Mathematics

Teacher's Manual

Grade 3

Papua New Guinea
Department of Education

From
the People of Japan

JICA

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

Issued free to schools by the Department of Education

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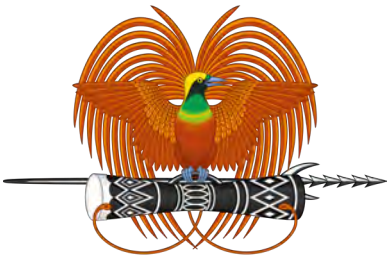

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Secretary's Message

Dear Teacher,

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

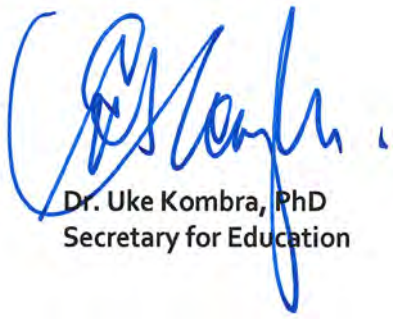
The Teacher's Manual is designed to achieve the implemented curriculum of the content standards outlined in the syllabus. It provides suitable teaching and learning content and concepts for the primary school teachers to promote and maintain standard lessons for daily, termly and yearly teaching and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

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

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

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

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



Dr. Uke Kombra, PhD
Secretary for Education

Introduction

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

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

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

1. How to use the Teacher's Manual

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

1.1 Composition of National Textbook

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

1. Heading colours of the Textbook

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

2. Titles and Numbers

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

3. Students' ideas

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

4. Activity Symbol

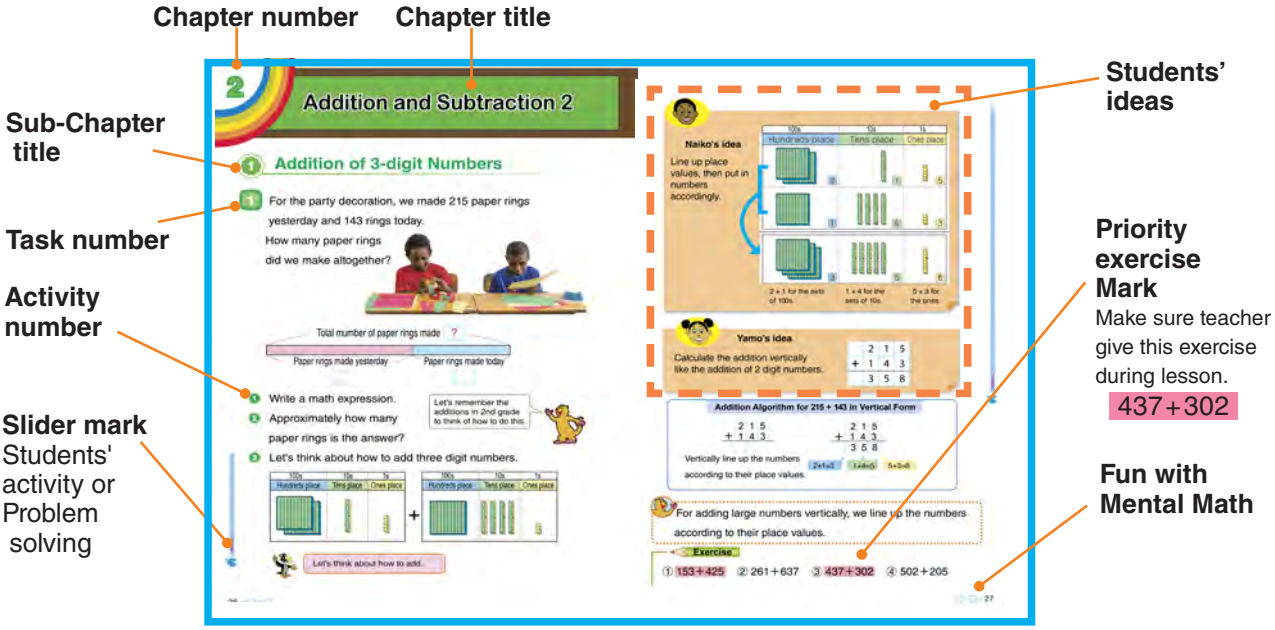
Some chapters have Ice breaking activity as the lead up activity for chapter.

5. Fun with Mental Math!

26 = □ × □

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

Sample Textbook page



"Necessary Competencies acquired through the use of textbook"

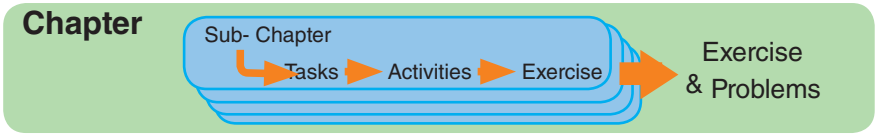
Experimental mathematical activities such as "measure", "compare", "divide", "order", "touch", "pile up" and "throw" are contained in all grades. It is intended to develop the ability and skills to be able to solve various problems logically in daily life by considering many ways.

Mathematical Literacy

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

Structure of a Chapter in the Textbook

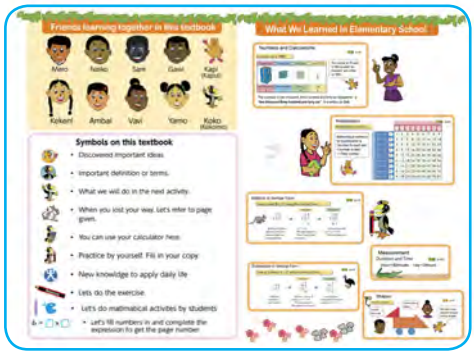
The structure in the Chapter consists of several Sub-Chapters, Tasks, Activities, Exercises and ends with a set of Exercise and Problems.

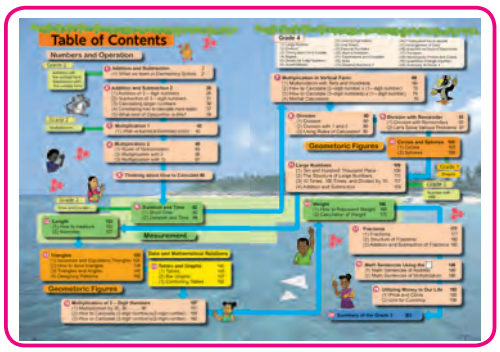


Parts of the Textbook

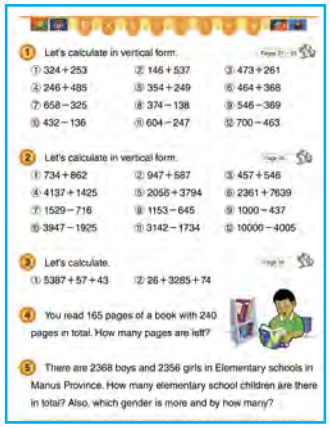
Textbook Introduction Page

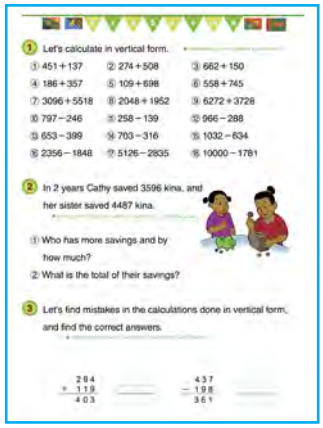
The introduction page consist of two pages which introduces very important information and icons allowing students and teachers to be familiar with what is expected to be encounted in the textbook. It also has chapters learned from previous grade outlined carefully and a table of contents. It promotes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





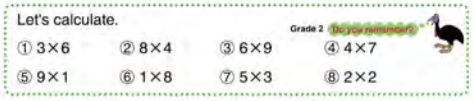
Exercise & Problems





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

Revison "Do you remember?"



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

Additional Information

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

1.2 Main content of the Teacher's Manual

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

Lesson information

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

Sub-unit objective

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

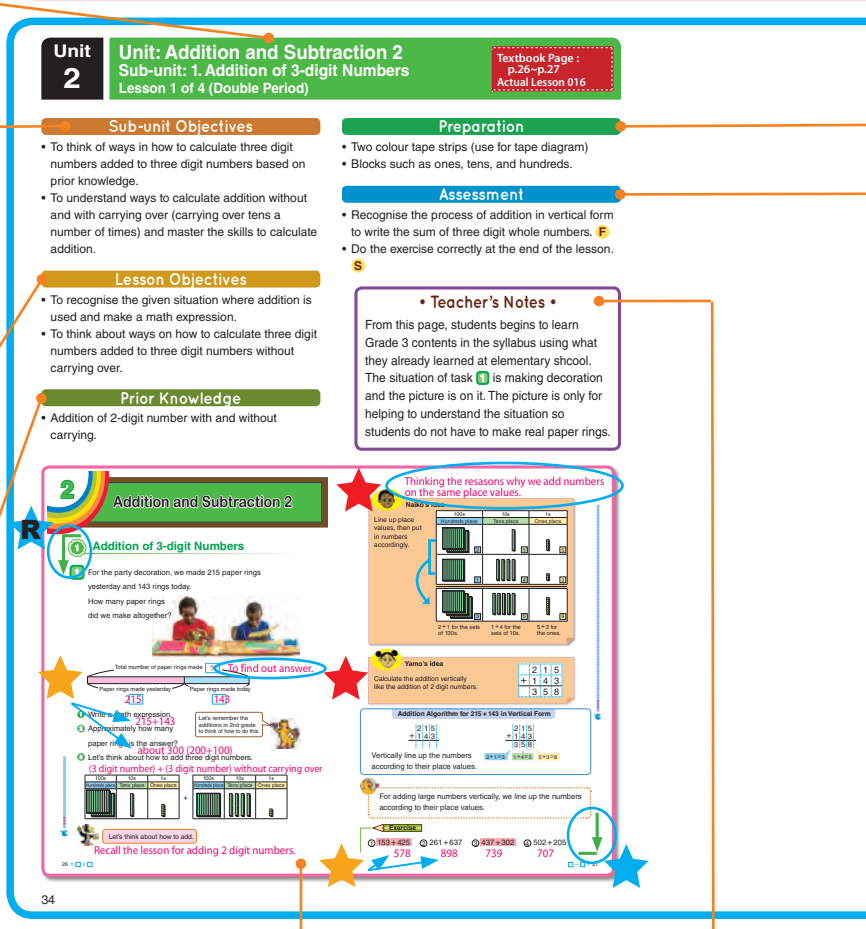
Lesson objective

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

Prior Knowledge

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

Teacher's Manual page sample



Reduced Textbook page of the lesson

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

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

Assessment

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

Preparation

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

Lesson flow

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

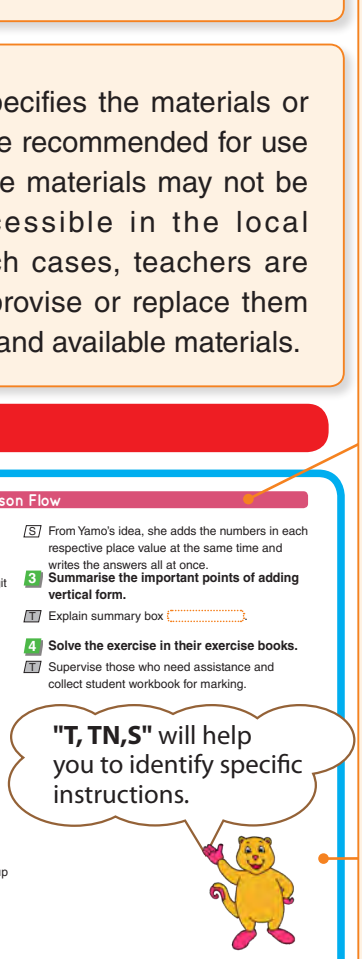
T : What the teacher should do and say during the lesson.

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

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

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

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

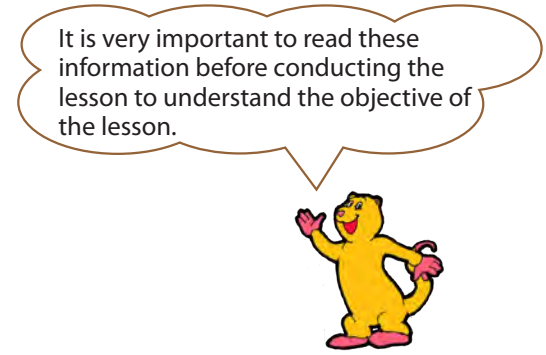


Blackboard Plan

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

Teacher's Notes

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



1.3 Other Contents: Chapter Introduction Page

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

1. Unit Objective

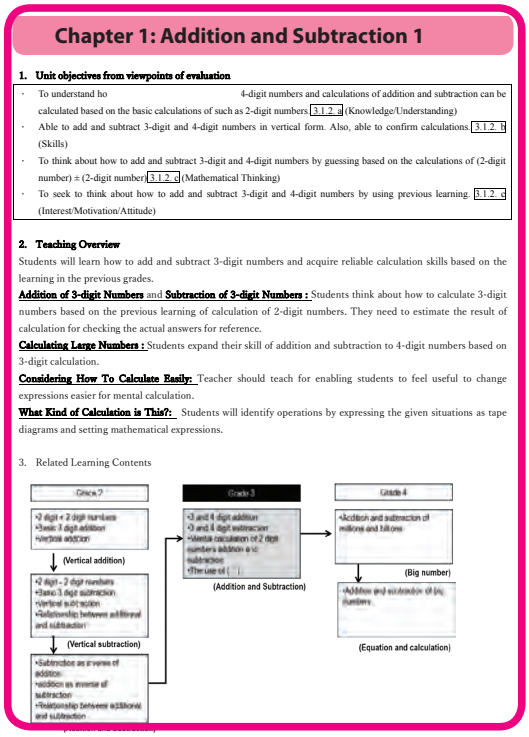
Outlines the key ASK-MT that students are expected to learn or acquire at the end of each unit. There may be one or more unit objectives for each unit depending on the unit capacity and content.

2. Teaching Overview

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

3. Related Learning Content

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



Chapter 1: Addition and Subtraction 1

1. Unit objectives from viewpoints of evaluation

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

2. Teaching Overview

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

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

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

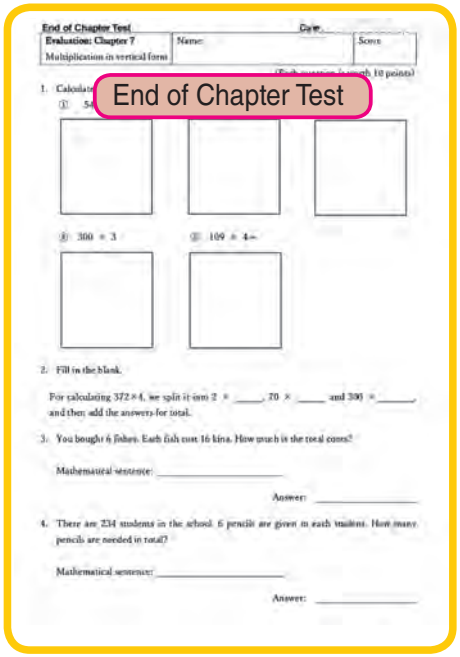
Considering How To Calculate Easily: Teacher should teach for enabling students to feel useful to change expressions easier for mental calculation.

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

3. Related Learning Contents

1.4 Other Contents: End of Chapter Test

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



End of Chapter Test

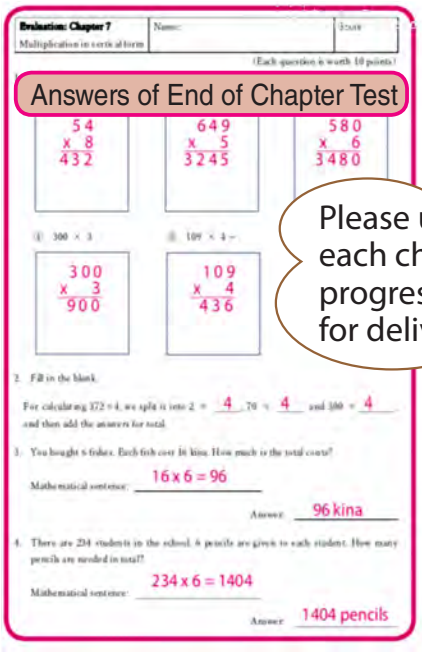
End of Chapter Test
Evaluation: Chapter 7
Multiplication in vertical form
Name:
Score
Date
(Each question is worth 10 points)

1. Calculate.
② 300 × 3 ③ 109 × 4 =

2. Fill in the blank.
For calculating 372 × 4, we split it into 2 × ____, 70 × ____ and 300 × ____, and then add the answers for total.

3. You bought 6 fishes. Each fish cost 16 kina. How much is the total costs?
Mathematical sentence: _____
Answer: _____

4. There are 234 students in the school. 6 pencils are given to each student. How many pencils are needed in total?
Mathematical sentence: _____
Answer: _____



Answers of End of Chapter Test

Evaluation: Chapter 7
Multiplication in vertical form
Name:
Score
(Each question is worth 10 points)

54 × 8 = 432
649 × 5 = 3245
580 × 6 = 3480

② 300 × 3 = 900
③ 109 × 4 = 436

2. Fill in the blank.
For calculating 372 × 4, we split it into 2 × 4, 70 × 4 and 300 × 4, and then add the answers for total.

3. You bought 6 fishes. Each fish cost 16 kina. How much is the total costs?
Mathematical sentence: 16 x 6 = 96
Answer: 96 kina

4. There are 234 students in the school. 6 pencils are given to each student. How many pencils are needed in total?
Mathematical sentence: 234 x 6 = 1404
Answer: 1404 pencils

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

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

2. Lesson presentation using TB and TM

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

2.1 Lesson Preparation

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

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

2.2 Lesson Presentation

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

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

Dos

1. Strictly follow Teachers Manual with reference to the Textbook.
2. Conduct experimental activities when necessary.
3. Expansion of student ideas in the textbook.
4 Involve students in outdoor exercises when required to.
5. Encourage students to use mathematical tools or instruments appropriately for its purpose.
6. Encourage more student interactions.
7. Every lesson is important as concepts are linked from one lesson to the next lesson.

