on how to calculate.

③ On the right, we can divide continuously. How can we say the answer?

④ Round the quotient to the hundredths place and give the answer to the nearest tenths.

```
  0.383
6)2.3
  18
   50
   48
    20
    18
     2
```

When the dividend is not divisible by the divisor or when the number of places become too long, the quotient is rounded.

Exercise

1 Let's calculate. Round the quotient to the hundredths place and give the answer to the nearest tenths.

① 5.5 ÷ 8 ② 9.9 ÷ 7 ③ 67.8 ÷ 79 ④ 42.9 ÷ 14

2 Divide a 16.3 m tape equally into 3 sections. How many metres is one section? Round the quotient to the hundredths place and give the answer to the tenths place.

□ × □ = 179

Lesson Flow

1 ❶ The meaning of remainder in (decimal number) × (whole number).

S ❶ Read the problem and make a mathematical expression.
S ❷ Think of ways on how to calculate 13.5 ÷ 2.
TN Refer to blackboard plan on ways to calculate.
T Let students think about how to calculate 13.5 ÷ 2 in vertical form.
S ❸ Solve the problem using the learned knowledge.
T Explain that there is no need to continue calculation when a quotient goes to decimal place.
T Ⓐ 15 is 15 sets of what?
S 15 sets of 0.1.
T Ⓑ Confirm by writing the decimal point of remainder in the same place as in the dividend.
T What is the relationship among dividend, divisor, quotient and remainder?
S Quotient = Dividend × Divisor + remainder. i.e 13.5 = 2 × 6 + 1.5

2 Summarise how to calculate (Decimal number) ÷ (Whole number) in vertical form.

T Explain the important point ⬚.

3 Do the exercise.

T Let students solve the problem in class and solve it together.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 1/3

MT Let's divide continuously in vertical form until the remainder is zero.

❶ There is a 13.5 m nylon. Shama makes grass skirts for sing-sing by using 2 m nylon tape. How many grass skirts does she make, and how many meters are left?

❶ Math Expression 13.5 ÷ 2

❷ Let's think of ways on how to calculate 13.5 ÷ 2

We can use the following methods:
- Changing the unit from m to cm
- The rule of division.
- The rule for checking remainder

Changing units
13.5 m = 1350cm
2m = 200cm
1350 ÷ 200cm = 6
6×200=1200
1350-1200=150
150cm = 1.5m
Answer 6 grass skirts
1.5m nylon left

The rule of division
13.5 ÷ 2 = 6 r 1.5
× 10 ↓ ↑ ÷ 10
135 ÷ 2 = 60 15
Answer 6 grass skirts 1.5m nylon left

The idea of sets
Dividend = quotient × divisor + remainder
13.5 = 6 × 2 + ☐
☐ = 13. 5 - 12 = 15

❸ Let's calculate using vertical form

$$\begin{array}{r} 6.\\ 2\overline{)\,13.5}\\ \underline{12}\\ 15 \end{array}$$

Ⓐ 15 sets of 0.1
Ⓑ Same place as dividend

Important point
In division of decimal numbers, the decimal point of the remainder is put at the same place as the original decimal point of the dividend.

Summary box

Exercise
There is a 47.6 m of ribbon. Cut 3 m each.

47.6 ÷ 3 = 15 r 2.6
Answer: 15 ribbons

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 3. Division Problems
Lesson 2 of 2 (Double Period)

Textbook Page : p.179
Actual Lesson 110

Lesson Objectives

- To understand the reason why a quotient needs to be rounded.
- To master how to round a quotient.

Prior Knowledge

- Division of decimal number with remainder. (previous three lessons)

Preparation

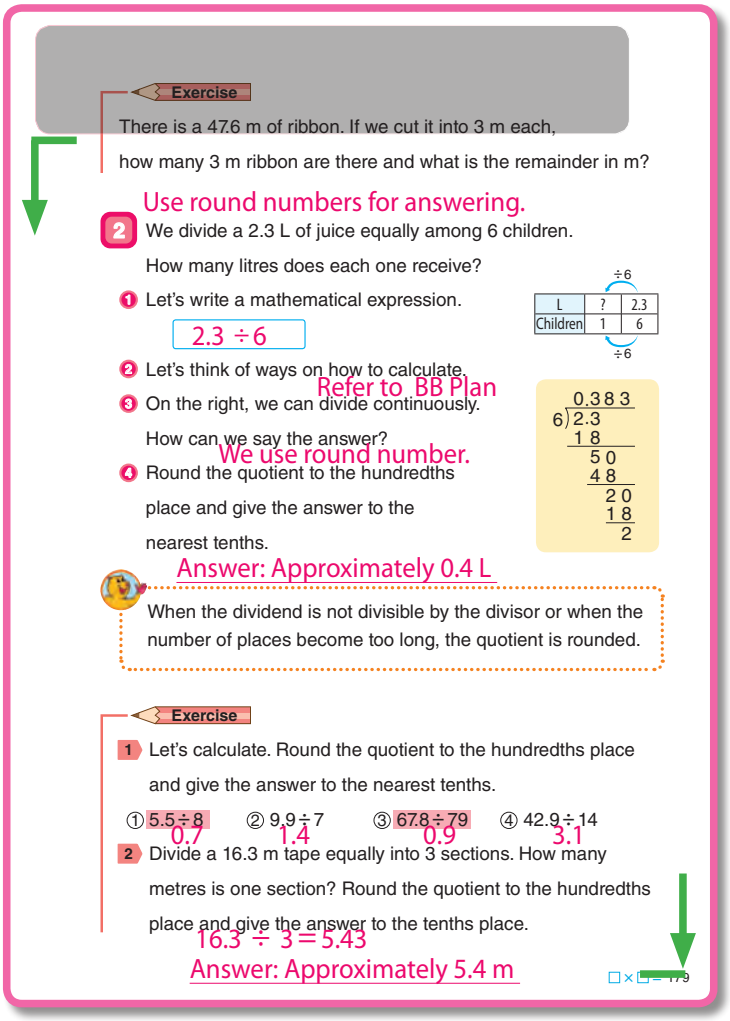
- A chart

Assessment

- Think about the reason why a quotient is rounded. F
- Understand how to round a quotient. F
- Do the exercise correctly. S

• Teacher's Notes •

When a calculation in division becomes too long, we can round the quotient. This normally occurs where we have continuous division.



Exercise

There is a 47.6 m of ribbon. If we cut it into 3 m each, how many 3 m ribbon are there and what is the remainder in m?

Use round numbers for answering.

2 We divide a 2.3 L of juice equally among 6 children.

How many litres does each one receive?

1 Let's write a mathematical expression.

2.3 ÷ 6

L	?	2.3
Children	1	6

(÷6 / ÷6)

2 Let's think of ways on how to calculate.

3 On the right, we can divide continuously. Refer to BB Plan

How can we say the answer? We use round number.

4 Round the quotient to the hundredths place and give the answer to the nearest tenths.

```
   0.3 8 3
6)2.3
  1 8
    5 0
    4 8
      2 0
      1 8
        2
```

Answer: Approximately 0.4 L

When the dividend is not divisible by the divisor or when the number of places become too long, the quotient is rounded.

Exercise

1 Let's calculate. Round the quotient to the hundredths place and give the answer to the nearest tenths.

① 5.5 ÷ 8 = 0.7 ② 9.9 ÷ 7 = 1.4 ③ 67.8 ÷ 79 = 0.9 ④ 42.9 ÷ 14 = 3.1

2 Divide a 16.3 m tape equally into 3 sections. How many metres is one section? Round the quotient to the hundredths place and give the answer to the tenths place.

16.3 ÷ 3 = 5.43

Answer: Approximately 5.4 m

□ × □ = 17.9

Lesson Flow

1 ❶ Use round numbers for answering (decimal number) × (whole number).

S ❶ Read the problem and make a mathematical expression.
S ❷ Think of ways on how to calculate 2.3 ÷ 6.
TN Refer to blackboard plan for possible ways.
T ❸ Ask students what can be done next by showing the calculation in the textbook.
S Calculation does not end so need to round the quotient. (continuous calculation)
S ❹ Round the quotient to the hundredth place and give the answer to the nearest tenths.
T Explain that there is no need to continue calculation when a quotient goes to decimal place.

2 Summary

T Explain the important point in the box .

3 Do the exercise.

T Let students work on the priority exercises highlighted. The rest can be for homework.

Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 1/3

MT Let's calculate decimal problems by rounding the quotient when the dividend is not divisible by the divisor.

Changing units
2.3 *L* = 2300 *mL*
2300 ÷ 6 = 383.3
383.3 *mL* = 0.383 *L*
Answer 0.383 L

The rule of division
2.3 ÷ 6 = 0.383
10 ↓ ↑10
23 ÷ 2 = 3.83
Answer 0.383 *L*

Summary
× When the dividend is not divisible by the divisor, or when the number of places become too long, the quotient is rounded.

Exercise 1 and 3

❷ We divide 2.3 L of juice equally among 6 children. How many liters does each one receive?

❶ Math Expression 2.3 ÷ 6

❷ Let's think of ways on how to calculate 2.3 ÷ 6.

We can use the following methods:
- The rule of division
- Changing the unit from m to cm.

❸ We can divide 2.3 ÷ 6 continuously.

```
  0.383
6)2.3
  18
  50
  48
  20
  18
   2
```

3 continues so we use round numbers.

❹ Round the quotient to the hundredths place, and give the answer to the nearest tenths.
Answer approximately 0.4 L

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: 4. What Kind of Expression?
Lesson 1 of 1 (Double Period)

Textbook Page : p.180
Actual Lesson111

Sub-unit Objectives

- To understand Multiplication and Division of Decimal number, make mathematical expressions and solve.

Lesson Objectives

- To solve problems by considering what kind of expression should be used.

Prior Knowledge

- Multiplication and division of decimal number. (Contents of this unit)

Preparation

- A chart of numberline and table can be used.

Assessment

- Show the situation in diagram, make math expression and solve. F
- Do exercise ③ correctly. S

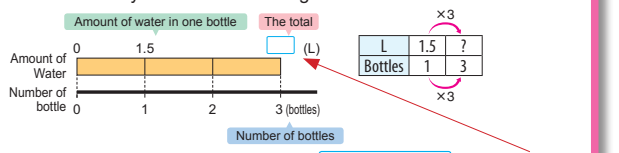
• Teacher's Notes •

- The tape diagram and the table will paly an important role in deciding what kind of expression should be used.
- Remind the students on how to use the tape diagram and table to write a mathematical expression.

(Decimal number) × (Whole number)

4 What Kind of Expression?

1 There are 3 bottles of water, each bottle contains 1.5 L of water. How many litres are there altogether?



❶ Let's write a mathematical expression. 1.5 × 3 Answer: 4.5 L

❷ Let's think of ways on how to calculate. Refer to BB Plan

❸ Let's think about how to divide in vertical form.

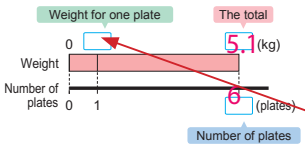
(Decimal number) ÷ (Whole number)

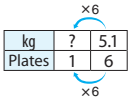
2 There are 6 plates with the same weight. The total weight is 5.1 kg. How many kg does each plate weigh?

❶ What is known? There are 6 plates. Total weight is 5.1 kg

❷ What do you want to know? Weight of each plate

❸ Write what is known in the diagram and find the answer.





❹ Let's write a mathematical expression. 5.1 ÷ 6

❺ Let's think of ways on how to calculate. Answer: 0.85 kg

❻ Let's think about how to divide in vertical form.

3 Divide a 9 m rope equally into 5 sections. How many metres is each section?

9 ÷ 5 = 1.8 Answer: 1.8 m

180 = □ + □

Lesson Flow

1 Review the previous lesson.

2 ① Solve problem.

T Explain the situation by using tape diagram and 4 tables.
T Confirm that 1 bottle is 1.5 L and there are 3 bottles in total.
S ① Students make mathematical expression. 1.5×3
S ② Think of ways on how to calculate 1.5×3.
T ③ Confirm the answer by calculating in vertical form.

3 ② Solve problem ②.

S Read the problem and understand the situation.
T ① What is known?
S There are 6 plates. Total weight is 5.1 kg.
T ② What do we want to know?
S Weight of each plate.
S ③ Fill the diagram and ④ make a mathematical expression. $5.1 \div 6$
S ⑤ Think of ways on how to calculate $5.1 \div 6$.
T ⑥ Confirm how to calculate $5.1 \div 6 = 0.85$ in vertical form step by step.

4 ③ Solve problem.

T Let students draw diagram and solve by themselves.
TN If it is difficult for students to draw diagrams on their own, teacher can draw on the blackboard and solve the problem together with the students.
T Confirm how to calculate $9 \div 5$ in vertical form and outlining the steps.

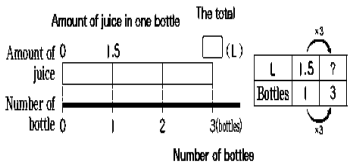
Sample Blackboard Plan

Date: **Chapter:** Multiplication and Division of Decimal Numbers **Topic:** Decimal Number x Whole Number **Lesson N°:** 1/3

MT

Let's think about how to multiply and divide decimal numbers with whole numbers using tape diagrams and tables.

1 There are 3 bottles of water, each bottle contains 1.5 L of water. How many liters are there altogether?



1 Using the above diagram, let's write a math expression.

1.5×3

2 Let's think of ways on how to calculate 1.5×3.

Changing units
$1.5\ L = 1500\ mL$
$1500 \times 3 = 4500\ ml$
$4500\ mL = 4.5\ L$
Answer 4.5 L

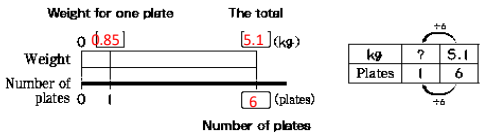
The rule of division
$1.5 \div 3 = 0.5$ ×
10 ↓ ↑ 10
$15 \div 3 = 5$
Answer 0.383 L

3 Let's think about how to divide in vertical form.

$$\begin{array}{r} 1.5 \\ \times\ 3 \\ \hline 4.5 \end{array}$$

2 There are 6 plates with the same weight. The total weight is 5.1 kg. How many kg does each plate weigh?

1 What is known? 6 plates weigh 1.5 kg
2 What is unknown? Weight of each plate
3 Fill in the blanks in the diagram



4 Math Expression $5.1 \div 6$

5 Let students solve using the methods described in task **1** activity **2**.

6 Let's think about how to divide in vertical form.

$$\begin{array}{r} 0.85 \\ 6\overline{)\ } \\ -48 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

3 Divide a 9 m rope equally into 5 sections, how many meters is each section?

$$\begin{array}{r} 1.8 \\ 5\overline{)\ 9\ } \\ -5 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

Unit 16

Unit: Multiplication and Division of Decimal Numbers
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.181~p.182
Actual Lesson 112

Lesson Objectives

- To deepen understanding what they have learned in this unit.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheets for the students

Assessment

- Solve the exercises correclty. F S

• Teacher's Notes •

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

Exercises

1 Let's calculate in vertical form. Pages 170 ~ 173, 174 ~ 177

① 5.3×7 = 37.1　② 9.2×49 = 450.8　③ 70.5×73 = 5146.5

④ 6.52×4 = 26.08　⑤ 0.26×8 = 2.08　⑥ 0.46×5 = 2.3

⑦ 6.5÷5 = 1.3　⑧ 12.6÷7 = 1.8　⑨ 8.1÷9 = 0.9

⑩ 49.4÷19 = 2.6　⑪ 65.61÷27 = 2.43　⑫ 15.36÷32 = 0.48

2 Let's calculate. Round the quotient to the hundredths place and give the answer to the tenths. Page 179

① 2.63÷3 = 0.9　② 40.4÷6 = 6.7　③ 30.42÷14 = 2.2　④ 5.6÷39 = 0.1

3 There is a rectangular flowerbed with an area of 17.1 m^2. The length is 3 m. Let's find the width of this flowerbed. Page 178

17.1÷3=5.7　Answer: 5.7 m

4 There is 9 L of rice that weighs 8 kg. How many kg does 1 L of this rice weigh? Round the quotient to the hundredths place and give the answer to the tenths. Page 179

8÷9=0.88　Answer: Approximately 0.9 m

5 There are 25 books. Each book weighs 14 g. How many kg are there altogether? Page 180

14 g=0.14 kg　25 x 0.14=3.5　Answer: 3.5 kg

Let's draw the following parallelogram and rhombus. Grade 4 Do you remember?

① 4cm, 3cm, 120°

② 5cm, 3cm

Problems

1 Let's summarise the multiplication and the division of decimal numbers.
● Understanding how to calculate multiplication and division of decimal numbers.

① Since 2.7×5 represents 27×5=135 as the unit of 0.1, the answer 2.7×5 is 13.5.

② Since 6.48÷9 represents 648÷9=72 as the unit of 0.01, the answer 6.48÷9 is 0.72.

③ Since 13 in Ⓐ means 13 sets of 0.1 shown on the right, 9.3÷4=2 remainder 1.3.

$4\overline{)9.3}$ → 2. → 8 → 13 ← Ⓐ

2 Let's calculate in vertical form.
● Calculating multiplication and division of decimal numbers in vertical form.

① 2.4×3 = 7.2　② 2.8×12 = 33.6　③ 0.12×5 = 0.6

④ 7.2÷4 = 1.8　⑤ 41.6÷26 = 1.6　⑥ 3.78÷6 = 0.63

3 There is a book with a length of 14.8 cm and width of 21 cm. What is the area of this book's cover in cm^2?
● Understanding the situation of division problem.

14.8 × 21=310. 8 A. 310.8 cm^2

4 Divide 36.5 cm of wool equally into 5 sections. How long in metres is each section?
● Understanding the situation of division problem.

36.5÷5=7.3　A. 7.3 m

5 Sophie and Alfie divided the area into two areas shown on the right. When the two areas are the same, fill in the □ with a number.
● Understanding the situation and answer.

□ m, 8 m, Sophie, Alfie, 9.5 m, 12 m

All areas 9.5×12=114
1 person's area 114÷2=57
57 ÷8 =7.125 A. 7.125 m

□×□= 181　182 =□+□

Lesson Flow

1 **① (Decimal number × (Decimal number) and (Decimal number) ÷ (Decimal number) in vertical form.**

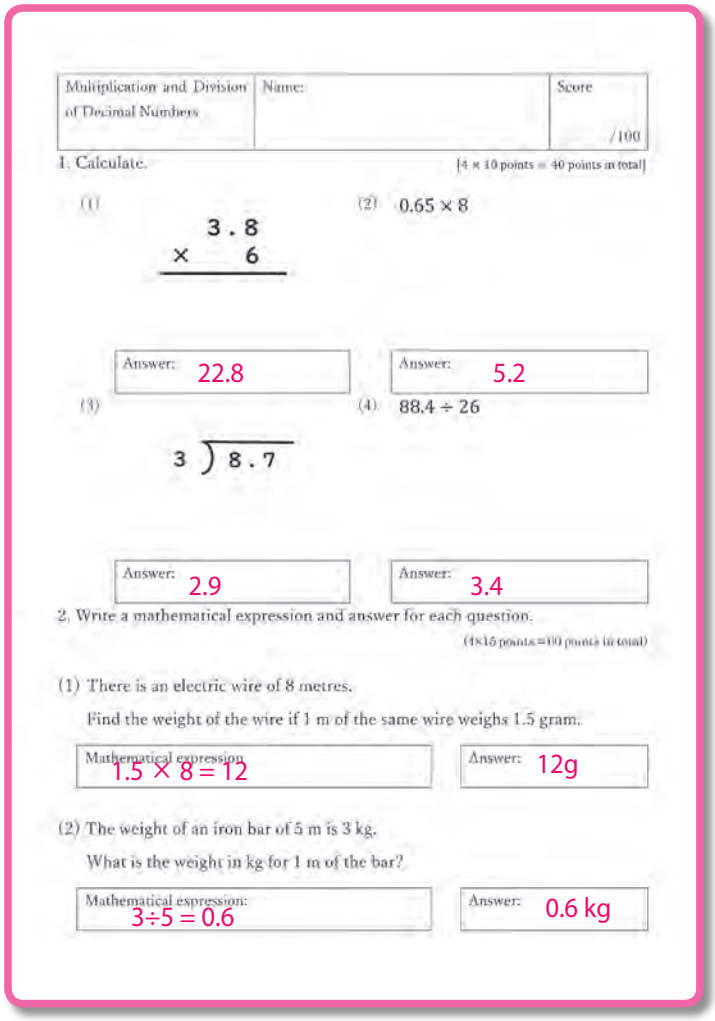
TN ①-③ (Decimal number up to tenth place) × (Whole number)
④-⑥ (Decimal number up t hundredth place) × (Whole number)
⑦-⑨ (Decimal number up to tenth place) ÷ (Whole number)
⑩-⑫ (Decimal number up to hundredth place) ÷ (Whole number)

T Confirm how to calculate step by step especially how to place decimal point in the answer.

2 **② Round the quotient to the nearest hundredths place and give the answer to the nearest tenths place.**

3 **③ Find the side of the rectangle by using formula of the area of a rectangle.**

T Confirm that (Length) × (Width) = (Area), and find the side by inserting numbers in the formula.



Multiplication and Division of Decimal Numbers | Name: | Score /100

1. Calculate. [4 × 10 points = 40 points in total]

(1) 3.8 × 6 Answer: 22.8

(2) 0.65 × 8 Answer: 5.2

(3) 3) 8.7 Answer: 2.9

(4) 88.4 ÷ 26 Answer: 3.4

2. Write a mathematical expression and answer for each question. (4×15 points=60 points in total)

(1) There is an electric wire of 8 metres.
Find the weight of the wire if 1 m of the same wire weighs 1.5 gram.
Mathematical expression: 1.5 × 8 = 12 Answer: 12g

(2) The weight of an iron bar of 5 m is 3 kg.
What is the weight in kg for 1 m of the bar?
Mathematical expression: 3÷5 = 0.6 Answer: 0.6 kg

4 **④ (Whole number) × (Whole number) = (Decimal number), and dividing continuously.**

S Divide continuously up to hundredth place and give the answer to tenth place by rounding the quotient.

5 **⑤ Multiplication of decimal number by whole number.**

6 **Solve "Do you remember".**

7 **① How to calculate (Decimal number) × (Whole number) and (Decimal number) ÷ (Whole number).**

TN ① (Decimal number up to tenth place) × (Whole number) based on the unit of 0.1
② (Decimal number) ÷ (Whole number) based on the unit of 0.001
③ Decimal point of remainder

8 **② Multiplication and division in vertical form.**

TN ① (Decimal number up to tenth place) × (1-digit whole number)
② (Decimal number up to tenth place) × (2-digit whole number)
③ (Decimal number up to hundredth place) × (1-digit whole number)
④ (Decimal number up to tenth place) ÷ (1-digit whole number)
⑤ (Decimal number up to tenth place) ÷ (2-digit whole number)
⑥ (Decimal number up to hundredth place) ÷ (1-digit whole number)

9 **③ Find the area of rectangle.**

S Find the area of rectangle by using the formula.

10 **④ Quotative division and partitive division.**

S Recognise that there are two meaning even the math expressions are same.

11 **⑤ Solve the problem.**

S 1. Find the area of whole rectangle and divide by half to find the area of each.
$9.5 \times 12 = 114$, $114 \div 2 = 57$
2. Apply the formula of area to find the width of Sophie's shape.
$8 \times \square = 57$, $57 \div 8 = 7.125$
Answer: 7.125 m

End of Chapter Test: Chapter 16 **Date:**

Multiplication and Division of Decimal Numbers	Name:	Score /100

1. Calculate. [4 × 10 points = 40 points in total]

(1)

$$\begin{array}{r} 3.8 \\ \times \quad 6 \\ \hline \end{array}$$

Answer:

(2) 0.65×8

Answer:

(3) $3 \overline{)\,8.7}$

Answer:

(4) $88.4 \div 26$

Answer:

2. Write a mathematical expression and answer for each question.

(4×15 points = 60 points in total)

(1) There is an electric wire of 8 metres.

Find the weight of the wire if 1 m of the same wire weighs 1.5 gram.

Mathematical expression	Answer:

(2) The weight of an iron bar of 5 m is 3 kg.

What is the weight in kg for 1 m of the bar?

Mathematical expression:	Answer:

Chapter 17 Fractions

1. Unit Objectives

- To deepen their understanding of various fraction and their representations based on unit fractions.
- To understand fractions larger than 1 and equivalent fractions concept. (4.1.9 a, b)
- To add and subtract fractions having same denominators. (4.1.9 c, d)

2. Teaching Overview

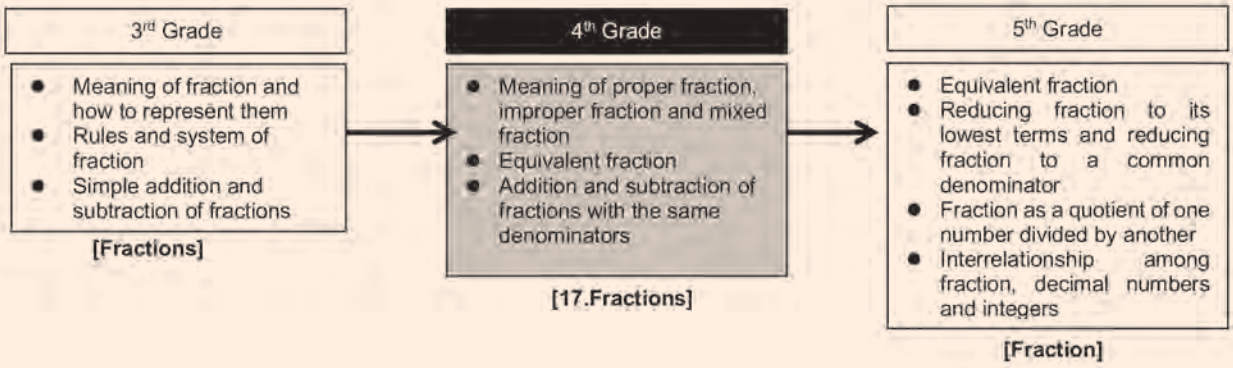
In Grade 3, students learn simple fractions and their addition and subtraction. In this unit, students learn fractions greater than 1, fractions as numbers on the same number system of whole numbers and addition and subtraction of various fractions.

Fractions Larger than 1: Students learn how to express the amount of water which is more than one bottle in improper and mixed fractions. The visualisation will help them to understand both ways of expressions are for the same amount. It is also important for students to express the fractions by the number of unit fractions.

Equivalent Fractions : The diagram with number lines will help students understand the relationship among equivalent fractions and relative size of the number to whole numbers.

Addition and Subtraction of Fractions : Teachers should avoid to impart that they should add/subtract numerators only in addition or subtraction of fractions with the same denominator. Firstly, they should think based on a concrete example. They can think each fraction in the calculation as the number of unit fractions and calculate the number of them. If they think like this, they would not have any problem even though the fractions in the calculation are mixed with improper, mixed fractions or whole numbers.

3. Related Learning Contents



Unit 17

Unit: Fractions
Sub-unit: 1. Fractions Larger than 1
Lesson 1 of 3 (Double Period)

Textbook Page : p.183~184
Actual Lesson 113

Sub-unit Objectives

- To think of ways on how to express fractions larger than 1 based on prior knowledge.

Lesson Objectives

- To recognise the given situation and think about how to express fractions larger than 1.

Prior Knowledge

- Fractions representing sizes less than 1 through understanding denominator and numerator.
- The structure of fractions by understanding the unit fraction.
- Addition and subtraction of fractions with the same denominator using number line and 1 L diagram representations.

Preparation

- Thermos, 2×1 L containers, 8×1 L diagrams (coloured for fractional parts).

Assessment

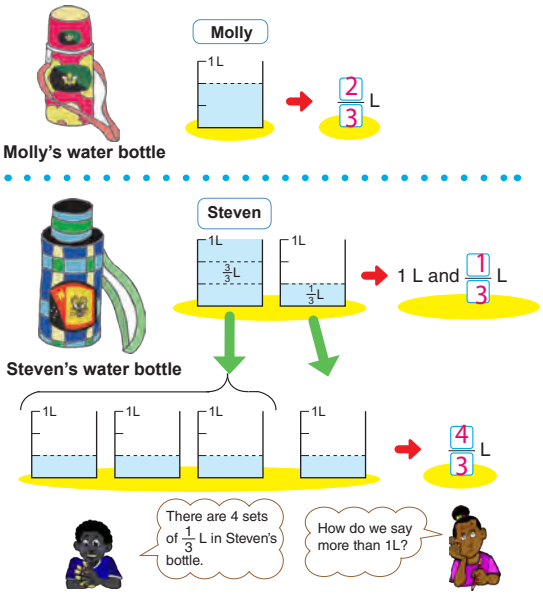
- Using ideas of unit fractions. F
- Understand and express mixed fractions, improper fractions and fractions greater than 1. S
- Have the ability to draw fractions greater than 1 in diagram. S

• Teacher's Notes •

- Misconceptions of content: Students should clearly understand that $\frac{3}{3}$ L is equivalent to 1. The fractional parts must be equal to avoid misconception.
- Background/improvise materials: Clearly drawn 1 L representation using charts.
- Stress on prior knowledge about fractions.

17 Fractions

What are the amounts of water in Molly's bottle and Steven's bottle in litres, respectively?



Let's think about how to represent fractions larger than 1 and how to calculate.

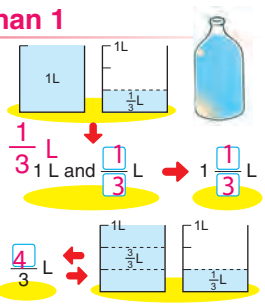
How to express and read mixed fractions and improper fractions.

1 Fractions Larger than 1

1 What is the amount of water in Steven's bottle in litres?

1 1 L and how many litres more?

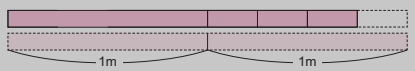
2 By looking at the figure on the right, how many $\frac{1}{3}$ L can we say?



The sum of 1 L and $\frac{1}{3}$ L is written as $1\frac{1}{3}$ L and is read as **"one and one third litres"**.
It is also written as $\frac{4}{3}$ L and read as **"four third litres" or "four over three litres"**.

$1\frac{1}{3} = \frac{4}{3}$

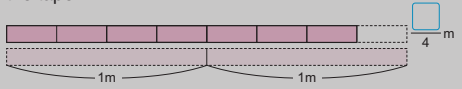
2 How many metres is the length of the tape below?



1 1 m and how many metres more?

1 m and $\square$ m → 1 $\square$ m

2 By looking at the figure below, how many $\frac{1}{4}$ m are there in the tape?



$\square \div \square =$ 183　　184 $= \square \times \square$

Lesson Flow

1 Review

T Identify and interpret the diagrams represented by the fractions that are displayed in front of you.
1. $\frac{3}{5}$ 2. $\frac{1}{2}$ 3. 1 Whole 4. $\frac{2}{3}$

S Draw their own interpretations of the fractions mentioned above and explain their diagrams.

2 Read and understand the given situation and constructively represent the description given.

T Show the amount of water in Molly's container and Steven's container in a diagram on the blackboard or have a container to represent $\frac{2}{3}$ L of water.
Molly – $\frac{2}{3}$ L
Steven – 1 L and $\frac{1}{3}$ L

S Read the display/diagram and recall their previous knowledge to think about the representation.

T Ask the students to identify and call out the representation of the diagram and explain why?

S Using their previous knowledge, they could say that the representation for Molly's container is $\frac{2}{3}$ L and it is made of 2 sets of $\frac{1}{3}$ L.
However, Steven's container is 1L and $\frac{1}{3}$ L and it is made of 4 sets of $\frac{1}{3}$ L which is $\frac{4}{3}$ L.

T Show a $\frac{3}{3}$ L diagram on the board.

S Read the display and identify that the representation of $\frac{3}{3}$ L is equivalent to 1 L.

S Express the idea of unit fraction and identify that $\frac{3}{3}$ L is made of 3 parts of $\frac{1}{3}$ L.

3 ❶ Think about how to express and represent fractions larger than 1 and calculate.

T Introduce the main task.

T ❶ ❷ Shows/displays the $\frac{1}{3}$ L and 1 L diagram together on the blackboard and ask students to think about how to express both as one fraction.

S Students share their ideas.
Steven: The amount of water is 1 L and a remaining part. The remaining part is $\frac{1}{3}$ so we say 1 and $\frac{1}{3}$ L. The amount of water which is 1 L is $\frac{3}{3}$ L. There are 4 of $\frac{1}{3}$ L so the amount of water is $\frac{4}{3}$ L

4 Summarise the lesson.

T Explain important point in the box .

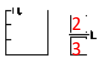
Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Fractions Larger Than 1. **Lesson N°:** 1/3

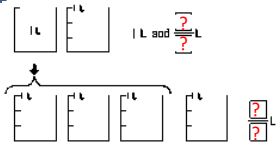
MT Let's think about how to represent fractions larger than 1.

What are the amounts of water in Molly's bottle and Steven's bottle in liters respectively?

Molly



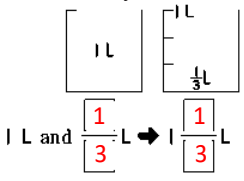
Steven



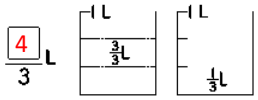
There are 4 sets of $\frac{1}{3}$ L in Steven's bottle
How can we say more than 1 L?

❶ What is the amount of water in Steven's bottle in liters?

❶ 1 L and how many liters more?