2.3 Lesson Evaluation

After the lesson, teachers should reflect on the lesson taught and evaluate students achievements and do self reflection.
These can be done through;

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

3. How to use blackboard plan

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

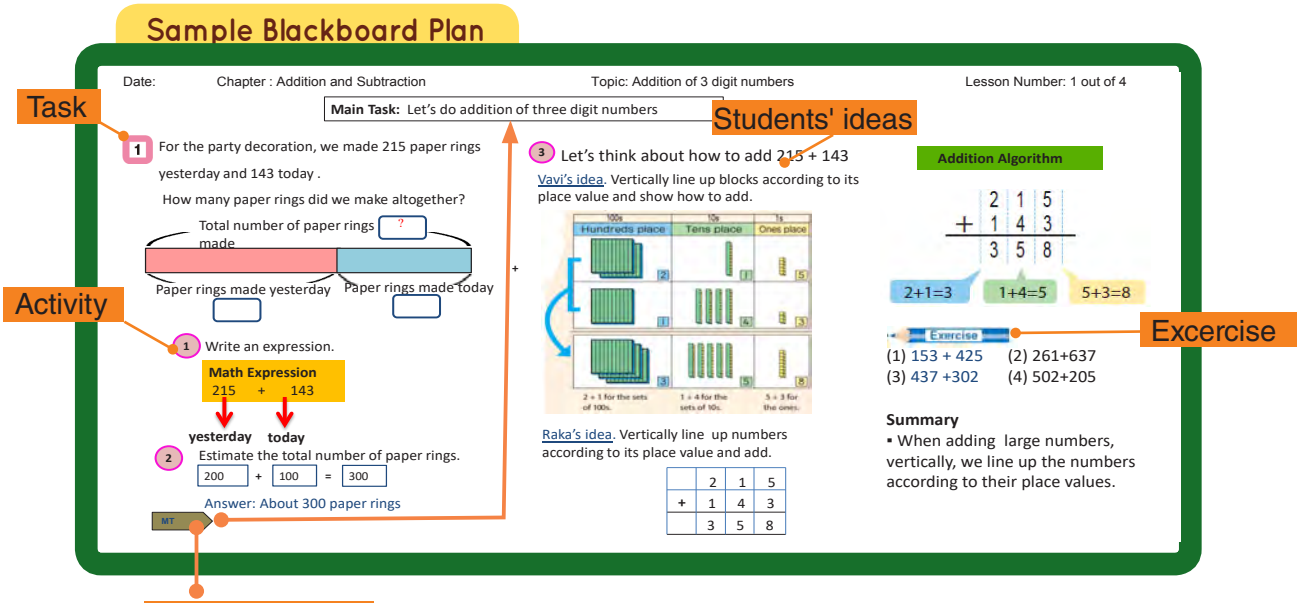
Use the blackboard according to the following steps.

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

Points to consider.

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

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



*MT: Main task mark

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

4. How to conduct Assessment

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

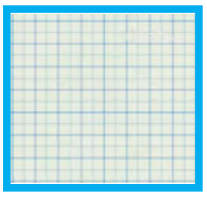
Formative assessment (F)
Formative assessment examples in the TM are:
1. Observation checklists
2. Correction of exercises
3. Analysis of discussions
4. Students' participation.

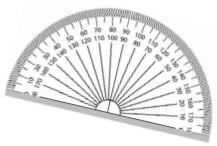
Summative assessment (S)
Summative assessment examples include:
1. Exercise and Problems
2. End of Chapter Test
3. Projects
4. Homework and Assignments.

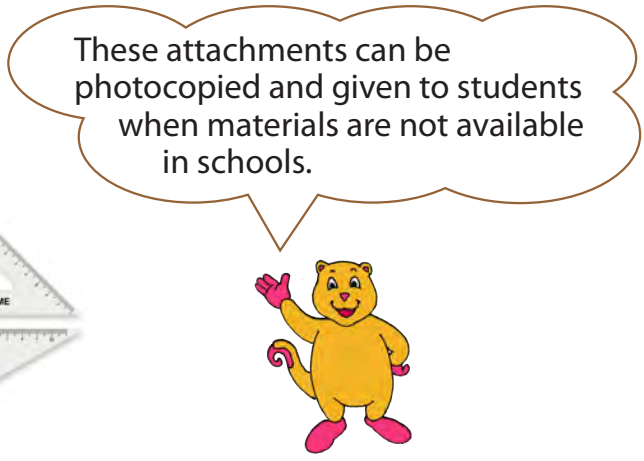
5. Attachments

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

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







6. Yearly Overview

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

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

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

Note that in the Yearly overview, the term 'units' is used while the term 'chapter' is used in the textbook.

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

7. Let's have fun for improving Math skills

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

Let's Play "Number Card Game"

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

When to play

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

How to play

1. Addition

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

2. Subtraction

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

3. Multiplication

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

Chapter 1 Addition and Subtraction 1

1. Unit Objectives

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

2. Teaching Overview

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

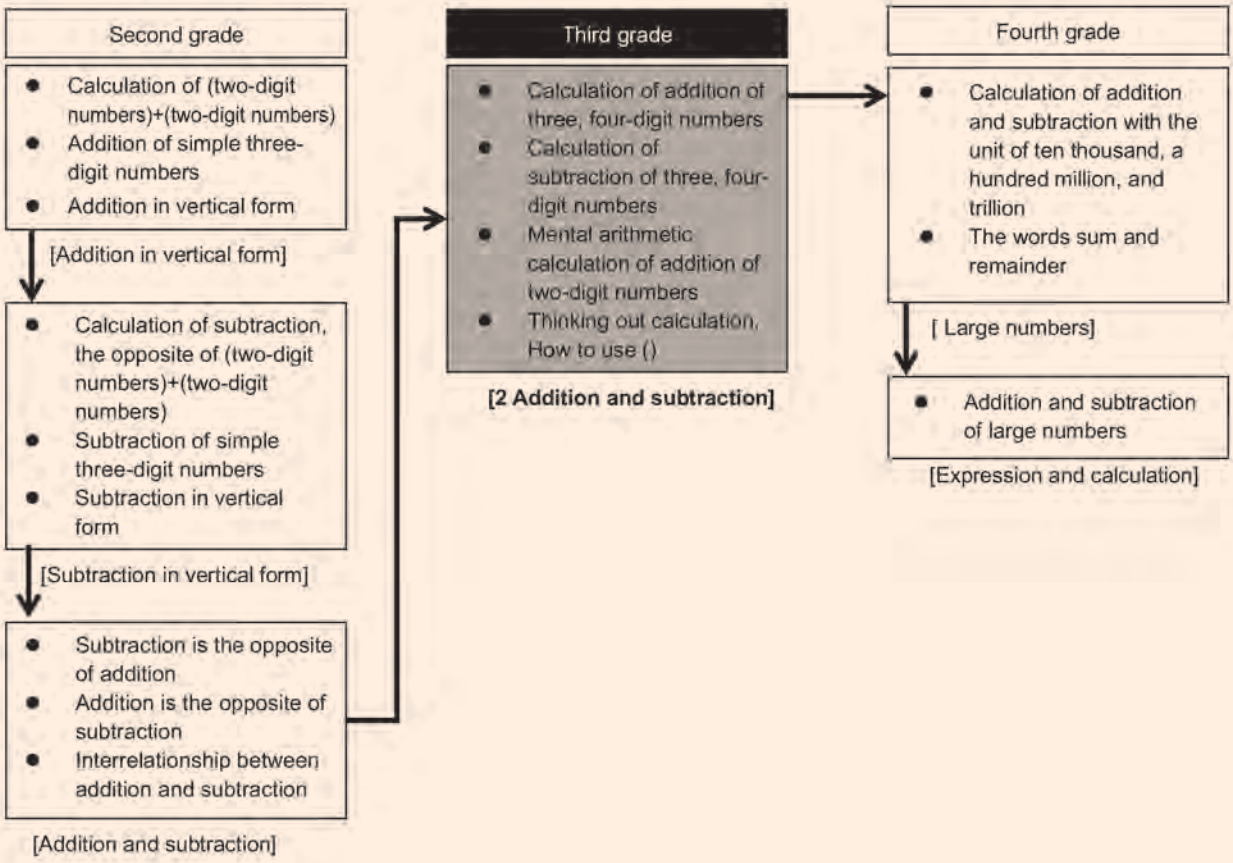
Addition of 3-digit Numbers and Subtraction of 3-digit Numbers : Students think about how to calculate 3-digit numbers based on the previous learning of calculation of 2-digit numbers. They need to estimate the result of calculation for checking the actual answers for reference.

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

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

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

3. Related Learning Contents



Unit 1

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

Textbook Page :
p.2
Actual Lesson 001

Sub-unit Objectives

- To understand the meaning of addition and subtraction.

Lesson Objectives

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

Prior Knowledge

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

Assessment

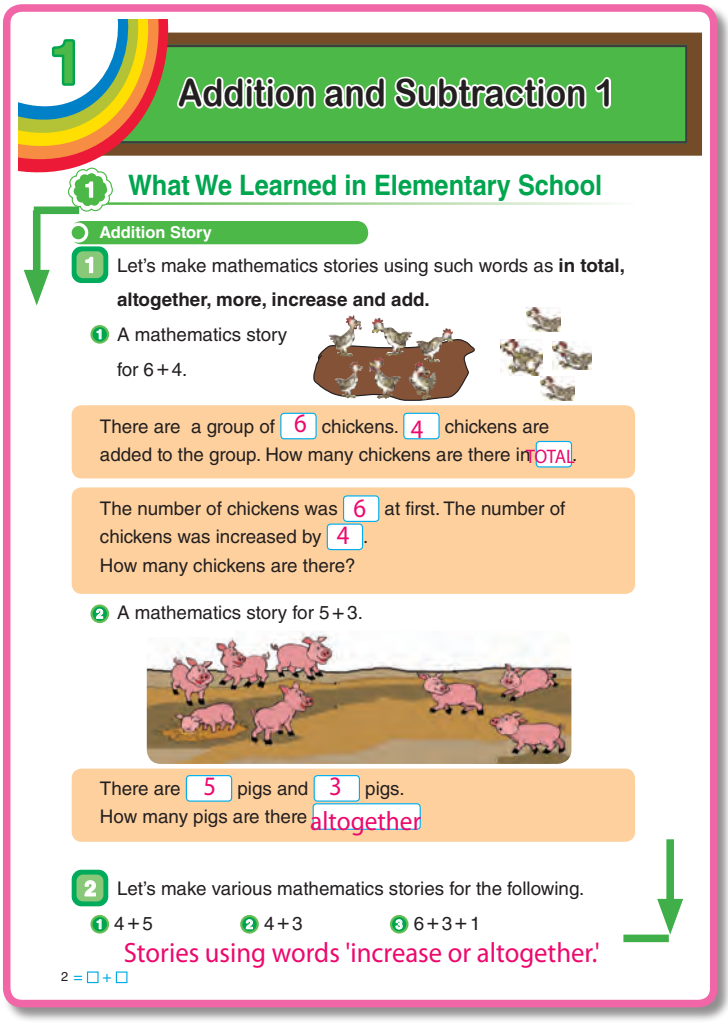
- Appreciate the addition stories for each other with the questions such as which questions are enjoyable for you and why. F
- Make math stories for addition. F S

• Teacher's Notes •

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

Key words: total, altogether, sum

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



1 Addition and Subtraction 1

1 What We Learned in Elementary School

Addition Story

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

1 A mathematics story for 6+4.

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

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

2 A mathematics story for 5+3.

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

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

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

Stories using words 'increase or altogether.'

2 = □ + □

Lesson Flow

1 ① Make their own stories for 6 + 4.

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

2 Display the stories and drawing on the blackboard.

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

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

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

4 ② Make various stories.

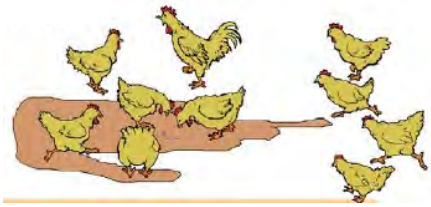
S Make stories focusing on the word of total, altogether, more, increase or others, and differentiating the story of increase or altogether.

Sample Blackboard Plan

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

Task: Let's think about making Addition Stories

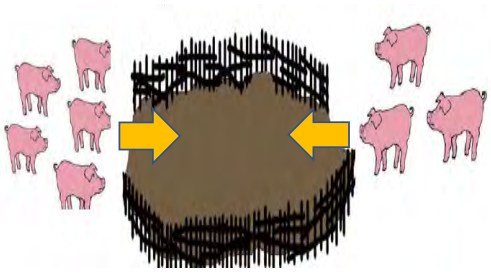
1 Make a math story for 6 + 4



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

MT

Make a math story for 5 + 3



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

Key words: total, altogether, sum

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

Summary

Summarise the lesson based on what the students have learnt.

Unit 1

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

Textbook Page : p.3
Actual Lesson 002

Lesson Objectives

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

Prior Knowledge

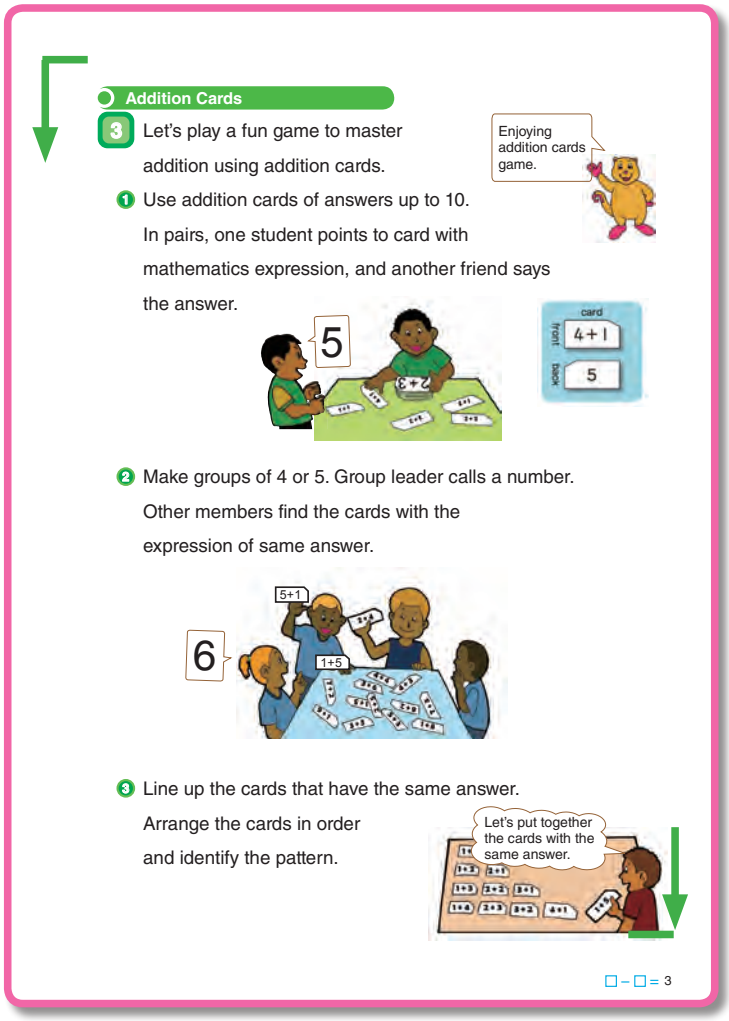
- Making various questions for addition. (Previous lesson)
- Different types of addition situations with the terms such as more, increase, altogether. (Previous lesson)

Preparation

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

Assessment

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



• Teacher's Notes •

Enjoy and learn mental addition

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

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

Lesson Flow

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

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

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

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

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

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

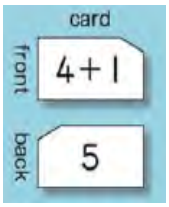
Sample Blackboard Plan

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

3

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

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



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

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

5 + 1
2 + 4
1 + 5

Emphasis the use of words like total and altogether.

3 Line up the cards that have the same answer

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

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

MT

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Blocks

Assessment

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

• Teacher’s Notes •

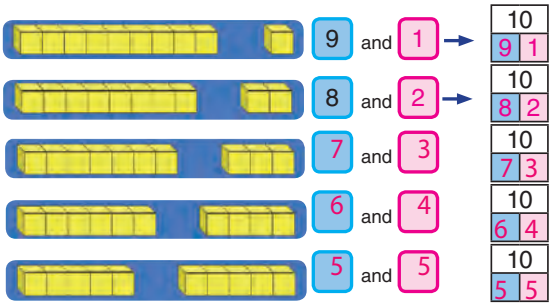
- T-Math
- T-Math is Table Mathematics. It is a total to assist student to do their calculation. Teacher read it holizontaly then vertically. Students can enjoy and find pattern of answers.
- In 6+2, 6 is the Augend and 2 is the Addend.
- Introduce the flash card game where teacher flashes number cards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

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

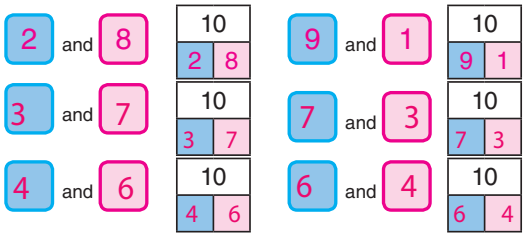
Teacher shows a number.

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

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



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



4 Let’s add and find the same answers.

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

4 = ☐ + ☐

Teacher explains about augend and addend.

Homework

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

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

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

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

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

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

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

☐ − ☐ = 5

Lesson Flow

1 4 1 Play make 10 game with flash cards.

T Introduce the main task.

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

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

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

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

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

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

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

TN All the answers should be given by students.

4 4 Solve the problems of addition.

• Teacher’s Notes •

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

Sample Blackboard Plan

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

Task: Let’s pair up numbers to make 10

4 Make 10 by adding two numbers.

2 Fill in numbers to make 10

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

3 Find other pair of numbers that make 10

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

“Middle”

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

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

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

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

Summary

Summarise the lesson based on what the students have learnt.

Unit 1

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

Textbook Page : p.6
Actual Lesson 004

Lesson Objectives

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

Prior Knowledge

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

Preparation

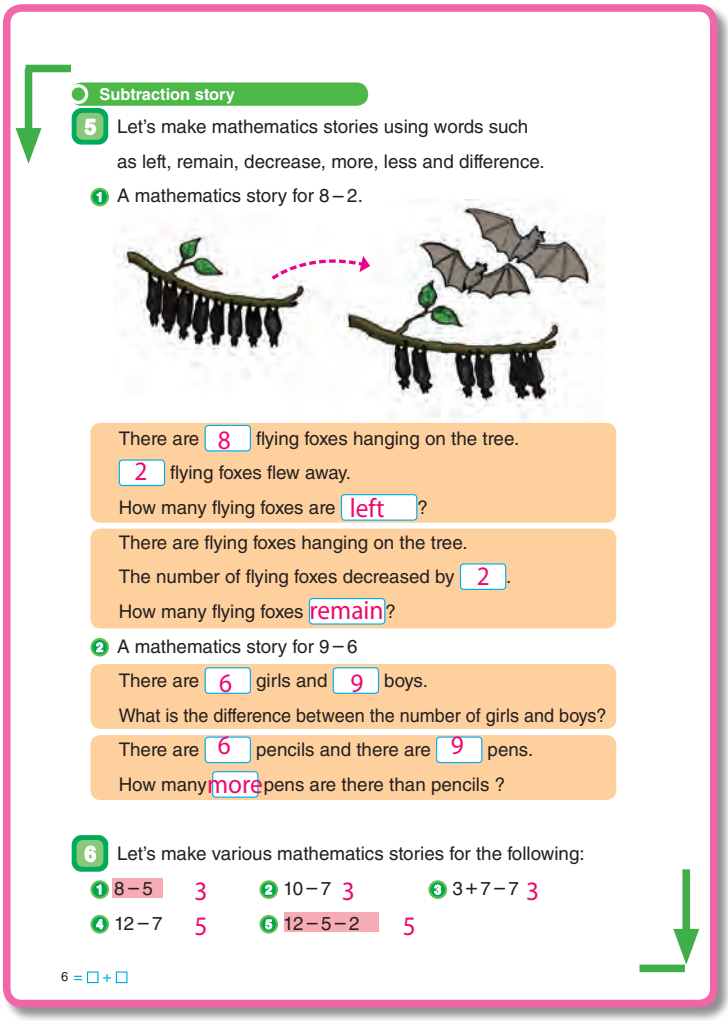
- Refer to the blackboard plan.

Assessment

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

• Teacher's Notes •

Key words: Left, remain, difference and more



Subtraction story

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

1 A mathematics story for 8 − 2.

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

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

2 A mathematics story for 9 − 6

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

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

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

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

6 = □ + □

Lesson Flow

1 5 Make their own stories for 8 - 2.