❷ By looking at the figure on the right, how many $\frac{1}{3}$ L can we say?



Important Point

The sum of 1 L and L is written as L and is read as **"one and one third liters"**
It is also written as L and is read as **"four thirds liters"** or **"four over three liters"**.

Unit 17

Unit: Fractions
Sub-unit: 1. Fractions Larger than 1
Lesson 2 of 3 (Double Period)

Textbook Page : p.184~p.185
Actual Lesson 114

Lesson Objectives

- To identify proper fraction, improper fraction and a mixed fraction.
- To express fraction which is more than one by using improper fraction and a mixed fraction.

Prior Knowledge

- Fractions Larger than 1 (previous lesson)
- How to express and read mixed fractions and improper fractions.

Preparation

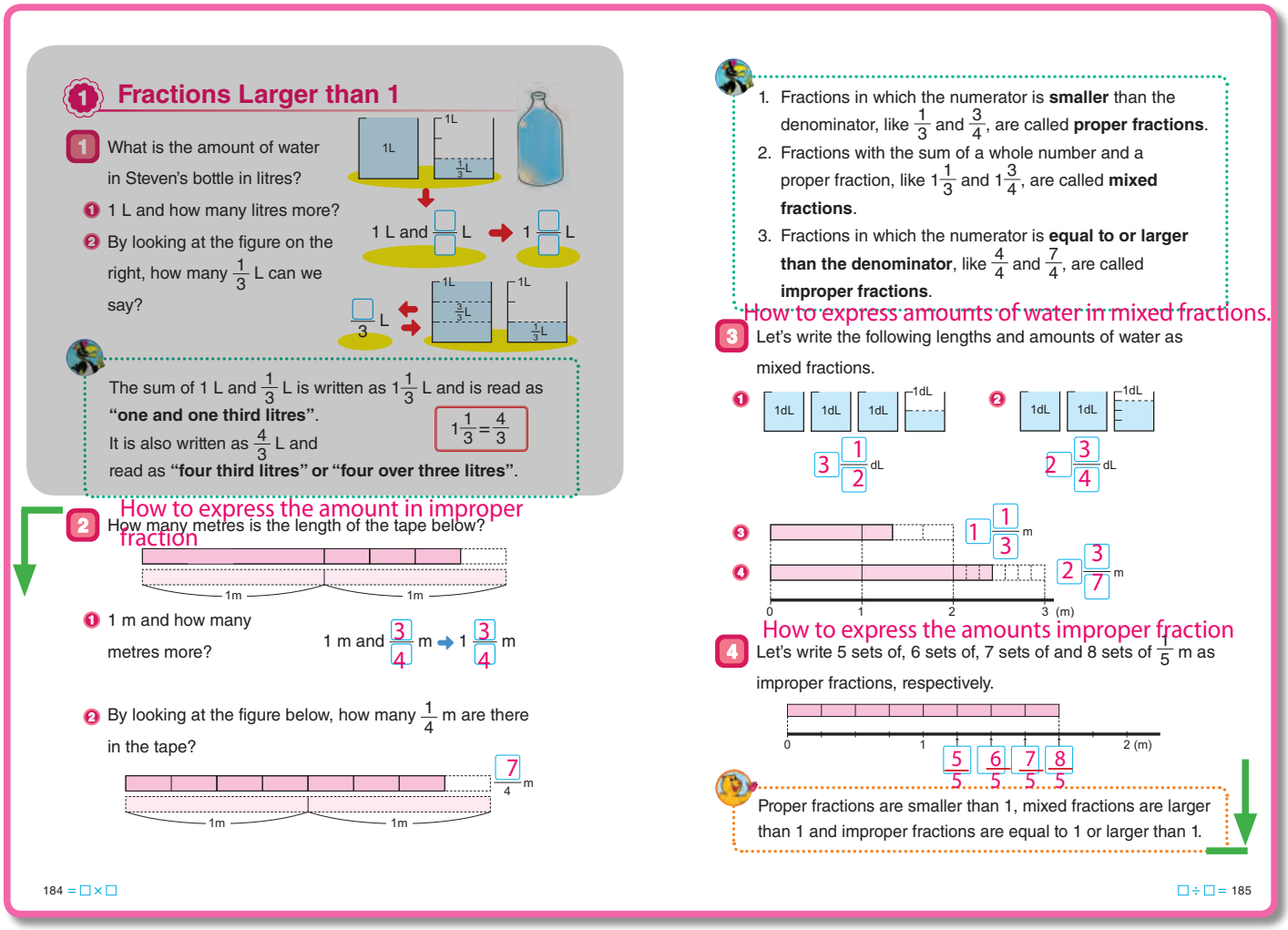
- Coloured paper strips, coloured chalks, ruler, white/black board, markers.

Assessment

- Identify proper fraction, improper fraction and a mixed fraction and their meaning. F
- Do task 3 and 4 correctly confirming the term and meaning of improper fraction and mixed fraction. S

• Teacher's Notes •

- Misconceptions of content
- Mixed fractions are bigger than improper fractions in fact they are the same.
- Whole number is not a fraction.



Lesson Flow

1 Review previous lesson.

T Show fractions using objects. 1) $\frac{2}{2}$ 2) $\frac{4}{5}$ 3) 1and $\frac{1}{4}$

S Read the objects and call out the fraction numerically.

2 ❷ Express the lengths larger than 1.

T Introduce the main task.

TN The number line allows students to recall their work from yesterday and apply the knowledge to solve the problem situation.

S Express the lengths larger than 1.

❶ 1 m and $\frac{3}{4}$ m $1\frac{3}{4}$ m

❷ $\frac{7}{4}$ m

3 Explain the important point in the box .

4 Think about how to express fractions as mixed fractions and improper fractions .

T ❸ Explain the exercise and remind students that same as the one done previously.

S Read and understand the given situation and answer in groups of 3 or 4.

T ❹ Using the number line interprete carefully the next exercises to show the questions on how to write sets of $\frac{1}{5}$ as improper fractions, respectively.

S Show and explain their answers on the blackboard.

T Confirm with the students the right answers.

5 Summary

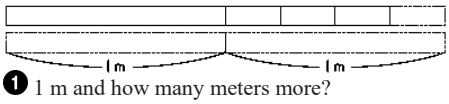
S Explain the important point in the box .

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Fractions Larger Than 1. **Lesson N°:** 2/3

MT Let's think about how to express the lengths and volume in fraction which are larger than 1.

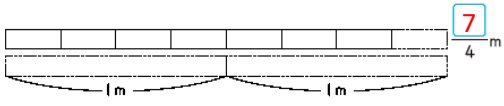
❷ How many meters is the length of the tape below?



❶ 1 m and how many meters more?

1 m and $\frac{3}{4}$ m ➡ 1 $\frac{3}{4}$ m

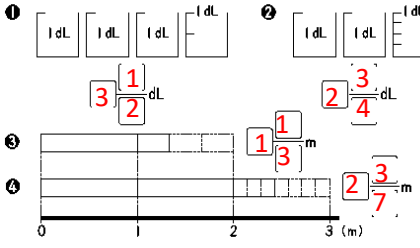
❷ By looking at the figure below, how many $\frac{1}{4}$ m are there in the tape?



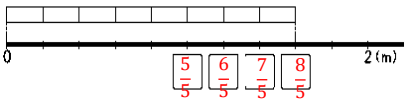
There are 7 of $\frac{1}{4}$ m tapes.

1. Fractions in which the numerator is smaller than the denominator, like and , are called **proper fractions**.
2. Fractions that are sum of a whole number and a proper fraction, like and are called **mixed fractions**.
3. Fractions in which the numerator is equal to or larger than the denominator, like and , are called **improper fractions**.

❸ Let's write the following lengths and amounts of water as mixed fractions



❹ Let's write 5, 6, 7 and 8 sets of $\frac{1}{5}$ m as improper fractions, respectively.



Important Point

- Proper fractions are smaller than 1m
- Mixed fractions are larger than 1
- Improper fractions are equal to or larger than1.

Unit 17

Unit: Fractions
Sub-unit: 1. Fractions Larger than 1
Lesson 3 of 3 (Double Period)

Textbook Page : p.186
Actual Lesson 115

Lesson Objectives

- To think of ways of changing mixed fractions to improper fractions and vice-versa, and change improper fractions to mixed fractions or whole numbers, and vice-versa.
- To understand the relationship between mixed fractions and improper fractions.
- Count sets of units.

Prior Knowledge

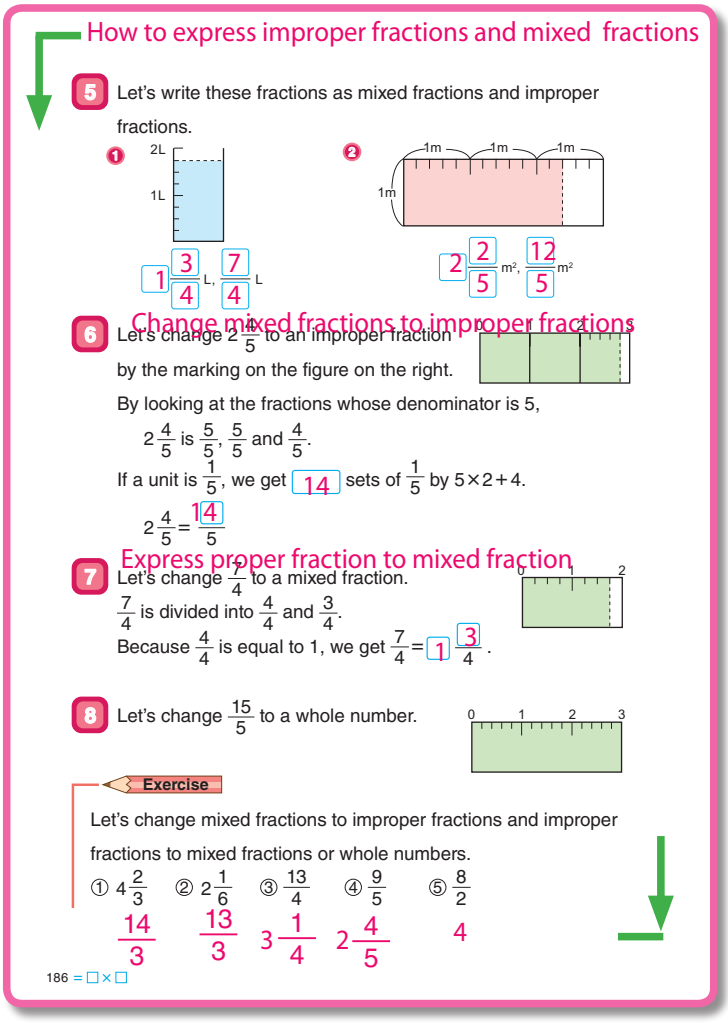
- How to express the lengths larger than 1.
- Definition of proper fraction, mixed fraction and improper fraction.
- How to express amounts of water in mixed fractions using containers and tape diagram.
- How to express the amount in improper fraction using tape diagram.

Preparation

- Colour paper strips, colour chalk, ruler, white/ blackboard, markers charts.

Assessment

- Change mixed fractions to improper fractions, and improper fractions to mixed fractions or whole numbers. F
- Think and explain the conversion steps of mixed and improper fractions using the idea of unit fractions. F
- Understand the meaning of proper, mixed and improper fractions and the relationships between mixed fractions and improper fractions. S
- Do the exercises correctly at the end of the lesson. S



• Teacher's Notes •

Misconceptions of content : Example:

*Change mixed fraction to improper fraction:

$1\frac{3}{2}=3$ which is wrong. Correct is $\frac{5}{3}$.

*Change improper fraction to mixed fraction:

$=3\frac{3}{2}$ sets of $\frac{3}{2}$

$=3\frac{3}{2}$ which is wrong. Correct is $4\frac{1}{2}$

Lesson Flow

1 Review previous lesson.

T Ask students to define and give examples of proper, improper or mixed fractions using their prior knowledge.

S Define and give examples of proper, improper and mixed fractions.

2 Think about how to express and change improper fraction to mixed fraction and vice- versa.

T Introduce the main task.

S 5 Using the situations from the two problems on a chart to help students visualise the diagram to explain how to express improper fractions and mixed fractions.

S Solve 6 - 8.

S Read the questions and think of a way to get the correct answers individually or in groups.

TN Allow students to show and explain their answers on the board and then confirm with the students the correct procedures and answers.

3 Do the exercise.

S Do the exercise and give a summary of the lesson with the teachers support.

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Fractions Larger Than 1. **Lesson N°:** 3/3

MT Let's express improper fractions as mixed fractions or vise versa.

5 Let's write these fractions as mixed fractions and improper fractions.

❶ 2 L, 1 L → 1 3/4 L, 7/4 L

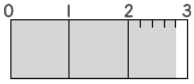
❷ 3 m, 1 m → 2 2/5 m², 12/5 m²

6 Let's change $2\frac{4}{5}$ to an improper fraction.

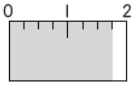
$2\frac{4}{5}$ is $\frac{5}{5}$, $\frac{5}{5}$ and $\frac{4}{5}$

If a unit is $\frac{1}{5}$, we get 14 sets of $\frac{1}{5}$ by $5 \times 2 + 4$.

Answer: $2\frac{4}{5} = \frac{14}{5}$



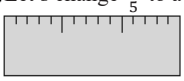
7 Let's change $\frac{7}{4}$ to a mixed fraction.



$\frac{7}{4}$ is divided into $\frac{4}{4}$ and $\frac{3}{4}$.

Because $\frac{4}{4}$ is equal to 1, we get $\frac{7}{4} = 1\frac{3}{4}$.

8 Let's change $\frac{15}{5}$ to a whole number.



15 sets of $\frac{1}{5}$ gives us 3 sets of $\frac{5}{5}$.

Because $\frac{5}{5}$ is equal to 1, we have 3 sets of 1

3 sets of 1 is equal to 3.

Exercise

Let's change mixed fractions to improper fractions, improper fractions to mixed fractions or whole numbers.

① $4\frac{2}{3}$ → $\frac{14}{3}$ ② $2\frac{1}{6}$ → $\frac{13}{6}$ ③ $\frac{13}{4}$ → $3\frac{1}{4}$ ④ $\frac{9}{5}$ → $1\frac{4}{5}$ ⑤ $\frac{8}{2}$ → 4

Unit 17

Unit: Fractions
Sub-unit: 2. Equivalent Fractions
Lesson 1 of 2 (Single Period)

Textbook Page : p.187
Actual Lesson 116

Sub-unit Objectives

- To understand that there are fractions that are equivalent in size but have different denominators and numerators.
- To think about the ways in how to express equivalent fractions based on prior knowledge.

Lesson Objectives

- To use a fraction wall to understand that there are equivalent fractions having different denominators and numerators.
- To compare sizes of fractions.

Prior Knowledge

- Using tape diagram and a container to express improper fractions and mixed fractions.
- Change mixed fraction to improper fraction.
- Express proper fraction to mixed fraction.
- Meaning and size of unit fractions

Preparation

- Teacher: $\frac{1}{2}$ m, $\frac{2}{4}$ m, 4.8 m, and 1 m tape diagrams, fraction wall diagram.
- Students: 1 m paper tape (3 pieces)

Assessment

- Identify fractions that are equal in size but have different denominators and numerators. F
- Understand that there are fractions that are equal in size but have different denominators and numerators. S
- Identify the relationship between the numerator and denominator of fractions that are equal in size. S

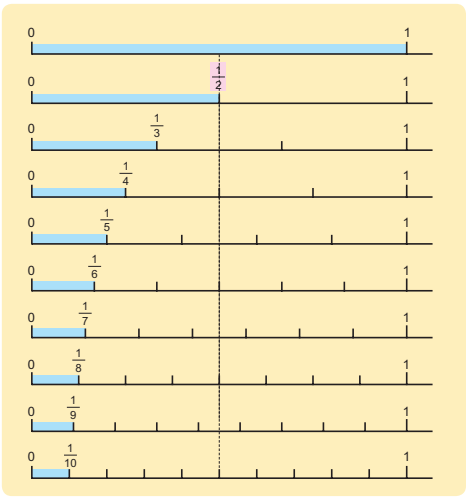
• Teacher's Notes •

Misconceptions of content: Misidentification of fractions with large denominator on the number line. (Example $\frac{8}{9}$ is not less to $\frac{9}{10}$)

To understand the size of unit fractions.

2 Equivalent Fractions

1 Let's investigate the following by using this fraction wall.



1 Let's read out the following fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, $\frac{1}{9}$ and $\frac{1}{10}$ from smallest to largest. $\frac{1}{10}, \frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}$

2 Let's replace the numerators in 1 with 2 and read them again from the smallest to the largest.

When the numerator is the same and the denominators become larger, the fraction becomes smaller.

$\frac{2}{10}, \frac{2}{9}, \frac{2}{8}, \frac{2}{7}, \frac{2}{6}, \frac{2}{5}, \frac{2}{4}, \frac{2}{3}, \frac{2}{2}$

□ ÷ □ = 187

Lesson Flow

1 ❶ Discuss freely about the fraction wall.

T Introduce the main task.
T Look at this diagram of fraction wall. What do you notice? (Show a chart of Fraction wall.)
S Lines are divided into increasingly smaller scales.
S Size of space on a given fraction wall becomes smaller as the value decreases.
S But the difference gradually decreases as well.
S Some fractions are in the same place.

2 ❶ Read and understand the size of unit fractions.

T Remind students to investigate the sizes of unit of fractions using the Fraction Wall.
S Discuss in groups of 2 or 3 and use the number line to understand the relation between the sizes of the unit fraction.
S $\frac{1}{2}$ has a bigger size than $\frac{1}{5}$ or $\frac{2}{10}$ just by looking at the size of the shape or colour .

3 Investigate using fraction wall the relationships between the numerator and denominator of fractions that are equal in size.

T Assist students to read out with accuracy and identify the relationships of sizes of each unit fraction from the smallest to the largest.
S Identify together each fraction size and read from the smallest to the largest.
$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}$ and $\frac{1}{10}$.

4 ❷ Replace the numerators with 2.

T Replace the numerators in the above exercise with 2 and read them again from the smallest to largest.

5 Summarise the lesson.

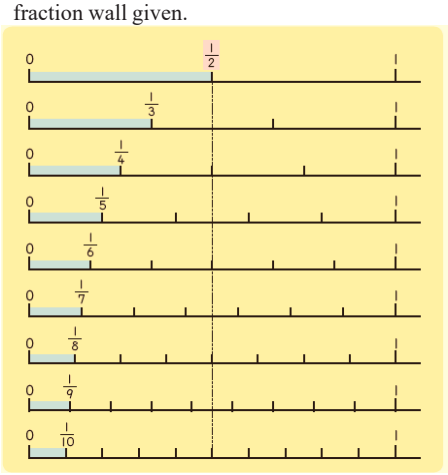
S Give a summary of the lesson with the teachers support.
S Fractions become smaller when their denominators become bigger.

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Equivalent Fractions **Lesson Nº:** 1/2

MT Let's investigate the size of unit fraction using the fraction wall.

❶ Let's investigate the following by using the fraction wall given.



❶ Let's read out the following fractions $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}$, and $\frac{1}{10}$ from smallest to largest.

$\frac{1}{10}, \frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{1}{1}$

❷ Let's replace the numerators in ❶ with 2 and read them again from smallest to largest.

$\frac{2}{10}, \frac{2}{9}, \frac{2}{8}, \frac{2}{7}, \frac{2}{6}, \frac{2}{5}, \frac{2}{4}, \frac{2}{3}, \frac{2}{2}, \frac{2}{1}$

Summary
When the numerator is the same, and the denominator becomes larger, its fraction becomes smaller.

Unit 17

Unit: Fractions
Sub-unit: 2. Equivalent Fractions
Lesson 2 of 2 (Single Period)

Textbook Page : p.188
Actual Lesson 117

Lesson Objectives

- To recognise the given fraction and think about how to find its equivalent fractions using a fraction wall.

Prior Knowledge

- Equivalent fractions
- Understanding of the size of unit fractions. (Previous lesson)

Preparation

- Enlarged fraction wall showing unit fractions, $\frac{1}{2}$ ..... $\frac{1}{10}$ (Fraction Board/Wall).

Assessment

- Write equivalent fractions of a given fraction. F
- Explore and find equivalent fractions. F
- Use fraction wall to find equivalent fractions of a given fraction. F
- Do the exercise correctly. S

• Teacher's Notes •

Students should clearly understand why some fractions have the same size even if their numerators and denominators are different.

❸ Let's look at the number line on the previous page, write the fractions that are equal to the following fractions.

Ⓐ $\frac{1}{2}=\frac{2}{4}=\frac{3}{6}=\frac{4}{8}=\frac{5}{10}$

Ⓑ $\frac{1}{3}=\frac{2}{6}=\frac{3}{9}$

Ⓒ $\frac{3}{4}=\frac{6}{8}=\frac{9}{12}$

❹ Let's look at the number line and find other fractions that are equal to the fractions in ❸. $\frac{2}{3}=\frac{4}{6}=\frac{6}{9}$, $\frac{1}{4}=\frac{2}{8}$, $\frac{1}{5}=\frac{2}{10}$

❺ Let's talk about what you have learned and summarise the results.

In fractions;

① When the denominators are the same, they become larger as the numerator increases. $\frac{1}{4}<\frac{2}{4}<\frac{3}{4}$

② When the numerators are the same, they become smaller as the denominator increases. $\frac{4}{2}>\frac{4}{4}>\frac{4}{8}$

③ Some fractions have the same size even if both their denominators and numerators are different.

Exercise

Which is larger? Let's fill in the ☐ with equal or inequality signs.

① $\frac{3}{5}$ [>] $\frac{3}{8}$ ② $\frac{3}{7}$ [<] $\frac{5}{7}$ ③ $\frac{1}{2}$ [=] $\frac{4}{8}$

188 = □ × □

Lesson Flow

1 Review the previous lesson.

T Displays the fraction wall with $\frac{1}{2}$ to $\frac{1}{10}$ on the blackboard.

S Read the display and recall their previous knowledge to think about the representation.

T Allow students to read from the smallest to the largest fraction and explain why?

S Read from the smallest to the largest fraction $\frac{1}{10}$ to $\frac{1}{2}$ and explain the reason.

2 ③ Think about how to find fractions that are equal to $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{3}{4}$ using the fraction wall.

T Introduce the main task.

S Use the previous knowledge and fraction wall to think about the fractions equivalent to $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{3}{4}$.

T Supervise and check student's ideas and discussions.

3 ④ Look for other fractions which are equal to fractions in ③.

T Look at the fraction wall again and look for other equivalent fractions. Teacher and students look together at the fraction wall on the blackboard.

S $\frac{2}{5}$ and $\frac{4}{10}$ are the same size and etc.

S $\frac{2}{3}$, $\frac{4}{6}$ and $\frac{6}{9}$ and etc.

4 ⑤ Discuss what the students learnt about fraction.

S Explain what was noticed.

5 Summary

S Read and understand the important point in the box .

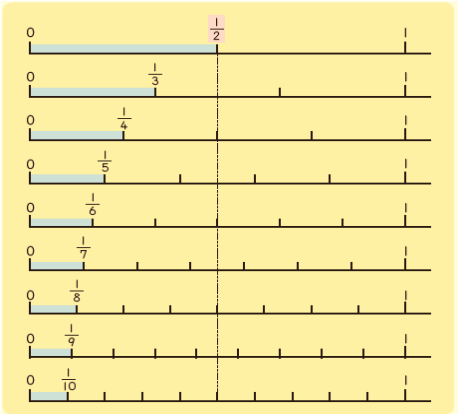
6 Do the exercise.

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Equivalent Fractions **Lesson N°:** 2/2

MT Let's think about how to find the equivalent fractions using the fraction wall.

③ Using the fraction wall on the previous page, write the fractions that are equal to the following fractions.



A $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$

B $\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$

C $\frac{3}{4} = \frac{6}{8}$

④ Let's look at the fraction wall and find other fractions that are equal to the fractions in ③.

i. $\frac{2}{3} = \frac{4}{6} = \frac{6}{9}$

ii. $\frac{1}{4} = \frac{2}{8}$

iii. $\frac{1}{5} = \frac{2}{10}$

⑤ Let's talk about what you have learnt and summarize the results.

Summary

1. When the denominators are the same, they become larger as the numerator increases.
2. When the numerators are the same, they become smaller as the denominator increases
3. Some fractions have the same size even if both their denominators and numerators are different.

Exercise

Which is larger? Let's fill in the ☐ with equal or inequality signs.

① $\frac{3}{5} \square \frac{3}{8}$ ② $\frac{3}{7} \square \frac{5}{7}$ ③ $\frac{1}{2} \square \frac{4}{8}$

Unit 17

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

Textbook Page : p.189
Actual Lesson 118

Sub-unit Objectives

- To think of ways to add and subtract fractions with the same denominator.
- To understand the meaning of addition and subtraction of fractions
- To explain how to add and subtract a fraction with the same denominator.

Lesson Objectives

- To add fraction with the same denominator
- To explain how to add fractions with the same denominator using a diagram, fraction wall and the idea of unit fraction.

Prior Knowledge

- Using fraction wall to identify equivalent fractions for various fractions.
- Equal and Inequality signs

Preparation

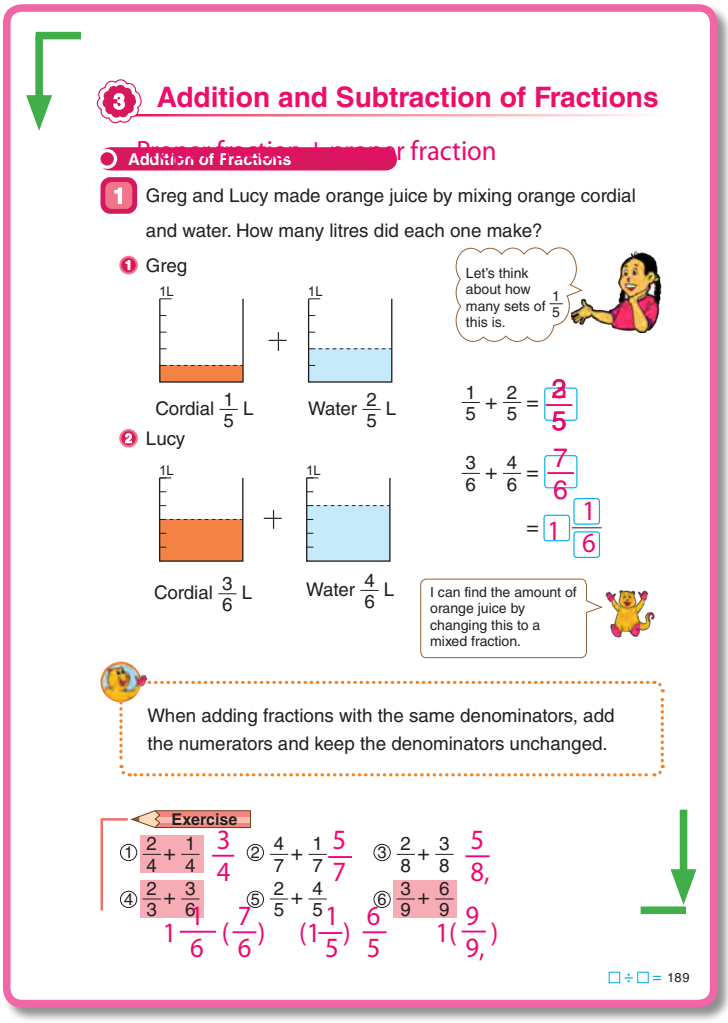
- Coloured water eg. Cordial, clear plastic container with measurement units written on, number line on stripes of paper.

Assessment

- Calculate addition of fractions with same denominator. F
- Think about and understand how to calculate addition of fractions with same denominator. F
- Do the exercise correctly. S

• Teacher's Notes •

In a fraction, the denominator tells us how many parts the whole is divided into, and the numerator tells us how many of those parts we're dealing with.
Add the numerators of the fractions when the denominators are the same.
Simplify your answer, if needed.



3 Addition and Subtraction of Fractions

Addition of Fractions

1 Greg and Lucy made orange juice by mixing orange cordial and water. How many litres did each one make?

1 Greg

Cordial $\frac{1}{5}$ L Water $\frac{2}{5}$ L

Let's think about how many sets of $\frac{1}{5}$ this is.

$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

2 Lucy

Cordial $\frac{3}{6}$ L Water $\frac{4}{6}$ L

$\frac{3}{6} + \frac{4}{6} = \frac{7}{6} = 1\frac{1}{6}$

I can find the amount of orange juice by changing this to a mixed fraction.

When adding fractions with the same denominators, add the numerators and keep the denominators unchanged.

Exercise

① $\frac{2}{4} + \frac{1}{4}$ $\frac{3}{4}$ ② $\frac{4}{7} + \frac{1}{7}$ $\frac{5}{7}$ ③ $\frac{2}{8} + \frac{3}{8}$ $\frac{5}{8}$,

④ $\frac{2}{3} + \frac{3}{6}$ $1\frac{1}{6}$ $(\frac{7}{6})$ ⑤ $\frac{2}{5} + \frac{4}{5}$ $(1\frac{1}{5})$ ⑥ $\frac{3}{9} + \frac{6}{9}$ $\frac{6}{5}$ $1(\frac{9}{9},)$

□÷□= 189

Lesson Flow

1 Review previous lesson.

T Review prior learning of adding simple fractions with the same denominator as
1) $\frac{1}{3}+\frac{1}{3}$ and 2) $\frac{2}{4}+\frac{2}{4}$

S Solve the problems using a diagram or fractions.

2 ❶ Read and understand the given situation and think about how many sets are there.

T Introduce the main task.

S ❶ Write a mathematical expression and think about how to calculate it.

S Notice that since adding one $\frac{1}{5}$ and two $\frac{1}{5}$, adding only numerator (1 + 2) and the answer will be $\frac{3}{5}$.

T ❷ Let students solve same way as ❶.

S Realise that if the answer becomes improper fraction, it can be changed to mixed fraction.

3 Summary

T Explain the important point in the box .

4 Do the exercise.

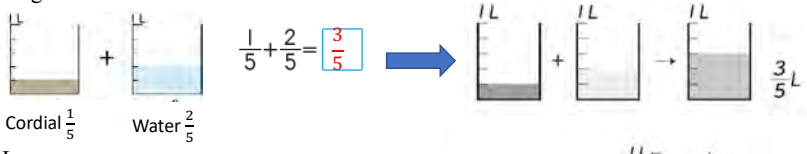
Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Addition and Subtraction of Fractions **Lesson N°:** 1/4

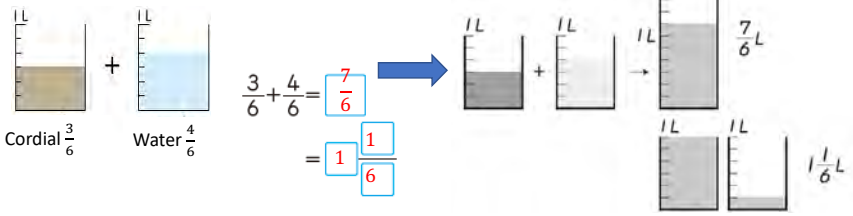
MT Let's think about how to add proper fractions with same denominator.

❶ Greg and Lucy made orange juice by mixing orange cordial and water. How many liters did each one make?

❶ Greg



❷ Lucy



Important Point

When adding fractions with the same denominators, add the numerators and keep the denominators unchanged.

Exercise

① $\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$ ② $\frac{4}{7}+\frac{1}{7}=\frac{5}{7}$ ③ $\frac{2}{8}+\frac{3}{8}=\frac{5}{8}$

④ $\frac{2}{3}+\frac{2}{3}=1\frac{1}{3}\left(\frac{4}{3}\right)$ ⑤ $\frac{2}{5}+\frac{4}{5}=1\frac{1}{5}\left(\frac{6}{5}\right)$ ⑥ $\frac{3}{9}+\frac{6}{9}=1\left(\frac{9}{9}\right)$

Unit 17

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

Textbook Page : p.190
Actual Lesson 119

Lesson Objectives

- To think about how to calculate (Mixed fraction) + (Mixed fraction) or (Mixed fraction) + (Proper fraction) with carrying.
- To master the skill of calculation of (Mixed fraction) + (Mixed fraction) or (Mixed fraction) + (Proper fraction) with carrying.

Prior Knowledge

- Addition of fraction without carrying over.
- Addition of fraction if it is an improper fraction change to a mixed fraction.

Preparation

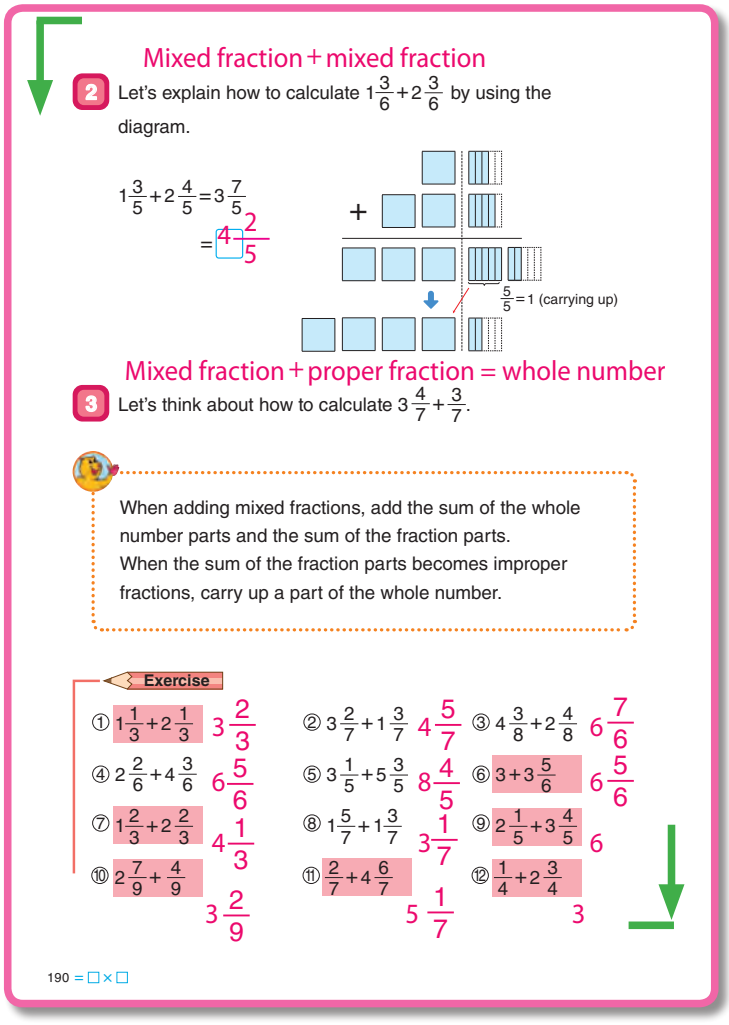
- Card diagram, work sheets

Assessment

- Think about how to calculate (Mixed fraction) + (Mixed fraction) or (Mixed fraction) + (Proper fraction) with carrying. F
- Do the exercise correctly. S

• Teacher's Notes •

- The basic ideas of adding fraction with same denominator is to think about how many unit fractions are there.
- Integer is a whole number.'
- Where there is an improper fraction as an answer, we change it to sets or reduce the fraction. (Simplifying fraction)



Mixed fraction + mixed fraction

2 Let's explain how to calculate $1\frac{3}{6}+2\frac{3}{6}$ by using the diagram.

$1\frac{3}{5}+2\frac{4}{5}=3\frac{7}{5}$

$=4\frac{2}{5}$

$\frac{5}{5}=1$ (carrying up)

Mixed fraction + proper fraction = whole number

3 Let's think about how to calculate $3\frac{4}{7}+\frac{3}{7}$.

When adding mixed fractions, add the sum of the whole number parts and the sum of the fraction parts.
When the sum of the fraction parts becomes improper fractions, carry up a part of the whole number.

Exercise

① $1\frac{1}{3}+2\frac{1}{3}$ $3\frac{2}{3}$

② $3\frac{2}{7}+1\frac{3}{7}$ $4\frac{5}{7}$

③ $4\frac{3}{8}+2\frac{4}{8}$ $6\frac{7}{6}$

④ $2\frac{2}{6}+4\frac{3}{6}$ $6\frac{5}{6}$

⑤ $3\frac{1}{5}+5\frac{3}{5}$ $8\frac{4}{5}$

⑥ $3+3\frac{5}{6}$ $6\frac{5}{6}$

⑦ $1\frac{2}{3}+2\frac{2}{3}$ $4\frac{1}{3}$

⑧ $1\frac{5}{7}+1\frac{3}{7}$ $3\frac{1}{7}$

⑨ $2\frac{1}{5}+3\frac{4}{5}$ 6

⑩ $2\frac{7}{9}+\frac{4}{9}$ $3\frac{2}{9}$

⑪ $\frac{2}{7}+4\frac{6}{7}$ $5\frac{1}{7}$

⑫ $\frac{1}{4}+2\frac{3}{4}$ 3

190 = □ × □

Lesson Flow

1 Review previous lesson.

T Give the question "How many m tapes do you get if you combine a $\frac{4}{5}$ m tape and $\frac{3}{5}$ m tape?

S Explain how to combine a $\frac{4}{5}$ m tape and $\frac{3}{5}$ m tape using the diagram.

TN when the sum is improper fraction convert to mixed number.

2 2 Explain how to calculate $1\frac{3}{5}+2\frac{4}{5}$ (mixed fraction + mixed fraction) using the diagram.

T Introduce the main task.

T How can we calculate the expression given?

S Try to explain observing the diagram.

S When adding mixed fractions we add whole number parts and then fractional parts, and when the sum of the fractional part becomes an improper fraction, carry up the part of the whole number.

TN Remind students that when the sum is improper fraction convert to mixed number that is the sum of an integer and a proper fraction.

3 3 Think about how to solve $3\frac{4}{7}+\frac{3}{7}$.

S Calculate by adding the whole number part. When the sum of fraction part becomes improper fraction, carry up to the whole number part.

4 Summarise the important point.

T Explain the important point in the box .

5 Do the exercise.

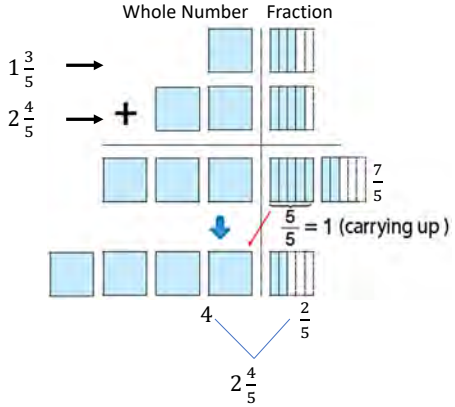
S Copmplete exercises 1, 6, 7, 9, 10, 11 and 12.

Sample Blackboard Plan

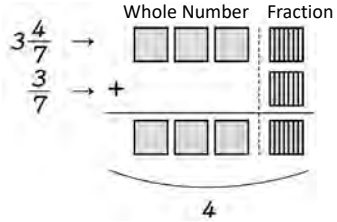
Date: **Chapter:** 17 Fractions **Topic:** Addition and Subtraction of Fractions **Lesson N°:** 2/4

MT Let's think about how to add mixed fractions with same denominator with carrying.

2 Let's explain how to calculate $1\frac{3}{5}+2\frac{4}{5}$ by using the diagram.



3 Let's think about how to calculate $3\frac{4}{7}+\frac{3}{7}$



$3\frac{4}{7}+\frac{3}{7}=3+\frac{4}{7}+\frac{3}{7}$
$=3+\frac{7}{7}$
$=3+1$
$=4$

Important Point

- When adding mixed fractions, add the sum of whole number parts and the sum of fraction parts.
- When the sum of fractions parts becomes improper fractions, carry up a part of whole number.

Exercise

① $1\frac{1}{3}+2\frac{1}{3}=3\frac{2}{3}$ ② $3\frac{2}{7}+1\frac{3}{7}=4\frac{5}{7}$ ③ $4\frac{3}{8}+2\frac{4}{8}=6\frac{7}{8}$

④ $2\frac{2}{6}+4\frac{3}{6}=6\frac{5}{6}$ ⑤ $3\frac{1}{5}+5\frac{3}{5}=8\frac{4}{5}$ ⑥ $3+3\frac{5}{6}=6\frac{5}{6}$

⑦ $1\frac{2}{3}+2\frac{2}{3}=4\frac{1}{3}$ ⑧ $1\frac{5}{7}+1\frac{3}{7}=3\frac{1}{7}$ ⑨ $2\frac{1}{5}+3\frac{4}{5}=6$

⑩ $2\frac{7}{9}+\frac{4}{9}=3\frac{2}{9}$ ⑪ $\frac{2}{7}+4\frac{6}{7}=5\frac{1}{7}$ ⑫ $\frac{1}{4}+2\frac{3}{4}=3$

Unit 17

Unit: Fractions
Sub-unit: 3. Addition and Subtraction of Fractions
Lesson 3 of 4 (Double Period)

Textbook Page : p.191
Actual Lesson 120

Lesson Objectives

- To think about how to calculate (Proper fraction) − (Proper fraction) and (Mixed fraction) − (Mixed fraction) without borrowing.
- To master the skill of calculation of (Proper fraction) − (Proper fraction) and (Mixed fraction) − (Mixed fraction) without borrowing.

Prior Knowledge

- Subtraction of fractions with carrying up/over and without carrying.
- Subtraction of fraction with same denominator and idea of unit fraction.

Preparation

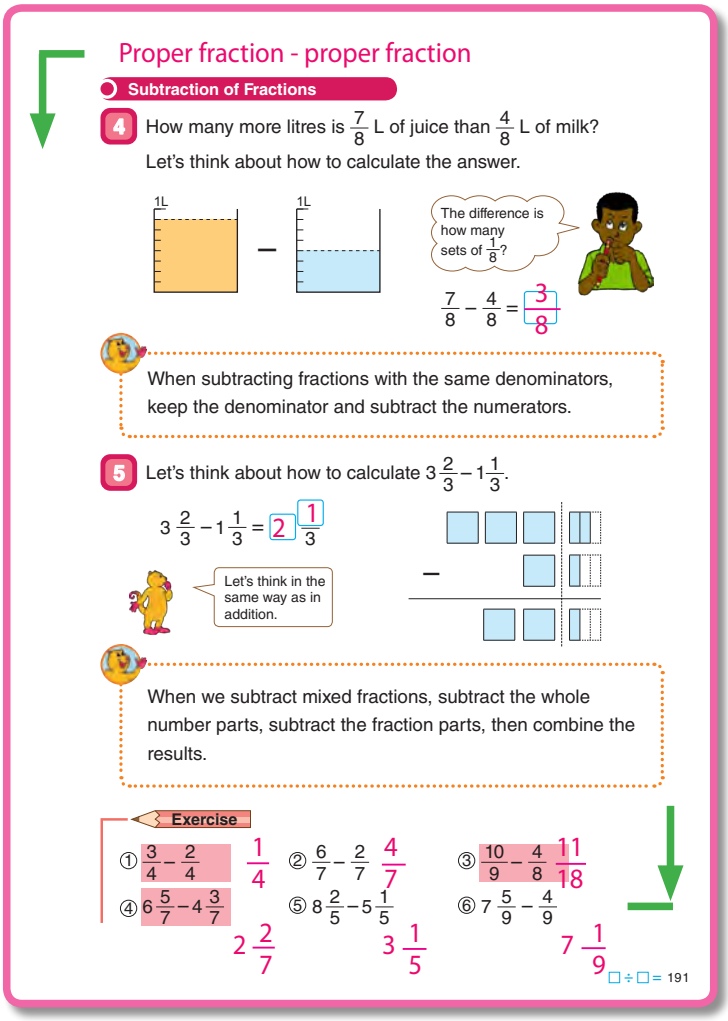
- Diagrams on a chart

Assessment

- Think about how to solve subtraction of fractions with the same denominator based on the idea of unit fractions. F
- Calculate subtraction of fractions with the same denominator. F
- Do the exercises correctly. S

• Teacher's Notes •

Misconceptions of content:
Sometimes students might calculate (adding or subtracting) without considering the denominator. Remind students if the denominators are the same only calculate the numerators.



Proper fraction - proper fraction

Subtraction of Fractions

4 How many more litres is $\frac{7}{8}$ L of juice than $\frac{4}{8}$ L of milk?

Let's think about how to calculate the answer.

$\frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

When subtracting fractions with the same denominators, keep the denominator and subtract the numerators.

5 Let's think about how to calculate $3\frac{2}{3} - 1\frac{1}{3}$.

$3\frac{2}{3} - 1\frac{1}{3} = 2\frac{1}{3}$

Let's think in the same way as in addition.

When we subtract mixed fractions, subtract the whole number parts, subtract the fraction parts, then combine the results.

Exercise

① $\frac{3}{4} - \frac{2}{4}$ $\frac{1}{4}$ ② $\frac{6}{7} - \frac{2}{7}$ $\frac{4}{7}$ ③ $\frac{10}{9} - \frac{4}{8}$ $\frac{11}{18}$

④ $6\frac{5}{7} - 4\frac{3}{7}$ $2\frac{2}{7}$ ⑤ $8\frac{2}{5} - 5\frac{1}{5}$ $3\frac{1}{5}$ ⑥ $7\frac{5}{9} - \frac{4}{9}$ $7\frac{1}{9}$

□÷□= 191

Lesson Flow

1 **Review the previous lesson.**

2 **4** **Read and understand the given situation.**

T What operation should be used to find the?
S Find the answer. $\frac{7}{8}$ L − $\frac{4}{8}$ L = $\frac{3}{8}$ L.
S Present their answers and then confirm in the class.
T Explain the important point in the box ☐.

3 **5** **Think about how to calculate $3\frac{2}{3}-1\frac{1}{3}$.**

T Let students to present their ideas with diagram, vertical calculation.
S Think of how to solve $3\frac{2}{3}-1\frac{1}{3}$ by displaying ideas with diagram, vertical calculation.
S I subtracted the whole number parts and then the fraction parts and finally my answer is $2\frac{1}{3}$.
T Assist the students to summarise the important point in the box.

4 **Summary**

T Explain the important point in the box ☐.

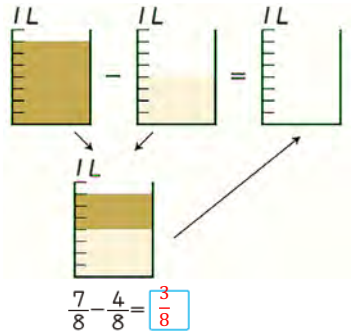
5 **Do the exercise.**

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Addition and Subtraction of Fractions **Lesson N°:** 3/4

MT Let's think about how to subtract fractions with same denominator.

4 How many more liters is $\frac{7}{8}$ L of juice than $\frac{4}{8}$ L of milk?

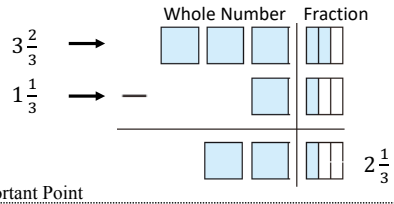


$\frac{7}{8}-\frac{4}{8}=\frac{3}{8}$

Important Point

When subtracting fractions with the same denominators, keep the denominators and subtract the numerators.

6 Let's think about how to calculate $3\frac{2}{3}-1\frac{1}{3}$.



Important Point

When we subtract mixed fractions, subtract the whole number parts, subtract the fraction parts, then combine the results.

Exercise

① $\frac{3}{4}-\frac{2}{4}=\frac{1}{4}$ ② $\frac{6}{7}-\frac{2}{7}=\frac{4}{7}$ ③ $\frac{10}{9}-\frac{8}{9}=\frac{2}{9}$

④ $6\frac{5}{7}-4\frac{3}{7}=2\frac{2}{7}$ ⑤ $8\frac{2}{5}-5\frac{1}{5}=3\frac{1}{5}$ ⑥ $7\frac{5}{9}-\frac{4}{9}=7\frac{1}{9}$

Unit 17

Unit: Fractions
Sub-unit: 3. Addition and Subtraction of Fractions
Lesson 4 of 4 (Double Period)

Textbook Page : p.192
Actual Lesson 121

Lesson Objectives

- To think about how to calculate (Mixed fraction) − (Mixed fraction) with borrowing and (Whole number) − (Mixed fraction).
- To master the skill of calculation of (Mixed fraction) − (Mixed fraction) with borrowing and (Whole number) − (Mixed fraction).

Prior Knowledge

- Subtraction of fractions without borrowing.
- Addition of fractions with carrying up/over and without carrying.
- Addition of fraction with the same denominator and idea of unit fraction.

Preparation

- Cardboard cuttings- divide into fractions of $\frac{1}{5}$ and $\frac{1}{3}$.

Assessment

- Become interested in explaining how to subtract mixed fractions using diagrams. F
- Think about how to subtract mixed fractions with borrowing. F
- Do the exercises correctly. S

• Teacher's Notes •

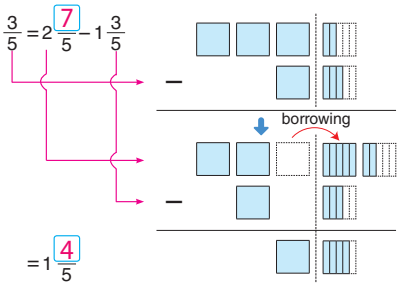
Misconceptions

- In the event of solving a mixed fraction students might just subtract the whole number without considering the numerators that cannot be subtracted, but in order for them to solve these types of problems they would need to borrow 1 from the whole number part of the subtracted number.
- Students must be reminded to solve their problem using the vertical calculation method
- The number that is borrowed must be stressed out clearly in vertical calculation and at the same time highlighted using a different chalk colour or putting it in a box for students to see clearly.
- Integer means a whole number, e.g. 1, 2, 3....

6 Mixed fraction - mixed fraction (with borrowing)

Let's explain how to calculate $3\frac{2}{5}-1\frac{3}{5}$ by using the diagram.

$3\frac{2}{5}-1\frac{3}{5}=2\frac{7}{5}-1\frac{3}{5}$



$=1\frac{4}{5}$

When the numerators of the fractional parts cannot be subtracted, calculate by regrouping from the whole number parts of the minuend.

7 Whole number - mixed fraction

Let's think about how to calculate $3-1\frac{1}{4}$.

$3-1\frac{1}{4}=2\frac{4}{4}-1\frac{1}{4}$

$=1\frac{3}{4}$

❶ $1\frac{2}{4}-\frac{3}{4}$ $\frac{3}{4}$ ❷ $1\frac{4}{9}-\frac{8}{9}$ $\frac{5}{9}$ ❸ $1\frac{1}{4}-\frac{1}{4}$ 1

❹ $6\frac{2}{7}-4\frac{5}{7}$ $1\frac{4}{7}$ ❺ $9\frac{1}{4}-3\frac{1}{4}$ 6 ❻ $7\frac{1}{4}-4\frac{1}{4}$ 3

❼ $1-\frac{1}{6}$ $\frac{5}{6}$ ❽ $8-1\frac{2}{7}$ $6\frac{5}{7}$ ❾ $4-2\frac{1}{5}$ $1\frac{4}{5}$

192 = □ × □

Lesson Flow

1 Review previous lesson.

S Solve $3\frac{2}{3}-2\frac{1}{3}$.

TN When subtracting mixed fractions with the same denominators we subtract the integers first and then subtract the numerators.

2 6 Think about how to calculate $3\frac{2}{5}-1\frac{3}{5}$ by using the diagram.

S Think of how to calculate $3\frac{2}{5}-1\frac{3}{5}$ individually and present ideas with the class.

T Reminds the students to use diagram and do calculations to solve mixed fractions based on using their prior knowledge.

S Subtract with integers to identify where the borrowing of a number will take place.

S Understand that the subtraction of numerators cannot be done in subtraction of mixed fractions but calculate by borrowing 1 from the whole number part of the subtracted number.

3 7 Think about how to calculate $3-1\frac{1}{4}$.

S Change a whole number to $\frac{4}{4}$ and calculate.

T If students do not understand the process very well, explain using diagram same as in 6.

4 Summary

T Explain the important point in the box .

5 Do the exercise 1 - 9.

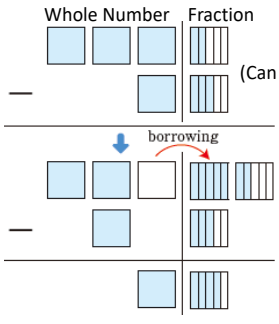
S Complete exercises 1, 4, 7 and 8.

Sample Blackboard Plan

Date: **Chapter:** 17 Fractions **Topic:** Addition and Subtraction of Fractions **Lesson N°:** 3/4

MT Let's think about how to subtract mixed fractions with borrowing.

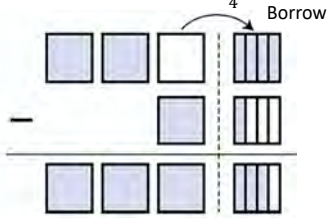
6 Let's explain how to calculate $3\frac{2}{5}-1\frac{3}{5}$ by using the diagram.



$3\frac{2}{5}-1\frac{3}{5}=2\frac{7}{5}-1\frac{3}{5}$

$=1\frac{4}{5}$

7 Let's think about how to calculate $3-1\frac{1}{4}$.



$3-1\frac{1}{4}=2\frac{4}{4}-1\frac{1}{4}$

$=1\frac{3}{4}$

Important Point

When the numerator of the fraction parts cannot be subtracted, calculate by regrouping 1 from the whole number parts of the minuend.

Exercise

① $1\frac{2}{4}-\frac{3}{4}=\frac{3}{4}$ ② $1\frac{4}{9}-\frac{8}{9}=\frac{5}{9}$ ③ $1\frac{1}{6}-\frac{2}{6}=\frac{5}{6}$

④ $6\frac{2}{7}-4\frac{5}{7}=1\frac{3}{4}$ ⑤ $9\frac{3}{5}-3\frac{4}{5}=5\frac{5}{9}$ ⑥ $7\frac{3}{8}-4\frac{7}{8}=2\frac{5}{6}$

⑦ $1-\frac{1}{6}=\frac{5}{6}$ ⑧ $8-1\frac{2}{7}=6\frac{5}{7}$ ⑨ $4-2\frac{1}{5}=1\frac{4}{5}$

Unit 17

Unit: Fractions
Sub-unit: Exercise and Evaluation
Lesson 1of 1 (Double Periods)

Textbook Page : p.193~p.194
Actual Lesson 122

Lesson Objectives

- To deepen understanding by applying the mathematical skills and knowledge learned in this unit to complete the exercise and problem.

Prior Knowledge

- All the contents in this unit

Preparation

- Assessment sheets for the students

Assessment

- Solve the exercises correctly. F S

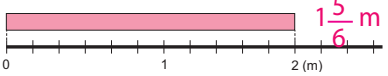
• Teacher's Notes •

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

Exercise

Proper fraction + proper fraction

1 Let's represent the following length as mixed fractions and improper fractions. Pages 183 ~ 186



$1\frac{5}{6}$ m $\frac{11}{6}$ m

2 Let's answer using the following fractions. Pages 183 ~ 186

1 $\frac{2}{5}$ $\frac{1}{6}$ $\frac{10}{7}$ $\frac{3}{3}$ $2\frac{1}{8}$ $\frac{1}{2}$ $\frac{9}{8}$

① Divide these fractions into proper fractions, improper fractions and mixed fractions. $\frac{1}{6}, \frac{1}{2}$ $1\frac{2}{5}, 2\frac{1}{8}$ $\frac{10}{7}, \frac{9}{8}$

② Let's change mixed fractions to improper fractions and change improper fractions to mixed fractions or whole numbers. $1\frac{2}{5}\ \frac{7}{5}$ $\frac{10}{7}\ 1\frac{3}{7}$ $2\frac{1}{8}\ \frac{17}{8}$ $\frac{9}{8}=1\frac{1}{8}$

3 Let's arrange the fractions in ( ) from the largest to the smallest. Pages 187 ~ 188

① $\left(\frac{2}{7}, \frac{5}{7}, \frac{6}{7}, \frac{4}{7}\right)$ $\frac{6}{7}, \frac{5}{7}, \frac{4}{7}, \frac{2}{7}$ ② $\left(\frac{1}{6}, \frac{1}{8}, \frac{1}{5}, \frac{1}{10}\right)$ $\frac{1}{5}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}$

③ $\left(2\frac{1}{8}, 2\frac{5}{8}, 2\frac{7}{8}, 2\frac{3}{8}\right)$ $2\frac{7}{8}, 2\frac{5}{8}, 2\frac{3}{8}, 2\frac{1}{8}$ ④ $\left(3\frac{2}{9}, 1\frac{5}{9}, 2\frac{7}{9}, 4\frac{1}{9}\right)$ $4\frac{1}{9}, 3\frac{2}{9}, 2\frac{7}{9}, 1\frac{5}{9}$

4 Let's calculate. Pages 193 ~ 196

① $\frac{3}{5}+\frac{2}{5}$ 1 ② $2\frac{5}{9}+\frac{8}{9}$ $7\frac{1}{9}$ ③ $1\frac{2}{7}+2\frac{2}{7}$ $3\frac{4}{7}$ ④ $4\frac{2}{3}+2\frac{2}{3}$ $7\frac{1}{3}$

⑤ $3\frac{4}{8}-1\frac{3}{8}$ $2\frac{1}{8}$ ⑥ $1\frac{5}{9}-\frac{7}{9}$ $\frac{7}{9}$ ⑦ $1-\frac{1}{10}$ $\frac{3}{10}$ ⑧ $4\frac{1}{5}-2\frac{3}{5}$ $1\frac{3}{5}$

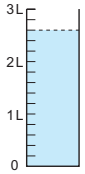
5 Ani ran $1\frac{2}{5}$ km on Sunday morning and $1\frac{4}{5}$ km in the evening. How many kilometres did she run altogether? What is the difference in km?

$1\frac{1}{3}$ $(\frac{4}{3})$ $(1\frac{1}{5})$ $\frac{6}{5}$ $1(\frac{9}{9})$

Problems

1 Let's summarise fractions larger than 1.
● Understanding the meaning of fractions and calculating addition of fractions

① Represent the amount of water shown on the right as mixed fractions and improper fractions.



② About $2\frac{3}{7}$, 2 means 2 sets of 1L and 3 means 3 sets of $\frac{1}{7}$ L

③ $\frac{17}{7}$ means 17 sets of $\frac{1}{7}$ L

④ Let's explain how to calculate $2\frac{3}{7}+1\frac{5}{7}$.

2 Let's change improper fractions to mixed fractions and change mixed fractions to improper fractions.
● Understanding the relationship between improper fractions and mixed fractions

$\frac{4}{7}$ $\frac{11}{5}$ $\frac{7}{2}$ $2\frac{3}{4}$ $3\frac{5}{6}$ $4\frac{4}{9}$ $2\frac{1}{5}$ $3\frac{1}{2}$ $\frac{11}{4}$ $1\frac{3}{4}$ $\frac{23}{6}$ $\frac{40}{9}$

3 Let's calculate.
● Calculating addition and subtraction of fractions

① $\frac{3}{4}+\frac{2}{4}$ $1\frac{1}{4}$ ② $2\frac{1}{3}+1\frac{1}{3}$ 3 ③ $2\frac{2}{7}+3\frac{5}{7}$ 6 ④ $1\frac{5}{8}+1\frac{6}{8}$ $3\frac{3}{8}$

⑤ $\frac{11}{9}-\frac{4}{9}$ $\frac{5}{9}$ ⑥ $3\frac{5}{6}-1\frac{4}{6}$ $2\frac{1}{6}$ ⑦ $5\frac{7}{15}-3\frac{7}{15}$ 2 ⑧ $4\frac{2}{7}-1\frac{3}{7}$ $2\frac{6}{7}$

4 Moses' family drank $1\frac{3}{5}$ L of milk yesterday morning and $\frac{4}{5}$ L in the evening.
● Understanding the situation and finding the answer.

① How many litres did they drink altogether? $2\frac{2}{5}$

② They drank $1\frac{2}{5}$ L today. Which is the biggest amount of milk drank and by how many litres more?

Yesterday morning by 1 L more.

□÷□= 193 194 =□×□

Lesson Flow

1 Exercise ①, ②, ③

S The exercises ①, ②, ③ by referring to their notes or pages given as reference and guide when they encounter difficulties.

T Guide and give ample time to the students to complete their exercises. Encourage students to share and explain their answers with others.

2 Exercise ④, ⑤

S Complete the exercises ④ and ⑤ by referring to their notes or pages given as reference and guide when they encounter difficulties.

T Guide and give ample time to the students to complete their exercises. Encourage students to share and explain their answers with others.

3 Problem ①, ②

TN Let students who have difficulty use number line for comparing.

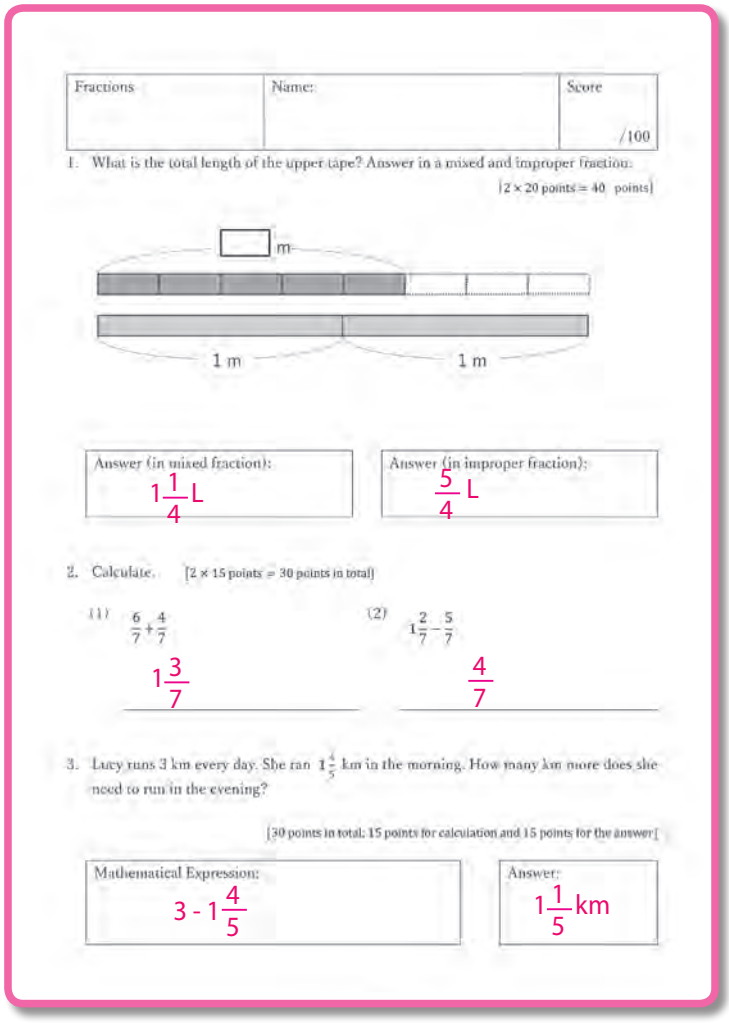
S Complete the problem ① and ② by referring to their notes or pages given as reference and guide when they encounter difficulties.

T Guide and give ample time to the students to complete their exercises.

4 Problem ③, ④

S Complete the problem ③ and ④ by referring to their notes or pages given as reference and guide when they encounter difficulties.

T Guide and give ample time to the students to complete their exercises. Encourage students to share and explain their answers with others.



Fractions	Name:	Score /100

1. What is the total length of the upper tape? Answer in a mixed and improper fraction. [2 × 20 points = 40 points]

Answer (in mixed fraction):	Answer (in improper fraction):
$1\frac{1}{4}$ L	$\frac{5}{4}$ L

2. Calculate. [2 × 15 points = 30 points in total]

(1) $\frac{6}{7}+\frac{4}{7}$ = $1\frac{3}{7}$

(2) $1\frac{2}{7}-\frac{5}{7}$ = $\frac{4}{7}$

3. Lucy runs 3 km every day. She ran $1\frac{4}{5}$ km in the morning. How many km more does she need to run in the evening?

[30 points in total; 15 points for calculation and 15 points for the answer]

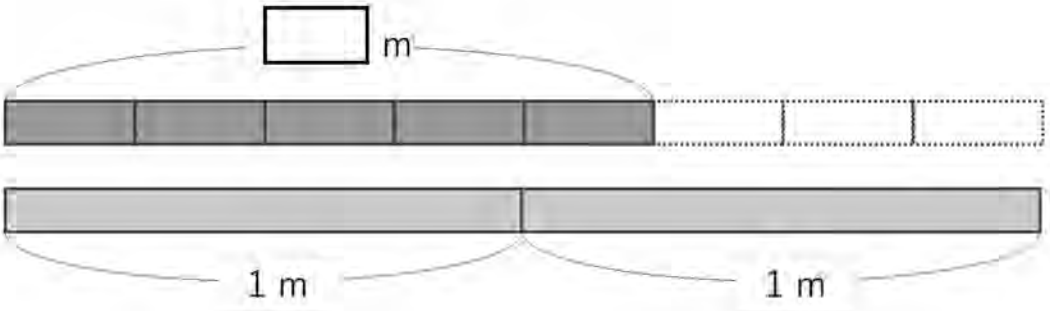
Mathematical Expression:	Answer:
$3-1\frac{4}{5}$	$1\frac{1}{5}$ km

End of Chapter Test: Chapter 17 **Date:**

Fractions	Name:	Score /100

1. What is the total length of the upper tape? Answer in a mixed and improper fraction.

[2 × 20 points = 40 points]



Answer (in mixed fraction):	Answer (in improper fraction):

2. Calculate. [2 × 15 points = 30 points in total]

(1) $\frac{6}{7}+\frac{4}{7}$

(2) $1\frac{2}{7}-\frac{5}{7}$

3. Lucy runs 3 km every day. She ran $1\frac{4}{5}$ km in the morning. How many km more does she need to run in the evening?

[30 points in total; 15 points for calculation and 15 points for the answer]

Mathematical Expression:	Answer:

Chapter 18 Rectangular Prisms and Cubes

1. Unit Objectives

- To investigate rectangular prisms and cubes by observing and manipulating them. (4.3.2a,c)
- To know about the structure of rectangular prism and cube. (4.3.2c)
- To understand the relationship of face and side of rectangular shape such as perpendicular or parallel. (4.3.2c)
- To draw a net or sketch. (4.3.2b)
- To represent the position of plane and space. (4.3.2c)

2. Teaching Overview

In Grade 2, students analytically observed shapes of boxes focusing on the faces, edges and vertices by literally observing from various angles, disassembling and assembling.