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

2 Display the stories and drawing on the blackboard.

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

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

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

4 6 Make various stories.

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

Sample Blackboard Plan

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

Task: Let's make subtraction stories.

5 Make a math story for 8 – 2

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

5 Make a math story for 9–6

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

What is the [difference] ?

6 Make various math stories for the

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

Summary

Summarise the lesson based on what the students have learnt.

MT

Key words: left, remain, difference, more

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

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

Assessment

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

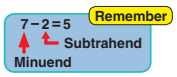
• Teacher's Notes •

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

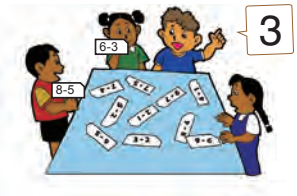
Subtraction Cards

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

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



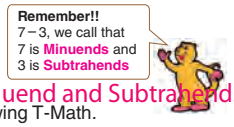
2 Make groups of 4 or 5. Group leader calls a number. Members find the cards with the same answer.



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

□ − □ = □

Homework



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

Teacher explains about Minuend and Subtrahend.

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

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

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

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

8 = □ + □

Lesson Flow

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

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

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

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

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

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

• Teacher's Notes •

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

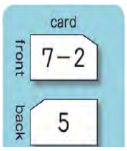
Sample Blackboard Plan

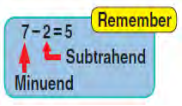
Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson: 5 of 15**

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

7

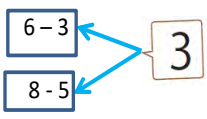
1 Pair up.
1.Peer show a subtraction card
2.The other says the answer.





MT

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



3 Line up the cards that have the same number

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

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

Unit 1

Unit: Addition and Subtraction 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 6 of 15 (Single Period)

Textbook Page : p.9
Actual Lesson 006

Lesson Objectives

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

Prior Knowledge

- Numbers 1 to 20 (Grade1)

Preparation

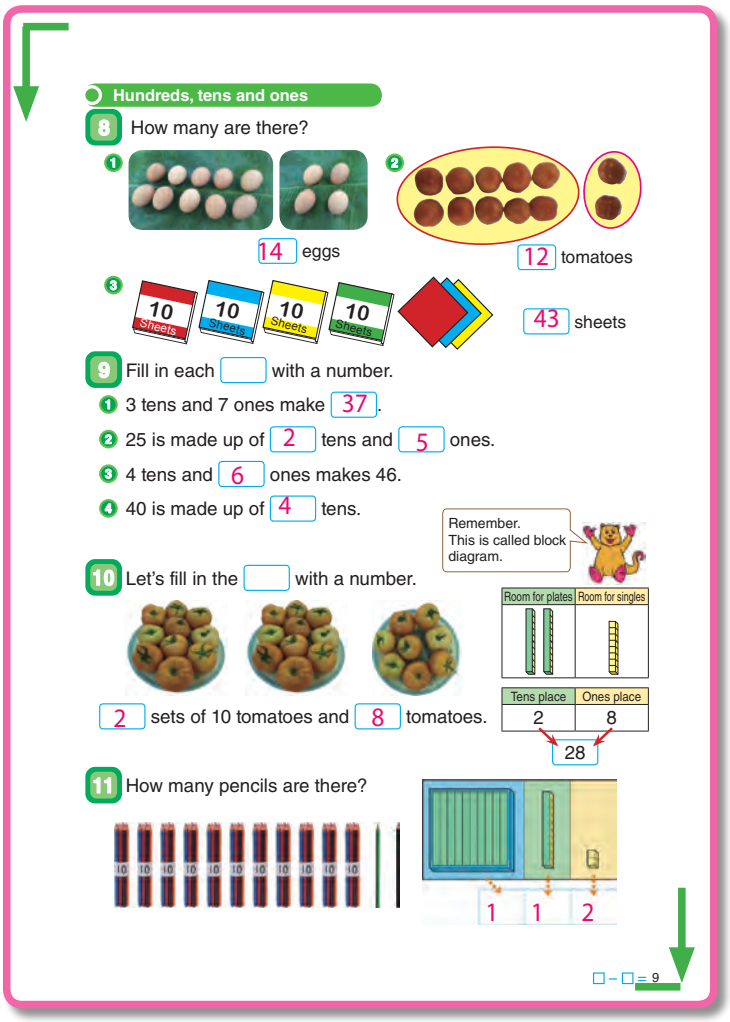
- Prepare according to board plan.

Assessment

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

• Teacher's Notes •

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



Lesson Flow

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

8

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

T Introduce the main task.

9

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

10

TN How to write the number "Twenty eight " using blocks.

Sets of 10	Ones
2	8

Sets of 10 → Write on the left.

Ones → Write on the right.

11

S Ten sets of ten become 100.

TN Allow students to explain using blocks.

Sample Blackboard Plan

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

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

8 How many are there?

①  14 eggs

1 group of 10 eggs 4 eggs

②  43 sheets

4 bundles of 10 sheets 3 single sheets

MT

9 Fill in the missing number.

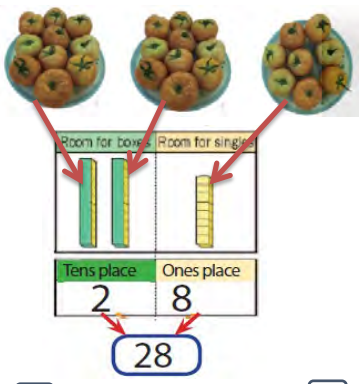
(1) 3 tens and 7 ones make 37

(2) 25 is 2 tens and 5 ones.

(3). 4 tens and 6 ones makes 46

(4). 40 is 4 tens

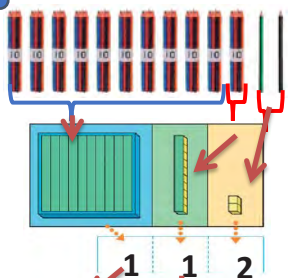
10 How many 10s and 1s are there?



2 sets of 10 tomatoes and 8 tomatoes

is 28 tomatoes

11 How many pencils are there?



10 sets of 10 pencils is 100

2 pencils

1 set of 10 pencils is 10

There are 112 pencils altogether

Summary

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Addition cards

Assessment

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

• Teacher's Notes •

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

Mental Addition

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

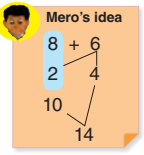
12 Think about how to calculate 8 + 6 in your mind.

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

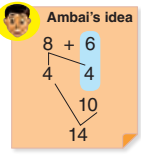
I made 10 from 6, so I removed 4 from 8.

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

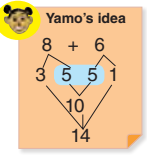
Mero's idea



Ambai's idea



Yamo's idea



13 Let's calculate using the ideas above.

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

① 7+6 13 ② 8+9 17 ③ 9+6 15

14 Find the answers mentally and explain.

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

15 Let's fill in the addition cards.

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

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

10 = □ + □

Homework

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

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

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

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

□ − □ = 11

Lesson Flow

1 12 Explain various ways to calculate 8+6.

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

2 13 14 Do the exescise.

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

3 15 Fill in addition cards.

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

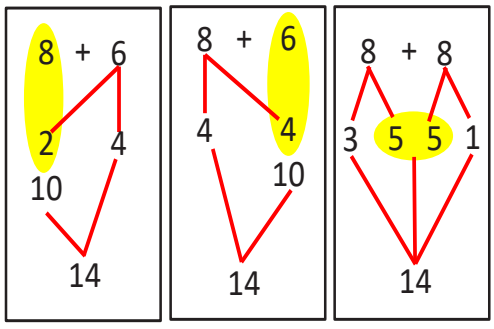
4 Give homework.

Sample Blackboard Plan

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

Task: Let's think about adding without counting.

12 Let's make 10



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

MT

13 Calculate using the idea of making 10

1) 7 + 6 = 13
2) 8 + 9 = 17
3) 9 + 6 = 15

14 Find answers mentally and explain

1) 7 + 6 = 13
6) 5 + 6 = 11
7) 4 + 7 = 11

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

15 Fill in the addition cards

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

Patterns

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

Summary

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

- Numbers 1 to 20
- Composing and decomposing numbers

Preparation

- Subtraction cards

Assessment

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

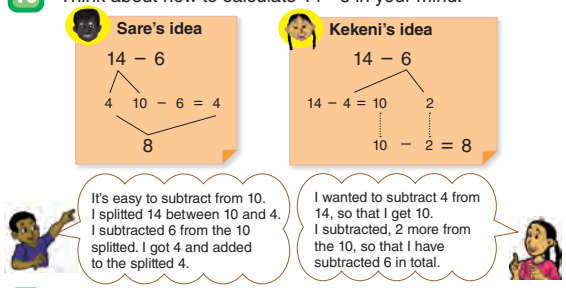
• Teacher's Notes •

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

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

Mental Subtraction

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



17 Let's calculate using the ideas above.

① 11 – 4 7 ② 13 – 9 4 ③ 17 – 8 9

18 Find the answer and explain how to calculate.

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

19 Let's fill in the subtraction cards.

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

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

12 = □ + □

Homework

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

T - Math Subtraction		Subtrahend									
		1	2	3	4	5	6	7	8	9	10
Minuend	10	10–1	10–2	10-3	10-4	10-5	10-6	10-7	10-8	10-9	10-10
	11	11–1	11-2	11-3	11-4	11-5	11-6	11-7	11-8	11-9	11-10
	12	12-1	12-2	12-3	12-4	12-5	12-6	12-7	12-8	12-9	12-10
	13	13-1	13-2	13-3	13-4	13-5	13-6	13-7	13-8	13-9	13-10
	14	14-1	14-2	14-3	14-4	14-5	14-6	14-7	14-8	14-9	14-10
	15	15-1	15-2	15-3	15-4	15-5	15-6	15-7	15-8	15-9	15-10
	16	16-1	16-2	16-3	16-4	16-5	16-6	16-7	16-8	16-9	16-10
	17	17-1	17-2	17-3	17-4	17-5	17-6	17-7	17-8	17-9	17-9
	18	18-1	18-2	18-3	18-4	18-5	18-6	18-7	18-8	18-9	18-10
	19	19-1	119-2	19-3	19-4	19-5	19–6	19-7	19-8	19-9	19-10
	20	20-1	20-2	20-3	20-4	20-5	20-6	20-7	20-8	20-9	20-10

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

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

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

□ – □ = 13

Lesson Flow

1 16 Explain various ways to calculate14 - 6.

T Introduce the main task.

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

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

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

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

2 17 18 Do the exercise.

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

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

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

3 19 Fill in subtraction cards

S Fill in the subtraction cards considering the number pattern.

T What kind of pattern did you notice?

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

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

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

S There are more cards whose answer is 9.

S Cards are lined up like stair steps.

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

4 Summary

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

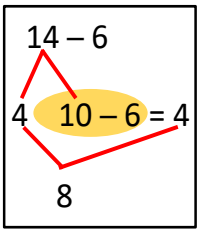
5 Give homework.

Sample Blackboard Plan

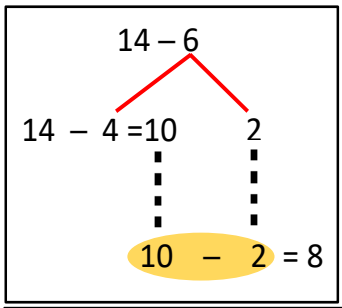
Date: **Chapter: Addition and Subtraction** **Topic: Subtracting without counting**

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

16 Let's make 10



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



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

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

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

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

19 Fill in the subtraction cards

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

Patterns

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

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

- Numbers up to 100
- Structure of place value table

Preparation

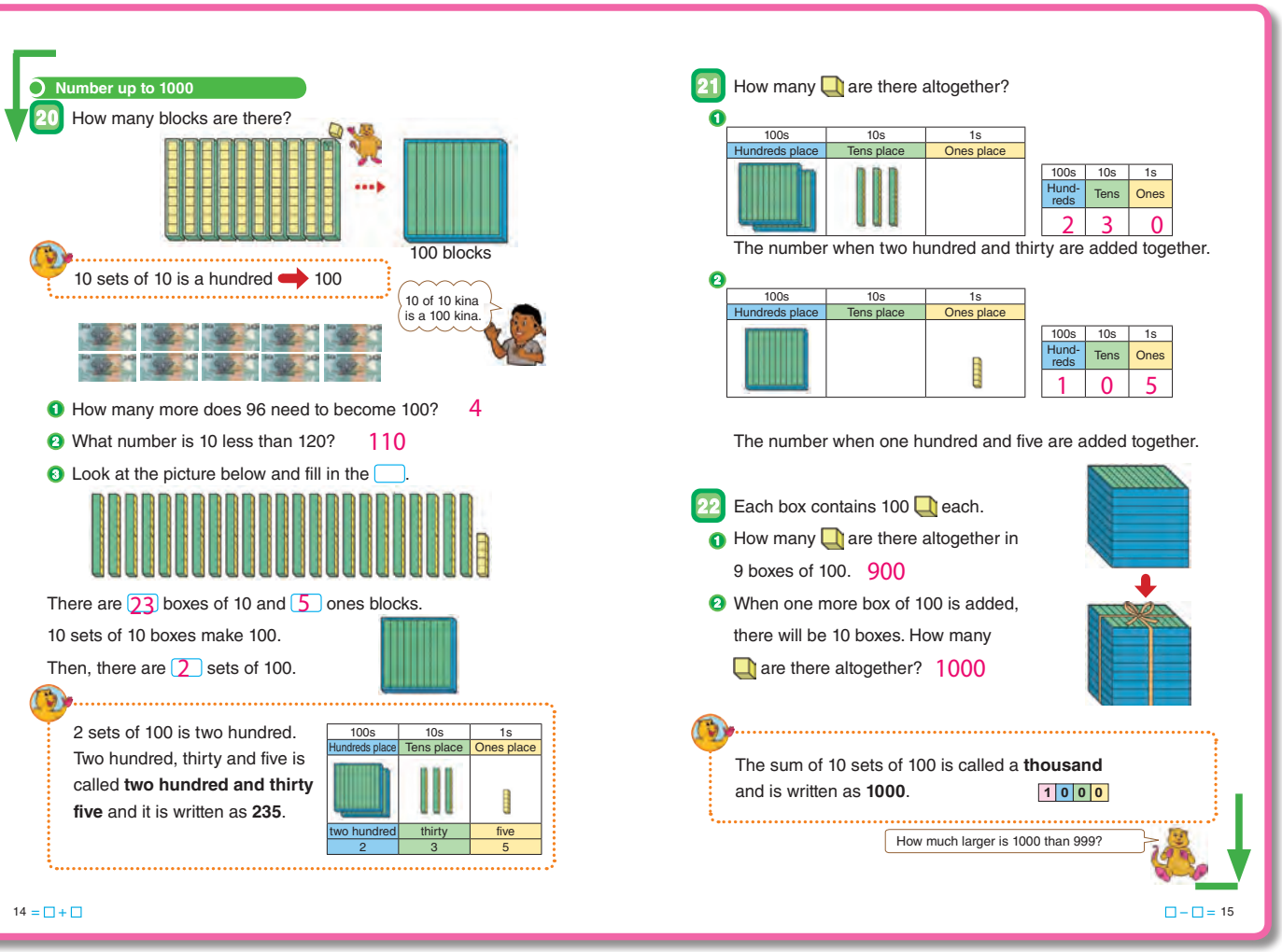
- Blocks and place value table

Assessment

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

• Teacher's Notes •

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



Lesson Flow

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

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

2 1 2 Complete activities.

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

3 21 Identify the numbers on the block diagram.

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

4 22 Make numbers up to 1000.

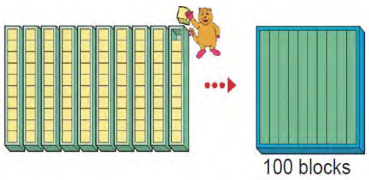
S Identify the number of blocks(100) in each box to determine the number of hundreds.
S 1 The number of blocks in 9 boxes of 100 is 900.
S 2 Make the number 1000 by adding another box of 100 so that there are 10 boxes of 100.
S Summarise by confirming that 10 sets of 100 is 1000.

Sample Blackboard Plan

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

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

20 How many blocks are there?



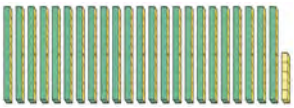
10 sets of 10 is a hundred → 100

MT

1 How many more for 96 to become 100?

2 What number is 10 less than 120?

3 Look at the picture



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

21 How many ☐ are there altogether?

1

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

The number when two hundred and thirty are added together.

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

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

22 Each box contains 100 ☐.

9 boxes 100 → 900

10 boxes 100 → 1000

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

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

- Numbers up to 1000

Preparation

- Blocks and place value table

Assessment

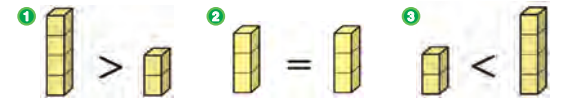
- Compare the numbers considering the size of each place value. F
- Order the numbers correctly considering relationship among numbers. F
- Do the exercises correctly at the end of the lesson. S

• Teacher's Notes •

Inequality signs

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

23 Let's compare the sizes of the numbers.



4 > 2　　3 = 3　　2 < 4

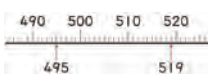
4 is larger than 2. 3 is the equal size as 3. 2 is smaller than 4.

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

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

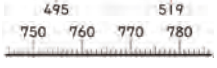
Which place values should we look at?

1 495 < 519



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

2 769 > 764



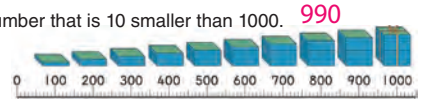
100s (Hundreds)	10s (Tens)	1s (Ones)

3 238 < 253

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

25 Let's write down the following numbers.

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



16 = □ + □

Exercise

1 Let's read the following numbers.

① 826　② 160　③ 408　④ 505　⑤ 900

2 Let's write the following numbers.

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

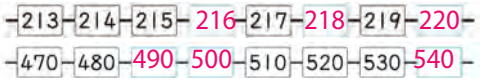
3 Let's fill in each □ with a number.

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

4 Which number is larger? Use > or <.

① 312 < 321　② 602 > 598　③ 880 > 808

5 Let's fill in each □ with a number.



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

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

□ − □ = 17

Lesson Flow

1 23 Compare the size of numbers.

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

2 24 Compare numbers up to 1000.

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

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

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

4 Complete the Exercises.

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

Sample Blackboard Plan

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

Task: Let's compare the size of numbers.

23 Compare the size of numbers.

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

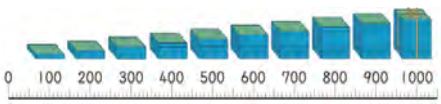
> and < are signs to represent larger and smaller for comparing sizes. When the size is the same, = is used.