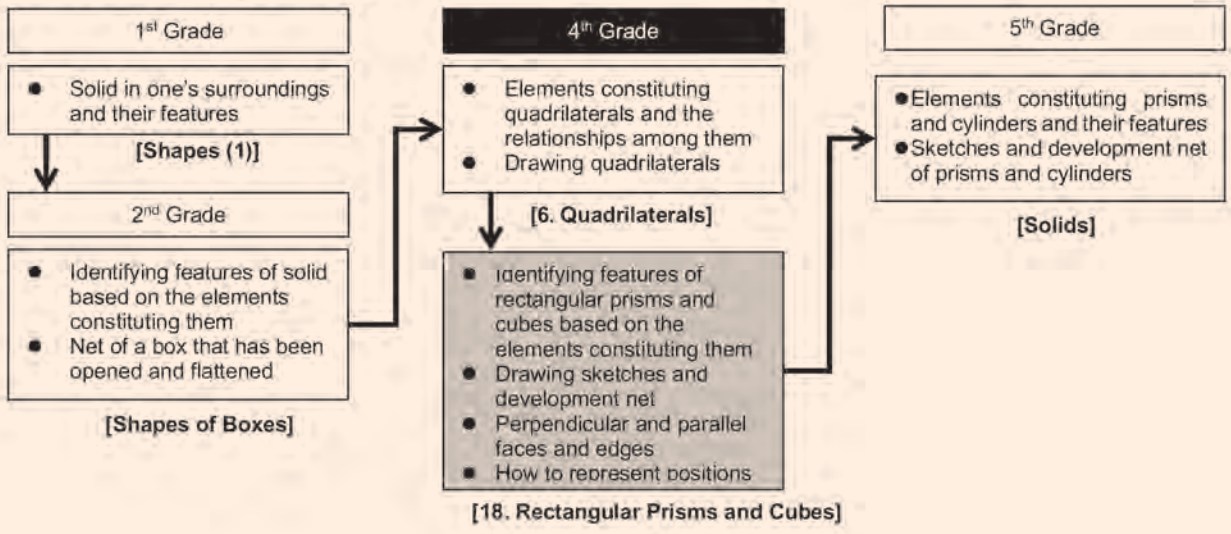
Rectangular Prisms & Cubes: Students analyse them by focusing on the number and sizes of edges, faces, vertices and shapes and relationships of faces.

Nets: They will understand the positions and their relationships by drawing, assembling the net and disassembling the box. This activity will develop student's imaginative skill of geometry.

Perpendicular and Parallel Faces and Edges: Students will develop the skill of capturing 3-dimensional space and properties by careful observation of the parallel and perpendicular relationship between edges and faces.

How to Represent Positions: They learn how to represent positions by a pair of 2 numbers on a plane. It will be expanded to the way how to represent positions by a set of 3 numbers in a space.

3. Related Learning Contents



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 1. Rectangular Prisms and Cubes
Lesson 1 of 1 (Double Period)

Textbook Page : p.195~p.196
Actual Lesson 123

Sub-unit Objectives

- To understand the definition and elements of rectangular prisms by categorising the boxes.

Lesson Objectives

- To think about and understand the definition of rectangular prisms and cubes through categorising boxes focusing on the shape of faces.
- To identify face, edge and vertex as elements of rectangular prisms and cubes.
- To find the characteristics of each element.

Prior Knowledge

- Shape of rectangle and square
- Shape of boxes (Elementary)

Preparation

- Various solid shapes (rectangular prisms and cubes)

Assessment

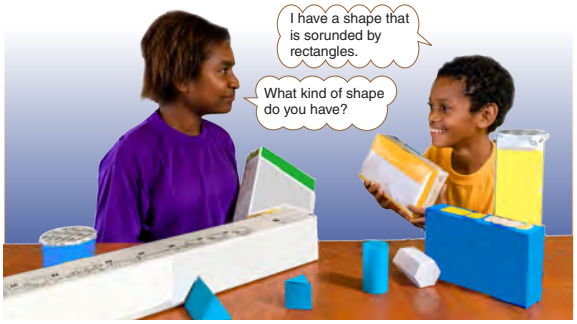
- Think about how to categorise boxes. F
- Think about the structure of the rectangular prisms and cubes by observing and manipulating them. F
- Summarise the characteristic of rectangular prism and cube. S

• Teacher's Notes •

When categorising the solid shapes in task 1, get rid of the other solid shapes then use only the rectangular prisms and cubes to define them.

18 Rectangular Prisms and Cubes

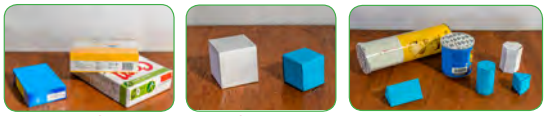
Let's look for various types of solid shapes in our daily lives.
Categorise them by investigating the faces of the solid shapes.



1 Rectangular Prisms and Cubes

Definition of cubes and rectangular prism based on the above activity.

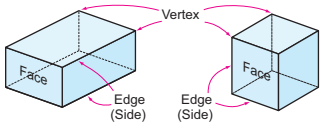
1 Joyce categorised them as follows.
How did she categorise them?



It has rectangular faces All the faces are square. Other

Let's investigate the characteristics of the solid shapes and how to make them.

A shape covered only by rectangles or by squares and rectangles is called **rectangular prism**.
A shape covered only by squares is called **cube**.



Rectangular Prism **Cube**

A flat face like the faces of a rectangular prism and cube is called **plane**.

Elements for construction of rectangular prism and cube.

2 About Rectangular Prisms and Cubes. Fill in the blanks in the table below with numbers or words.

		Rectangular prism	Cube
Face	Shape	Rectangle or square	Square
	Number of faces	6	6
Edge	Length	Pair of opposite sides are same	All are the same
	Number of edges	12	12
Vertex	Number of vertices	8	8

□ + □ = 195 196 = □ ÷ □

Lesson Flow

1 ▶▶ Build interest to learn rectangular prisms and cubes.

T Display the various solid shapes, pose lead up questions.
- What kind of solid shapes can you see here?
- What are their uses?
- What shapes can you find?

S Observe and manipulate the solid shapes, and discuss to build their interest to learn rectangular prisms and cubes.

2 1 Categorise solid shapes.

T Introduce the main task.

T Ask the students to group the solid shapes according to the shapes used.

S Arrange the solid shapes which have shapes of rectangles and square, rectangles only, squares only and others.

T/S Explain the main point in the solid shapes.
- Definition of rectangular prism and cube.
- Name the parts of a rectangular prism and cube.

3 Summarise the characteristic of a rectangular prism and cube.

S Complete the table observing the rectangular prism and cube.

S Share their ideas in the class.

T Lead the discussion and complete the table summarising the characteristic of two shapes.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Rectangular Prisms and Cubes **Lesson N°:** 1/1

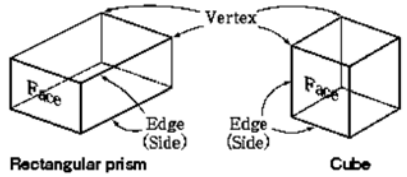
MT

Let's categorize solid shapes and investigate the characteristics of rectangular prism and cube.

1 Lets investigate the characteristics of the solid shapes and how to make them.

Important Point

A shape covered only by rectangles or by squares and rectangles is called **rectangular prism**.
A shape covered only by squares is called **cube**.



A flat face like the faces of a rectangular prism and cube is called a **plane**.

2 Fill the blanks in the table below with numbers or words about rectangular prisms and cubes.

		Rectangular prism	Cube
Face	Shape	Rectangle or square	Square
	Number of faces	6	6
Edge	Length	3 sets of 4 edges are not the same	Same
	Number of edges	12	12
Vertex	Number of vertices	8	8

Findings
Similarities;
Both have 6 faces, 12 edges and 8 vertices.
Differences;
Shape of faces and Length of edges are not same.

Summary
- Faces, edges and the number of vertices are the same
- The shapes of faces and the length of the edges are not the same.

Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 2. Nets
Lesson 1 of 4 (Double Period)

Textbook Page : p.197
Actual Lesson 124

Sub-unit Objectives

- To explore and understand how to make a net of a rectangular prism and cube.
- To draw a net of rectangular prism and cube.

Lesson Objectives

- To trace faces of rectangular prism to create a net and make a rectangular prism.

Prior Knowledge

- Definition of rectangular prism and cube (Previous lesson)

Preparation

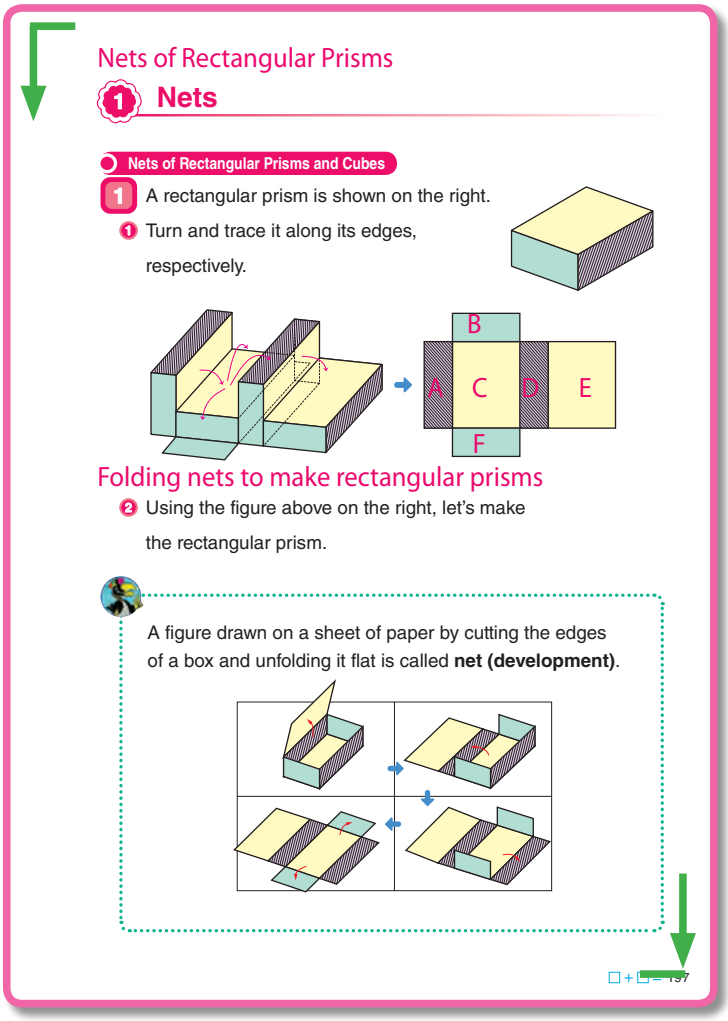
- Rectangular prism, Tracing paper (A4 paper), Scissors

Assessment

- Trace the solid shape correctly and make a rectangular prism. F
- Understand what net (or development) is. S

• Teacher's Notes •

- Making a net also means that to 'construct' a net. The term 'construct' can be used in place of make.
- Students may take time to understand how to draw a net diagram. Therefore, the teacher can demonstrate first then let the students work on their own.



Lesson Flow

1 Review previous lesson.

2 ① Think about how to make rectangular prism.

T Introduce the main task.
T Show a rectangular prism and ask students how we can make the same box.
S Measure all the side and draw all face and they assemble them.
S Trace all faces by rolling the box.

3 ① Trace all faces by rolling the rectangular prism.

S Trace the sides of all faces by turning the rectangular prism.
TN Close observation is necessary for correct tracing of the figure.

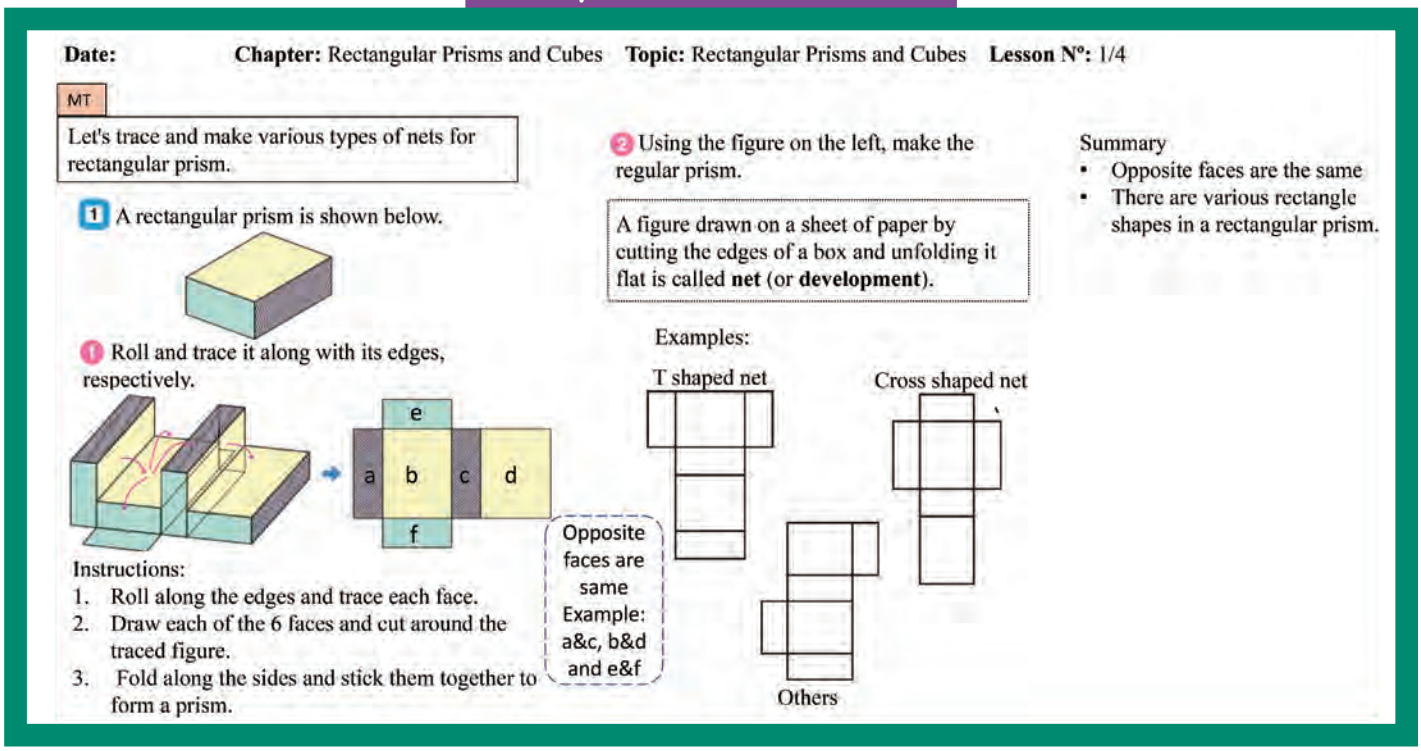
4 ② Construct a rectangular prism.

S Cut the traced diagram and make a rectangular prism.

5 Understand the term and meaning of 'net (development)' .

S Explain about 'net (development)' based on what they did in the lesson.

Sample Blackboard Plan



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 2. Nets
Lesson 2 of 4 (Single Period)

Textbook Page : p.198
Actual Lesson 125

Lesson Objectives

- To draw a net of rectangular prism and think about the relationship of faces and edges.

Prior Knowledge

- Definition of rectangular prism and cube
- Meaning of net and how to draw it. (Previous lesson)

Preparation

- Net for 2 3 A,B and C. Net for 3, A4 papers Scissors

Assessment

- Draw a net of rectangular prism and explain the relationship of faces and edges. F
- Do the task 3 correctly. S

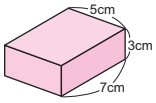
• Teacher's Notes •

3 3, use the idea of direct comparison to identify where the overlapping edges are and colour them.

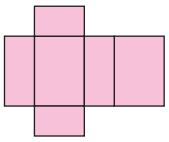
Draw 6 faces, and assemble a box of Rectangular Prisms

2 Let's make a rectangular prism box for storing cards.

1 Draw six faces and arrange them for folding.

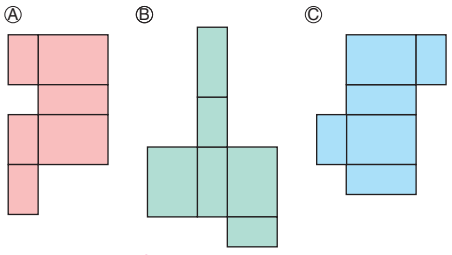


2 Let's fold the shape.



B and C

3 Which is the appropriate net?



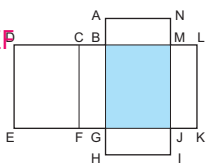
Nets of Rectangular Prisms

3 Let's fold the net as shown on the right.

1 Colour the face opposite to the blue face BGJM. Face CDEF

2 Circle the points that overlap point L. Point D

3 Colour the side that overlaps with the edge EF. Side IH



198 = □ ÷ □

Lesson Flow

1 Review previous lesson.

2 ② Draw a net of rectangular prism and construct a rectangular prism.

T ① Introduce the maint task.
S ② Draw various nets of rectangular prism.
S Cut the nets and make a rectangular prism.
T/S Confirm if the nets are appropriate to make a triangular prism.

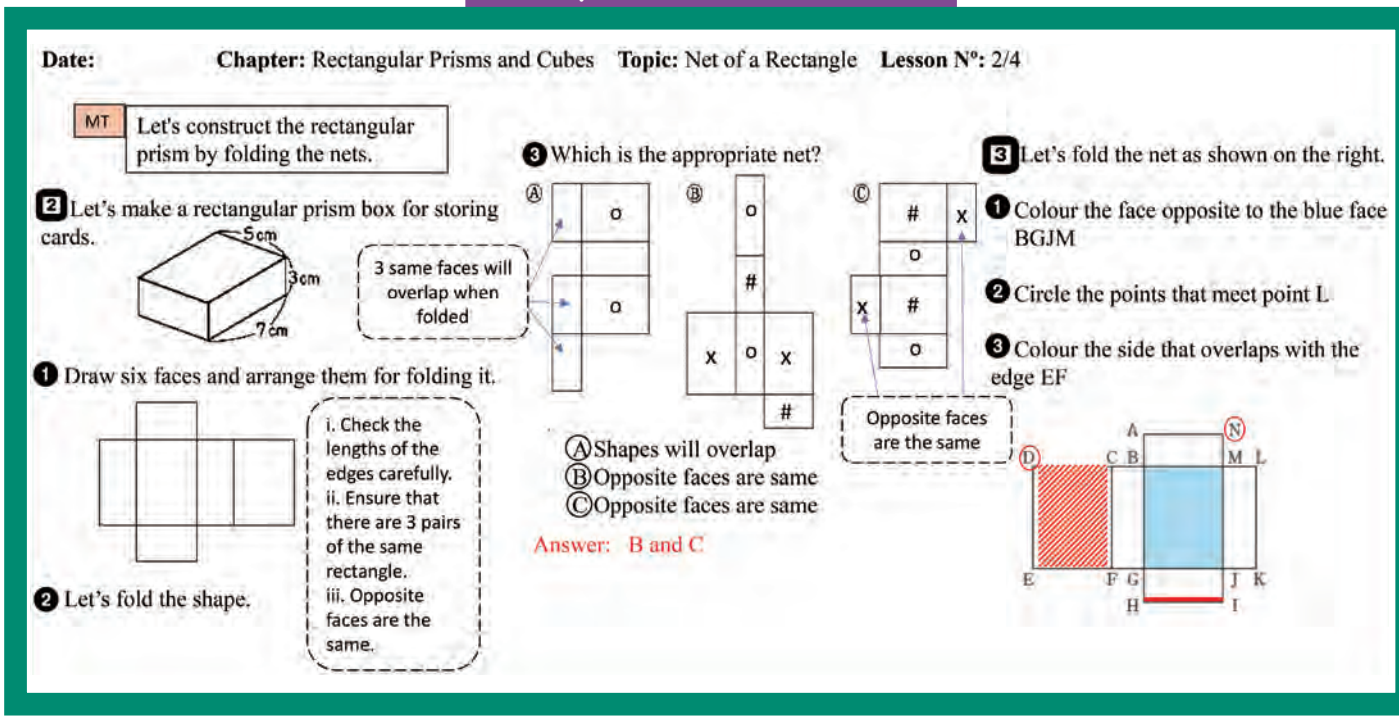
3 ③ Find appropriate net of rectangular prism.

T Which are the appropriate net of rectangular prism?
S B and C
TN Concerning A, some faces overlap.
S Explain which faces are overlapping.

4 ③ Recognise the relationship of opposite faces, vertex and edges which are overlapping.

S ① ② ③ Solve them through imagining a process to make a rectangular prism .
T Confirm the answer by constructing a rectangular prism from the net.

Sample Blackboard Plan



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 2. Nets
Lesson 3 of 4 (Single Period)

Textbook Page : p.199
Actual Lesson 126

Lesson Objectives

- To draw a net of rectangular prism.

Prior Knowledge

- Definition of rectangular prism and cube
- Meaning of net and how to draw it. (Previous lesson)

Preparation

- Square grid paper for students, Scissors, Sticky tape

Assessment

- Draw a net of rectangular prism correctly. F S

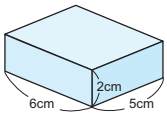
• Teacher's Notes •

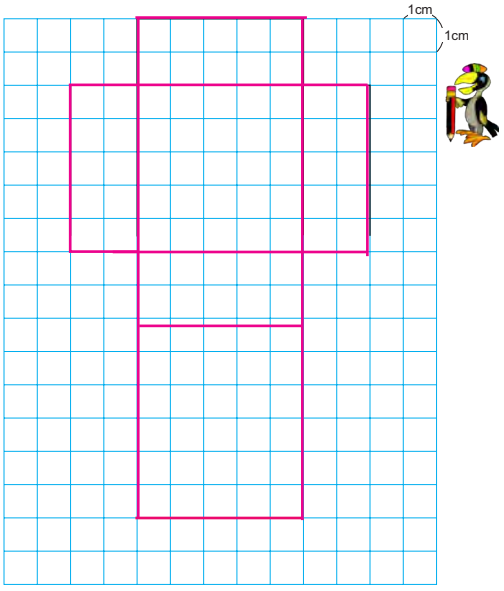
- Teacher should prepare the nets first before the lesson.
- Notice that the opposite faces are equal as shown in activity 2.

Draw a net of a rectangular prism and assemble it.

4 Let's make a rectangular prism box as shown on the right.

1 Draw the rest of the net as shown below.





2 Copy the net on a sheet of paper and fold it.

Lesson Flow

1 Review previous lesson.

2 4 1 Complete the net of rectangular prism.

T Introduce the main task.
S Draw a net of rectangular prism on the square paper.
T Confirm that there are three types of rectangle.
TN There are some students who might draw same rectangles consecutively. Confirm that another rectangle is needed between opposite two faces.

3 2 Make rectangular prism.

S Cut the net and make a rectangular prism.
T Confirm how to draw the net correctly.

4 Draw various types of nets of rectangular prism.

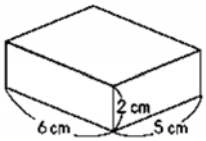
T Distribute square paper for drawing another net.
S Draw various type of net of rectangular prism by themselves.
T Let students compare what they made in altogether.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Net of a Rectangle **Lesson N°:** 3/4

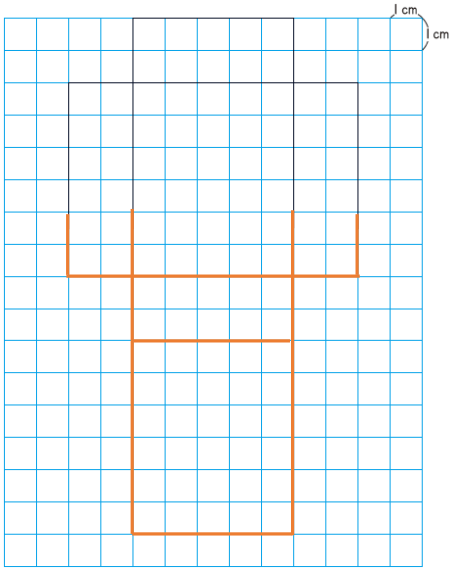
MT Let's draw the rest of the net and fold to make a rectangular prism.

4 Let's make a rectangular prism box as shown on the right.

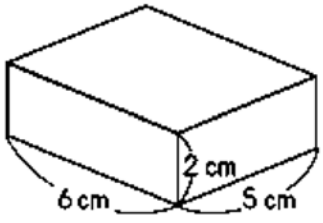


The rectangular prism has 3 different sizes of rectangles
1. 2cm x 5cm
2. 2cm x 6cm
3. 5cm x 6cm
} x 2 rectangles

1 Draw the rest of the net as shown below.



2 Copy the net on a sheet of paper and fold it.



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 2. Nets
Lesson 4 of 4 (Single Period)

Textbook Page : p.200
Actual Lesson 127

Lesson Objectives

- To draw various nets of cubes imagining a completed cube.

Prior Knowledge

- Definition of cube
- Meaning of net and how to draw it.

Preparation

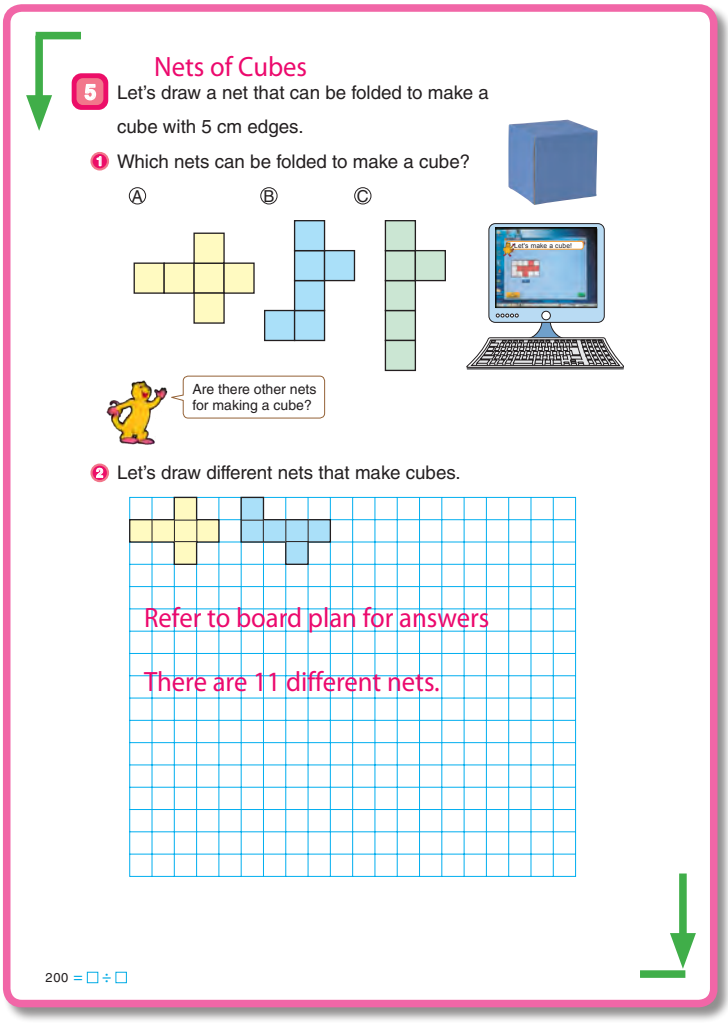
- Square grid paper for students, Scissors, Sticky tape

Assessment

- Draw various nets of cubes correctly. F S

• Teacher's Notes •

To confirm that a net constructed produces a cube, cut out the net and fold it to see if a cube is formed.



Nets of Cubes

5 Let's draw a net that can be folded to make a cube with 5 cm edges.

1 Which nets can be folded to make a cube?

Ⓐ Ⓑ Ⓒ

Are there other nets for making a cube?

2 Let's draw different nets that make cubes.

Refer to board plan for answers

There are 11 different nets.

200 = □ ÷ □

Lesson Flow

1 Review previous lesson.

2 5 Think about the nets of cubes.

T 1 Introduce the main task.
T Which of the nets can be folded to make a cube?
S A and B can be folded to make a cube.
S For C, two faces will be overlapping.
TN Let students imagine how to fold a net to get a completed cube.

3 2 Draw various nets of cubes.

T How many types of nets can we draw?
S I drew 5, I drew 7, etc.
TN Let students try to draw as many as possible.

4 Share students' idea.

T Ask students to share the nets that they drew.
T If you are not sure cut and fold the net to confirm.
S Recognise that there are 11 types of net for making cube.

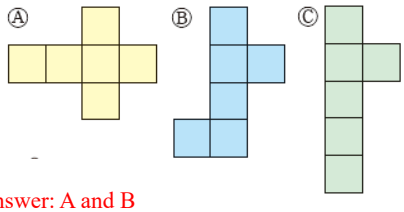
Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Net of a Cube **Lesson N°:** 4/4

MT Let's think about a net of cube and draw different nets that make a cube.

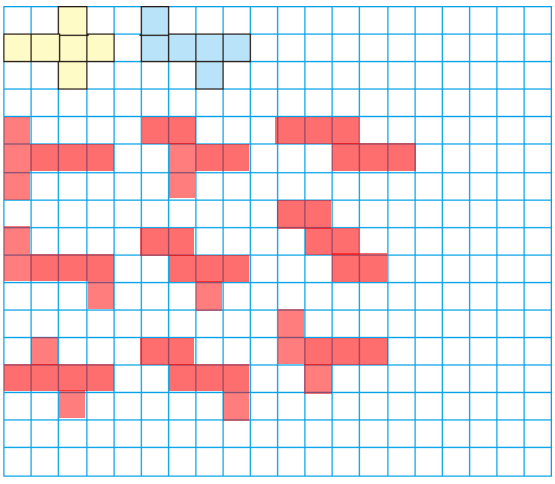
5 Let's draw a net that can be folded to make a cube with 5 cm edge.

1 Which net can be folded to make a cube?



Answer: A and B

2 Let's draw different nets that make cubes.



There are total of 11 types of nets for cubes.

Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 3. Perpendicular and Parallel Faces and Edges
Lesson 1 of 3 (Double Period)

Textbook Page : p.201~202
Actual Lesson 128

Sub-unit Objectives

- To understand the relationship of faces and edges which are perpendicular and parallel in terms of rectangular prism and cube.
- To observe and understand a sketch of rectangular prism and cube in view of a 3-dimensional form.
- To draw a sketch of rectangular prism and cube.

Lesson Objectives

- To understand the relationship of faces which are perpendicular and parallel in rectangular prism and cube.
- To understand the relationship of edges which are perpendicular and parallel in rectangular prism and cube.

Prior Knowledge

- Definition of rectangular prism and cube
- Definition of parallel and perpendicular

Preparation

- Big box of rectangular prism and cube. Set Squares

Assessment

- Think and explain the relationship of faces and edges which are perpendicular and parallel in rectangular prism. F S

• Teacher's Notes •

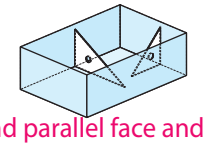
- 3-dimension is another way of viewing objects. It is used in the representation of solid shapes.
- For each task the teacher can demonstrate practically by having the materials prepared in advance.
- Even if opposite sides, faces or edges are not connected in a cube or rectangular prism, they can still be regarded as perpendicular or parallel.

3 Perpendicular and Parallel Faces and Edges

Faces of rectangular prism and their perpendicular face and edges

Relationships between Faces and Faces, Edges and Edges

1 Take off the top of a rectangular prism and put the right angle of a set-square against the inner faces.



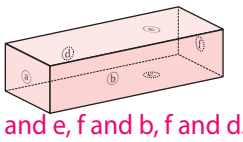
Faces of cube and their perpendicular and parallel face and edges.

2 Place a tool to measure the right angles on the outer faces of a cube as shown on the right.

Any adjacent two faces of a rectangular prism and cube are **perpendicular** to each other.

Faces of rectangular prism and their perpendicular and parallel face and edges

3 Look at the rectangular prism on the right.



① Which faces are perpendicular to one another?

a and c, a and e, a and b, a and d, f and c, f and e, f and b, f and d.

② Which faces are not perpendicular to one another?

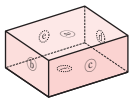
a and f, b and d, c and e

Two faces are parallel when they never intersect each other such as ⓑ and ⓓ, and ⓒ and ⓔ.

4 The figure on the right shows a rectangular prism box.

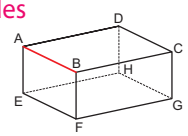
a and f, b and d, c and e

Let's find the pairs of parallel faces.



Perpendicular and parallel sides

5 The figure on the right shows a rectangular prism box.

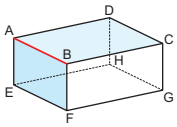


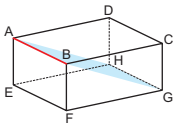
① Which edges are perpendicular to edge AB?.

AE, BF, DH, CG, AD, BC, EH, FG

② Which edges are parallel to edge AB?

CD, GH and EF





6 Let's check the cubes in the same way as you did in 3, 4 and 5.

Faces of rectangular prism and their perpendicular and parallel, face and edges.

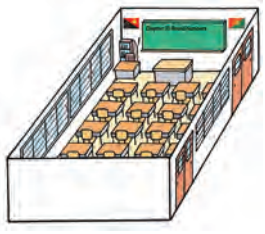
Exercise

Look for the following in the classroom.

① Faces that are parallel to the floor. Ceiling (top)

② Faces that are perpendicular to the floor.

All sides of the classroom.



□ + □ = 201　　202 = □ ÷ □

Lesson Flow

1 Review previous lesson.

2 1 Investigate the relationship of faces in a rectangular prism.

T Introduce the main task.
T Put a triangle ruler on the edge between two faces.
S Realise that two faces are perpendicular.