MT

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

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

25 Write down the following numbers.



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

Summary

Unit 1

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

Textbook Page : p.18
Actual Lesson 011

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Tape diagram

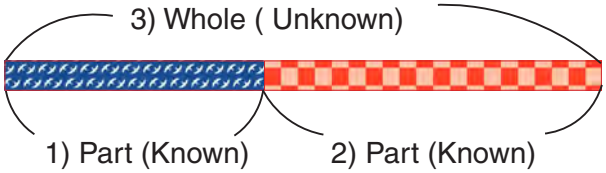
Assessment

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

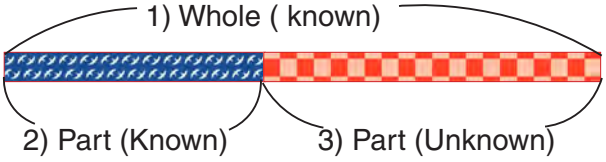
• Teacher's Notes •

Tape Diagrams

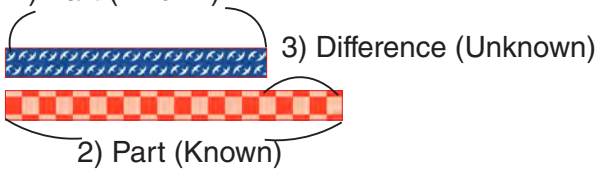
A) Part, Part and then Whole Diagram



B) Whole, Part and then Part Diagram



C) Difference between Part 1) and Part 2)

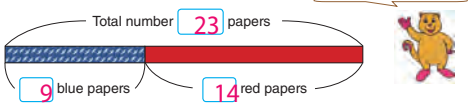


Addition or Subtraction

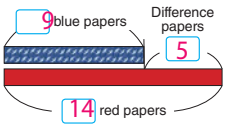
26 Write a mathematical expression and solve it based on each tape diagram. There are 9 blue papers and 14 red papers.

1. How many papers are there in total?

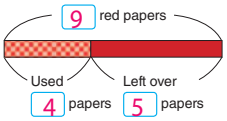
Remember. This is a **tape diagram**



2. Which colour is more and by how many?



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



Homework

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

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

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

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

18 = □ + □

Lesson Flow

1 26 Think how to solve problem 1 2 3.

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

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

S Copy the tape diagram in the exercise book.

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

T Introduce the main task.

T Write the mathematical expression and explain.

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

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

S The answer is 9 + 14 = 23

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

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

2 Give homework.

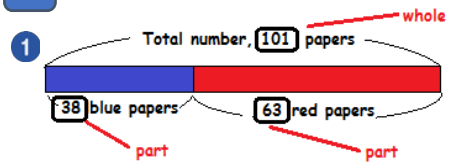
Sample Blackboard Plan

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

Task: Let's solve problems using tape diagrams.

26 How many papers are there in total?

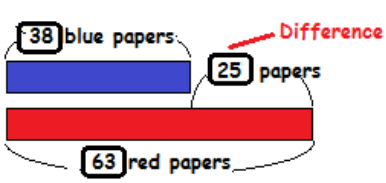
1



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

	3	8
+	1 6	3
1	0	1

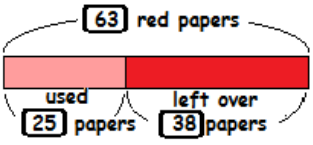
2 Which colour is more and by how many?



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

	6	3
−	3	8
	2	5

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



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

	6	3
−	2	5
	3	8

Summary

MT

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Assessment

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

Preparation

- Blocks

• Teacher's Notes •

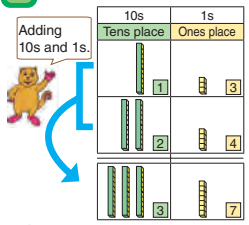
Addition algorithm in vertical form

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

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

Addition in Vertical Form 1

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



How to Add 13 + 24 using Vertical Form

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

Line up numbers according to their place value.

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

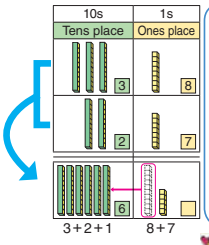
1 + 2 = 3 3 + 4 = 7

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

❶ Find the answers using vertical form.

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

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



How to Add 38 + 27 using Vertical Form

Ones place Tens plaece

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

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

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

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

❶ Find the answers using vertical form.

① 14 + 29 43 ② 28 + 16 43 ③ 59 + 36 95

④ 72 + 18 90 ⑤ 56 + 4 60 ⑥ 8 + 44 52

29 Find the mistake and explain the reason.

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

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

Forget carrying over, Line up same place value

□ + □ = 19 20 = □ + □

Homework

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

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

❷ Mary has 27 flowers. James gave 65 flowers to Mary. How many flowers does Mary have?

27 + 65 = 92 A. 92 flowers

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

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

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

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

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

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

Lesson Flow

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

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

2 Summarise the important points in using vertical forms.

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

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

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

4 29 Find and explain the mistakes.

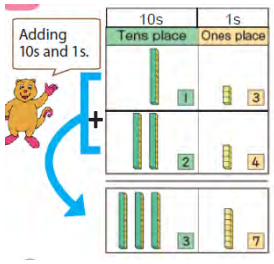
S Find and explain the mistakes of calculation.

Sample Blackboard Plan

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

Task: Let's think about adding vertically.

27



How to add 13 +24

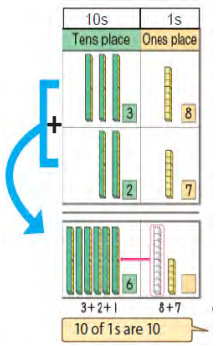
	1	3
+	2	4
	3	7

1 + 2 = 3 + 4 =

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

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

28 Find the answers in vertical form



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

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

29 Find the mistakes and explain.

	2	7
+	6	5
	8	2

	5	6
+	3	
	8	

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Summary

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Blocks

Assessment

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

• Teacher's Notes •

On 74+65, if we calculate

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

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

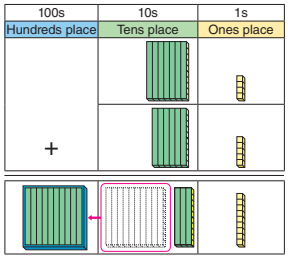
```
  74
+ 65
   9 ←4+5
 13 ←7+6
 139
```

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

Addition in Vertical Form 2

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

```
  7 4
+ 6 5
1 3 9
```



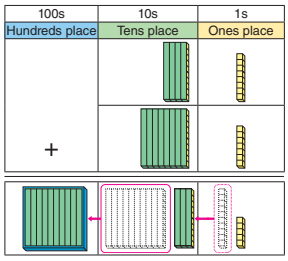
31 Add in vertical form.

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

32 Explain each vertical form using block diagram.

```
  4 8
+ 8 7
  1
1 3 5
```

```
  4 8
+ 8 7
  1 5
1 2
1 3 5
```



33 Let's add in vertical form.

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

□−□=21　　22=□+□

Homework

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

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

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

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

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

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

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

Lesson Flow

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

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

2 31 Practice using vertical forms to solve the problems.

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

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

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

4 33 Practice addition in vertical form.

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

Sample Blackboard Plan

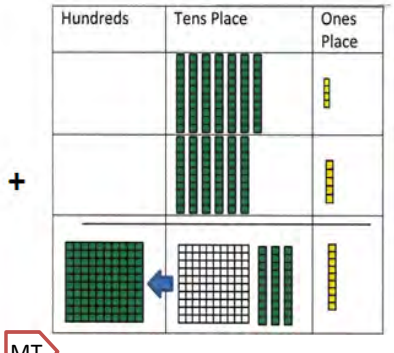
Date: **Chapter: Addition and Subtraction** **Topic: What we learned at Elementary** **Lesson: 13 of 15**

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

30 Let's explain the algorithm.

	7	4
+	6	5
1	3	9

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



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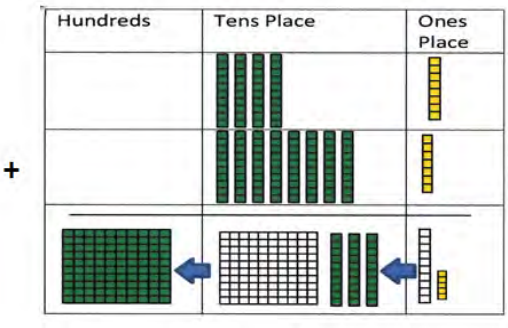
31 Let's add in vertical form.

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

32

	4	8
+	8	7
1	3	5

	4	8
+	8	7
1	2	5



33 Let's add in vertical form.

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

Unit 1

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Blocks

Assessment

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

• Teacher's Notes •

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

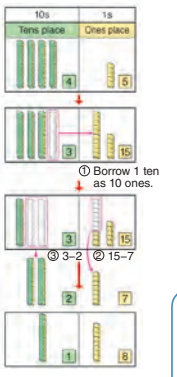
Subtraction in Vertical Form 1

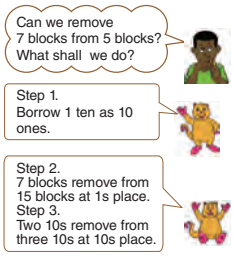
34 Let's find the answers in vertical form.

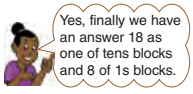
① 76 – 32 44　② 56 – 40 16　③ 58 – 5 53
④ 98 – 18 80　⑤ 43 – 42 1　⑥ 30 – 20 10

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

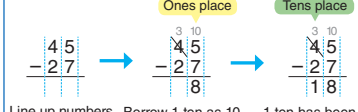
	4	5
–	2	7







How to Subtract 45 – 27 Using Vertical Form



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

36 Let's find the answers in vertical form.

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

□ – □ = 25

Homework

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

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

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

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

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

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

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

24 = □ + □

Lesson Flow

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

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

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

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

3 36 Practice subtraction with borrowing to solve the problems.

T Make sure students are borrowing using vertical form correctly.

4 Give homework.

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

Sample Blackboard Plan

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

Let’s think about subtracting vertically.

34 Find answers in vertical form.

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

35 Explain subtraction in vertical form.

How to Subtract 45−27 Using Vertical Form

	Ones place	Tens place
	45 − 27	3 10 / 45 − 27 / 8	3 10 / 45 − 27 / 18
	Line up numbers in each column.	Borrow 1 ten as 10 ones, so 15−7=8 The ones place of the answer becomes ☐.	1 ten has been borrowed by the ones place. So 3−2=☐.

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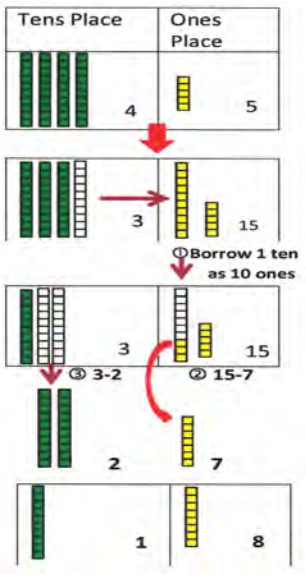


36 Find answers in vertical form.

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

Homework

Unit 1

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

Textbook Page : p.25
Actual Lesson 15

Lesson Objectives

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

Prior Knowledge

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

Preparation

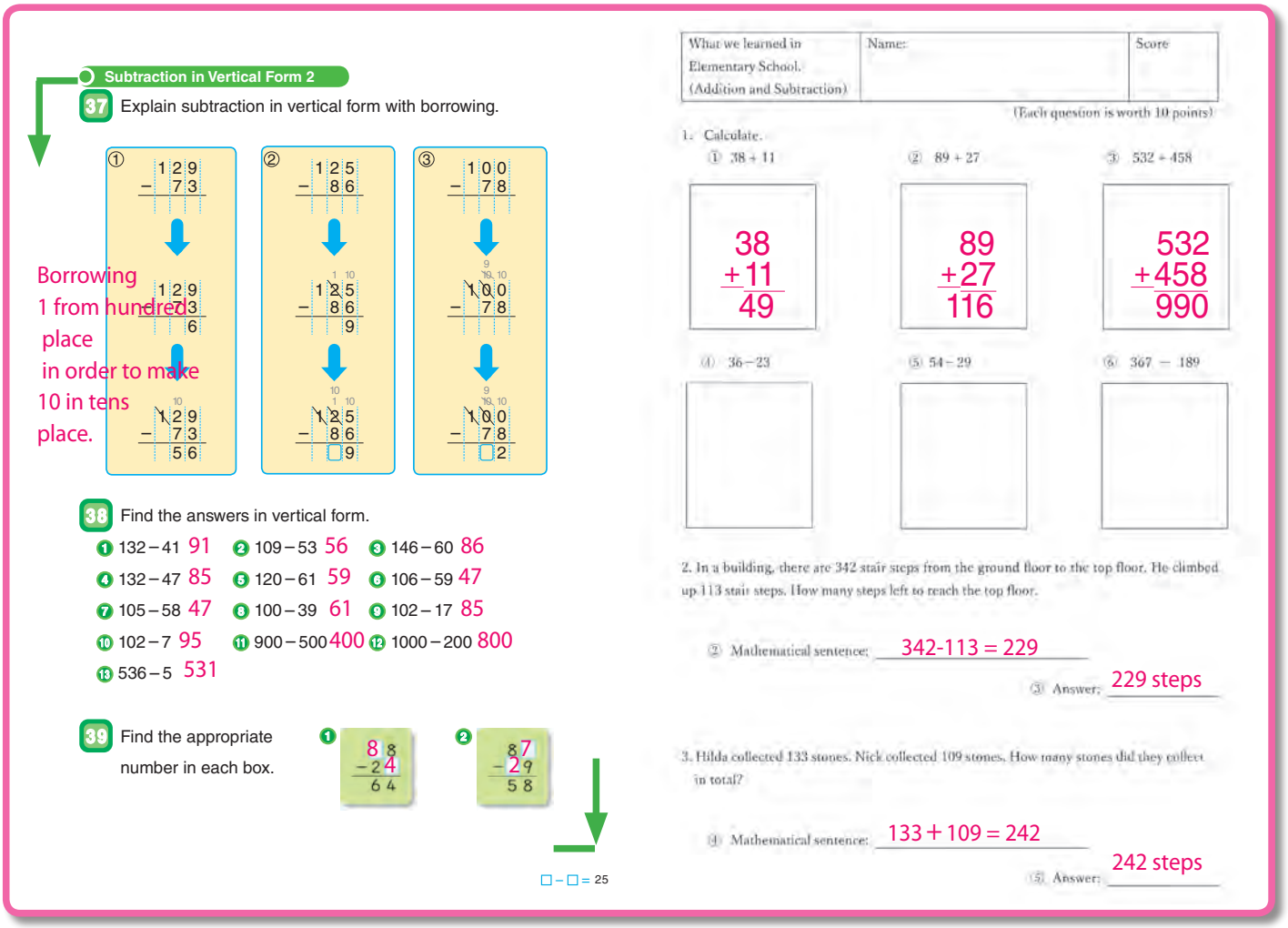
- Prepare according to board plan

Assessment

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

• Teacher's Notes •

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



Subtraction in Vertical Form 2

37 Explain subtraction in vertical form with borrowing.

① 129 − 73 = 56
② 125 − 86 = 39
③ 100 − 78 = 22

Borrowing 1 from hundred place in order to make 10 in tens place.

38 Find the answers in vertical form.

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

39 Find the appropriate number in each box.

1. 88 − 24 = 64
2. 87 − 29 = 58

□ − □ = 25

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

(Each question is worth 10 points)

1. Calculate.

① 38 + 11 = 49
② 89 + 27 = 116
③ 532 + 458 = 990
④ 36 − 23
⑤ 54 − 29
⑥ 367 − 189

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

② Mathematical sentence: 342-113 = 229
③ Answer: 229 steps

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

④ Mathematical sentence: 133 + 109 = 242
⑤ Answer: 242 steps

Lesson Flow

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

(1) 129 – 73

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

(2) 125 – 86

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

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

(3) 105 – 78

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

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

T Introduce the main task.

2 38 Practice subtraction with borrowing to solve the problems.

T Make sure students do the exercises correctly.

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

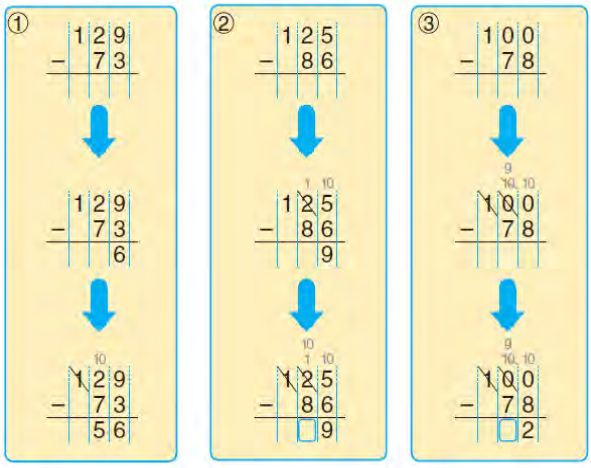
TN Let students think about the missing number from the minuend, subtrahend and answer. For example, first calculation, minuend is 8 and answer is 4, so the missing number (subtrahend) is 4.

Sample Blackboard Plan

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

Let's subtracting vertically with borrowing/regrouping.

37 Let's explain subtraction in vertical form.



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38 Find answers in vertical form.

1) 132 – 41 2) 109 – 5

3) 146 – 60 4)132 – 47

5) 120 – 61 6) 106 – 59

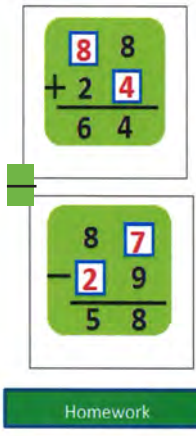
7) 105 – 58 8) 100 – 39

9) 102 – 17 10) 102 – 7

11) 900 – 500 12) 1000 –200

13) 536 –5

39 Find answers in vertical form.



Homework

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

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

(Each question is worth 10 points)

1. Calculate.

① 38 + 11

② 89 + 27

③ 532 + 458

④ 36 − 23

⑤ 54 − 29

⑥ 367 − 189

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

② Mathematical sentence: _____

③ Answer: _____

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

④ Mathematical sentence: _____

⑤ Answer: _____

Chapter 2 Addition and Subtraction 2

1. Unit Objectives

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

2. Teaching Overview

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

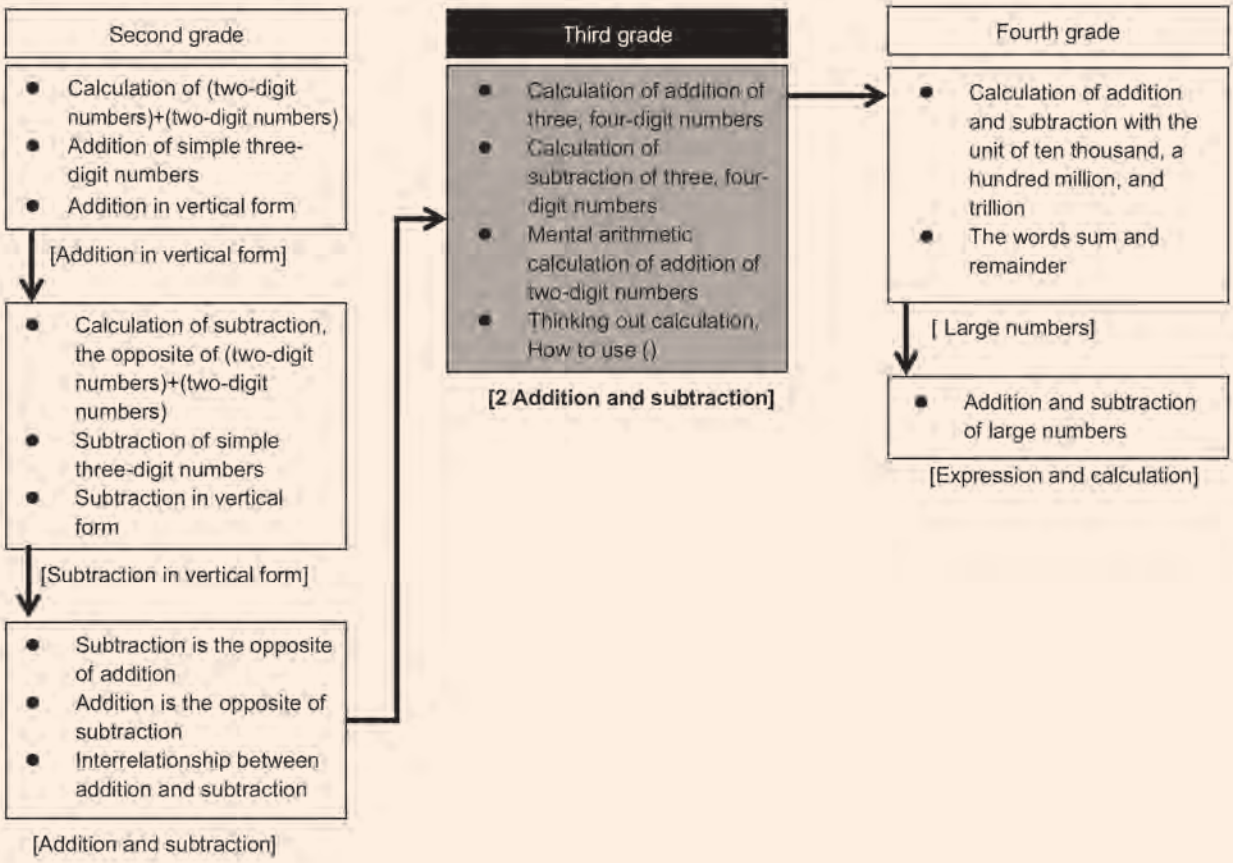
Addition of 3-digit Numbers and Subtraction of 3-digit Numbers : Students think about how to calculate 3-digit numbers based on the previous learning of calculation of 2-digit numbers. They need to estimate the result of calculation for checking the actual answers for reference.