3 2 Investigate the relationship of faces in a cube.

T Put a triangle ruler on the edge between two faces.
S Realise that two faces are perpendicular.
T Explain the important point in the box ( ).

4 3 Investigate faces which are perpendicular and parallel.

T 1 Which faces are perpendicular?
TN Confirm one by one using a box of rectangular prism.
S Recognise that there are 8 perpendicular faces.
S 2 There are 3 pairs that are not perpendicular.
T Explain the important point in the box ( ).

5 4 Find parallel faces in rectangular prism.

S Think about parallel faces in rectangular prism.
S Recognise that 3 pairs of opposite faces are parallel.

6 5 Find parallel and perpendicular edges on edge AB.

T Solve 1 2.

7 6 Do the same as 3 4 and 5 concerning a cube.

8 Do the exercise.

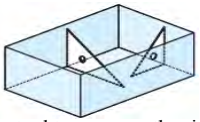
S Solve (1) and (2).

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Perpendicular and Parallel Faces and Edges **Lesson N°:** 1/3

MT Let's think about perpendicular and parallel faces and edges of a rectangular prism and a cube.

1 Take off the top of rectangular prism and put the right angle of a set square against the inner face.

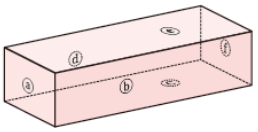


2 Place a tool to measure the right angles on the outer faces of a cube as shown.

Important Point

Any adjacent two faces of a rectangular prism and cube are perpendicular to each other.

3



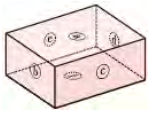
1 Which faces are perpendicular?
ⓐ- ab, ac, ad and ae ⓑ- ba, bc, bd, bf
ⓒ- ca, cb, ce, cf ⓓ- da, db, de, df

2 Which faces are not perpendicular ?
a and f
b and d (opposite faces are parallel)
c and e

Important Point

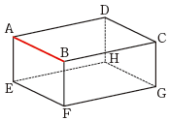
Two faces are parallel when they never intersect each other such as ⓑ and ⓓ, and ⓒ and ⓔ.

4



Lets find the pairs of parallel faces.
b and d, c and e, a and f.

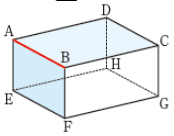
5

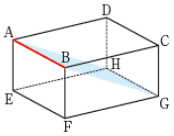


1 Which edges are perpendicular to edge AB?
AE, BF, AD, EH, BC, FG, DH and CG.

2 Which edges are parallel to edge AB?
EF, CD, and GH

6 Let's check the cubes in the same as you did in 3, 4 and 5.





Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 3. Perpendicular and Parallel Faces and Edges
Lesson 2 of 3 (Single Period)

Textbook Page : p.203
Actual Lesson 129

Lesson Objectives

- To understand the relationship of perpendicular and parallel between faces and edges in rectangular prism.

Prior Knowledge

- Definition of rectangular prism and cube
- Parallel and perpendicular edges and faces in rectangular prism and cube.

Preparation

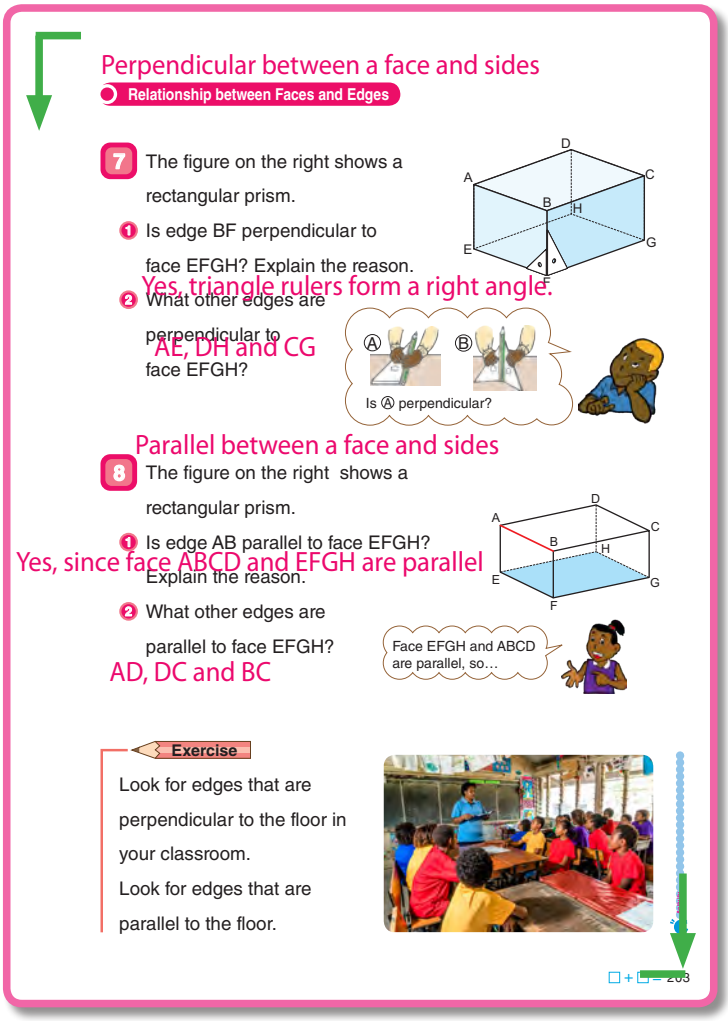
- Big box of rectangular prism and cube

Assessment

- Think about and explain the relationship of perpendicular and parallel between faces and edges in rectangular prism. F S
- Enjoy finding parallel and perpendicular in the classroom. F
- Do the exercises correctly. S

• Teacher's Notes •

- 3-dimension is another way of viewing objects. It is used in the representation d solid shapes.
- For each task teacher can demonstrate practically by having the materials prepared in advance.
- Even if opposite sides, faces or edges are not connected in a cube or rectangular prism, they can be still regarded as perpendicular or parallel.



Lesson Flow

1 Review previous lesson.

2 7 Investigate the relationship of faces and edges in a rectangular prism. (Perpendicular)

T Introduce the main task.
T ❶ Is the edge BF perpendicular to face EFGH?
S Yes. because when two triangle rulers on the edge BF, they fit the edge BF and face EFGH. Therefore, Edge BF is perpendicular to face EFGH.
T ❷ What other edges are perpendicular to face EFGH?
S Edge AE, CG and DH

3 8 Investigate the relationship of faces and edges in a rectangular prism.(Parallel)

T ❶ Is the Edge AB Parallel to face EFGH?
S Yes, because face EFGH and face ABCD are parallel so edge AB and face EFGH are also parallel.
T ❷ What other edges are parallel to face EFGH?
S Edge BC, Edge CD and Edge AD

4 Do the exercise

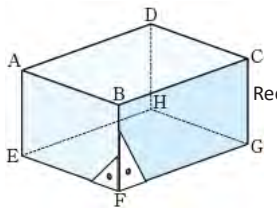
S Find edges which are parallel and perpendicular to the floor in the classroom.
Side of blackboard, desks, chairs, windows, etc.
S Share their ideas in class.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Perpendicular and Parallel Faces and Edges **Lesson N°:** 2/3

MT Let's investigate the relationship between faces and edges of rectangular prism.

7

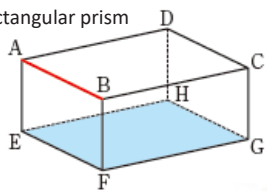


Rectangular prism

❶ Is edge BF perpendicular to face EFGH?
Yes, edge BF is Perpendicular to side EFGH.

❷ What other edges are perpendicular to face EFGH?
Edges: AE, DH and CG.

8 Rectangular prism



❶ Is edge AB parallel to face EFGH?
Yes, edge AB is parallel to face EFGH.

❷ What other edges are parallel to face EFGH?
Edges: EF, CD and GH.

Exercise

Look for edges that are perpendicular to the floor in your classroom.

And look for edges that are parallel to the floor.

Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 3. Perpendicular and Parallel Faces and Edges
Lesson 3 of 3 (Single Period)

Textbook Page : p.204
Actual Lesson 130

Lesson Objectives

- To understand the sketch of rectangular prisms and cubes.
- To think about how to draw a sketch of rectangular prism and cube.

Prior Knowledge

- Definition of rectangular prism and cube
- Parallel and perpendicular edges and faces in rectangular prism and cube.

Preparation

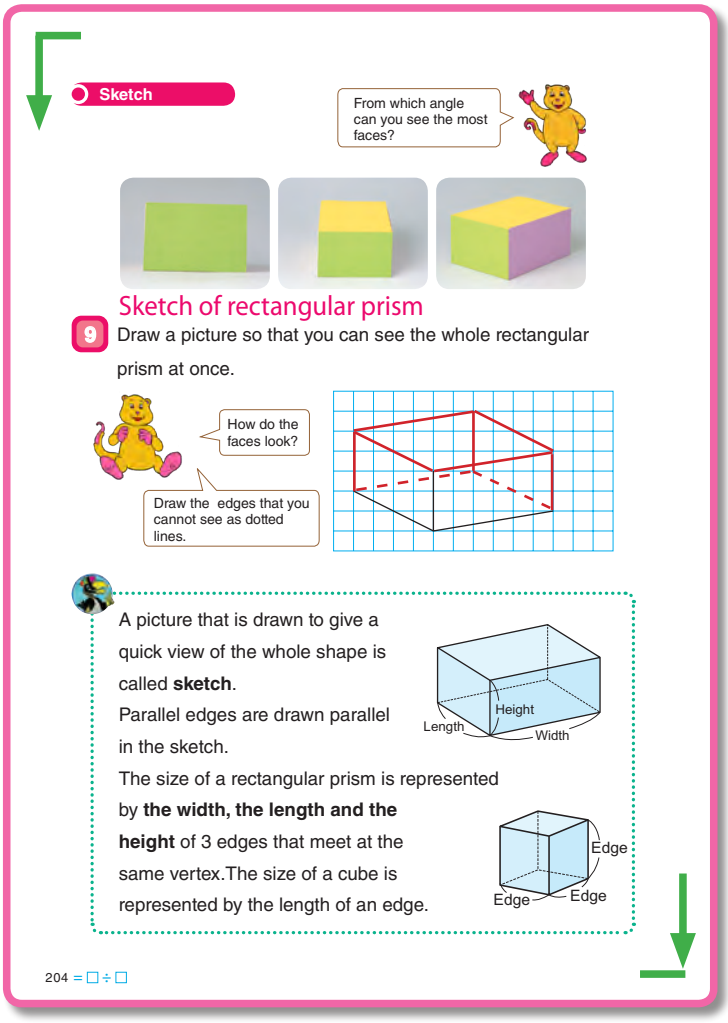
- Box of rectangular prism and cube, square paper for the students.

Assessment

- Think about how to draw a sketch of rectangular prism. F
- Draw a sketch of rectangular prism correctly. F S
- Understand the word 'sketch' and its meaning. S

• Teacher's Notes •

Prisms can be sketched in 3 different ways. However, it is best to represent the prisms in 3-D form for clear visualisation.



Lesson Flow

1 Review previous lesson.

2 Recognise and understand that the rectangular prism can be observed with three faces.

T Look at the three pictures, which pictures are rectangular prisms?
S Middle and right pictures are rectangular prisms, but we cannot judge the left picture whether it is rectangle or rectangular prism.
T Why?
S Because only one face can be observed.

3 9 Draw a sketch of rectangular prism.

T Introduce the main task.
S Draw a sketch of a rectangular prism.
T • Opposite edges are drawn parallel.
• Opposite edges are drawn with same length.
• Edges which cannot be seen are drawn with dotted line.
S Practice more in their exercise book.
T Explain the important point in the box .

4 Summarise how to draw a sketch of rectangular prism and cube.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** Perpendicular and Parallel Faces and Edges **Lesson N°:** 3/3

MT Let's draw a rectangular prism that can be seen as a whole shape.

From what angle can you see the whole rectangular prism at once?

1 2 3

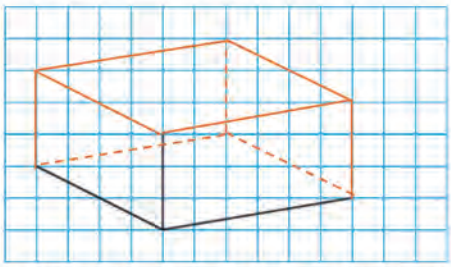
Only one face can be seen from the front when parallel to the prism

Only 2 faces can be seen from the front when looking down from the top.

3 faces can be seen from the front when looking down at the vertex from the top.

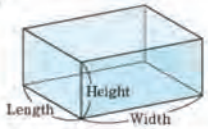
Answer: 3

9 Draw a picture so that you can see the whole rectangular prism at once.

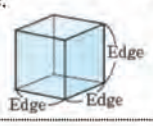


Hints:
- Parallel lines should have the same length.
- Edges that are not visible should be drawn with dotted lines.

A picture that is drawn to give a quick view of the whole shape is called **sketch**.
Parallel edges are drawn parallel in the sketch



The size of the rectangular prism is represented by the width, the length and the height of the 3 edges that meet at the same vertex.
The size of cube is represented by the length of an edge.



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 4. How to Represent Positions
Lesson 1 of 3 (Single Period)

Textbook Page : p.205
Actual Lesson 131

Sub-unit Objectives

- To understand that pair of two numbers are needed to express the position in two dimension.
- To understand that pair of three numbers are needed to express the position in three dimension.

Lesson Objectives

- To understand that pair of two numbers are needed to express the position in two dimension.

Prior Knowledge

- Parallel line and perpendicular line
- Rectangular prism
- Net and sketch of rectangular prism

Preparation

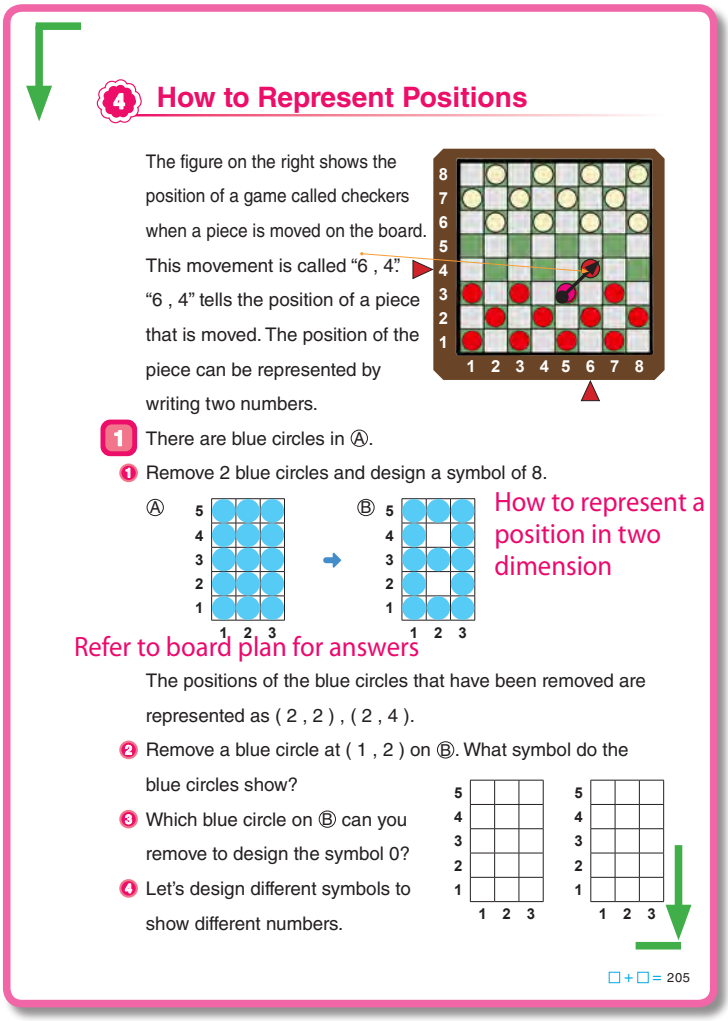
- Squared grid paper

Assessment

- Think about how to express the position in two dimension by pair of numbers. F
- Express the position in two dimension correctly by pair of numbers. S

• Teacher's Notes •

2-dimension in this lesson is referring to two numbers read to give the position of an object. It is similar process in reading of graphs where we have vertical and horizontal axes.



4 How to Represent Positions

The figure on the right shows the position of a game called checkers when a piece is moved on the board. This movement is called "6 , 4." "6 , 4" tells the position of a piece that is moved. The position of the piece can be represented by writing two numbers.

1 There are blue circles in Ⓐ.

1 Remove 2 blue circles and design a symbol of 8.

Ⓐ Ⓑ

How to represent a position in two dimension

Refer to board plan for answers

The positions of the blue circles that have been removed are represented as (2 , 2) , (2 , 4).

2 Remove a blue circle at (1 , 2) on Ⓑ. What symbol do the blue circles show?

3 Which blue circle on Ⓑ can you remove to design the symbol 0?

4 Let's design different symbols to show different numbers.

□ + □ = 205

Lesson Flow

1 Review previous lesson.

2 Think about how to represent the position of a piece of checker.

T How can you express the position of checker when it moves from one place to the another place?
T Where was the previous position of the piece of checker?
S It was on (5. 3).
T Where is the position of the checker now?
S (6. 4)
S Practice more on how to tell the position by using pair of numbers.

3 ① Make a number by removing circles.

T Introduce the main task.
T Draw 5×3 squares and circles in each square.
T ① Ask students to remove circles (2, 2) and (2, 4) to make number 8.
T ② When removing a circle (1, 2) from b, which number can we make?
S 9
T ③ Which blue circleon B can you remove to design a symbol O?
S (2, 3)

4 ④ Make various numbers and express how to make it.

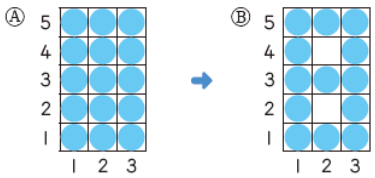
S I can make number 5 by removing (3, 4) from number 9.
S I can make number 6 by removing (3, 4) from number 8.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** How to Represent Position **Lesson N°:** 1/3

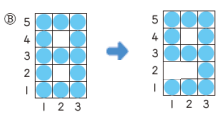
MT Let's think about how to represent position writing two numbers.

❶ There are blue circles in A.
❶ Remove 2 blue circles in A and design a symbol of 8.

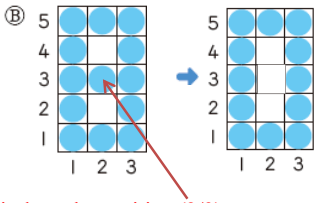


The positions of the blue circles removed are represented by : (2/2) and (2/4)

❷ Remove a blue circle at 1/2 on B, what symbol do the blue circles show?
Symbol of 9.

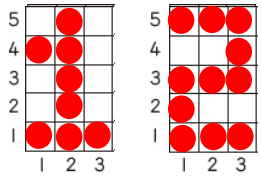


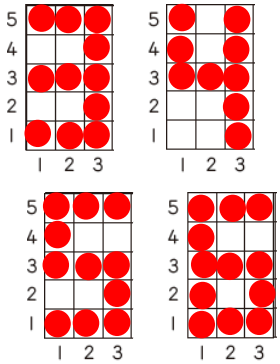
❸ Which blue circle on B can you remove to design a symbol of 0?

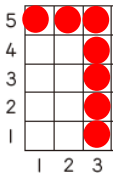


Circle at the position (2/3)

❹ Let's design different symbols to show different numbers.







Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 4. How to Represent Positions
Lesson 2 of 3 (Single Period)

Textbook Page : p. 206
Actual Lesson 132

Lesson Objectives

- To understand how to express position on the grid paper.
- To enjoy connecting points to create pictures on the grid papers.

Prior Knowledge

- How to express a position on plane by using pair of two numbers.

Preparation

- Square grid paper

Assessment

- Enjoy making picture by connecting points. F
- Draw the picture correctly. S

• Teacher's Notes •

In order to plot the points using the pair of numbers in the brackets, we read the first given number horizontally, and then we read the second number vertically. Where the two numbers meet, we plot the point.

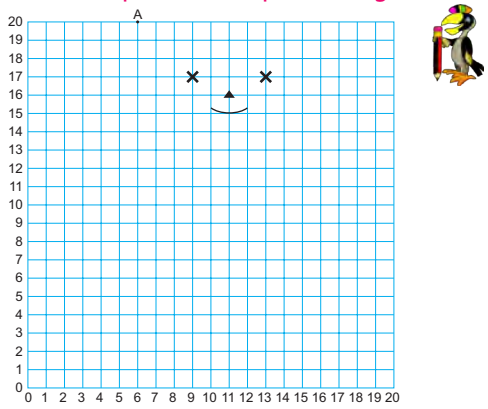
How to represent a position on a grid paper.

2 On the grid paper, the vertical and horizontal axis are numbered as follows.

Point A is represented as (6 , 20). Let's plot the points below in order and connect them with lines.

(6 , 20) A →	(14 , 20) B →	(14 , 15) C →	(16 , 12) D
(18 , 12) E →	(18 , 10) F →	(16 , 0) G →	(14 , 12) H
(13 , 12) I →	(13 , 0) J →	(11 , 0) K →	(11 , 7) L
(9 , 7) M →	(9 , 3) N →	(7 , 3) O →	(3 , 5) P
(5 , 6) Q →	(7 , 5) R →	(7 , 12) S →	(6 , 12) T
(6 , 7) U →	(4 , 7) V →	(4 , 15) W →	(6 , 15) X
(6 , 20) Y			

Refer to board plan for completed diagram



206 = □ ÷ □

Lesson Flow

1 Review previous lesson.

2 ② Understand and enjoy connecting position on a grid paper.

T Introduce the main task.

T Let's plot the points in order and connect with lines.

TN In order to plot the points using the pair of numbers in the brackets we read the first given number horizontally, and then we read the second number vertically.

TN Where the two numbers meet plot the point.

S Point A is shown as (6, 20) and next point is (14, 20). Connect first point and second point. Continue up to the last point.

T Let students work 2, 3 or 4 points and share the drawing with friends. If it is ok let them continue.

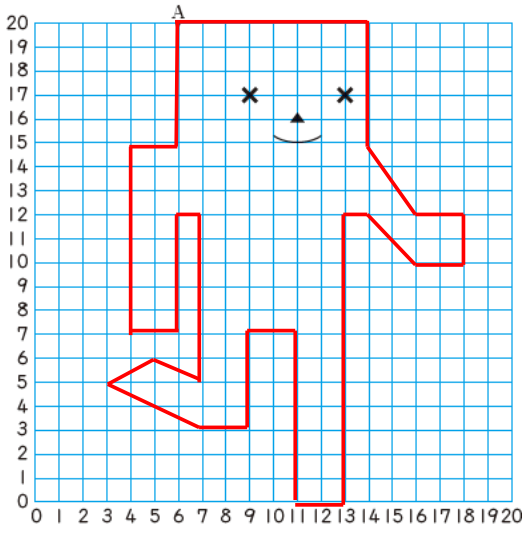
Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** How to Represent Position **Lesson N°:** 2/3

MT Let's draw a picture by plotting and connecting points with a line.

2 On the grid paper, the vertical and horizontal axises are numbered as follows. Point A is represented as (6 and 20). Let's put the points below in order and connect them with lines.

(6 and 20) ➡ (14 and 20) ➡ (14 and 15) ➡ (16 and 12) ➡ (18 and 12) ➡ (18 and 10) ➡ (16 and 10) ➡ (14 and 12) ➡ (13 and 12) ➡ (13 and 0) ➡ (11 and 0) ➡ (11 and 7) ➡ (9 and 7) ➡ (9 and 3) ➡ (7 and 3) ➡ (3 and 5) ➡ (5 and 6) ➡ (7 and 5) ➡ (7 and 12) ➡ (6 and 12) ➡ (6 and 7) ➡ (4 and 7) ➡ (4 and 15) (6 and 15) ➡ (6 and 20)



Unit 18

Unit: Rectangular Prisms and Cubes
Sub-unit: 4. How to Represent Positions
Lesson 3 of 3 (Single Period)

Textbook Page : p.207
Actual Lesson 133

Lesson Objectives

- To understand how to express positions in three dimensions.

Prior Knowledge

- How to express a position in space by using pair of two numbers.

Preparation

- Refer to the board plan

Assessment

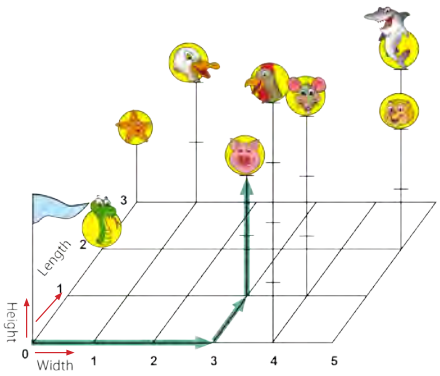
- Think about how to express a position in the space by solving the problems. F
- Understand how to express a position in space. S

• Teacher's Notes •

To plot the points, read the width first, the length second, then the height.

How to represent a position in three dimension

3 Based on the standing position of the flag, let's represent the position of animals using numbers.



Every position in the space is represented by a list of three numbers.

The position of the pig is Width 3, Length 1 and Height 2.

We represent it by (3 , 1 , 2).

1. Let's express the position of the animals below.


(0, 3, 1)


(0, 2, 0)


(4, 0, 4)

2. What animal is at position (4 , 1 , 3)?

Rat/Mouse

Lesson Flow

1 ❸ Think about how to represent a position in three dimension.

T Introduce the main task.
T What is the position of the Kapul and the shark?
S Both are (5, 2), but the heights are different.
S The height of Kapul is 2 and shark is 3.
T Explain that every position in the space is represented by a list of three numbers. The position of pig is 3 Width, 1 Length and 2 Height. It is represented by (3, 1, 2).

2 ❶ ❷ Express the position of other animals.

T Let's find the position of starfish, snake and rooster.
S The starfish is (0, 3, 1). The snake is (0, 2, 0). The rooster is (4, 0, 4).
T What animal is at position (4, 1, 3)?
S Mouse.

3 Summarise the lesson.

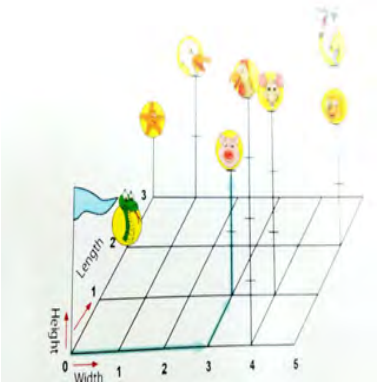
T Recap on how to read the positions of the animals.

Sample Blackboard Plan

Date: **Chapter:** Rectangular Prisms and Cubes **Topic:** How to Represent Position **Lesson N°:** 3/3

MT Let's express the position of animals using 3 numbers.

❸ Based on the standing position of the flag, represent the position on the animals using numbers.



Every position in the space is represented by a list of three numbers. The position of the pig is 3 Width, 1 Length and two Height. We represent it by (3, 1, 2).

❶ Let's represent the position of the animals below.


(5, 2, 3)


(0, 2, 0)


(4, 0 4)

❷ What animal is at position (4, 1, 3)?
Rat

Unit 18

Unit: Rectangular Prisms and Cubes
Sub unit: Exercise and Evaluation
Lesson 1 of 1(Double Period)

Textbook Page : p.208-p.209
Actual Lesson 134

Lesson Objectives

- To deepen the understanding of what they learned in the Unit.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheets for students

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

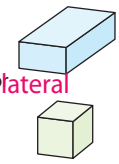
Use 30 minutes for the exercise and give the evaluation test after that.

Exercises

Pages 195 ~ 196

1 Let's summarise rectangular prisms and cubes.

① Rectangular prisms and cubes are categorised by the shape of Faces

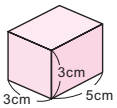


② Rectangular prisms are covered only by Quadrilateral, or by both rectangles and squares.
Cubes are covered only by Squares.

③ The number of edges for both rectangular prism and cubes is 12. The number of vertices for both rectangular prism and cubes is 8.

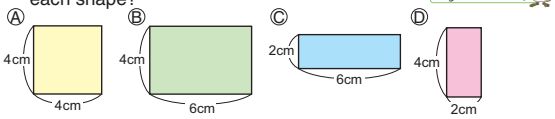
2 Let's draw the net of a rectangular prism on the right.

Pages 196 ~ 200



3 There are a number of sheets of papers of different sizes shown below. Make rectangular prisms and cubes by using them. How many sheets of papers of each size are there in each shape?

Pages 196 ~ 200



Grade 3 Do you remember?

Roku bought 6 pigs and paid 1440 kina. What is the cost of one pig?

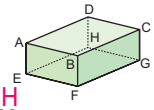
① Let's write a mathematical sentence with words.
cost for 1 pig × 6 pigs = 1 440 kina

② Represent a mathematical sentence by putting an unknown number to □, and find the answer by filling in the □.
□ x 6 = 1 440
□ = 1 440 ÷ 6 = 240 kina per pig

208 = □ ÷ □

Problems

1 The picture on the right is a rectangular prism box.
Understanding relationships between both faces, both edges and face and edge.



① Which edges are perpendicular to edge AE?
BF, CG and DH

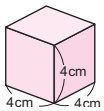
② Which edges are parallel to edge AE?
AD, AB, EF, EH, CD, GH, BC and FG

③ Which face is parallel to face ABCD?
Face EFGH

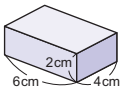
④ Which edges are perpendicular to face AEFB?
Face ABCD, EFGH, BCFG and ADEH

2 Let's draw the nets of the rectangular prism and cube shown below.
Drawing the nets of rectangular prisms and cubes.

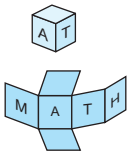
① A cube with 4 cm edge.

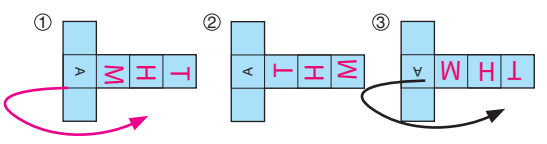


② A rectangular prism with 6 cm length, 4 cm width and 2 cm height.



3 We designed a net to make a cube with side faces that spell out the word "MATH." Let's write the characters in the nets below.
Understanding the relationship between face and face.





□ + □ = 209

Lesson Flow

1 ① **Summarise rectangular prism and cube.**

S Solve the exercises by imagining the both shapes.

TN Do not let students memorise the number of each elements but imagine the shape and think of the characteristics.

2 ② **Draw a net of rectangular prism.**

S Draw a net of rectangular prism.

T Let students draw a net correctly by using ruler.

3 ③ **Think about the structure of the rectangular prism and cube.**

T Confirm the structure of the rectangular prism and cube.

S Both rectangular prism and cube have 6 faces.
All 6 faces are same in cube.
Rectangular prism has 3 pairs of two same faces.

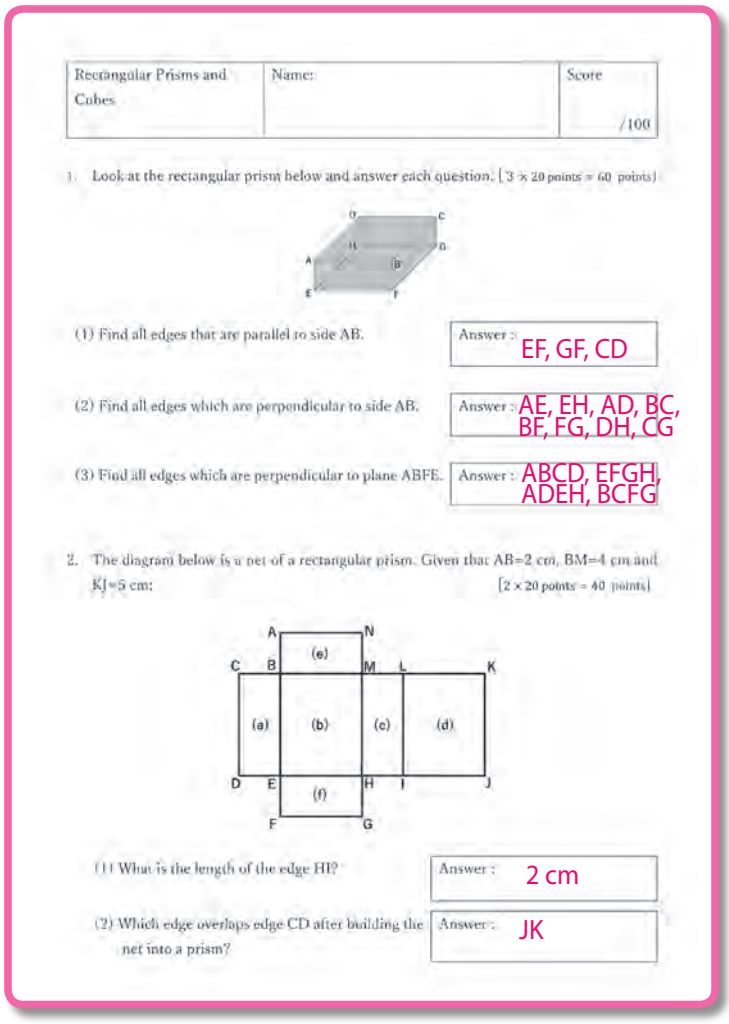
4 **Do the exercise 'Do you remember'.**

5 ① Think about the relationship between face and face, edge and edge, and face and edge.

6 ② Draw a net of rectangular prism and cube.

7 ③ Understand the relationship between face and face of a cube.

TN It is recommended that students make a cube by paper and confirm the relationship using the cube.