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

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

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

3. Related Learning Contents



Unit 2

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

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

Sub-unit Objectives

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

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

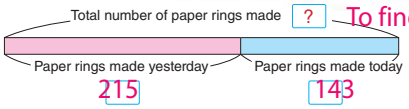
Assessment

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

2 Addition and Subtraction 2

1 Addition of 3-digit Numbers

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

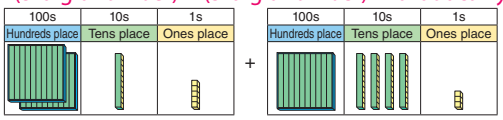


To find out answer.

1 Write a mathematical expression.
215+143
2 Approximately how many paper rings is the answer?
about 300 (200+100)
3 Let's think about how to add three-digit numbers.

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

(3-digit number) + (3-digit number) without carrying over



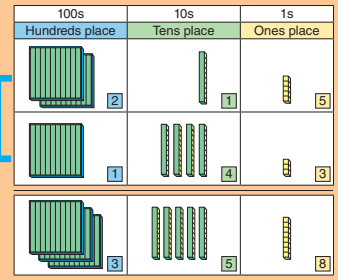
Let's think about how to add.

Recall the lesson for adding 2-digit numbers.

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

Naiko's idea

Line up place values, then put in numbers accordingly.

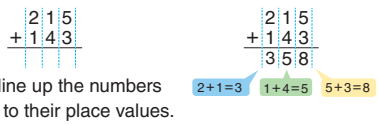


Yamo's idea

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

	2	1	5
+	1	4	3
	3	5	8

Addition Algorithm for 215+143 in Vertical Form



Vertically line up the numbers according to their place values.

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

Exercise

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

26 = □ + □

□ − □ = 27

Lesson Flow

1 ① Read the task and distinguish addition or subtraction.

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

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

S ② Answer the question.

T Introduce the main task.

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

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

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

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

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

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

3 Summarise the important points of adding in vertical form.

T Explain the summary box .

4 Solve the exercise in their exercise books.

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

• Teacher's Notes •

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

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

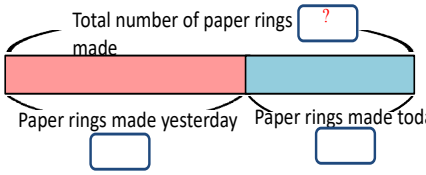
Sample Blackboard Plan

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

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

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

How many paper rings did we make altogether?



① Write an expression.

Math Expression
215 + 143

yesterday today

② Estimate the total number of paper rings.

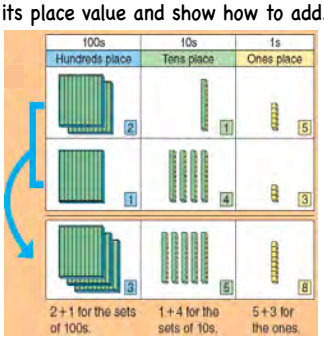
200 + 100 = 300

Answer: About 300 paper rings

MT

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

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



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

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

	2	1	5
+	1	4	3
	3	5	8

Addition Algorithm

2	1	5
+ 1	4	3
3	5	8

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

Exercise

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

Summary

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

Unit 2

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

Textbook Page : p.28
Actual Lesson 017

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Blocks such as ones, tens and hundreds

Assessment

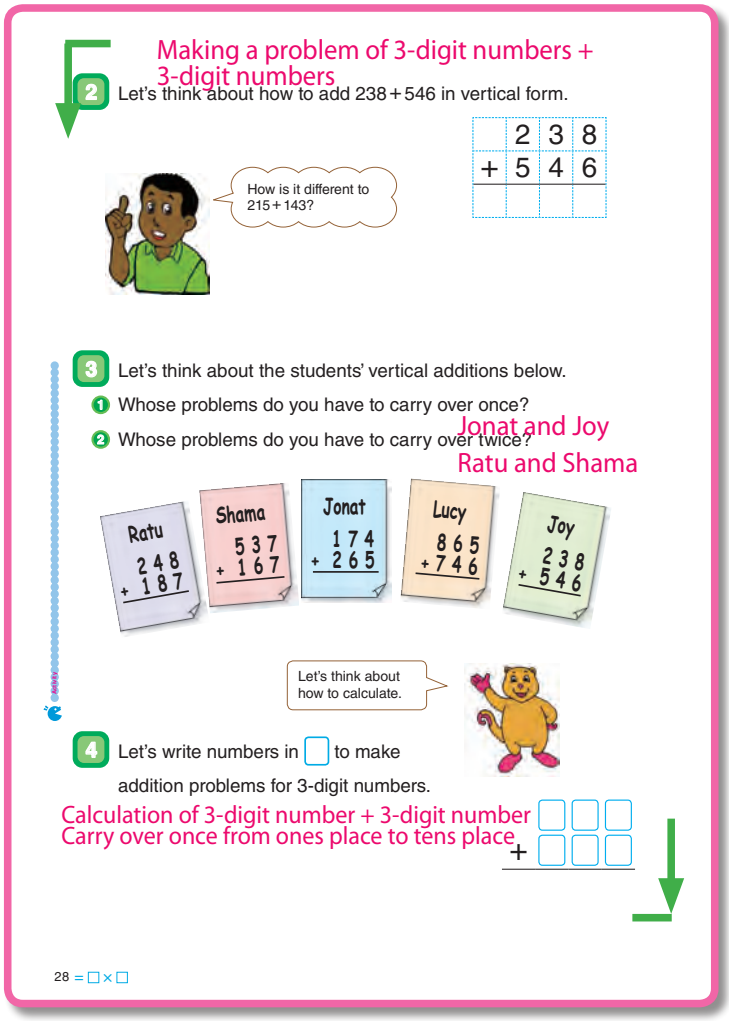
- Make various problems of 3-digit numbers added to 3-digit numbers. F
- Sort out the problems depending on the number and types of carrying over. F S

• Teacher's Notes •

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

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

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



Lesson Flow

1 2 Think about how to calculate 238 + 546.

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

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

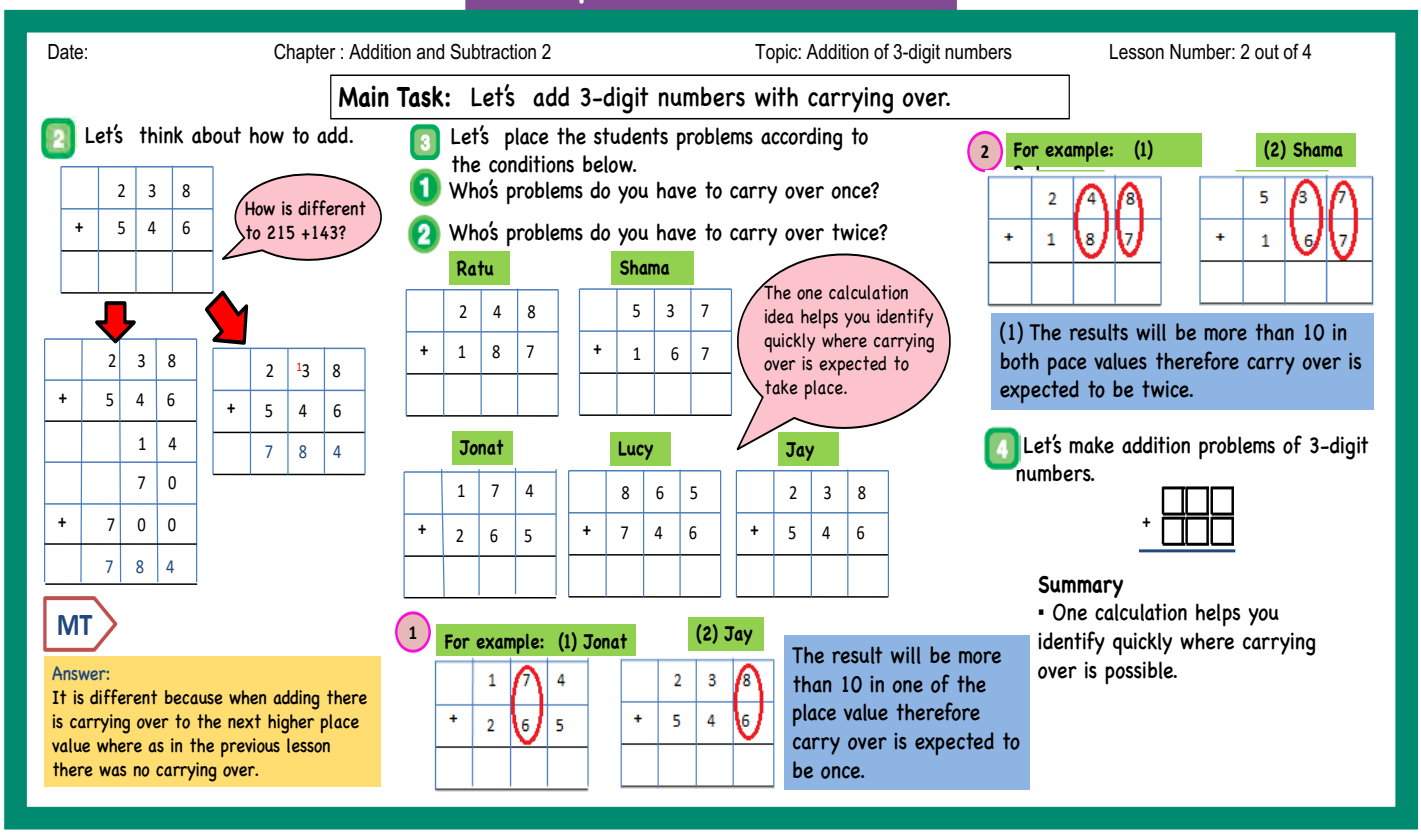
S Make questions of three-digit numbers added to three-digit numbers.
T Ask students to display their work on the blackboard.
T Classify the students' work based on the following criteria;
1. Without carrying over.
2. With carrying over from ones place to tens place.
3. With carrying over from tens place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

T Let the students to think of ways on how to solve the problem and focus on carrying over.

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

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

Sample Blackboard Plan



Unit 2

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

Textbook Page : p.29
Actual Lesson 018

Lesson Objectives

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

Prior Knowledge

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

Preparation

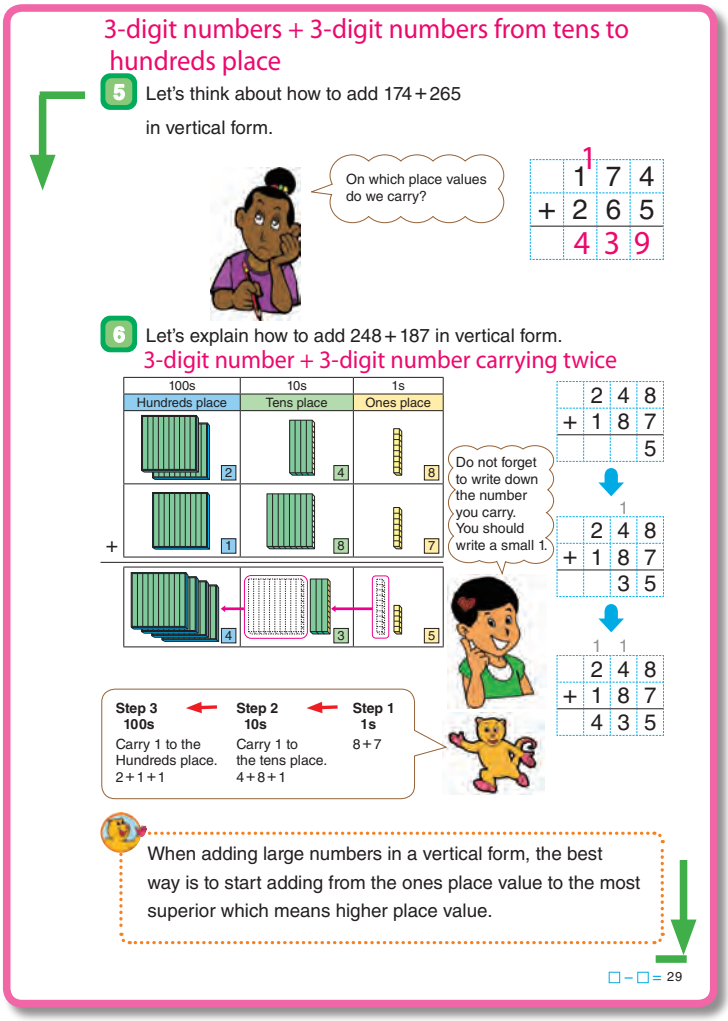
- Blocks such as ones, tens, and hundreds.

Assessment

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

• Teacher's Notes •

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



Lesson Flow

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

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

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

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

T Introduce the main task.

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

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

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

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

T Explain the important point in the box .

Sample Blackboard Plan

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

Main Task: Let's add 3-digit numbers with carrying over.

5 Let's think about how to add.

	1	7	4
+	2	6	5

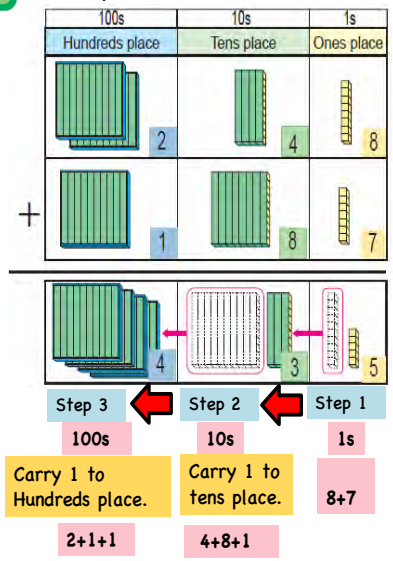
On which place value do I carry over?

	¹1	7	4
+	2	6	5
	4	3	9

Answer: 7+6 is 13 therefore carry 1 over to hundreds place.
It is the same as 70+60=130 therefore 1 hundred is carried over.

MT

6 Let's explain how to add in vertical form.



	2	4	8
+	1	8	7
			5

	2	¹4	8
+	1	8	7
		3	5

	¹2	¹4	8
+	1	8	7
	4	3	5

Do not forget to write down the number you carry over. Always write a small 1.

Summary

- When adding large numbers, the best way is to start adding from the ones place to the most superior.

Unit 2

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

Textbook Page : p.30
Actual Lesson 019

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Prepare according to the blackboard plan.

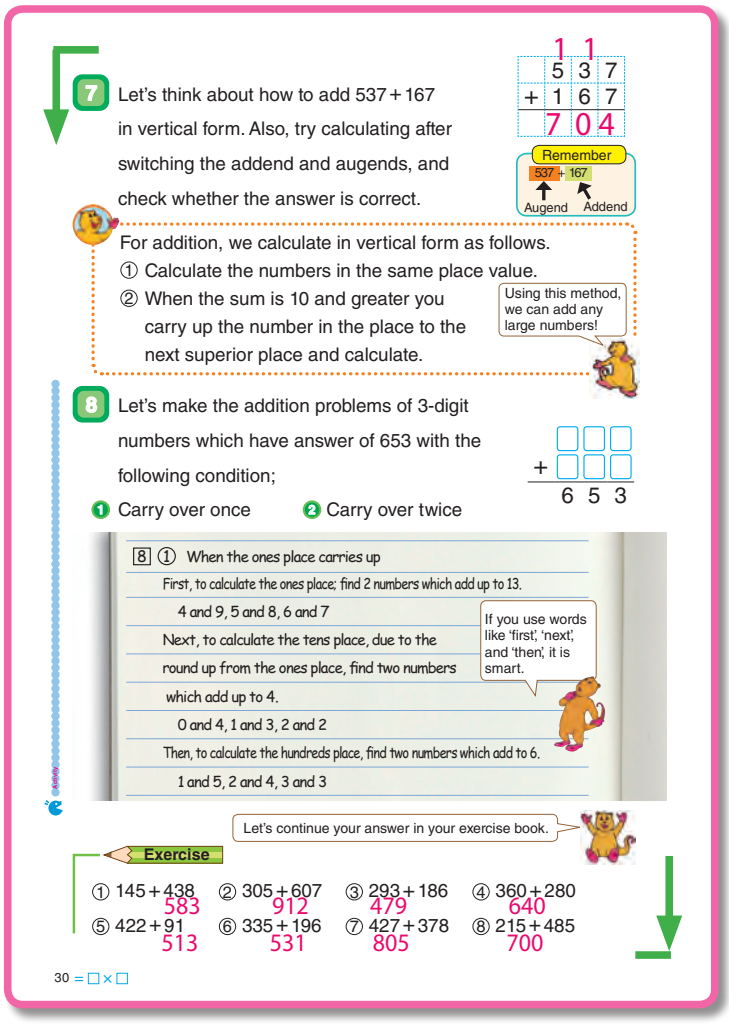
Assessment

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

• Teacher's Notes •

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

Teach the importance of aligning numbers under their place values.



Lesson Flow

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

T Introduce the main task.

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

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

T Explain the important point in the box .