Rectangular Prisms and Cubes	Name:	Score /100

1. Look at the rectangular prism below and answer each question. [3 × 20 points = 60 points]

(1) Find all edges that are parallel to side AB. Answer : EF, GF, CD

(2) Find all edges which are perpendicular to side AB. Answer : AE, EH, AD, BC, BF, FG, DH, CG

(3) Find all edges which are perpendicular to plane ABFE. Answer : ABCD, EFGH, ADEH, BCFG

2. The diagram below is a net of a rectangular prism. Given that AB=2 cm, BM=4 cm and KJ=5 cm: [2 × 20 points = 40 points]

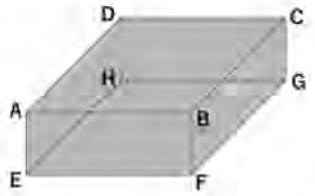
(1) What is the length of the edge HI? Answer : 2 cm

(2) Which edge overlaps edge CD after building the net into a prism? Answer : JK

End of Chapter Test: Chapter 18 **Date:**

Rectangular Prisms and Cubes	Name:	Score /100

1. Look at the rectangular prism below and answer each question. [3 × 20 points = 60 points]

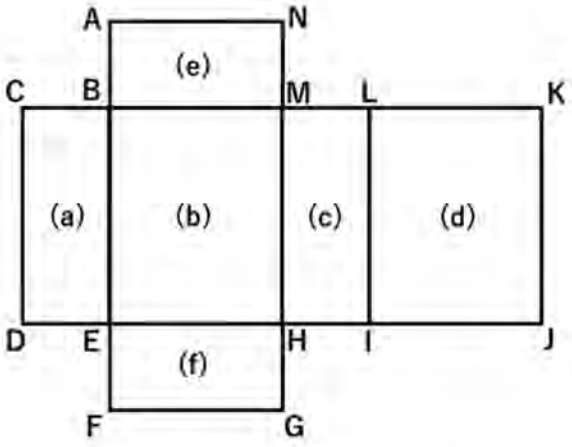


(1) Find all edges that are parallel to side AB. Answer :

(2) Find all edges which are perpendicular to side AB. Answer :

(3) Find all edges which are perpendicular to plane ABFE. Answer :

2. The diagram below is a net of a rectangular prism. Given that AB=2 cm, BM=4 cm and KJ=5 cm; [2 × 20 points = 40 points]



(1) What is the length of the edge HI? Answer :

(2) Which edge overlaps edge CD after building the net into a prism? Answer :

Chapter 19 Quantities Change Together

1. Unit Objectives

- To investigate and express the 2 numbers which change together. (4.4.1a)
- To express the changes by using line graph and read the characteristics. (4.4.1c)
- To understand and express the relationship of numbers using mathematical sentences. (4.4.1b)
- To understand and use the formula. (4.4.1b)
- To express the amount by using ☐ and ○, and make mathematical sentences. (4.4.1.d)

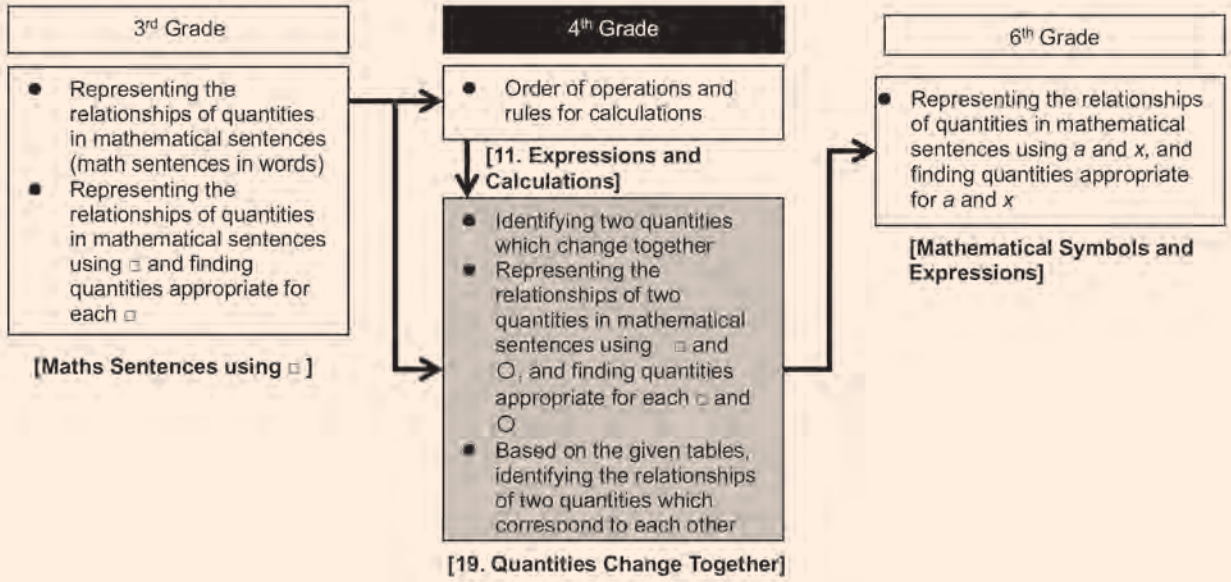
2. Teaching Overview

Functional perspectives are gradually developed in the previous grades. In this unit, students pay attention to 2 quantities change together and find the patterns of changes or correspondences of the 2 quantities.

2 Quantities Change Together : Students organise the change of the numbers of triangles and straws in a table. They also appreciate graphs when they see the visualised change of 2 quantities and that it is easy to compare the changes.

Mathematical Sentences Using ☐ and ○ : They express the relationship for the 2 quantities changing together in a mathematical sentences. This will be the foundation for learning linear function in the further grades.

3. Related Learning Contents



Unit 19

Unit: Quantities Change Together
Sub-unit: 1. Quantities Which Change Together
Lesson 1 of 3 (Single Period)

Textbook Page : p.210~p.211
Actual Lesson 135

Sub-unit Objectives

- To find out quantities which change together in our daily life.
- To express a relationship between two numbers by making table or graph.

Lesson Objectives

- To notice that when one quantity changes another quantity changes together.

Prior Knowledge

- Quanities (L,dL)
- Representation and expression of matehmatical sentence using using □ and ○ (G4,U11).

Preparation

- Pictures of textbook page 210 and 211 Table

Assessment

- Think about the quantities which change together and how they change in different situation. F
- Summarise on their own what they learned at the end of the lesson. S

• Teacher's Notes •

- One quantity changes causes the other quantity to change also. So both quantities change simultaneously (at the same time).

19 Quantities Change Together

Ⓐ

April 21 30 cm

April 26 130 cm

April 28 190 cm

Ⓑ

Ⓒ

Ⓓ

Let's look for quantities that change together in the photographs Ⓐ, Ⓑ, Ⓒ and Ⓓ. Let's discuss how they are changing at the same time.

Quantities are the numbers such as length, time, amount of water, weight, angles and area that you have learned.

Let's investigate the relationships of 2 quantities which change together.

	Things which change together			How they changed
Ⓐ	Height	and	time	both increase
Ⓑ	Height	and	time	height decreases as time increases
Ⓒ	Amount of water in the bucket	and	Amount of water in the container	
Ⓓ	Height	and	Steps	both increase

1 Quantities Which Change Together

1 Let's look for quantities that change together in Ⓐ, Ⓑ, Ⓒ and Ⓓ. How are they changing together?

In our surroundings, there are some quantities that change as another quantity changes.

210 = □ − □

□ ÷ □ = 211

Lesson Flow

1 Find quantities which change together in our daily life.

T Let the students think about and find quantities which change together.

2 ▶▶ Find and discuss the quantities which change together in pictures A, B, C and D.

T In picture A, what quantity is changing?
S Height of bamboo plants and date.
T What about picture B?
S The height of the candle and time
T What quantity changes in picture C?
S The amount of water in two containers.
T What about picture D?
S Number of steps and height from the ground.
TN Let students feel a sense that something is changing.

3 1 Think about the relationship between two quantities which changes together.

T Introduce the main task.
T Let them complete the table in the textbook.
T In picture A, how do the quantities change?
S The height of bamboo plants increase as the day passes.
T How about picture B?
S The height of candle decreases as the time passes.
T How about picture C?
S Amount of water in the bucket decreses as the amount of water in the container increases.
T How about picture D?
S The number of steps increases, as the height from the ground increases.
T Explain the important point in the box .
S Summarise in their exercise book on their own what they learned.

Sample Blackboard Plan

Date: **Chapter:** 19 Quantities Change Together **Topic:** Quantities which Change Together **Lesson N°:** 1/3

MT Let's identify two quantities which change together.

Pictures of A, B, C and D

1 Let's Look for quantities that change together in the photographs A, B, C and D. How are they changing together?

A. Height of plant is increasing.
B. Length of candle decreases as time goes by
C. Depth of water increasing
D. The height from the ground increasing.

Important Point

In our surrounding, there are some quantities that change as another quantity change.

Fill in the table below.

	Things which change together	How they change
A	Height and time	Height of bamboo and time increases
B	Length and time	Length of candle decreases as time increases
C	Depth and time	Depth of water increases as time passes by
D	Height and number of steps	The height from the ground increases as the number of steps increases.

Unit 19

Unit: Quantities Change Together
Sub-unit: 1. Quantities Which Change Together
Lesson 2 of 3 (Double Period)

Textbook Page : p.212
Actual Lesson 136

Lesson Objectives

- To draw a table of two quantities which change together and investigate their relationship.

Prior Knowledge

- Quantities change together (Previous lesson)

Preparation

- Sticks or straws (around 5 cm, 20 for each group)

Assessment

- Think about the relationship of two quantities through an activity. F
- Draw a table to show the change of two quantities. F
- Understand how two quantities change by solving problem 3 and 4. S

• Teacher's Notes •

- When one quantity changes, it causes the other quantity to change. The change in other quantity is bound by rules.
- To identify the rule on how one quantity affects the other quantity to change, we draw a table.
- Using the table, the rule can be identified easily.

2 Let's make equilateral triangles that are lined up horizontally by using straws of the same length.

Ⓐ 

Ⓑ 

Ⓒ 

1. Let's look for two quantities which change together from the above. Number of straws and number of triangles
2. Let's investigate how to change the number of equilateral triangles and straws.

Number of Equilateral Triangles and Straws

Number of equilateral triangles	1	2	3	4	5	6	7	8
Number of straws	3	5	7	9	11	13	15	17

When we look for the rule on how 2 quantities change together, we draw the table to find the rule easily.

3. When the number of equilateral triangles increases by 1, by how many does the number of straws increase? 2 times
4. When we make 10 equilateral triangles, how many straws do we need? 21 straws

212 = □ − □

Lesson Flow

1 Review the previous lesson.

2 ❷ Make equilateral triangles by using same length straws.

T Introduce the main task.

T Let the students manipulate with actual straws to make triangles so that students notice which quantity and how it changes.

TN You can substitute straws to sticks, however If both cannot be prepared let students draw the triangles A,B and C in their exercise book.

3 ❶ Find the quantities which change together by looking at the diagram.

T Which quantities are increasing when comparing A,B and C?

S The number of triangle, the number of straws, length of perimeter and so on.

4 ❷ Investigate the relationship between the number of triangles and the number of straws.

T Let students fill in the table starting from 1 triangle.

S Draw a table in their exercise book referring to the textbook.

T What do you notice?

S When the number of triangle increase by 1, the number of straw increases by 2.

T/S Summaries using the .....

5 Solve ❸ and ❹ and find any rules of increase.

S When the number of triangle increase by 1, the number of straw increases by 2.

S When making 10 triangles 21 straws are needed.
Ex: 17+2+2=21, 9×2+3=21

Sample Blackboard Plan

Date: **Chapter:** 19 Quantities Change Together **Topic:** Quantities which Change Together **Lesson N°:** 2/3

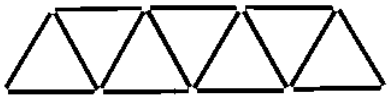
MT Let's identify two quantities which change together.

❷ Let's make equilateral triangles that are lined up horizontally by using straws of the same length.

Ⓐ

Ⓑ

Ⓒ



❶ Let's look for two quantities which change together from the above.
1. Number of straws
2. Number of triangles

❷ Let's investigate how to change the number of equilateral triangles and straws.

Number of Equilateral Triangles and straws

Number of equilateral triangles	1	2	3	4	5	6	7	8	
Number of straws	3	6	9	12	15	18	21	22	

Important Point

When we look for the rule how two quantities change together, we draw the table for finding the rule easily.

❸ When the number of equilateral triangles increase by 1, by how much does the number of straws increase?
When the number of equilateral triangles increase by1, the number of straws increase by 2

❹ When we make 10 equilateral triangles, how many straws do we need?

17 + 2+ 2 =21
9 × 2 + 3 = 21

Answer: 21 straws

Unit 19

Unit: Quantities Change Together
Sub-unit: 1. Quantities Which Change Together
Lesson 3 of 3 (Double Period)

Textbook Page : p.213
Actual Lesson 137

Lesson Objectives

- To draw a line graph of the two quantities and read how they change.

Prior Knowledge

- Draw a table of two quantities which change together. (Previous lesson)
- Line graph (G4,U8)

Preparation

- Graph paper, Tables for task 3

Assessment

- Draw a line graph of two quantities and read how they change. F
- Solve activity 5 correctly. S

• Teacher's Notes •

- The other way in which we can find the rule between two different quantities is by using graphs.
- In a graph, we can easily see the relationship on how the two quantities change.
- The graph gives the behavior on how two quantities change. E.g. in task 3, the graph leans towards the right therefore, we say that when one quantity increases as the other increases also.

Changing Quantities and Graphs

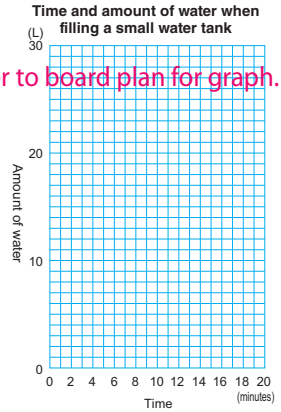
3 The table below shows how the amount of water and the time change as a small water tank is filled.

Time and amount of water when filling a small water tank

Time (minutes)	0	2	4	6	8	10	12	14	
Amount of water (L)	0	3	6	9	12	15	18	21	

1. Let's plot the points on the graph by using the numbers on the table.
2. Let's connect the points with a line.
3. What is the amount of water in 7 minutes after filling the water tank? 10.5 L
4. How many litres of water will there be after 20 minutes? 30 L

Refer to board plan for graph.



5. Another water tank was filled with water as shown in the table on the right. Let's draw a graph by using the information from the table above. Compare the 2 graphs and tell everyone what you observed.

Time and amount of water when filling a water tank

Time (minutes)	0	4	8	12	16	
Amount of water (L)	0	3	6	9	12	

□ ÷ □ = 213

Lesson Flow

1 Review previous lesson.

2 ③ Understand that the amount of water increases as the time passes.

T Introduce the main task.
T Which quantities are changing together in the situation?
S Time and amount of water.

3 ① ② Draw a line graph using the data in the table.

T Let the students review on how to draw a line graph.
T What does the horizontal axis shows?
S Time in minute.
T How many minutes in one scale?
S 1 minute
T What does the vertical axis shows?
S Amount of water in L
T How many L in one scale?
S 1 L
S Draw a line graph.
1. Plot the points
2. Connect the points

4 ③ Solve the activity by reading graph.

TN The amount is between 10 L and 11 L.

5 ④ Predict the amount of water after 20 minutes.

S Extend the line after 14 minutes and read the graph.
T Let the students notice that it is good to draw a graph because they can predict the amount even if they have not measured.

6 ⑤ Draw a graph.

S Draw a graph using same steps of the previous graph.
TN Students draw the graph in the same graph paper.

7 Compare the two graphs and discuss the differences.

T What is the difference between A and B?
S Amount of water A increases faster than that of B.

Sample Blackboard Plan

Date: **Chapter:** 19 Quantities Change Together **Topic:** Quantities which Change Together **Lesson Nº:** 3/3

MT Let's draw a line graph to represent the relationship between time and amount of water.

3 The table below shows how the amount of water and time change as a small water tank is filled.

Time and Amount of Water When Filling a small water tank

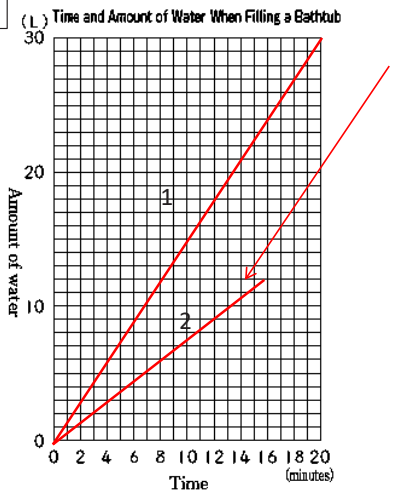
Time (minutes)	0	2	4	6	8	10	12	14	
Amount of water (L)	0	3	6	9	12	15	18	21	

1 Let's write points on the graph by using the numbers on the table.

2 Let's connect the points with a line

3 What is the amount of water in 7 minutes after starting to fill the water tank? 10.5 L

4 How many liters of water will there be after 20 minutes? 30 L



5 Another water tank was filled with water as shown below.

Summary
Compare the two graphs and write down what you have noticed.
1. 1st graph is steeper than the 2nd graph
2. 1 has more water than 2.
3. The slope of the graphs are different.
4. _____
5. _____

Unit 19

Unit: Quantities Change Together
Sub-unit: 2. Mathematical Sentence Using □ and ○
Lesson 1 of 2 (Single Period)

Textbook Page : p. 214
Actual Lesson 138

Sub-unit Objectives

- Express 2 quantities which change together in mathematical sentence using □ and ○.

Lesson Objectives

- Express 2 quantities which change together in mathematical sentence using □ and ○.

Prior Knowledge

- Quantities which change together (Previous sub-unit)

Assessment

- Think about the relationship between 2 quantities and express with mathematical sentence. F
- Find answer inserting numbers in the sentence. F
- Understand the meaning of the mathematical sentence. S

• Teacher's Notes •

- We can use symbols like □ and ○ to find the relationship between two quantities changing.
- The symbols also helps us in identifying the rule that is found between the two changing quantities.

2 Mathematical Sentence Using □ and ○

1 Shama's school has stairs to go to the playground. The children decided to use the stairs to measure the height at ground level to the top of the stairs.

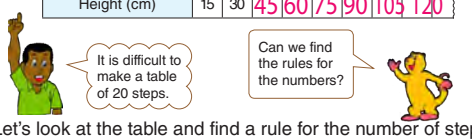
1 As the number of steps increases, how does the height from the playground change?

height from the playground decreases

2 There are 20 steps from the playground to the classroom. Let's write the number of steps and the height of the classroom in the table.

Number of Steps and Height

Number of steps (steps)	1	2	3	4	5	6	7	8	
Height (cm)	15	30	45	60	75	90	105	120	



3 Let's look at the table and find a rule for the number of steps and height.

When the number of steps is □ and its height is ○, let's write a mathematical sentence by using □ and ○.

Height of each step × Number of steps = Height from floor

15 × □ = ○

4 Let's find the height when there are 20 steps.

300 cm (3m)

214 = □ − □

Lesson Flow

1 Review the previous lesson.

2 ❶ Understand the situation and what to do by observing the picture.

T Introduce the main task.
S Read and understand the situation.

3 ❶ Solve the activity.

T When increasing the steps how does the height from the playground change?
S The height from the playground increases.

4 ❷ Make a table and find the relationship between the number of steps and the height from the playground.

T What is the height of a step?
S 15 cm
T How many cm will increase in each step?
S 15 cm
T Fill in the blank of the table.

5 Think about how to find the height of 20 steps.

T Is it very hard to draw a table until 20 steps. Did you find any rules in the table?
S Start with fifteen and when increasing one step the height increases 15 cm.

6 ❸ Think about the relationship using ○ & □.

T Express the number of stairs as □ and the height from the playground as ○.
S (The height of a step, 15) × (The number of stairs, □) = (The height from the playground, ○)

7 ❹ Find the height of 20 steps using the mathematical sentence.

T What is the height of 20 steps? Use the mathematical sentence you made.
S 15 × 20 = 300 <u>300 cm (3 m)</u>

Sample Blackboard Plan

Date: **Chapter:** 19 Quantities Change Together **Topic:** Mathematical Sentences Using □ and ○ **Lesson N°:** 1/2

MT Let's investigate the relationship between the number of stairs and the height from the ground using □ and ○.

❶ Shama's classroom was on the third floor. The children decided to use the stairs to measure the height from the floor on the first floor to the floor on the third floor.

❶ As the number of steps increases, how does the height of the first floor change? Height increases by 15 cm.

❷ There are 40 steps between the first and third floors. Let's fill in the table below.

Number of Steps and Height

Number of steps (steps)	1	2	3	4	5	6	7	8	
Height (cm)	15	30	45	60	75	90	105	120	

❸ Let's look at the table and find a rule for the number of steps and height.
When the number of steps is □ and its height is ○, let's express mathematical sentence by using □ and ○.

Height of each step × number of steps = height

15 × □ = ○

❹ Let's find the height when there are 40 steps.
15 × 20 = ○
= 300 *cm*

Unit 19

Unit: Quantities Change Together
Sub-unit: 2. Mathematical Sentence Using □ and ○
Lesson 2 of 2 (Single Period)

Textbook Page : p.215
Actual Lesson 139

Lesson Objectives

- To think about the rules and relationship between the number of square and stairs.
- To generalise the rule and relationship between the number of squares and stairs.

Prior Knowledge

- Mathematical sentence using □ and ○. (Previous lesson)

Preparation

- Figures and a table for task 2.

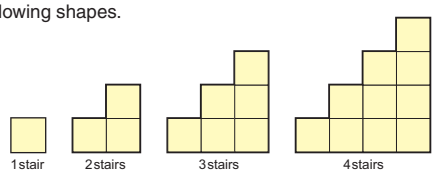
Assessment

- Think about the relationship between 2 quantities and express them with mathematical sentence. F
- Do the exercises correctly. S

• Teacher's Notes •

- The length around the stairs is referring to the perimeter of the shapes in the stairs.
- In this lesson, we are using the idea of symbols □ and ○ from the previous lesson to show the relationships.
- We'll show the relationship by writing mathematical sentences.

2 Arrange a square paper with 1 cm side and make the following shapes.



1. How many cm are the length around 1 stair and 2 stairs?
   4 cm and 8 cm
2. Let's study how the number of stairs and the length around the stairs change.

Number of Stairs and the Length Around the Stairs

Number of stairs	1	2	3	4	5	6	7
Length around the stairs (cm)	4	8	12	16	20	24	28

3. When the number of stairs increases by 1, how long does the length around the stairs increase?
   increases by 4 times
4. When the number of stairs is □ and the length around the stairs is ○, let's show the relationship by a mathematical sentence.
   4 × □ = ○
5. When the number of stairs is 8, how many cm is the length around the stairs? When the length around the stairs is 40 cm, what is the number of stairs?
   1) 4 × 8 = 32 cm
   2) 4 × □ = 40
   □ = 40 ÷ 4 = 10 steps

Exercise

Belinda bought a ream of drawing paper for 20 kina. When the number of reams is □ and the cost is ○. Let's express the relationship between □ and ○ in a mathematical sentence.

20 × □ = ○

□ ÷ □ = 215

Lesson Flow

1 Review previous lesson.

2 ② Observe the picture of the squares and share what students notice.

T Introduce the main task.
T Observe the picture of the square. What did you notice?
S Stairs are increasing one by one.
S The number of squares are increasing.

3 ① Draw a table of the relationship between the number of squares and the length around stairs.

T What are the lengths around 1 stair and 2 stairs?
S 4cm and 8cm.

4 ② ③ Draw a table of the relationship between the number of steps and the length around the stairs.

T What is the length around 1 stair?
S 4 cm
T How many cm will the height increase in 1 stair?
S 4 cm
S Complete the table.
TN When the number of stairs increases by 1, the length around the stairs increase by 4 cm.

5 ④ Make a mathematical sentence using □ (The number of stairs) and ○ (Length around stairs).

T Let students understand that length around stairs increase 4 cm by 4 cm.
TN Let the students think of the mathematical sentence with words.
S (Increased length) × (The number of stairs) = (Length around stairs)
$4 \times \square = \bigcirc$
T ⑤ Where would we put 8 in the mathematical sentence?
S □, so $4 \times 8 = 32$ 32 cm
T Where shall we put 40 in the mathematical sentence?
S ○, so $40 \div 4 = 10$ 10 stairs

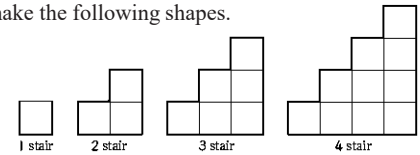
6 Do the exercise.

Sample Blackboard Plan

Date: **Chapter:** 19 Quantities Change Together **Topic:** Mathematical Sentences Using □ and ○ **Lesson N°:** 2/2

MT Let's investigate the relationship between the number of stairs and the length around the stairs using □ and ○.

❷ Arrange a square paper with 1 cm side and make the following shapes.



❶ How many cm are the length around 1 stair and 2 stairs?
4 cm around 1 stair and 8 cm around 2 stairs.

❷ Let's study how the number of stairs and length around the stairs change.

Number of Stairs and the Length Around the Stairs

Number of stairs	1	2	3	4	5	6	7	
Length around stairs(cm)	4	8	12	16	20	24	28	

❸ When the number of stairs increase by 1, how long does the length around the stairs increase?
Increase 4 times.

❹ When the number of stairs is □ and the length of around stairs is ○, let's show the relationship by a mathematical sentence.
○ □

❺ When the number of stairs is 8, how many cm is the length around the stairs? And when the length around stairs is 40cm, what is the number of stairs?
1. ○
2. □

Answer: 10 stairs

Exercise
I buy sheets of drawing paper at 20kina each. When the number of sheets I buy is □ and the cost is ○, let's express the relationship between □ and ○ as a mathematical sentence.

Number of sheets × cost of one sheet = cost
× = cost
□ ○

Unit 19

Unit: Quantities Change Together
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p. 216~p.217
Actual Lesson 140

Lesson Objectives

- To deepen understanding on contents learned in this Unit.

Prior Knowledge

- All the contents in this unit

Preparation

- Evaluation sheets of students

Assessment

- Solve the problems remembering what they learned in this unit. F
- Complete the exercise correctly. S

• Teacher's Notes •

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

Exercises

1 Let's look at the relationships between the 2 quantities written below. In which one is "both increasing" and in which one is "one increasing and one decreasing?"

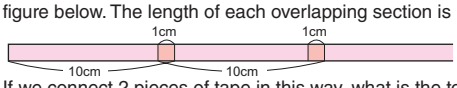
Pages 210 ~ 211

① The distance that a car travels and the quantity of fuel used.
② The time that you are riding on the bus that started at one bus stop and the distance from the bus to the next bus stop.
③ The quantity of orange juice consumed and the remaining amount.

distance increases as fuel decreases
both time and distance increases
quantity consumed increases as remaining decreases

Page 212

2 The children are going to connect 10 cm tapes as shown in the figure below. The length of each overlapping section is 1 cm.



① If we connect 2 pieces of tape in this way, what is the total length in cm? 19 cm

② Write the numbers in the table below.

Number of Pieces of Tape and Total Length

Number of piece of tape	1	2	3	4	5	6	7	8	9
Total length(cm)	10	19	28	37	46	55	64	73	82

③ If we connect 10 pieces of tape, what is the total length in cm? 91 cm

Let's calculate. Grade 4 Do you remember?

① 8.6×68 584.8 ② 24.8×65 1612 ③ 0.79×5 3.95
④ 5.1÷3 1.7 ⑤ 32.2÷7 4.6 ⑥ 45.6÷48 0.95
⑦ $\frac{5}{9}+\frac{8}{9}$ $1\frac{4}{9}$ ⑧ $1\frac{3}{4}+\frac{3}{4}$ $2\frac{1}{2}$ ⑨ $6\frac{1}{5}+3\frac{4}{5}$ 10
⑩ $\frac{5}{6}-\frac{1}{6}$ $\frac{2}{3}$ ⑪ $3\frac{5}{8}-1\frac{7}{8}$ $1\frac{3}{4}$ ⑫ $2-1\frac{2}{3}$ $\frac{1}{3}$

Problems

1 Let's look at the relationships between the 2 quantities shown below. In which, are "both increasing" and in which is "one increasing and one decreasing?"

● Understanding the relationship between 2 quantities.

① Day time and night time in a day.
② The number of times phone calls are made and the fees.

One increase while the other decrease
Both increase

2 Summarise the 2 quantities that change together.

● Understanding the relationship between 2 quantities from a table.

A string is cut at several points. Check the relationship between the number of cuts and the pieces of string.

① When the number of cuts increase, what else increases? Pieces of strings
② Make a table and find the relationship.

Number of Cuts and Pieces of String

Number of cuts	1	2	3	4	5	6	7	8
Pieces of string	2	3	4	5	6	7	8	9

③ How many times should we cut the string to make 10 pieces? 9 times

3 Let's investigate the relationship between the length of one side and the perimeter of a square.

● Understanding the relationship between 2 quantities from a table.

① Let's fill in the table.

Length of One Side and Perimeter of a Square

Length of one side (cm)	1	1.5	2	3	4	5
Perimeter (cm)	4	6	8	12	16	20

② Let's represent the relationship by the mathematical sentence when one side is □ cm and the perimeter is ○ cm. 4 × □ = ○

③ What is the length of the side of the square when the perimetre is 36 cm? 4 × □ = 36
□ = 36 ÷ 4 = 9cm

Lesson Flow

1 ① **Understand the relationship between 2 quantities which change together.**

S Understand each situation and consider when one quantity increases the other quantity increases or decreases.

2 ② **Understand the relationship between the length of tape and overlapping section.**

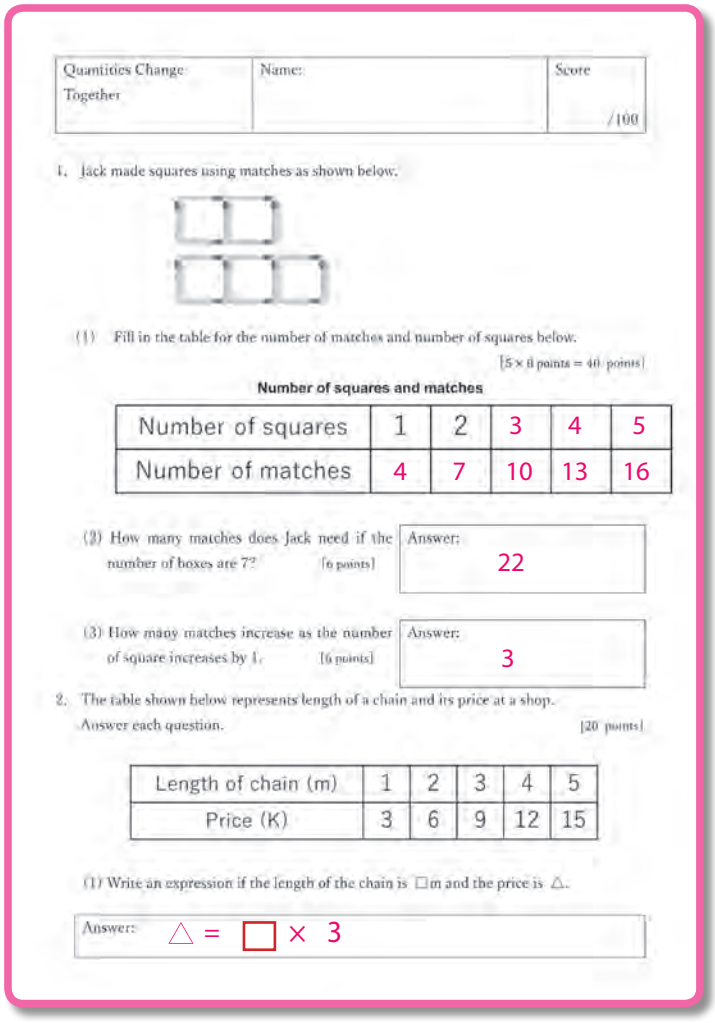
T Let the students notice that there is overlapping section when two tapes are connected.

TN Relationship between number of tapes and overlapping section.
1 tape : Overlapping section is 0
2 tapes: Overlapping section is 1
3 tapes: Overlapping section is 2
The number of overlapping section
＝The number of tape－1

T If we connect 10 pieces of tape, what is the total length in cm?

S 10×10－1×9＝91

3 **Do the exercise of 'Do you remember?'**



Quantities Change Together | Name: | Score /100

1. Jack made squares using matches as shown below.

(1) Fill in the table for the number of matches and number of squares below. [5×8 points = 40 points]

Number of squares and matches

Number of squares	1	2	3	4	5
Number of matches	4	7	10	13	16

(2) How many matches does Jack need if the number of boxes are 7? [6 points] Answer: 22

(3) How many matches increase as the number of square increases by 1. [6 points] Answer: 3

2. The table shown below represents length of a chain and its price at a shop. Answer each question. [20 points]

Length of chain (m)	1	2	3	4	5
Price (K)	3	6	9	12	15

(1) Write an expression if the length of the chain is □m and the price is △.

Answer: △ = □ × 3

4 ① **Understand the relationship between 2 quantities which change together.**

S Think about each situation and consider when one quantity increases the other will increase or decrease.

5 ② **Understand the relationship between 2 quantities based on the table.**

T How many times should we cut the string to make 10 pieces?