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

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

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

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

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

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

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

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

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

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

4 Solve the exercise.

Sample Blackboard Plan

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

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

7 Let's add in vertical form.

	5	3	7
+	1	6	7

Remember: 537 + 167 — Addend, Augend

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

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

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

MT

Important Point

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

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

1 Carry over once

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

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

2 Carry over twice

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

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

Exercise

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

Summary

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

Unit 2

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

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

Sub-unit Objectives

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

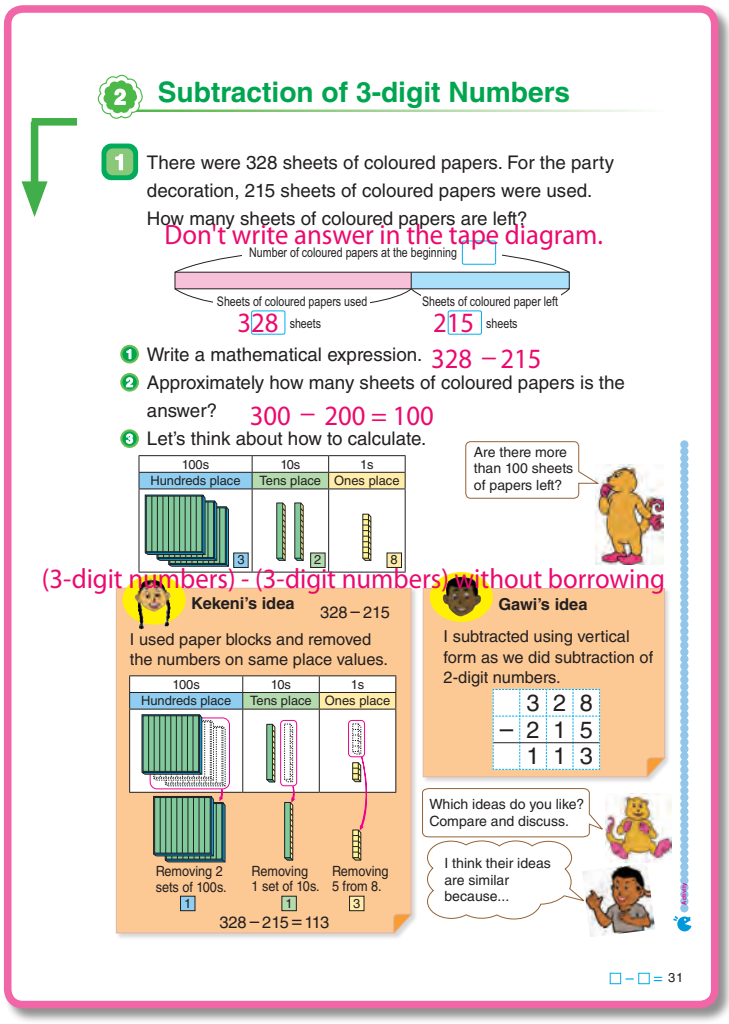
- Block diagram, Paper blocks (1s, 10s & 100s)

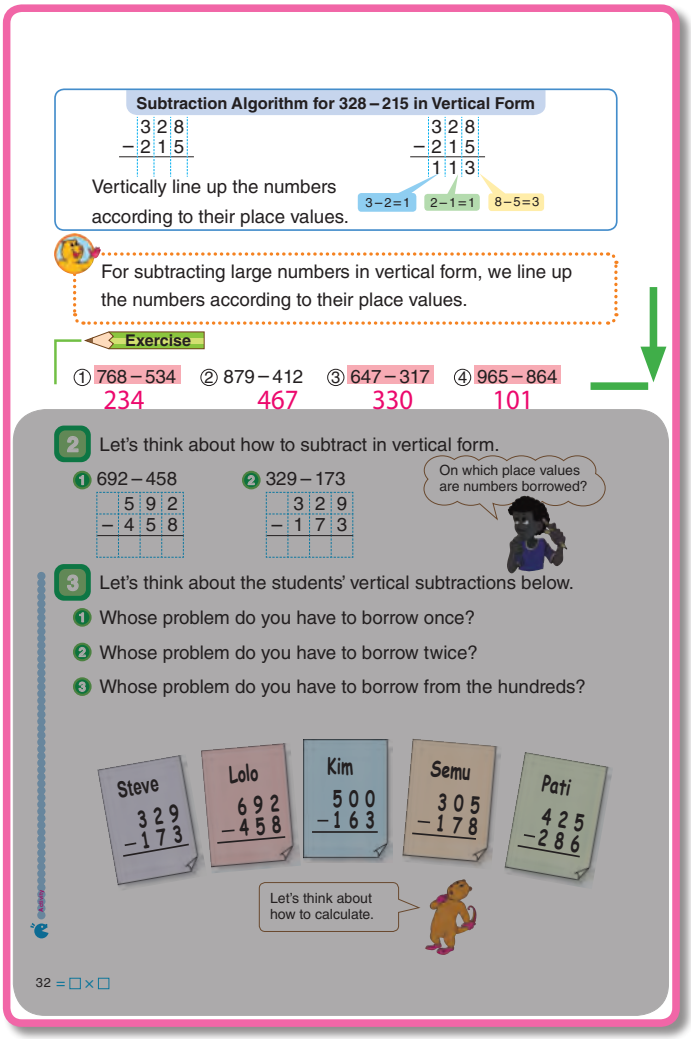
Assessment

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

• Teacher's Notes •

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





Lesson Flow

1 ① Read the task and distinguish addition or subtraction.

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

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

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

3 Summarise the important points of subtracting in vertical form.

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

4 Do the exercise.

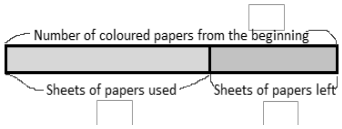
T Supervise those who need assistance and collect student exercise books for marking.

Sample Blackboard Plan

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

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

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



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

② 300 – 200 = 100

Answer: About 100 papers will remain.

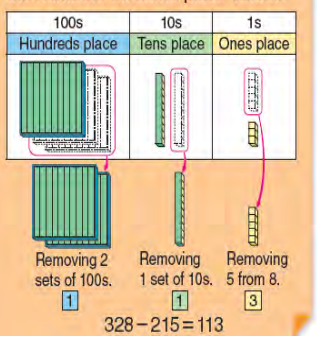
MT

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

Students Ideas
Working out with answers

Kekeni's Idea
Using Block Diagram

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



Gawi's idea
Line up numbers

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

	3	2	8
–	2	1	5
	1	1	3

Answer: 113

Summary

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

Exercise

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

Unit 2

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

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

Lesson Objectives

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

Prior Knowledge

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

Preparation

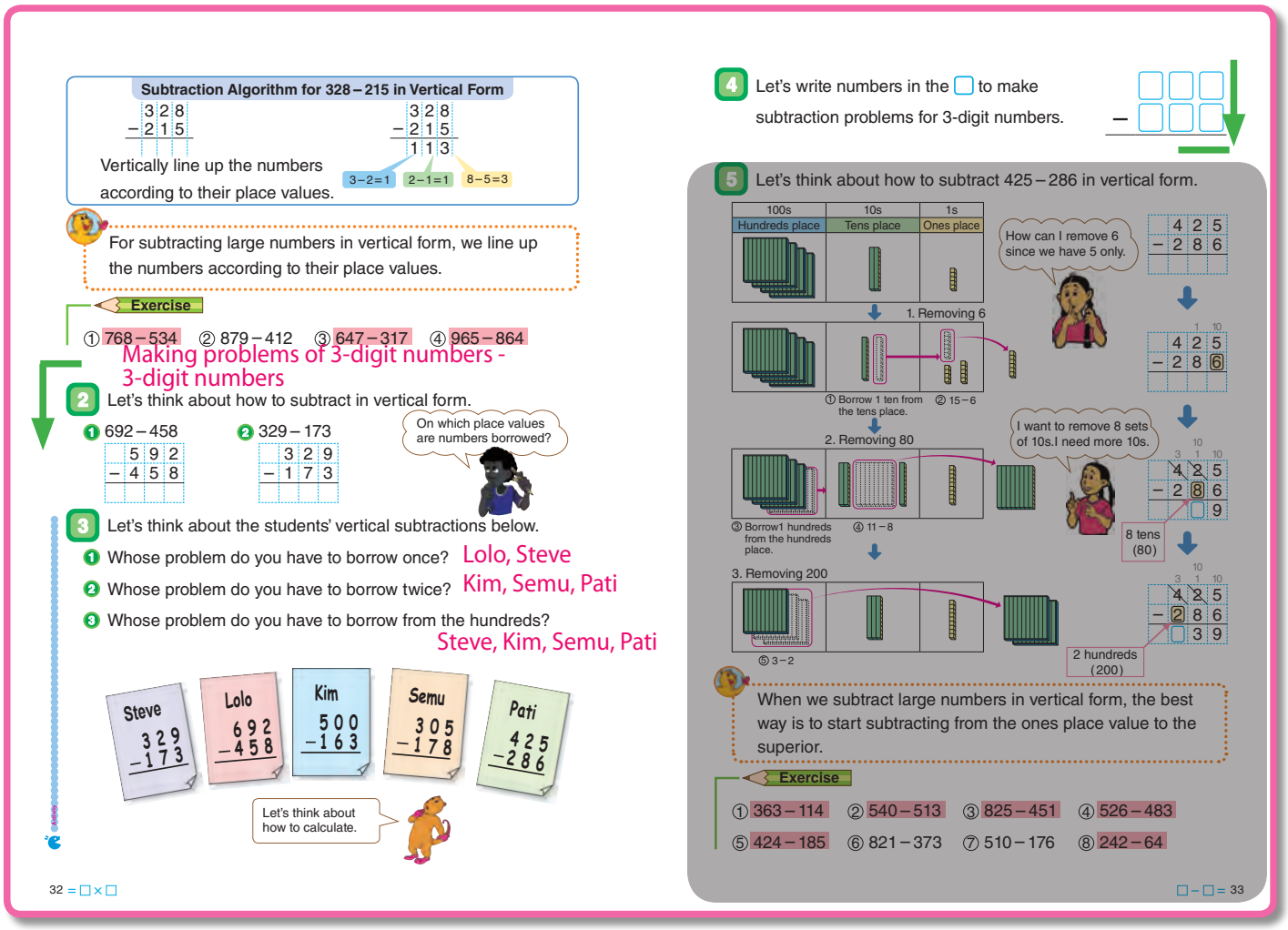
- Block diagram, Paper blocks (1s, 10s & 100s)

Assessment

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

• Teacher's Notes •

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



Lesson Flow

1 ❷ Think about how to subtract ❶ and ❷ in vertical form.

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

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

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

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

T Introduce the main task.

2 ❸ Analyse the operation focusing on the borrowing.

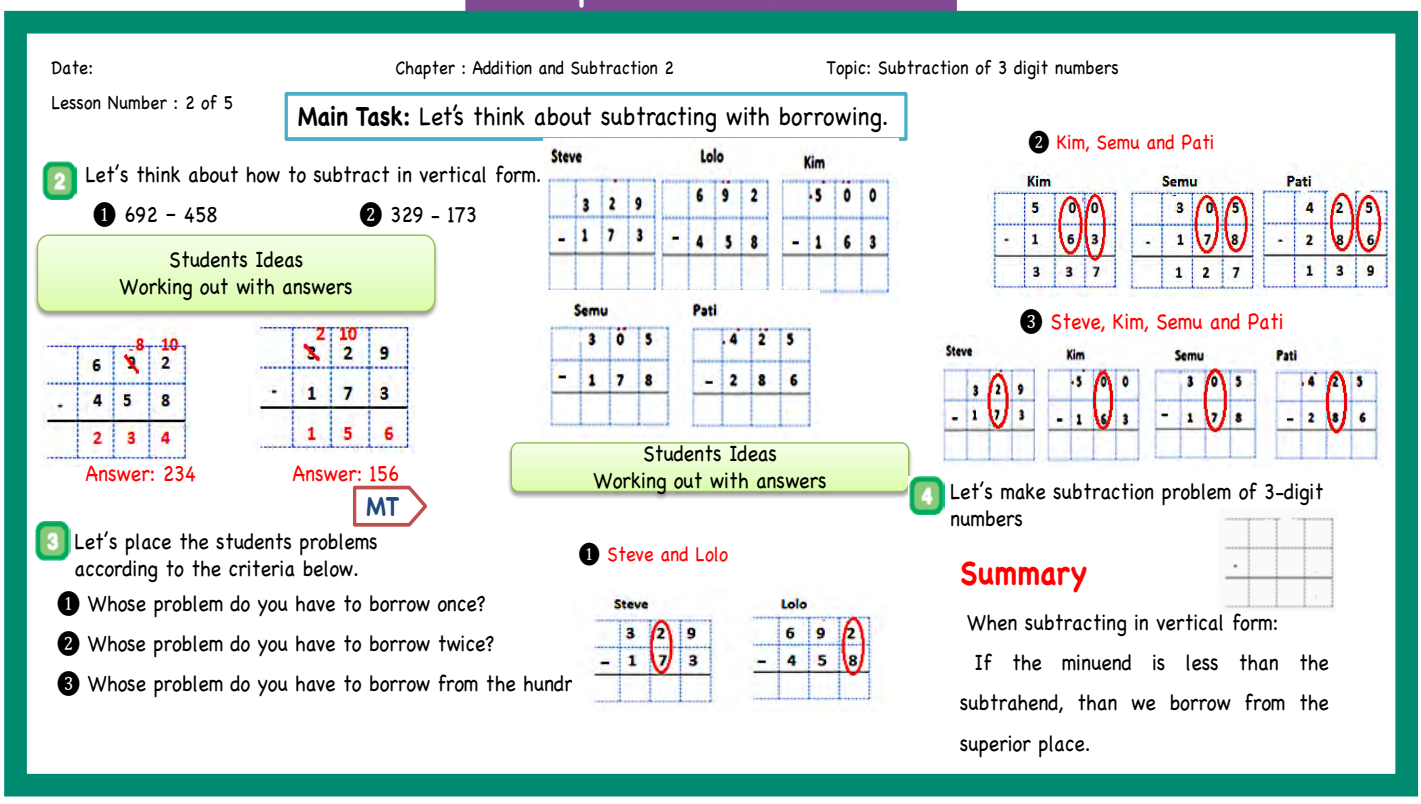
S Categorise 5 operations based on the criteria of ❶, ❷ and ❸.

3 ❹ Make subtraction problems of 3-digit numbers.

S Make any subtraction problem of 3-digit numbers.

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

Sample Blackboard Plan



Unit 2

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

Textbook Page : p.33
Actual Lesson 022

Lesson Objectives

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

Prior Knowledge

- Subtraction of 2-digit numbers with borrowing.

Preparation

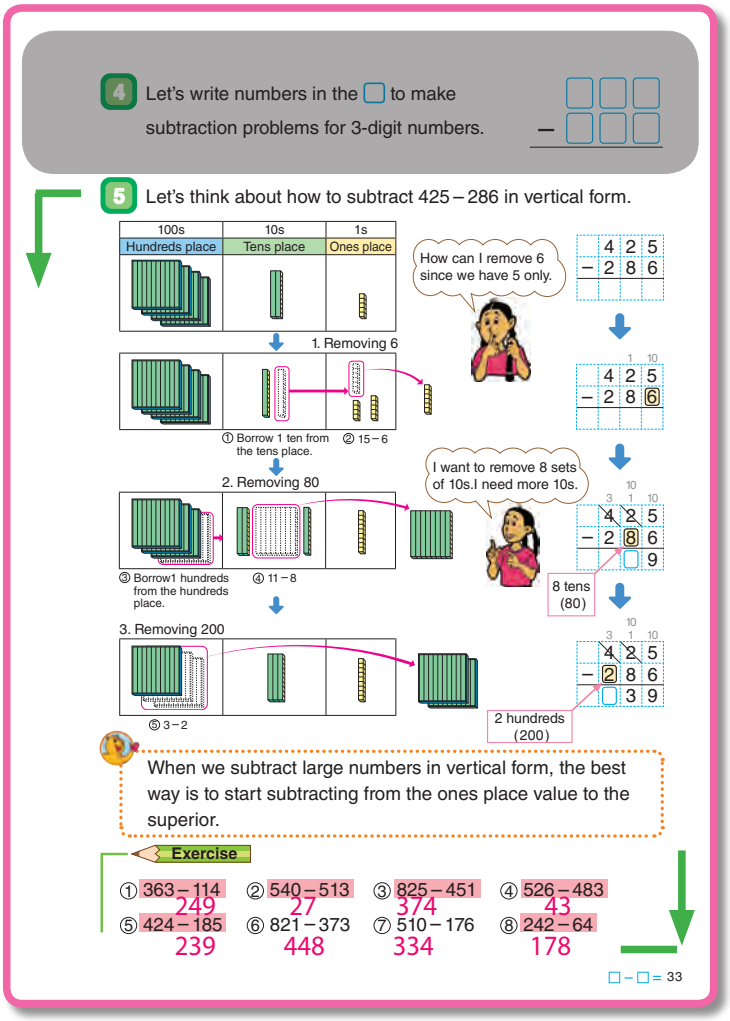
- Block diagram

Assessment

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

• Teacher's Notes •

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



Lesson Flow

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

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

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

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

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

T Introduce the main task.

2 Summarise the important points of subtracting vertical form.

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

3 Do the exercise.

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

Sample Blackboard Plan

Date:

Chapter : Addition and Subtraction 2

Topic: Subtraction of 3-digit numbers

Lesson

Number: 3 of 5

Review

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

Subtract in vertical form

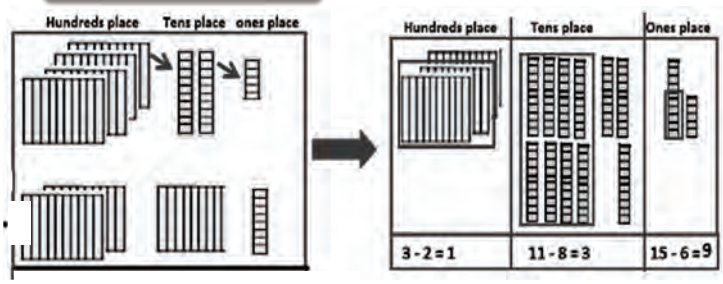
329 - 173

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

5 425 - 286

Students Ideas
Working out with answers

Textbook Idea



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

Remove 6 (15 - 6 = 9)

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

Remove 80 (11 - 8 = 3)

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

MT

Summary

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

Exercise

Complete ① - ⑤

Home work ⑥ - ⑧

Unit 2

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

Textbook Page : p.34
Actual Lesson 023

Lesson Objectives

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

Prior Knowledge

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

Preparation

- Paper blocks

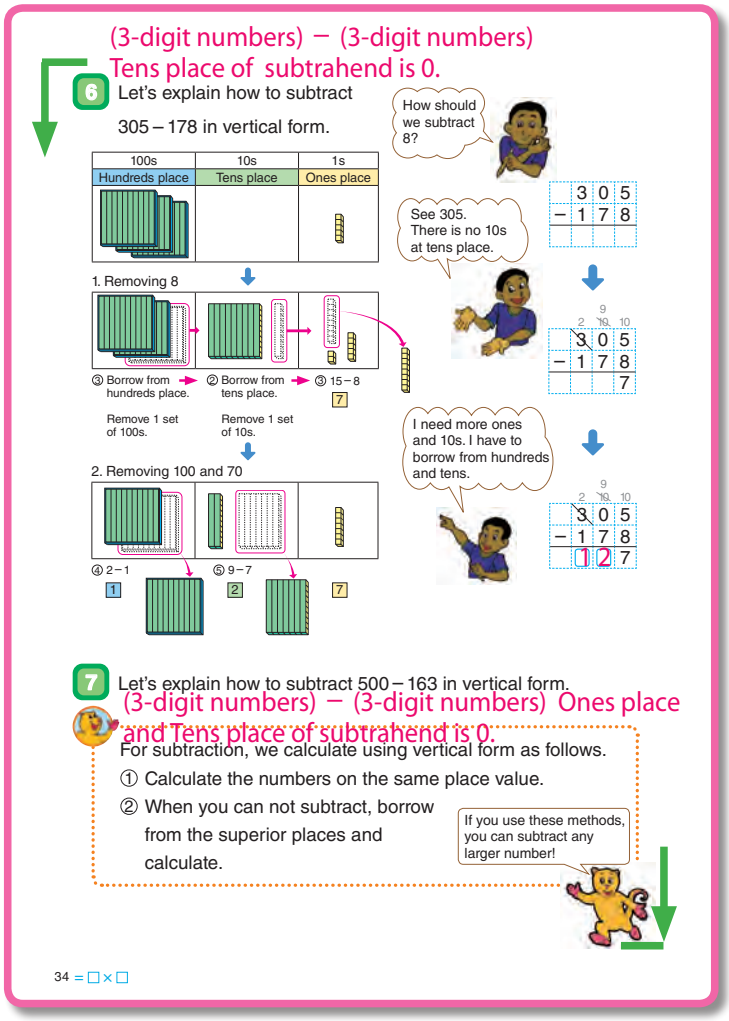
Assessment

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

• Teacher's Notes •

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

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



49
500
− 163
337

Lesson Flow

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

T Introduce the main task.

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

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

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

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

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

T Summarise the important point in the box .

Sample Blackboard Plan

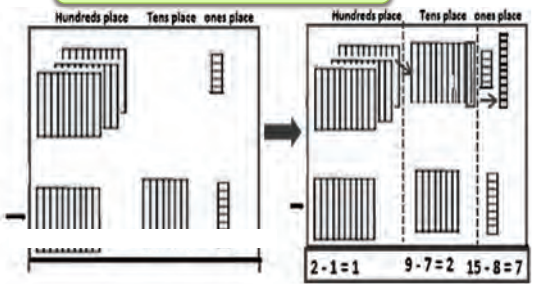
Date: Chapter : Addition and Subtraction 2 Topic: Subtraction of 3-digit number Lesson Number : 4 of 5

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

MT

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

Students Ideas
Working out with answers

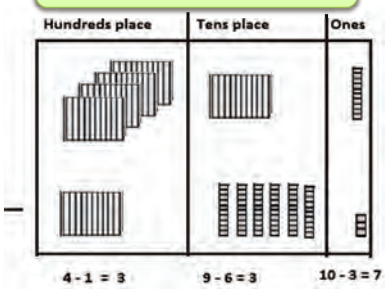


	2	10 9	10
	3	0	5
-	1	7	8
	1	2	7

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

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

Students Ideas
Working out with answers.



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

Summary

For subtraction, we calculate using vertical form as follows:

1. Calculate the numbers on the same place.
2. When you can not subtract, borrow from the superior place and subtract.

Unit 2

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

Textbook Page : p.35
Actual Lesson 024

Lesson Objectives

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

Prior Knowledge

- Subtraction of 3-digit numbers with borrowing.

Preparation

- Prepare according to the board plan.

Assessment

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

• Teacher's Notes •

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

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

Making subtraction problems with 3-digit numbers to find difference of 356 with borrowing once and twice.

8 Let's make the subtraction of 3-digit numbers with the answers as 356 using the following conditions.

□□□
−□□□
3 5 6

① Borrowing once

792
−436
356

② Borrowing twice

712
−356
356

8 ① When we cannot subtract from ones place.
First, to calculate the ones place borrow from the tens place, so there will be 2 numbers on ones place which becomes 6 after subtraction.
5 and 9, 4 and 8, 3 and 7, 2 and 6, or 1 and 5.
Next, to calculate the tens place, remember the number 1 which was borrowed for the ones place. It means finding 2 numbers on the tens place which become 6 after subtraction.
6 and 0, 7 and 1, 8 and 2, or 9 and 3.
Then, to calculate the hundreds place, find 2 numbers which become 3 after subtraction.

Just think in order, just like addition!

Let's continue your answer in your exercise book.

Exercise

① 405 − 286 = 119
② 601 − 198 = 403
③ 402 − 107 = 295
④ 702 − 46 = 656
⑤ 800 − 197 = 603
⑥ 200 − 38 = 162
⑦ 700 − 403 = 297
⑧ 600 − 9 = 591

□ + □ = 35

Lesson Flow

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

T Introduce the main task.

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

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

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

3 Do the exercise.

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

Sample Blackboard Plan

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

MT

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

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

❶ Borrowing once

Students Ideas
Working out with answers

	7	8 ~~9~~	10 2
-	4	3	6
	3	5	6

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

❷ Borrowing twice

Students Ideas
Working out with answers

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

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

Summary

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

Do **Exercise**

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

Unit 2

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

Textbook Page : p.36
Actual Lesson 025

Sub-unit Objectives

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

Lesson Objectives

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

Prior Knowledge

- Addition and subtraction of 3-digit number.

Preparation

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

Assessment

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

• Teacher's Notes •

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

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

3 Calculating Larger Numbers

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

① 865 + 746

	8	6	5
+	7	4	6
1	6	1	1

② 1248 − 936

	1	2	4	8
−		9	3	6
		3	1	2

③ 1000 − 895

	1	0	0	0
−		8	9	5
		1	0	5

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

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

① 4175 + 3658

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

② 6073 + 3927

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

Even in larger numbers, we use the same method.

③ 3925 − 1947

	3	9	2	5
−	1	9	4	7
	1	9	7	8

④ 10000 − 5089

	1	0	0	0	0
−		5	0	8	9
		4	9	1	1

Exercise

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

36 = □ × □

Lesson Flow

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

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

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

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

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

T Introduce the main task.

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

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

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

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

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

3 Do the exercise.

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

Sample Blackboard Plan

Date:
Lesson Number : 1 of 1

Chapter : Addition and Subtraction 2

Sub - Chapter/Topic: Calculating Larger Numbers

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

1 Let's explain the calculation below.

❶ 865 + 746

Students Ideas
Working out with answers

	8	6	5
+	7	4	6
1	6	1	1

Answer: 1611

❷ 1248 − 936

Students Ideas
Working out with answers

1	2	4	8
−	9	3	6
	3	1	2

Answer: 312

❸ 1000 - 895

	9	9	10
1	0	0	0
−	8	9	5
	1	0	5

Answer: 105

MT

2 ❶ 4175 + 3658

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

Answer: 7833

❷ 6073 + 3927

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

Answer: 1000

❸ 3925 − 1947

2	10	10	10
3	9	2	5
−	1	9	4	7
1	9	7	8

Answer: 1978

❹ 10 000 − 5089

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

Answer: 4911

Summary

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

Exercise

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

Unit 2

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

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

Sub-unit Objectives

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

Lesson Objectives

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

Prior Knowledge

- Addition and subtraction of 3-digit number.

Assessment

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

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

4 Considering How to Calculate More Easily

1 Let's calculate easily.

❶ 298 + 120 ❷ 500 − 198

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

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

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

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

Exercise

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

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

□ + □ = 37

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

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

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

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

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

Compare ideas of how to calculate mentally using easier ways.

Mental Calculations

4 Let's calculate mentally.

❶ 35 + 46

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

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

❷ 81 − 27

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

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

Exercise

1 Let's calculate easily.

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

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

2 Let's calculate mentally.

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

38 = □ × □

Lesson Flow

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

T Introduce the main task.

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

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

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

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

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

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

4 **Do the exercise.**

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

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

T Go through the important point in the box .

6 **4 Calculate mentally.**

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

7 **Do the exercise.**

Sample Blackboard Plan

Date: Chapter : Addition and Subtraction 2 Sub - Chapter/Topic: Considering How to Calculate More Easily Lesson Number: 1 of 1

MT

Main Task: Let's think about how to calculate more easily.

1 Let's calculate easily.

1 298 + 12 2 500 - 198

Students Ideas
Working out with answers

298 + 120 → 300 + 118 = 418 Answer: 418

500 - 198 → 502 - 200 = 302 Answer: 418

Important Point

2 1 308 + 197 2 305 - 99

Students Ideas
Working out with answers

308 + 197 → 305 + 200 = 505 Answer: 505

305 - 99 → 306 - 100 = 206 Answer: 206

3 875 + 47 + 53

Students Ideas
Working out with answers

875 + (47 + 53) = 875 + 100 = 900 Answer: 900

Important Point

This symbol () means you should calculate the numbers inside first.

Let's calculate Mentally.

4 1 35 + 46

Vavi's Idea	Ambai's Idea
In Vertical form	Splitting Method
5 + 6 = 11	(1) Split 46 into 40 and 6
3 + 4 + 1 = 8	(2) 35 + 40 = 75
Answer: 81	(3) 75 + 6 = 81 Answer: 81

2 81 - 27

Students Ideas
Working out with answers

Sare's Idea	Mero's Idea
In Vertical form	Splitting Method
11 - 7 = 4	(1) Split 27 into 20 and 7
7 - 2 = 5	(2) 81 - 20 = 61
Answer: 54	(3) 61 - 7 = 54 Answer: 54

Summaries using the Important Point

Do Exercise ①–④

Do Exercise

1 Let's Calculate easily

2 Let's Calculate mentally

Unit 2

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

Textbook Page : p.39
Actual Lesson 027

Sub-unit Objectives

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

Lesson Objectives

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

Prior Knowledge

- Addition and subtraction of 3-digit numbers.

Preparation

- Paper strips (tapes)

Assessment

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

• Teacher's Notes •

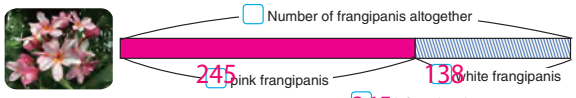
Situations of Subtraction
It can be understood that when one set can be divided in two subsets, the finding of remainders (opposite of increase) or finding of the other one (opposite of addition) are the situations of finding a quantity of the other subset when already knowing a quantity in total and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

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

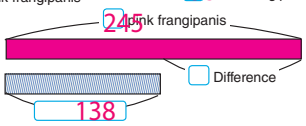
5 What Kind of Calculation is This?

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

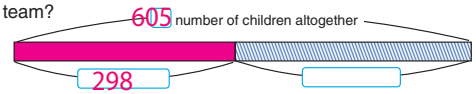
① How many frangipanis blossomed ?



② Which colour blossomed the most?

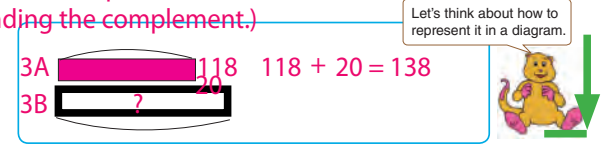


2 There are 605 children in Eileen's school. In a sports day, children are divided into red and blue teams. There are 298 children in the red team. How many children are in the blue team?



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

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



□ + □ = 39

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

Lesson Flow

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

T Introduce the main task.

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

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

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

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

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

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

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

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

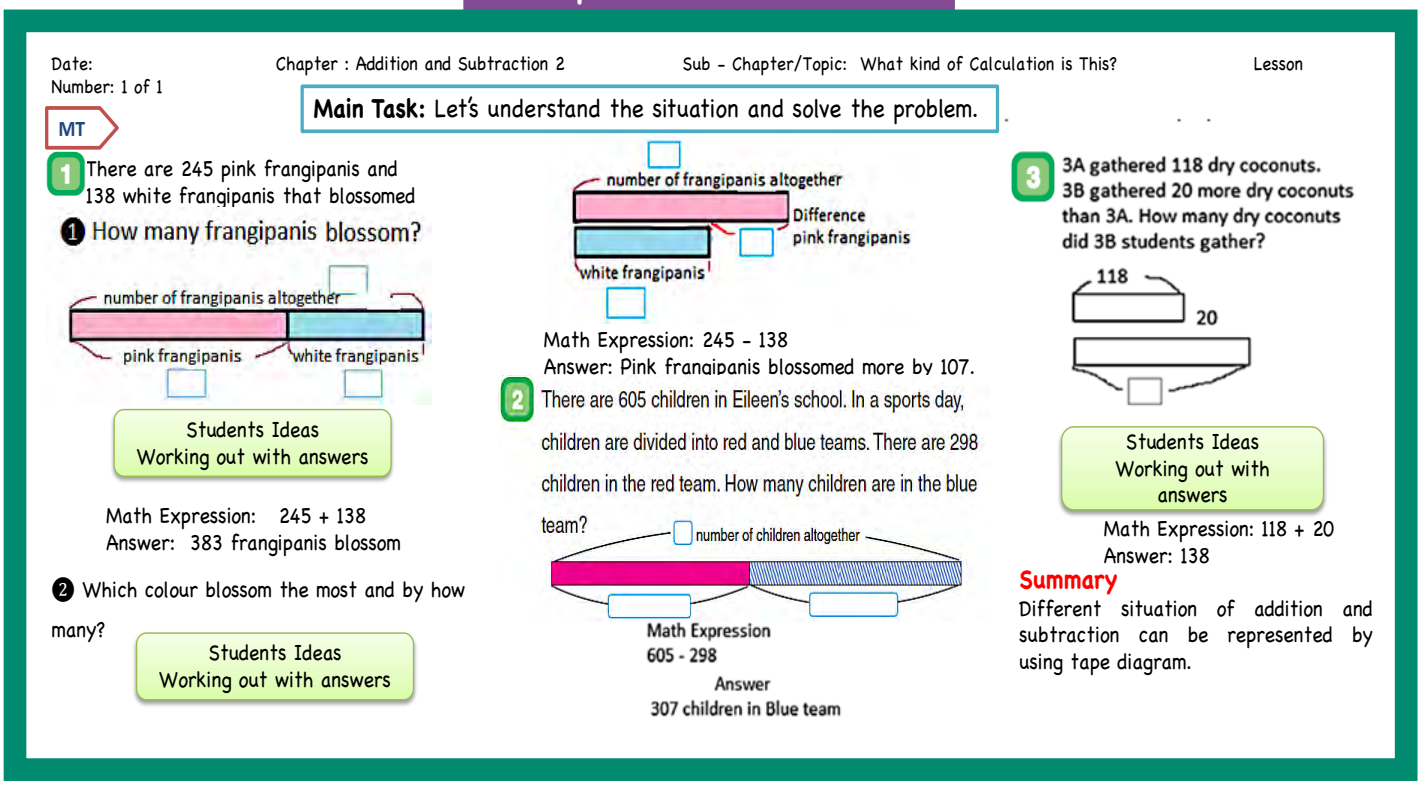
S Identify that it is a subtraction situation where you find the bigger number based on the difference so they are to write a math expression based on the relational diagram.

S Think about how to represent it in a diagram.

T Let students share with friends and discuss.

S Explain the diagram they drew to the whole class.

Sample Blackboard Plan



Unit 2

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

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

Lesson Objectives

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

Prior Knowledge

- All the contents of this Unit

Preparation

- Evaluation sheet

Assessment

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

• Teacher's Notes •

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

Exercises

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

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

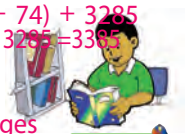
2 Let's calculate in vertical form. Page 36

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

3 Let's calculate. Page 38

① 5387 + 57 + 43 = 5387 + (57 + 43) = 5387 + 100 = 5487
② 26 + 3285 + 74 = (26 + 74) + 3285 = 100 + 3285 = 3385

4 You read 165 pages of a book with 240 pages in total. How many pages are left?



240 − 165 = 75　Answer 75 pages

5 There are 2368 boys and 2356 girls in Elementary schools in Manus Province.

How many elementary school children are there in total? Also, which gender is more and by how many? Page 39

2368 + 2356 = 4724　Answer 4724 students
2368 − 2356 = 12　Answer 12 students

Let's calculate. Grade 2 Do you remember?

① 3×6 18　② 8×4 32　③ 6×9 54　④ 4×7 28
⑤ 9×1 9　⑥ 1×8 8　⑦ 5×3 15　⑧ 2×2 4

40 = □ × □

Problems

1 Let's calculate in vertical form.
● Understanding how to calculate in vertical form.

① 451 + 137 588　② 274 + 508 782　③ 662 + 150 812
④ 186 + 357 543　⑤ 109 + 698 807　⑥ 558 + 745 1303
⑦ 3096 + 5518 8614　⑧ 2048 + 1952 4000　⑨ 6272 + 3728 10000
⑩ 797 − 246 551　⑪ 258 − 139 119　⑫ 966 − 288 678
⑬ 653 − 399 254　⑭ 703 − 316 387　⑮ 1032 − 634 398
⑯ 2356 − 1848 508　⑰ 5126 − 2835 2291　⑱ 10000 − 1781 8219

2 In 2 years Cathy saved 3596 kina and her sister saved 4487 kina.
● Distinguish the situation for addition or subtraction and find the answer.

① Who has more savings and by how much? Her sister . By 891 kina

② What is the total of their savings? 8083 kina

3 Let's find mistakes in the calculations done in vertical form and find the correct answers.
● Identifying the mistakes in calculations in vertical form and correcting.

2 9 4 + 1 1 9 = 4 0 3	2 9 4 + 1 1 9 = 4 1 3	
4 3 7 − 1 9 8 = 3 6 1		4 3 7 − 1 9 8 = 2 3 9

□ − □ = 41

Lesson Flow

1 ① **Calculate the addition and subtraction of 3-digit numbers in vertical form.**

S Recall previous lessons and solve the exercises.

2 ② **Calculate the addition and subtraction of 4 and 5-digit numbers in vertical form.**

3 ③ **Think of how to calculate the addition of 3 numbers using easier ways.**

4 ④ **Read the word problem and solve it.**

TN Students draw their attention to the words 'number of pages read, number of pages in total and 'pages not read' in order for them to identify the number of pages read and the number of pages in total.

TN Use a tape diagram to describe or relate the situation showing the number of pages read and the number of pages in total. Students realise that it is a subtraction situation as finding the difference from the number of pages in total to find the completion so they are to write a math expression.

Addition and Subtraction	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 383 + 264

$$\begin{array}{r} 383 \\ +264 \\ \hline 647 \end{array}$$

② 897 + 436

$$\begin{array}{r} 897 \\ +436 \\ \hline 1333 \end{array}$$

③ 1347 + 4458

$$\begin{array}{r} 1347 \\ +4458 \\ \hline 5805 \end{array}$$

④ 413 − 245

$$\begin{array}{r} 413 \\ +245 \\ \hline 658 \end{array}$$

⑤ 897 − 436

$$\begin{array}{r} 897 \\ -436 \\ \hline 461 \end{array}$$

⑥ 6000 − 5236

$$\begin{array}{r} 6000 \\ -5236 \\ \hline 764 \end{array}$$

2. In a building, there are 1200 stair steps from the ground floor to the top floor. He climbed up 618 stair steps. How many steps left to reach the top floor.

① Mathematical sentence: 1200 − 618 = 582

② Answer: 582steps

3. Anne collected 186 stones. Ratu collected 298 stones. How many stones did they collect in total?

① Mathematical sentence: 186 + 298 = 484

② Answer: 484stones

5 ⑤ **Read the word problem and solve it.**

TN Students draw their attention to the words 'number of school boys, number of school girls and 'school children in total' in order for them to identify the number of school boys and the number of school girls.

T Which gender is more and by how many?

6 ① **Calculate the addition and subtraction of 3-digit numbers in vertical form.**

7 ② **Read the word problem and solve it**

TN Students think of the word problem and draw their attention to the words 'Cathy's savings, her sister's savings and 'total of their savings' in order for them to identify the amount Cathy saved and her sister saved.