S (The number of cut)＋1＝10 (The number of string)
10－1＝9 9 times

6 ③ **Make a mathematical sentence of the relationship between 2 quantities.**

T How many sides are there in a square?

S 4

T When a side is 1.5 cm, how many cm is the perimeter?

S 1.5×4＝6 cm

T Complete the table.

T Let's make a mathematical sentence when one side is □ cm and the perimeter is ○ cm.

S □×4＝○

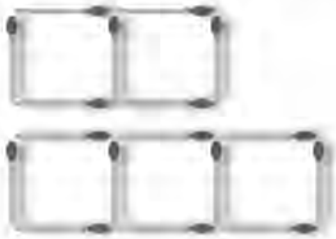
T What is the length of the side of the square when the perimeter is 36cm?

S □×4＝36, □＝36÷4＝9, 9 cm

End of Chapter Test: Chapter 19 **Date:**

Quantities Change Together	Name:	Score /100

1. Jack made squares using matches as shown below.



(1) Fill in the table for the number of matches and number of squares below.

[5 × 8 points = 40 points]

Number of squares and matches

Number of squares	1	2			
Number of matches					

(2) How many matches does Jack need if the number of boxes are 7? [6 points]

Answer:

(3) How many matches increase as the number of square increases by 1. [6 points]

Answer:

2. The table shown below represents length of a chain and its price at a shop. Answer each question. [20 points]

Length of chain (m)	1	2	3	4	5
Price (K)	3	6	9	12	15

(1) Write an expression if the length of the chain is □m and the price is △.

Answer:

Chapter 20 Summary of the Grade 4

This chapter is a summary of all the contents in Grade 4.
It is important for the students to acquire a procedural fluency in mathematics. That is not just understanding facts or procedures but using various procedures depending on the situation.
Various problems learned in Grade 4 are included in this chapter, so please give sufficient time to students to solve all the problems.

Unit 20

Unit: Summary of Grade 4
Sub-unit: Summary of Grade 4
Lesson 1 of 4 (Single Period)

Textbook Page : p.218
Actual Lesson 141

Lesson Objectives

- To read a table and draw a graph correctly.

Prior Knowledge

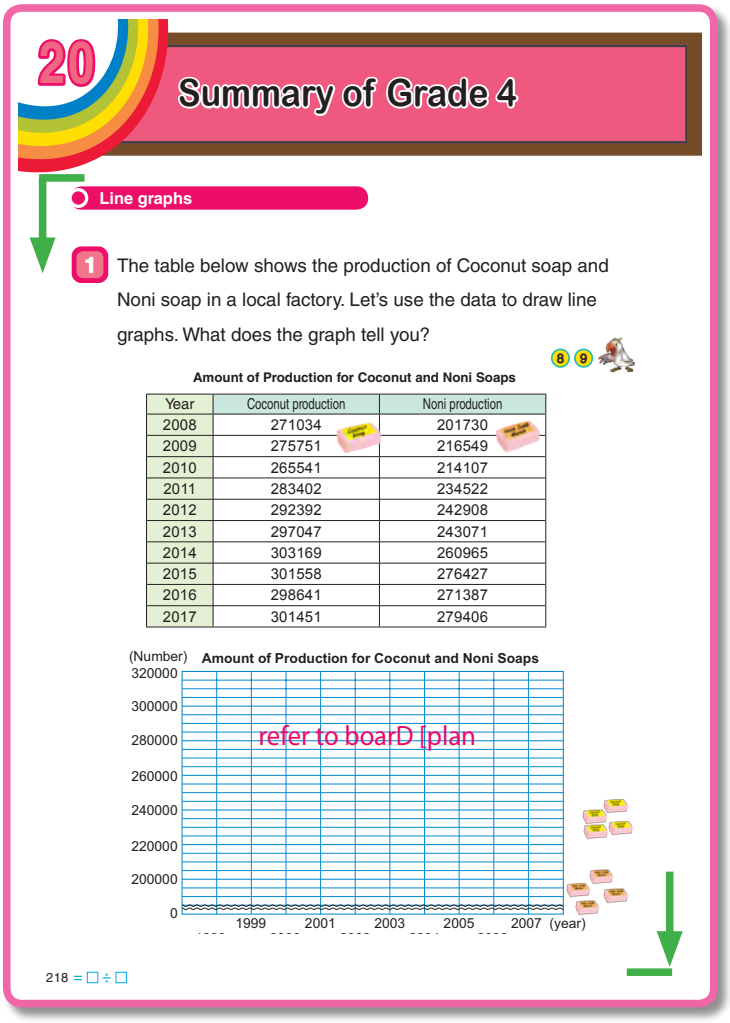
- Data and mathematical relations in grade 4

Preparation

- Graph sheets

Assessment

- Solve the problems remembering what they learned in Grade 4. F
- Complete the exercise correctly. S



20 Summary of Grade 4

Line graphs

1 The table below shows the production of Coconut soap and Noni soap in a local factory. Let's use the data to draw line graphs. What does the graph tell you?

8 9

Amount of Production for Coconut and Noni Soaps

Year	Coconut production	Noni production
2008	271034	201730
2009	275751	216549
2010	265541	214107
2011	283402	234522
2012	292392	242908
2013	297047	243071
2014	303169	260965
2015	301558	276427
2016	298641	271387
2017	301451	279406

(Number) Amount of Production for Coconut and Noni Soaps

218 = □ ÷ □

Lesson Flow

1 ① Draw line graphs.

T Confirm that 4 unit shows 20000.

T 1 unit shows how many?

S 5000

TN Drawing the line graph the numbers can be rounded off to the nearest 10 thousands

S Draw two graphs, production of coconuts and noni soaps.

2 Share the finding from the graph.

T What did you find from the graph?

S The amount of coconuts is always higher than the amount of noni soaps.

S The both production are increasing.

S The difference between amount of coconuts and amount of noni soap is becoming less.

TN Whatever students identify can be added on.

Sample Blackboard Plan (Lesson 141)

Date: Chapter 20: Summary of Gr 4 Topic: Summary of Grade 4 Lesson Number: 1 out of 4

Main Task: Let's review how to arrange and represent data.

Line graphs

1 The table below shows the production of coconut soap and noni in a local factory.

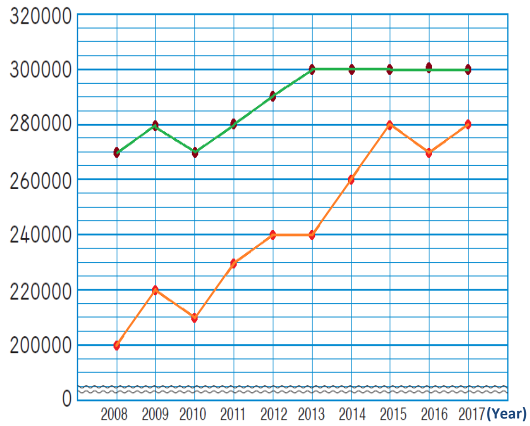
Amount of Production for coconut and noni soap

Year	Coconut production	Noni production
2008	271034	201730
2009	275751	216549
2010	265541	214107
2011	283402	234522
2012	292392	242908
2013	297047	243071
2014	303169	260965
2015	301558	276427
2016	298641	271387
2017	301451	279406

MT: Introduce main task here.

① Let's use the data to draw line graphs.

Amount of Production for coconut and noni soap



② What does the line graph tell you?

1. The graph is about the production of coconut and noni soap in a local factory.
2. There are two lines graphs
3. The line graph tells us that the amount of coconuts is always higher than the amount of noni soaps.
4. Both productions are increasing.
5. The difference between the amount of coconuts and noni soap is becoming less.

③ **Summary**

- The horizontal axis shows the year of production and the vertical axis shows figures of the amount of produce for coconut and noni .
- The scale of 1 unit is 5000 and the scale of 4 units is 20000.
- In order to draw the line graph , the numbers were rounded off to the nearest 10 thousands.

Exercise

Sample Blackboard Plan (Lesson 142)

Date: Chapter 20: Summary of Gr 4 Topic: Summary of Grade 4 Lesson Number: 2 out of 4

Main Task: Let's think about how to calculate and solve.

MT: Introduce main task here.

Numbers and Calculations

1 Let's read the following numbers and round to the place as shown in the ().

① 3 824 901 → 3 820000

② 64 098 172 → 64 000 000

③ 2 715 205 860 432 → 2 720 000 000 000

2 Let's write the following numbers in numerals.

① 300 sets of100 million and 68 sets of 10 thousand.

300 ×100= 300 000 and 68×10=180
Ans: 300 billion and Ans: 180 thousand

② 100 times 80 billion → 100 ×80= 8000 Ans: 8 trillion

③ 250 million divided by 10 → 250÷10=25 Ans: 25 million

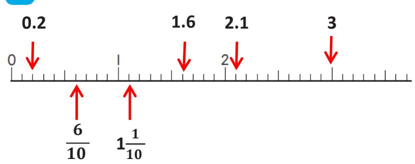
④ 5 sets of1and 3 sets of 0.1 → 5.3

⑤ 12 sets of 0.1 → 1.2

⑥ 4 sets of → 4× =

⑦ Mixed fractions and improper for 11 sets of → 11× = =1

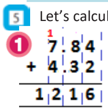
3 Let's write the following numbers on the number line.



4 Let's arrange these numbers from the largest to the smallest.

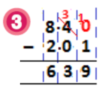
8, 0, 0.8, .0.08, 0.808

5 Let's calculate.

① 

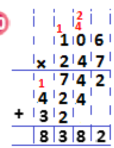
④

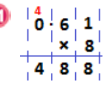
⑧

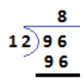
③ 

⑥

⑨

⑩ 

⑪ 

⑬ 

Exercise

1. Try to complete the activities not done as well as task 6,7, 8, 9, 10, 11 and 12 as homework.

Unit 20

Unit: Summary of Grade 4
Sub-unit: Summary of Grade 4
Lesson 2 of 4 (Single Period)

Textbook Page : p.219-221
Actual Lesson 142

Lesson Objectives

- To review and confirm number and calculation in Grade 4.

Prior Knowledge

- Number and calculation in grade 4

Preparation

- Refer to each task and teacher can improvise.

Assessment

- Solve the problems remembering what they learned in Grade 4. F
- Solve the exercise correctly. S

Numbers and Calculations

1 Let's read the following numbers. Round them to the place as shown in ( ).

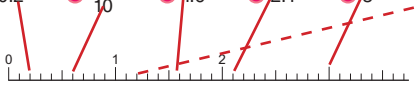
1. 3 824 901 (ten thousand) 3 820 000
2. 64 098 172 (million) 64 000 000
3. 2 715 205 860 432 (ten billion) 2 720 000 000 000

2 Let's write the following numbers in numerals.

1. 300 sets of 100 million and 68 sets of 10 thousand. 300 068 000
2. 100 times 80 billion. 8 000 000 000 000
3. 250 million divided by 10. 25 000 000
4. 5 sets of 1 and 3 sets of 0.1. 5.3
5. 12 sets of 0.1. 1.2
6. 4 sets of $\frac{1}{5}$. $\frac{4}{5}$
7. Mixed fractions and improper fractions for 11 sets of $\frac{1}{7}$. $\frac{11}{7}$ $1\frac{4}{7}$

3 Let's write the following numbers on the number line.

1. 0.2
2. $\frac{6}{10}$
3. 1.6
4. 2.1
5. 3
6. $1\frac{1}{10}$



4 Let's arrange these numbers from the largest to the smallest.

0.08 8 0.8 0.808 0

8, 0.808, 0.8, 0.08, 0

5 Let's calculate.

1. 7.84 + 4.32 12.16	2. 16.89 + 5.3 22.19	3. 8.4 − 2.01 10.41
4. $\frac{3}{8}+\frac{7}{8}$ $1\frac{1}{4}$	5. $2\frac{2}{7}+\frac{6}{7}$ $3\frac{1}{7}$	6. $1\frac{7}{9}+4\frac{7}{9}$ $6\frac{5}{9}$
7. $1\frac{1}{3}-\frac{2}{3}$ $\frac{2}{3}$	8. $8\frac{1}{5}-2\frac{3}{5}$ $5\frac{3}{5}$	9. $3-\frac{5}{6}$ $2\frac{1}{6}$
10. 106 × 247 26 182	11. 0.61 × 8 4.88	12. 0.24 × 75 18
13. 96 ÷ 12 8	14. 864 ÷ 36 24	15. 080 ÷ 72 1.1
16. 75.2 ÷ 8 9.4	17. 3.68 ÷ 16 0.23	18. 45 ÷ 36 1.25

6 There are 144 packages that must be put on 3 trucks, with each truck carrying the same number of packages. How many packages are placed on each truck?

144 ÷ 3 = 48 48 packages

7 Look at the following calculations. Find the errors and correct them.

1. $10-3\times2=7\times2$ $= 10-6$
   $=14$ $=4$
2. $21+80\times(13-7)=101\times6$ $= 21+480$
   $=606$ $=501$

8 127 grade 4 children are going to Loloata Island by boat. Only 25 children can go at a time.

1. How many trips will it take to carry all children to the Island? 6 trips
2. We want to carry the same number of children in 6 trips. How should the number of children be divided?

5 trips of 23 students and a trip of 22 students

□ × □ = 219 220 = □ ÷ □

Lesson Flow

1 ① Round the numbers.

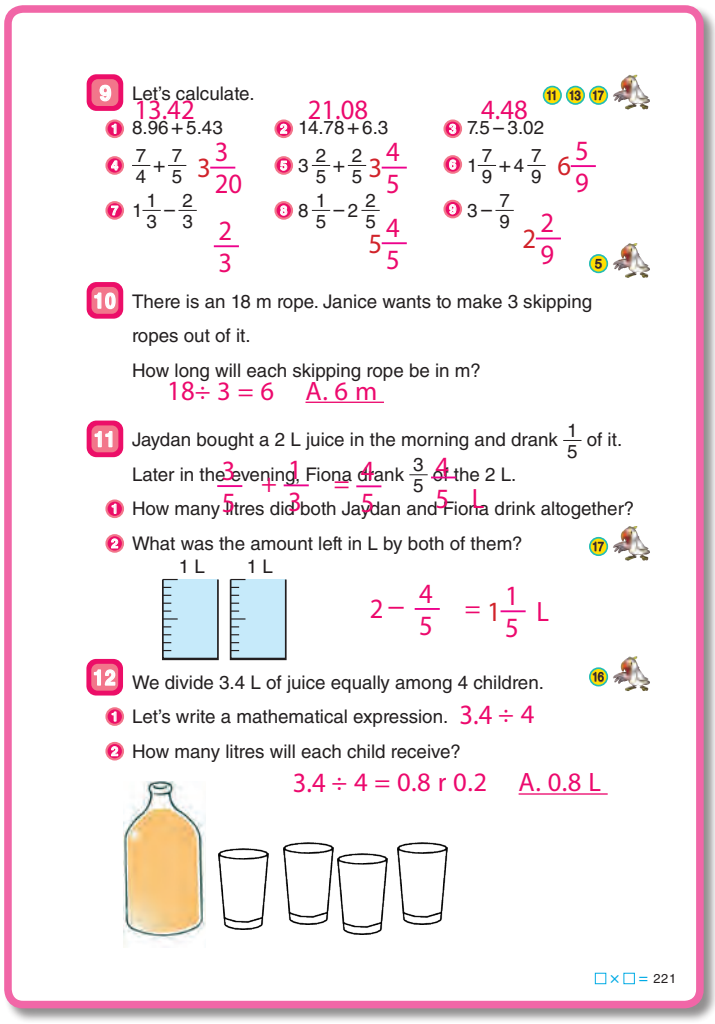
T Confirm how to read numbers.
T Confirm the meaning of rounding.
S Think of which place should be focused to round in indicated place.

2 ② Confirm the structure of whole number, fraction and decimal.

T Summarise the decimal system using place value chart.
T Summarise how the number after multiplying 10, 100 or $\frac{1}{10}$.
T Confirm the relationship between improper fraction and mixed fraction.

3 ③ Deepen understanding of numbers by expressing them on the number line.

T What is 1 scale unit on the number line?
S 0.1
T Let the students focus on the denominator of fraction first and then think about where the numerator should be expressed on the number line.



9 Let's calculate. ⑪ ⑬ ⑰

① 8.96 + 5.43 = 13.42
② 14.78 + 6.3 = 21.08
③ 7.5 − 3.02 = 4.48
④ $\frac{7}{4}+\frac{7}{5}=3\frac{3}{20}$
⑤ $3\frac{2}{5}+\frac{2}{5}=3\frac{4}{5}$
⑥ $1\frac{7}{9}+4\frac{7}{9}=6\frac{5}{9}$
⑦ $1\frac{1}{3}-\frac{2}{3}=\frac{2}{3}$
⑧ $8\frac{1}{5}-2\frac{2}{5}=5\frac{4}{5}$
⑨ $3-\frac{7}{9}=2\frac{2}{9}$ ⑤

10 There is an 18 m rope. Janice wants to make 3 skipping ropes out of it.
How long will each skipping rope be in m?
18 ÷ 3 = 6 A. 6 m

11 Jaydan bought a 2 L juice in the morning and drank $\frac{1}{5}$ of it.
Later in the evening, Fiona drank $\frac{3}{5}$ of the 2 L.
① How many litres did both Jaydan and Fiona drink altogether? $\frac{1}{5}+\frac{3}{5}=\frac{4}{5}$ L
② What was the amount left in L by both of them? ⑰
1 L 1 L
$2-\frac{4}{5}=1\frac{1}{5}$ L

12 We divide 3.4 L of juice equally among 4 children. ⑯
① Let's write a mathematical expression. 3.4 ÷ 4
② How many litres will each child receive?
3.4 ÷ 4 = 0.8 r 0.2 A. 0.8 L

□ × □ = 221

S Solve the task.

4 ④ Compare the numbers

T To compare numbers, from which place value do we have to compare, the largest or smallest ?
S Largest place value
TN When it is difficult to compare the numbers, use a place value chart.

5 ⑤ Do 4 operations of decimal number and addition and subtraction of fraction.

T Confirm the method of each calculation.
TN In case when most students face difficulty, explain the method step by step on the black board.

6 ⑥ Solve word problem of division.

S Read and understand the problem.
T Which operation should we use?
S Division.
S Make mathematical expression and solve it.

7 ⑦ Find and correct mistakes.

T Let students focus on the order of calculation.
- Multiplication and division are calculated first.
- When there are parentheses, calculate the expression in the parenthesis first.

8 ⑧ Solve word problems of division with remainder.

T Confirm how to treat remainder.
(1) Remainder (Children) also go to the top of the mountain.
(2) The remainder (Children) has to be added for a cable car.

Sample Blackboard Plan

Sample blackboard plan refer to page 317.

Unit 20

Unit: Summary of Grade 4
Sub-unit: Summary of Grade 4
Lesson 3 of 4 (Single Period)

Textbook Page :
p.222-224
Actual Lesson 143

Lesson Objectives

- To review and confirm geometry and measurement in Grade 4.

Prior Knowledge

- Geometry and measurement in Grade 4.

Preparation

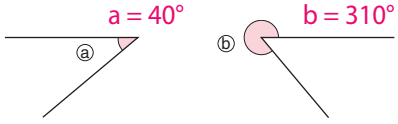
- Protractor

Assessment

- Solve the problems remembering what they learned in Grade 4. F
- Solve the exercise correctly. S

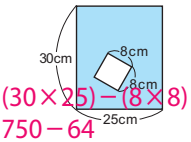
Measurement and Shapes

1 How many degrees are the angles ⓐ and ⓑ? 4

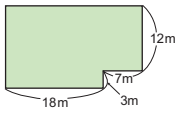


2 Let's draw angles of 70° and 123°. 4

3 Let's find the areas of the shaded parts. 12



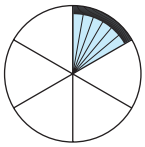
$(30 \times 25) - (8 \times 8)$
$750 - 64$
$686\ cm^2$



$(18 \times 12) - (7 \times 3)$
$216 - 21$
$195\ cm^2$

Why Are the Degrees of a Circle Equal to 360 Degrees?

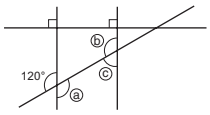
About 6000 years ago in ancient Babylonia, people divided a circle into 6 equal sections and then divided each part into 60 equal parts that they called "one degree."
The degrees of a circle equal 360°.
At that time in Babylonia, people used a method of counting that was based on 60. They defined a circle as 360 degrees because 1 year is approximately 360 days.



Quadrilaterals and Net

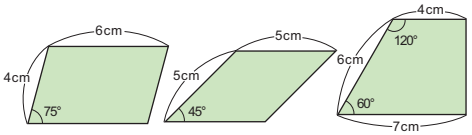
1 How many degrees are the angles ⓐ, ⓑ and ⓒ on the right? 6

a = 120° b = 120° c= 60°

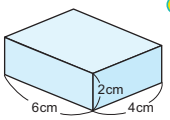


2 Let's draw the following quadrilaterals. 6

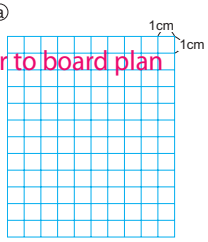
❶ Parallelogram ❷ Rhombus ❸ Trapezoid



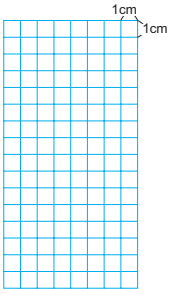
3 We made a rectangular prism box shown on the right. Let's draw its nets on the graph below. 18



ⓐ refer to board plan



ⓑ



222 = □ ÷ □

□ × □ = 223

Lesson Flow

1 ① Measure the angle using protractor.

T Confirm how to use protractor correctly.
1. Put the center of protractor on the vertex of angle.
2. Align the 0° with one side of the angle.
3. Read the degree which overlap the other side of the angle.

T To find angle b, measure the smaller angle first and subtract the angle from 360°.

S Solve the task.

2 ② Draw the angle using protractor.

T Confirm the steps to draw the angle.

S Solve the task.

T Let the students measure the angle to check whether it is drawn accurately.

3 ③ Find the area of combined figure

T Let students explain how to find the area.

S There are 3 ways to find the area in figure 2.

$12\times25+3\times18=354\ (m^2)$
$15\times18+12\times7=354\ (m^2)$
$15\times25-3\times7=354\ (m^2)$

4 ① Find angles using definition of parallel and perpendicular lines.

T Let students remember the definition of parallel and perpendicular lines.

T Confirm that straight line is 180°.

S Understand that angles can be found using the definition of parallel and perpendicular lines instead of using protractor.

S Solve the task.

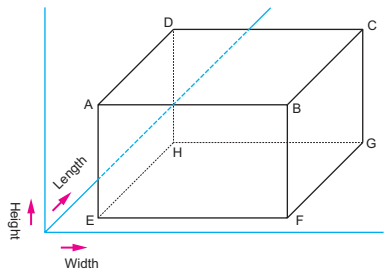
5 ② Draw various quadrilaterals.

S Explain how to draw each quadrilateral.

6 ③ Draw the nets of rectangular prism.

S Think of two nets focusing on the connection of faces.

4 A rectangular prism box is set as follows. ⑱
Let's answer the questions.



① Vertices A, E, F, G and H are represented as follows;

A (1, 1, 3) E (1, 1, 0)
F (6, 1, 0) G (6, 5, 0)
H (1, 5, 0)

Let's write the positions of vertices B, C and D. Explain why.
B (6, 1, 3) C (6, 5, 3) D (1,5, 3)

② When the unit scale is 1 cm for the length, the width and the height. Find the area of figure below.

Ⓐ Rectangle EFGH
Ⓑ Rectangle AEFB $4\times5=20$ $20cm^2$
Ⓒ Rectangle BFGC $5\times5=25$ $25cm^2$
$4\times3=12$ $25cm^2$

224 = □ ÷ □

Sample Blackboard Plan

Sample blackboard plan refer to page 323.

Unit 20

Unit: Summary of Grade 4
Sub-unit: Summary of Grade 4
Lesson 4 of 4 lesson (Single Period)

Textbook Page : p.225
Actual Lesson 144

Lesson Objectives

- To review and confirm about mathematical relations in Grade 4.

Prior Knowledge

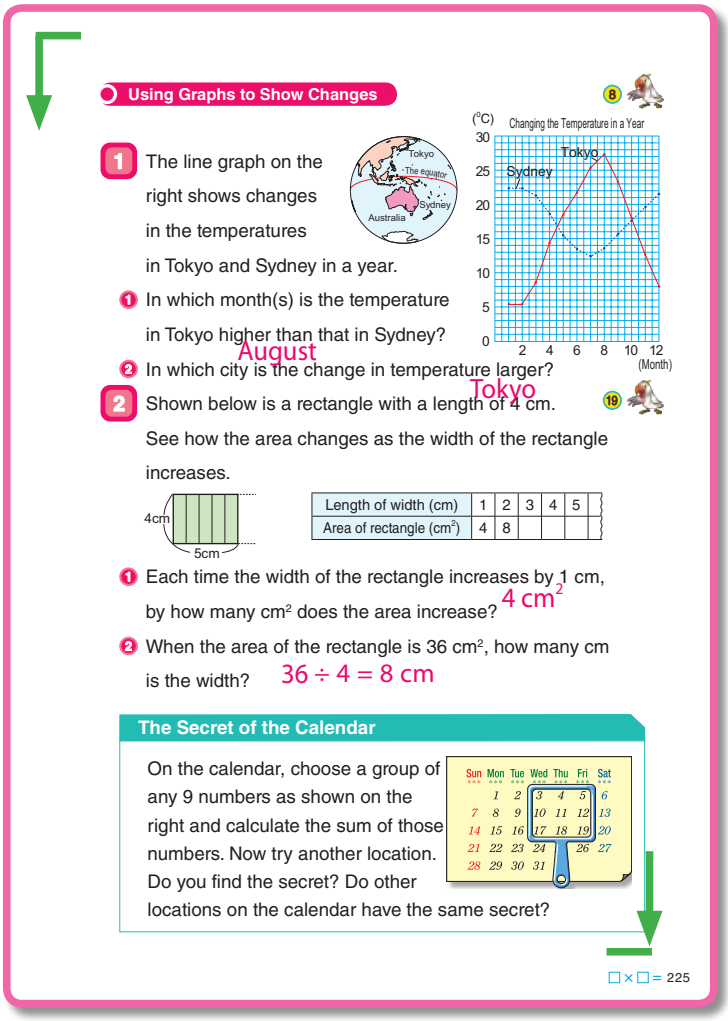
- Data and mathematical relations in grade 4.

Preparation

- Refer to the tasks and teacher may improvise.

Assessment

- Solve the problems remembering what they learned in Grade 4. F
- Complete the exercise correctly. S



Using Graphs to Show Changes

8

1 The line graph on the right shows changes in the temperatures in Tokyo and Sydney in a year.

1 In which month(s) is the temperature in Tokyo higher than that in Sydney? August

2 In which city is the change in temperature larger? Tokyo

19

2 Shown below is a rectangle with a length of 4 cm. See how the area changes as the width of the rectangle increases.

Length of width (cm)	1	2	3	4	5	
Area of rectangle (cm^2)	4	8				

1 Each time the width of the rectangle increases by 1 cm, by how many cm^2 does the area increase? $4\ cm^2$

2 When the area of the rectangle is 36 cm^2, how many cm is the width? $36 \div 4 = 8$ cm

The Secret of the Calendar

On the calendar, choose a group of any 9 numbers as shown on the right and calculate the sum of those numbers. Now try another location. Do you find the secret? Do other locations on the calendar have the same secret?

□×□= 225

Lesson Flow

1 Using Graphs to show changes

T Introduce task 1.
S Read and understand the situation given.
T 1 In which month is the temperature in Tokyo higher than that in Sydney?
S In the month of August.
T 2 In which city is the change in temperature larger?
S Tokyo

2 Using Table to show changes

T Introduce task 2.
S Read and understand the situation given.
T Each time the length of the rectangle increases by 1 cm, by how many cm^2 does the area increase?
S 4 cm^2
T When the area of the rectangle is 36 cm^2, how many cm is the width?
S $36 \div 4 = 8$ cm

3 The Secret of the Calendar

T Let the students work on the secret in the calender.
TN Guide the students carefully with the instructions given in the textbook.

Sample Blackboard Plan (Lesson 143)

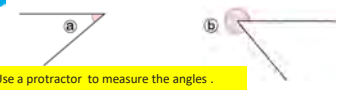
Date: Chapter 20: Summary of Gr 3 Topic: Summary of Grade 3 Lesson Number: 3 out of 4

Main Task: Let's think about how to calculate and solve.

MT: Introduce main task here.

Measurement and Shapes

1 Let's find how many degrees do these angles measure.

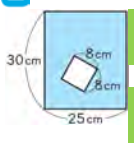


Use a protractor to measure the angles .

2 Let's draw angles of and .

Use a protractor to draw the angles .

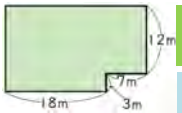
3 Let's find the area of the shaded parts.



L × W
30 ×25 = 750
Ans: 750cm2

S × S
8 × 8 = 16
Ans: 16cm2

Area of shaded part
750 – 16 = 734
Ans:734cm2

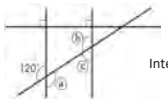


L × W
18 ×12 = 216
Ans: 216cm2

L × W
12 ×7 = 84
Ans: 84cm2

Area of shaded part
216 + 84 = 300
Ans:300cm2

4 Let's find how many degrees are these angles.



opposite angles are the same

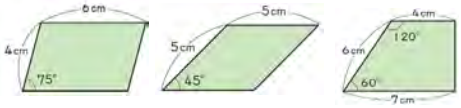
Intersected lines crosses at same angles

Supplementary to angle *b*

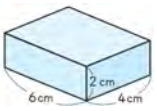
Two lines which are intersected by a line at the same angles are parallel.

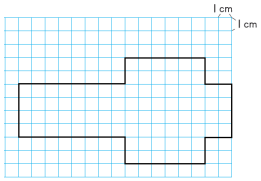
5 Let's draw the following quadrilaterals and explain

1. Parallelogram
2. Rhombus
3. Trapezoid



Let's draw the net of the rectangular prism on the grid.





Exercise

1. Try to complete task 4 on shapes as homework.

Sample Blackboard Plan (Lesson 144)

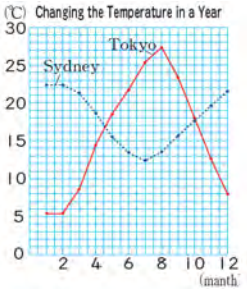
Date: Chapter 20: Summary of Gr 4 Topic: Summary of Grade 4 Lesson Number: 4 out of 4

Main Task: Let's review how to arrange and represent data.

MT: Introduce main task here.

Using graphs to show changes

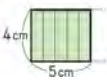
1 The lie graph show changes in temperatures.



1 Let's find which months are the temperatures higher in Tokyo than in Sydney? 5th to the 9th month.

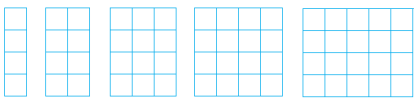
2 Which city is the change in temperature larger? Tokyo

2 Let's investigate how the area changes as the width of the rectangle changes.



Length of width (cm)	1	2	3	4	5
Area of rectangle (cm^2)	4	8			

1 If the width of the rectangle increases by 1cm, by how many cm2 does the area increase? It increases by 2 times 4m2



When the length of width is □ and its area is ◯, let's write a mathematical sentence by using □ and ◯.

Area of rectangle × Length of width = Size of rectangle

4 × □ = ◯

Let's find the area when the length is 3? The area increases together by 3 times therefore 4×3=12

2 When the area of the rectangle is 36m2, how many cm is the width?

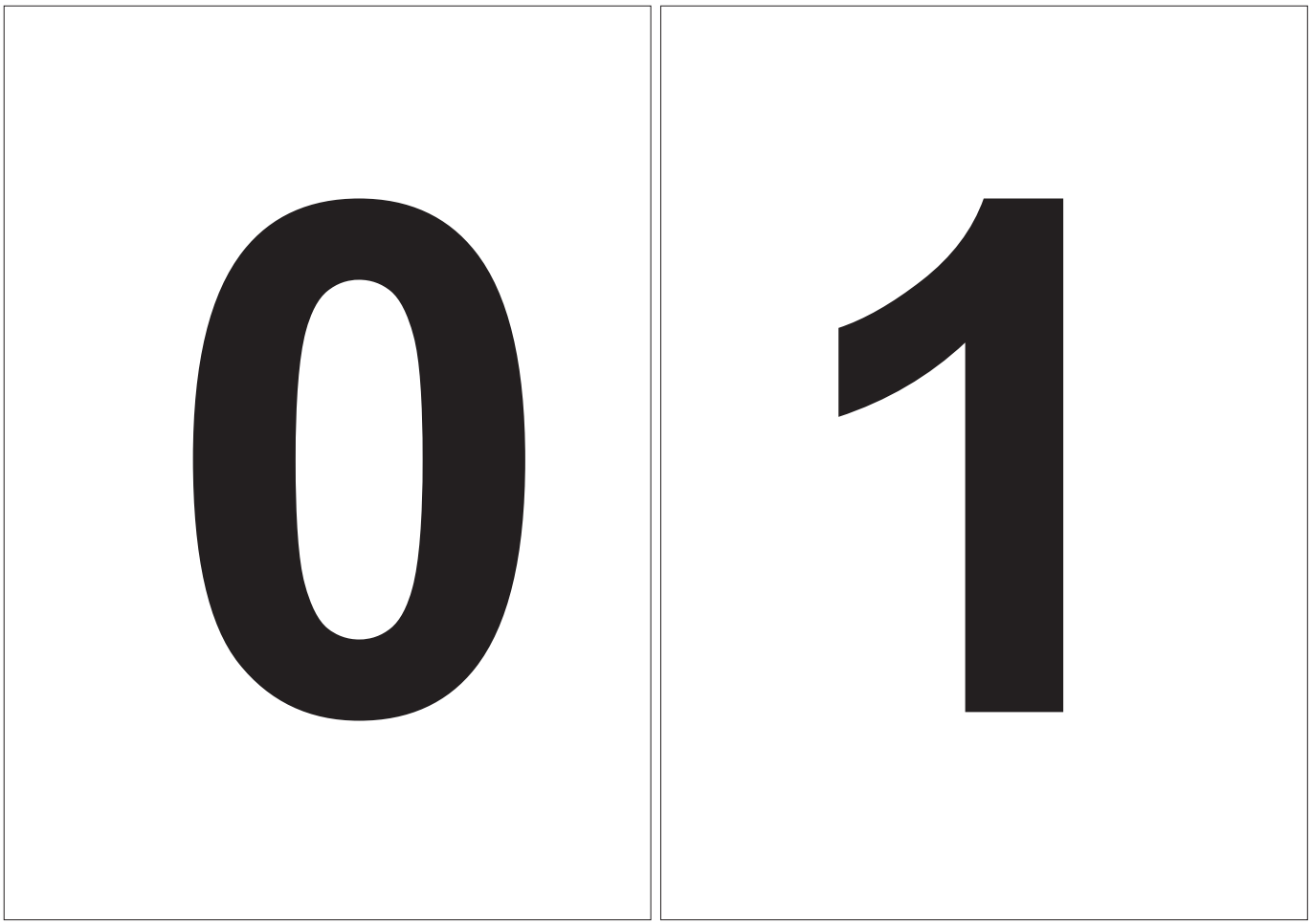
4 × □ = 36

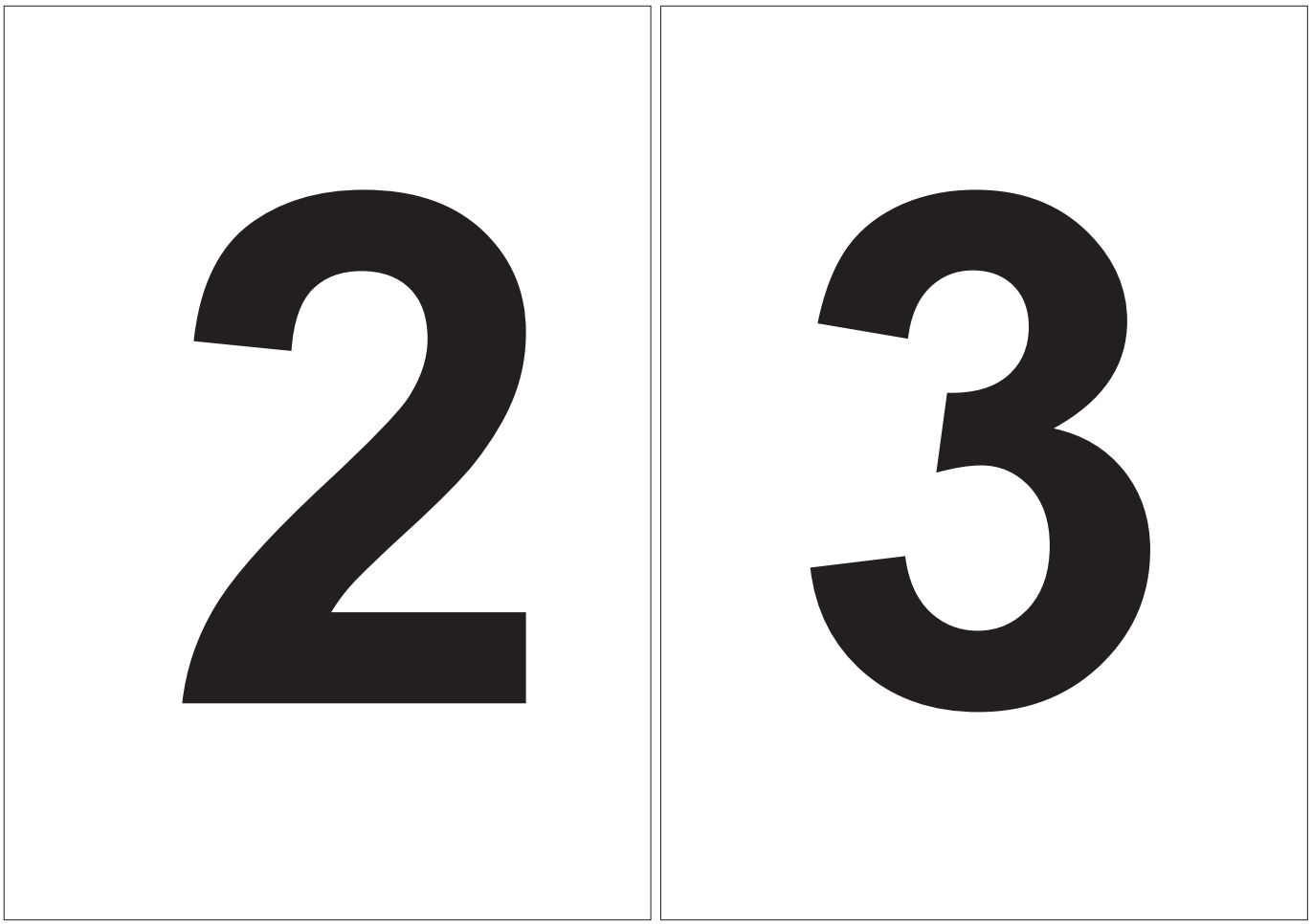
Exercise

Let's think about the multiplication table!

Multiplier \ Multiplicand	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81
10	10	20	30	40	50	60	70	80	90
11	11	22	33	44	55	66	77	88	99
12	12	24	36	48	60	72	84	96	108

Let's have fun for improving Math skills!
Number cards sample, 0 - 9 (Refer to page XIV)



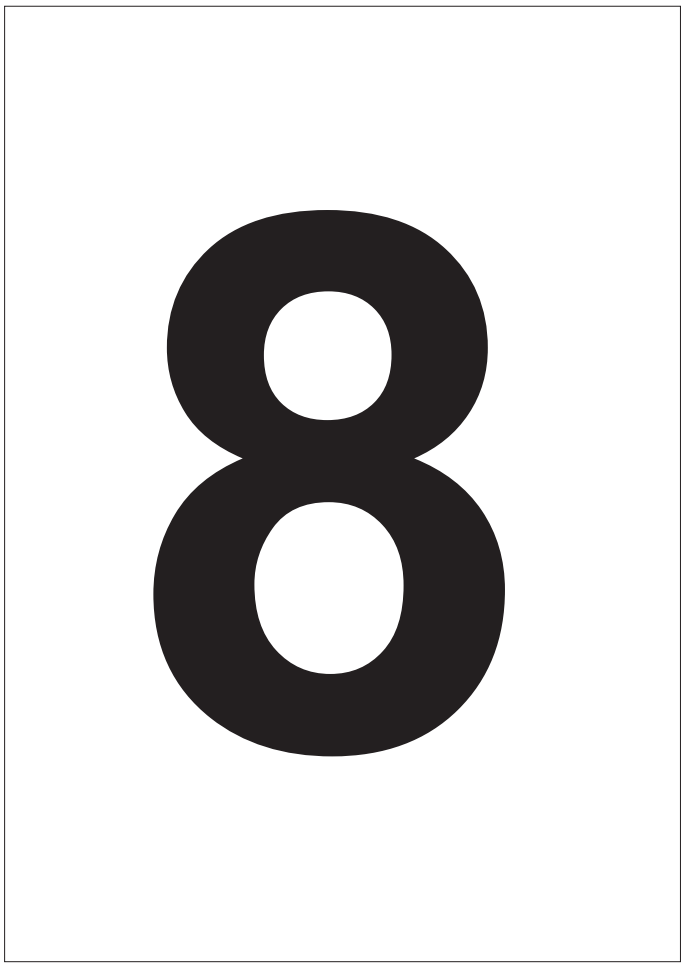


4

5

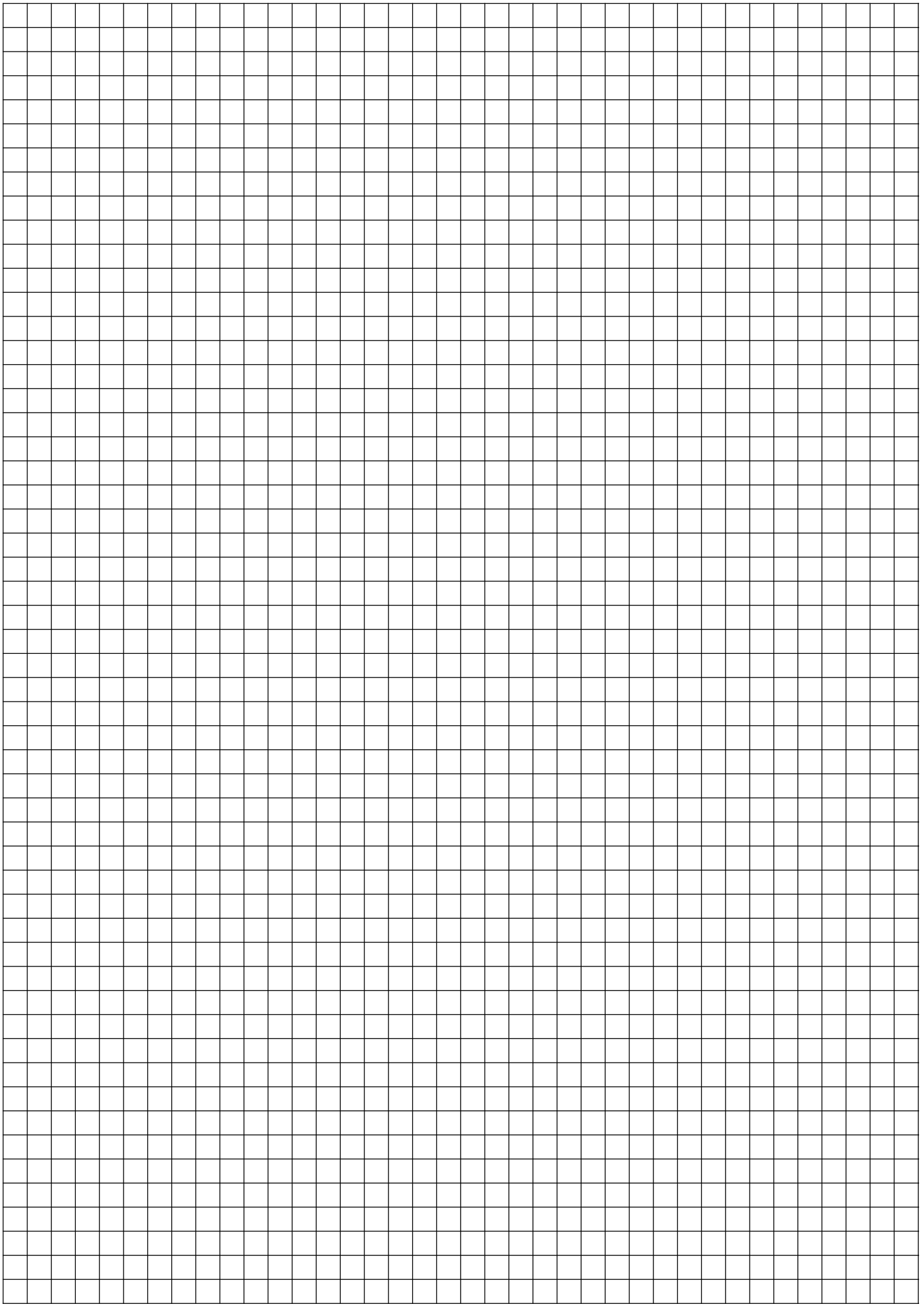
6

7

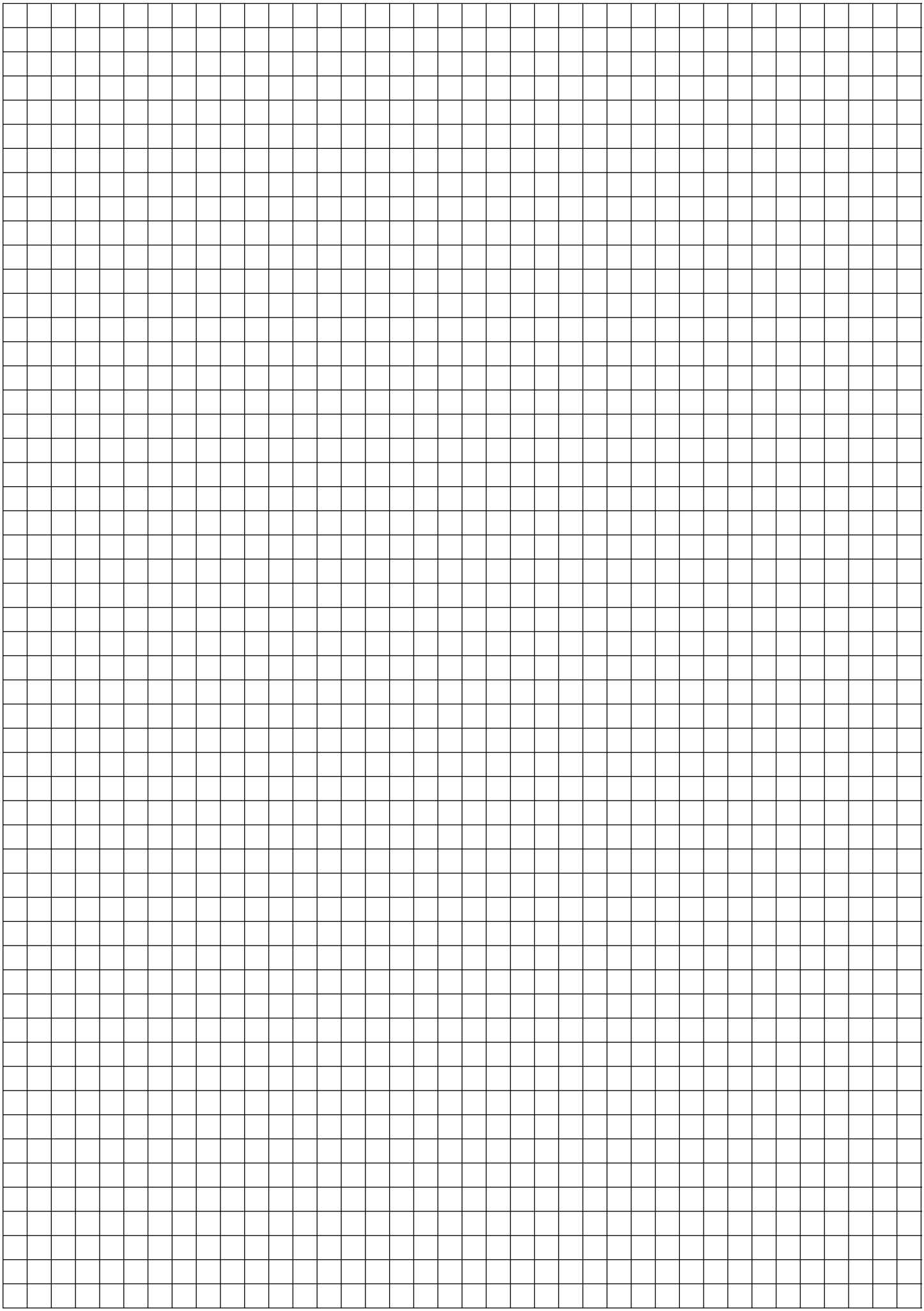

8


9

5mm^2 grid

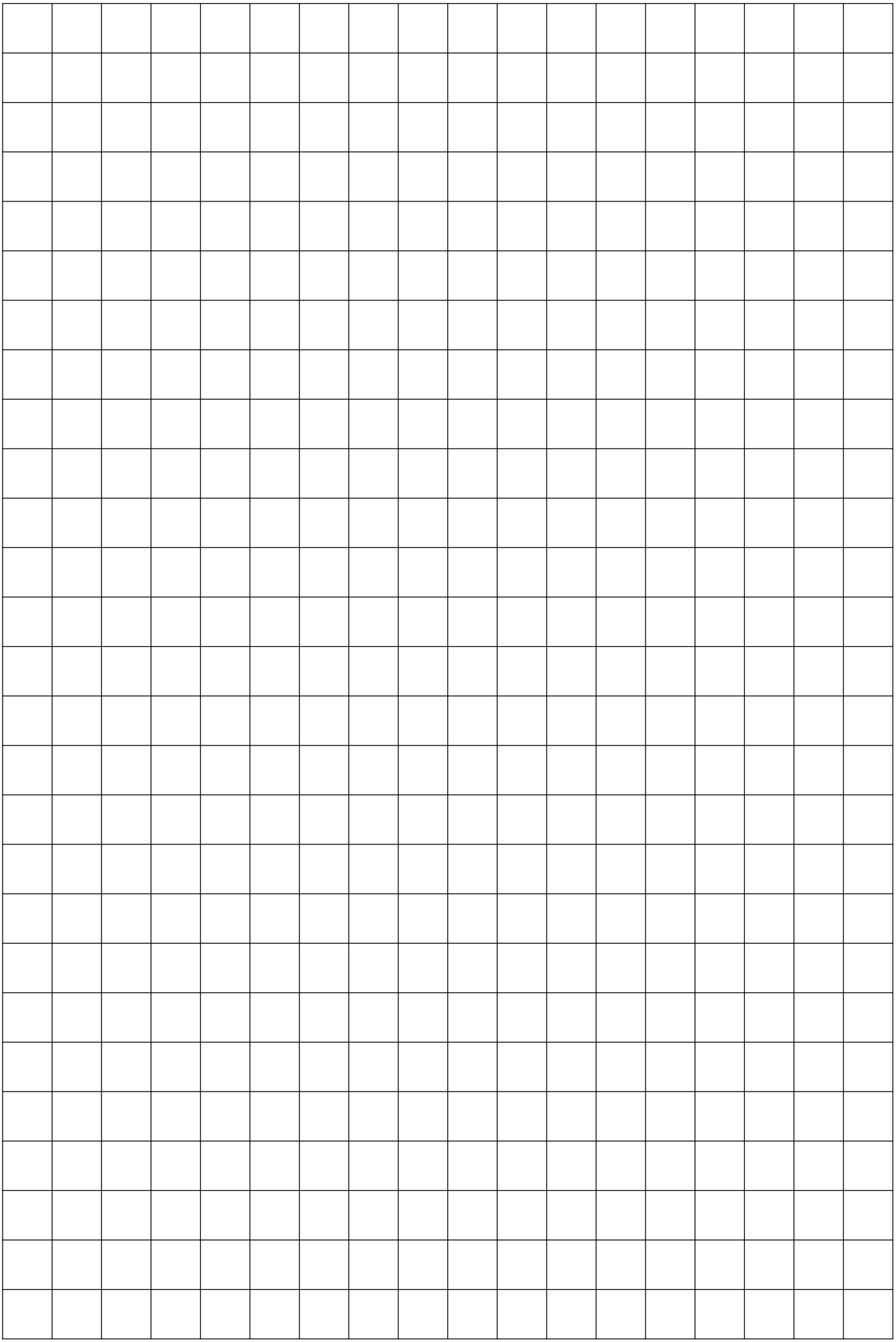


5mm^2 grid

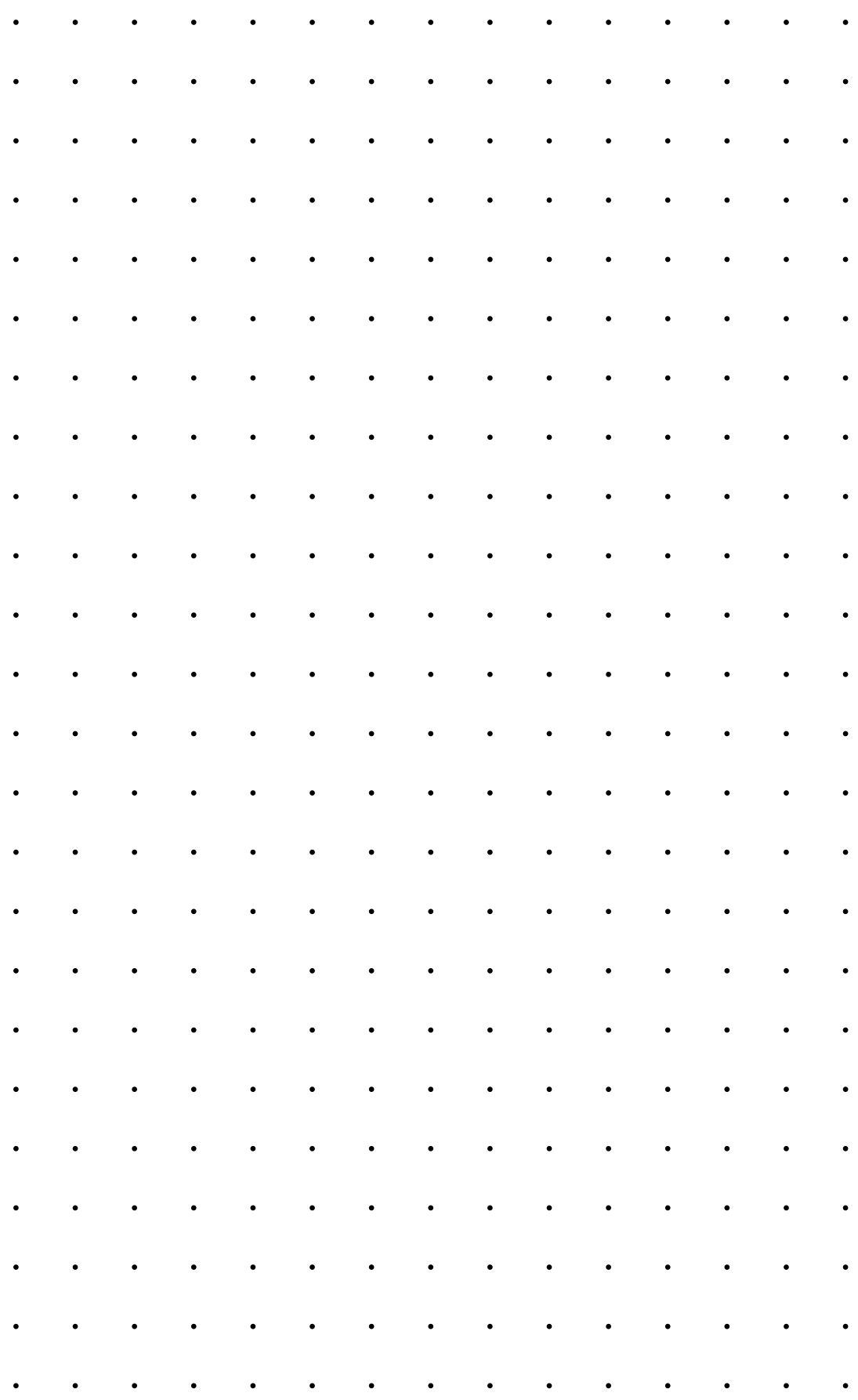


1cm^2 grid

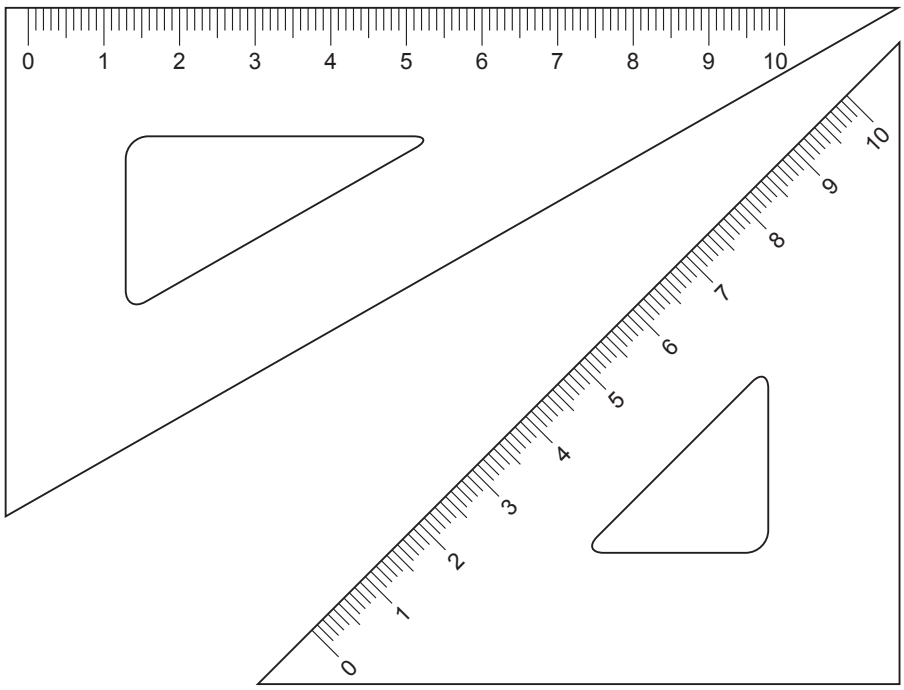
1cm^2 grid

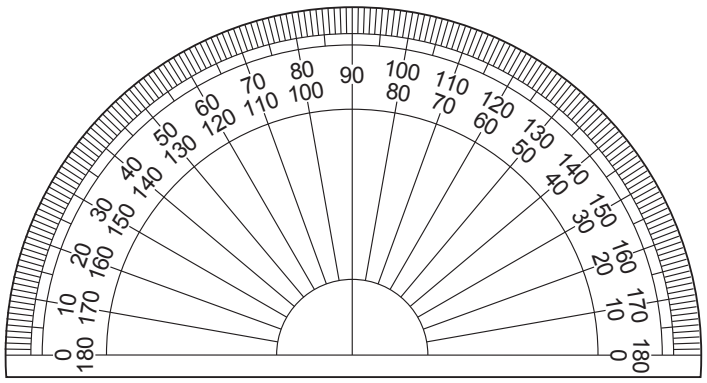


1cm^2 dotted grid



Triangle rulers and protractor





Structure of learning contents in Mathematics from Elementary Prep to Grade 8
Number and Operation

Elementary Prep - Elementary 2

Elementary Prep

+ Natural numbers up to 120

+ Additions and subtractions of one digit numbers
+ Additions and subtractions of simple 2 digit numbers

Elementary 1

+ Natural numbers up to 1000

+ Simple fractions

+ Additions and subtractions of 2 digit numbers
+ Additions and subtractions of simple 3 digit numbers

Elementary 2

+ Natural numbers up to 10000

+ Meaning of multiplication
+ Multiplication table.
+ Multiplication of simple 2 digit numbers

Grade3 - Grade4

Grade 3

+ Natural numbers less than 100 000
+ Addition and subtraction of natural numbers (with carrying & borrowing)
+ Multiplication of natural numbers
+ Meaning of division
+ Division in the simple case where divisors are 1 digit numbers

+The meaning and the representations of decimal numbers
+ Addition and subtraction of decimal numbers (the tenths place)
+The meaning and the representation of fractions
+ Simple addition and subtraction of fractions with same denominator less than 1

Grade 4

+ Natural numbers less than billion
+ Round numbers, round up and round down
+ Division in the case where divisors are 2 digit numbers
+ Acquisition and utilization of 4 operations of natural numbers

+ Addition and subtraction of decimal numbers (the tenths and the hundredths places)
+ Multiplication and division of decimals by whole numbers
+ Addition and subtraction of fractions with same denominators(proper fraction, mixed numbers)

Grade5 - Grade6

Grade 5

+ Even and odd numbers, prime numbers,multiples and divisors
+ Numeration system for decimals, fraction and whole numbers

+ Multiplications and divisions by decimals (tenths and hundredths place, etc)
+ Addition and subtraction of fractions with different denominators

Grade 6

+ Multiplication and division of fractions
+ Calculations that involve both fractions and decimals
+ Consolidation and utilization of the 4 basic operations of decimals and

Grade7 - Grade 8

Grade 7

Positive numbers, negative numbers
+ Necessity and meaning of positive and negative numbers (set of numbers and the 4 fundamental operations)
+ Four basic operations with positive and negative numbers

Algebraic expressions using letters
+ Necessity and meaning of using letters
+ How to express multiplication and division
+ Addition and subtraction with linear expressions
+ Representing with algebraic expressions with letters (representations in inequality)

Linear equations with one unknown
+ Meaning of equations and their solutions
+ Property of equality and how to solve equations
+ Solving and using linear equations (proportional expressions)

Grade 8

Calculations of 4 basic operations with expressions using letters
+ Calculations of addition and subtractions with simple polynomials, as well as multiplication and division with monomials

Simultaneous linear equations with two unknowns
+ Necessity and meaning of simultaneous linear equations with two unknowns and the meaning of their solutions
+ Meaning of simultaneous equations and their solutions
+ Solving simultaneous equations and applying them

Quantities and Measurements

Elementary Prep - Elementary 2

Elementary Prep

+ Comparing amount of length, area, volume (arbritrary)

+ Telling clock times (O'clocks)

Elementary 1

+Unit of length (cm, mm, m)

+ Reading times

Elementary 2

+Unit of volume(L, dL, mL)

+Unit of time (day, hour, minute, second)

Grade3 - Grade4

Grade 3

+Unit of length (km)
+Unit of weight (g, kg, t)

+Calculations with time

Grade 4

+Unit of area (square cm, square m, square km, a, ha)
+Finding area of rectangle and square
+Unit of angle (degree)

Grade5 - Grade6

Grade 5

+Area of triangles, rectangles, parallelograms, trapeziums and rhombi
+Unit of volume (cubic cm, cubic m, mL, kL)
+Volume of cuboids and cubes

+Mean of measurements
+Per unit quantity

Grade 6

+Area of approximate shape
+Area of a circle
+Volume of prisms

+Metric system

+Speed

Grade7 - Grade 8

Grade 7

+Volume cylinders

Geometrical figure

Elementary Prep - Elementary 2

ELementary Prep

+Observing and composing the shapes of planer figures and solid figures

Elementary 1

+Triangles, quadrilaterals, rectangles, squares, right triangles

+shape of a box

Elementary 2

+Circle, sphere

Grade3 - Grade4

Grade 3

+Isosceles triangle, equilateral triangle
+Angle

Grade 4

+Perpendicular and parallel
+Parallelogram, rhombus, trapezium

+Cube, cuboid

Grade5 - Grade6

Grade 5

+Polygons and regular polygons,(irregular polygons)
+Congruence of triangles and quadrilaterals
+Circular constant

+Prisms, cylinders, sketches, nets

Grade 6

+Line symmetry, point symmetry
+Enlarged and reduced figures

Grade7 - Grade 8

Grade 7

Plane figures
+Fundamental methods for constructing of figures and their applications
+Moving figures (parallel translation, symmetric transformation, rotation)

Space figures
+Positional relationship between straight lines and planes
+Structure of space figures and their representation on the plane (sketches, nets, projection drawings)
+Length of arc of a sector and area of the sector
+Surface area and volume of prisms, cones and spheres

Grade 8

Basic plane figures and properties of parallel lines
#Properties of parallel lines and angles
#Properties of angles of polygons

Congruence of plane figures
+Congruence of plane figures and conditions of congruence of triangles
+Necessity, meaning and methods of proof
+Basic properties of triangles and parallelograms

Mathematical relations

Elementary Prep - Elementary 2

Elementary Prep

+Representing the number of objects using pictures and figures

Elementary 1

+Relationship between addition and subtraction

+Basic table and graphs

Elementary 2

+Representing situations where multiplication is used

+Tables and bar graphs in pictorial /symbols

Grade3 - Grade4

Grade 3

+Representing the situations where divisions are used by using algebraic expressions
+Making connections between algebraic expressions and diagrams, Algebraic expressions that use empty boxes

+Tables and graphs(Bar +Columus) in numerical representation

Grade 4

+Algebraic expressions that contain some of the 4 basic operations and
expressions with brackets and formulas.
+Expressions with empty boxes and empty triangles

+Relationship between two numbers/quantities as they vary simultaneously

+Points, broken line graphs

Grade5 - Grade6

Grade 5

+ Simple proportional relations
+Relations of two quantities that are expressed by simple algebraic relations

+Percentage, pie charts

Grade 6

+Algebraic expressions using letters such as x or a

+Proportional relationship

+Proportion and inverse proportion

+The Average of data, frequency distribution, histgram

Grade7 - Grade 8

Grade 7

Direct proportion and Inverse proportion
+Meaning of functional relationship
+Application of direct proportion and inverse proportion
Dispersion of data and representative value of data
+ Necessity and meaning of histogram and representative values
+ Applying histogram and representative values

Grade 8

Linear functions
+ Phenomena and linear functions
+ Tables, algebraic expressions and graphs of linear functions
+ Linear equations with two unknowns and functions
+ Using linear functions

Probability
+ Necessary and meaning of probability and finding the probability

Mathematics Grade 4 Teacher's Manual Development Committee

The Mathematics Teacher's Manual was developed by Curriculum Development Division (CDD), Department of Education in partnership with Japan International Cooperation Agency (JICA) through the Project for Improving the Quality of Mathematics and Science Education (QUIS-ME Project). The following stakeholders have contributed to manage, write, validate and make quality assurance for developing quality Textbook and Teacher's Manual for students and teachers of Papua New Guinea.

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