8 ③ **Find mistakes done in the calculations in vertical form and find the corrections to them.**

End of Chapter Test: Chapter 2 **Date:**

Addition and Subtraction	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 383 + 264

② 897 + 436

③ 1347 + 4458

④ 413−245

⑤ 897−436

⑥ 6000 − 5236

2. In a building, there are 1200 stair steps from the ground floor to the top floor. He climbed up 618 stair steps. How many steps left to reach the top floor.

① Mathematical sentence: _____

② Answer: _____

3. Anne collected 186 stones. Ratu collected 298 stones. How many stones did they collect in total?

① Mathematical sentence: _____

② Answer: _____

Chapter 3 Multiplication 1

Chapter 4 Multiplication 2
Chapter 5 Thinking about How to Calculate

1. Unit Objective

- To understand the meaning and the representations of numbers, and extend their ability to use numbers.
- To consider a number in relation to other numbers by regarding it as product of other numbers.
- To know situations where multiplication is used and to understand the meaning of multiplication through activities of showing diagram.
- To multiply up to rows of 9.

2. Teaching Overview

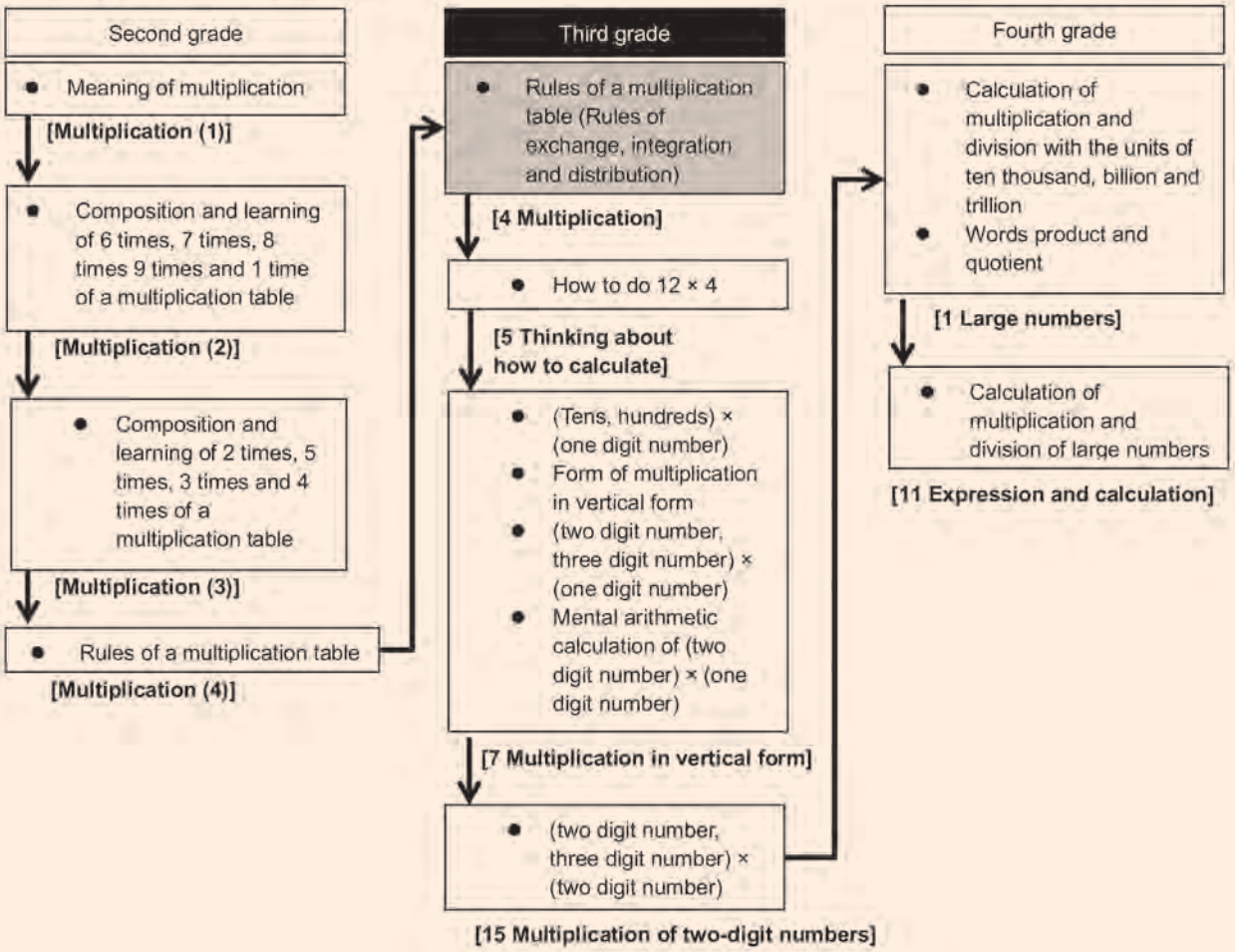
Unit 3 is revision from previous grades and actual learning for grade 3 is in Unit 4.

What we learned at Elementary School: This topic is to consolidate the meaning of multiplications. The following topics will require correct memories of multiplication tables of 1-digit numbers. Let students memorise all multiplications of 1 digit numbers.

The Rules of Multiplication: This is the first step of leaning commutative and distributive laws. Let students understand the laws/rules with diagrams and change of mathematical expressions. Don't teach the rules itself but let them experience why the rules are applicable in multiplication. Let students pay attention to the amount of increase/decrease of product when multiplicand/multiplier increases by 1.

Multiplication with 0 and 10: Students may forget the rules if you teach the rules itself. Student will not forget the rules if they understand it through games and real-life experiences.

3. Related Learning Contents



Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 1 of 5 (Single Period)

Textbook Page : p.42 - p.43
Actual Lesson 029

Sub-unit Objectives

- To recall what the students learned in elementary schools.
- To make the multiplication table.

Lesson Objectives

- To review how to interpret situations as multiplication.
- To find the number of groups of each units and express it as mathematics sentence.

Prior Knowledge

- Addition and subtraction(Grade 1 & 2)

Preparation

- Important point on chart

Assessment

- Think about mathematical expression of multiplication. S
- Understand the meaning of multiplication as repeated addition. F

• Teacher's Notes •

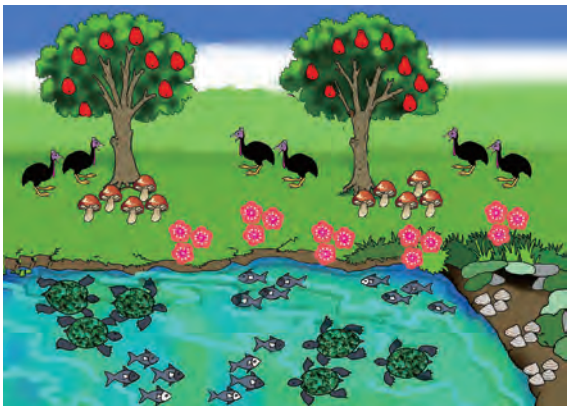
Definition: Multiplication is repeated addition.
$5 \times 2 = 2+2+2+2+2 = 10$
Through this lesson the students should identify groups and see the relationship between multiplication and repeated addition.
Example: 7 groups of 3 flowers can be written as 7×3 and calculated as $7+7+7=21$

3 Multiplication 1

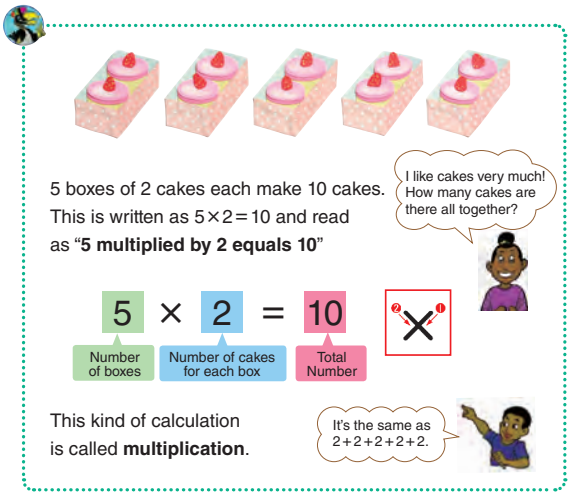
1 What We Learned in Elementary School

Meaning of Multiplication

1 Let's represent the situation by making a multiplication sentence.



42 = □ × □



2 There are 2 oranges in each bag. How many oranges altogether in 1 bag, 2 bags and 3 bags?

1 bag	1 × 2 = 2	2 oranges
2 bags	2 × 2 = 4	4 oranges
3 bags	3 × 2 = 6	6 oranges

3 Group the stars (★) to get 4×3.

3×4=12

refer to blackboard plan.

□+□= 43

Lesson Flow

1 1 Make groups from the picture.

T How many groups can you find for each object in the picture? Allow for class discussion.
S I find 2 groups of 3 turtles.
S I find 3 groups of 2 cassowaries.
S I find 3 groups of 4 shells
S I find 7 groups of 3 flowers
T Introduce the main task.

2 Understand the meaning of multiplication.

T Put up the chart about the important point on the blackboard
T Confirm the meaning of each number.

5	×	2	=	10
No. of boxes		No. of cakes		Total no. of cakes

3 Make mathematics sentence.

T Redirect the class attention to the introductory activity. Allow students to write the mathematics sentence by themselves.
S 3 groups of 2 cassowaries can be written as 3×2=6
3 groups of 4 shells can be written as 3×4=12
7 groups of 3 flowers can be written as 7

4 Solve 2 and 3.

TN Confirm the meaning of each number in every question.

5 Summarise the lesson.

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we learned at Elementary Lesson Number: 1 of 5

Main Task: Let's represent the situation by making a multiplication sentence .

Students Ideas
Multiplication Sentences

1 Let's make groups. Lets make mathematics sentences

Two groups of 3 turtles	2 x 3 = 6
Three groups of 4 shells	3 x 4 = 12
Three groups of 7 flowers	3 x 7 = 21
Twos groups of 5 balls	2 x 5 = 10
Three groups of 2 cassowary	3 x 2 = 6

Let's Study the meaning of multiplication (SN)
"5 boxes of 2 cakes each make 10 cakes. It is written as 5 x 2 = 10 and read as 5 multiplied by 2 equals 10"

5	x	2	=	10
Number of boxes		Number of cakes		Total number

This kind of calculation is called multiplication.
It is the same as repeated addition where 2 + 2 + 2 + 2 + 2 = 10

MT

Students Ideas
Multiplication Sentences

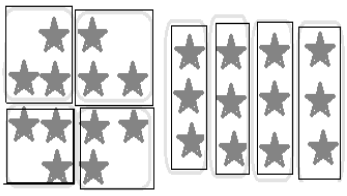
2

1 bag	1 x 2 = 2	2 oranges.
2 bags	2 x 2 = 4	4 oranges
3 bags	3 x 2 = 6	6 oranges

3 Group stars to get 4 x 3

Students Ideas

Sample Answer



Summary:

- Multiplication is a repeated addition.
- 3 x 2 is the same as 2 + 2 + 2 = 6

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 2 of 5 (Single Period)

Textbook Page : p.44
Actual Lesson 030

Lesson Objectives

- To identify that the answer will be the same even if the order of multiplicand and multiplier changes.
- To explain why the rules are true in properties of multiplication.

Prior Knowledge

- Meaning of Multiplication

Preparation

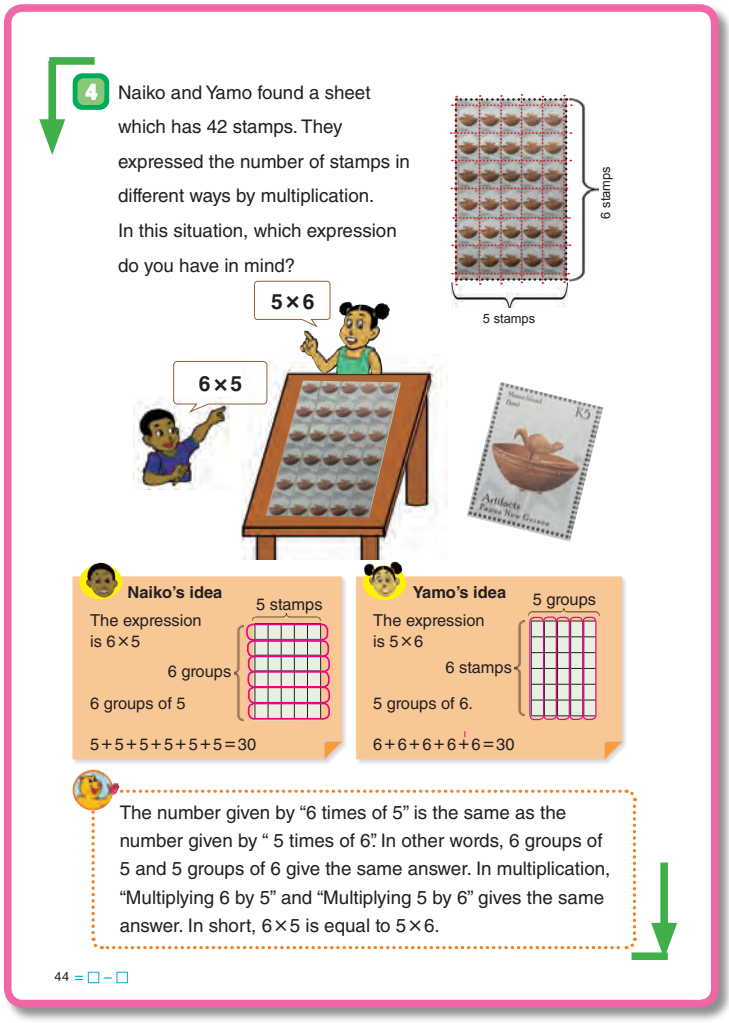
- Paper blocks for 5×6 and 6×5.

Assessment

- Analyse the mathematical expression of 5×6 and 6×5. F
- Understand that even the multiplicand and the multiplier are switched the answer does not change. S

• Teacher's Notes •

The main objective of the lesson is for the students to understand that the order of 1st and 2nd number can change but the answer will remain the same. They should also be able to explain why the rule is true using the illustration.



Lesson Flow

1 Review previous lesson: Number of Groups × Number of each item = Total number of items

T Introduce the main task.

2 4 Think about how to express the picture of stamps by multiplication.

T What is the mathematical expression to find the number of stamps?

S1 (Naiko's idea)
The expression is 5×6 because, if I observe the stamps vertically there are 5 groups and each group has 6 stamps.

S2 (Yamo's idea)
The expression is 6×5 because, there are 6 groups and each group has 5 stamps horizontally.

T What is the answer of those expressions?

S Both answers are 30.

T Confirm that the answer will be the same even if the order of 1st and 2nd number change.

T Summarise the important point in the box .

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we Learnt in Elementary Lesson Number: 2 of 5

Main Task: Let's find out more about multiplication.

Let's review previous lesson:

"5 boxes of 2 cakes each make 10 cakes. It is written as 5 x 2 = 10 and read as 5 multiplied by 2 equals 10"

5	x	2	=	10
Number of boxes		Number of cake		Total

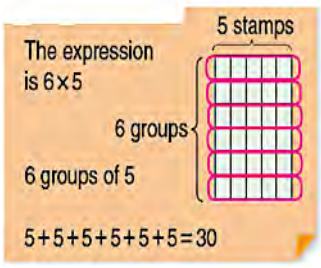
This kind of calculation is called multiplication.

MT

Let's discuss Naiko and Yamo's idea.

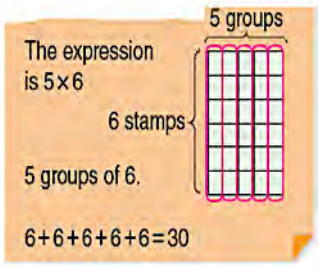
Naiko's Idea

The math sentence is 5 x 6 = 30



Yamo's Idea

The math sentence is 6 x 5 = 30



Summary:

In multiplication, multiplying 6 x 7 and multiplying 7 x 6 gives the same answer.

In short 6 x 7 = 7 x 6

4 Which expression do you have in mind?

Important Point

Students Ideas
Multiplication Expressions

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 3 of 5 (Single Period)

Textbook Page : p.45-p.46
Actual Lesson 031

Lesson Objectives

- To deepen the understanding about multiplication of 5.
- To develop multiplication table of 5.

Prior Knowledge

- Meaning of Multiplication.
- Commutative law of multiplication (Previous lesson)

Preparation

- Cardboards, drawing paper, multiplication table of 5
- Pictures of task 3 and 4

Assessment

- Think about the meaning of the multiplication of 5. F
- Understand the multiplication table of 5. S

• Teacher's Notes •

The students have learned about multiplication in Elementary. Here the purpose of the lesson is to deepen their understanding. Guide them to make meaning of 5×2 and 2×5.

For example, for every leaf with 5 peanuts added the total number of peanuts increases by 5. For 5 leaves that have one peanut added, the total peanut increases by 5.

Cards of multication table

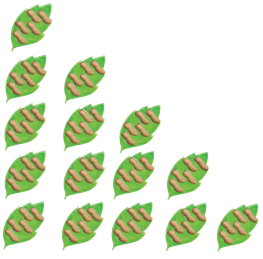
The Multiplication of 5

5 Let's make a mathematical expression of multiplication for the number of lollies.

Express the table of 2 by pictures

6 Let's draw a picture of 3×5.

7 There are 5 peanuts on each leaf. Let's find the total number of peanuts as the number of leaves increases from 1 to 5 and read the sentence.



1×5=5
1 multiplied by 5 equals 5

2×5=10
2 multiplied by 5 equals 10

3×5=15
3 multiplied by 5 equals 15

4×5=20
4 multiplied by 5 equals 20

5×5=25
5 multiplied by 5 equals 25

1 Complete the mathematical sentences from 6 leaves to 9 leaves.

2 Explain what you found.

How many peanuts increase as 1 leaf is added?

5×6=30
6×6=36
7×6=42
8×6=48
9×6=54

□×□=45 46=□+□

8 Let's consider the following pictures.

There are 5 leaves of 1 peanut each.

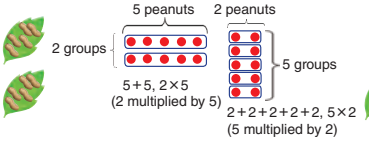
5×1=5

5×2=10

5×3=15

1 Complete the mathematical sentences from 4 peanuts to 9 peanuts.

2 Think about the difference compared to 3.



5×4=20
5×5=25
5×6=30
5×7=35
5×8=40
5×9=45

In task 7, second number is always 5. However, in task 8, first number is always 5.

We learned even we switch 1st and 2nd numbers, answer does not change.

Grade 2 Do you remember?

Multiplication tabel of 5

5×1=5	Five ones are 5	5×6=30	Five sixes are 30
5×2=10	Five twos are 10	5×7=35	Five sevens are 35
5×3=15	Five threes are 15	5×8=40	Five eights are 40
5×4=20	Five fours are 20	5×9=45	Five nines are 45
5×5=25	Five fives are 25		

Lesson Flow

1 5 Make a mathematical expression for the drawing.

T Introduce the main task.
T How many groups are there?
S 6 groups.
T How many lollies does each group have?
S 5
T What is the mathematical expression?
S 6×5

2 6 Draw a picture of 3×5.

S Draw a picture of 3×5 and share with friends.

3 7 Make mathematical sentences and discuss the findings.

T How many peanuts does each leaf have?
S 5
S ❶ Fill in the boxes to complete the mathematical sentences.
T ❷ What did you find?
S The number of leaf increased by 1, the total number of peanuts increased by 5.

4 8 Make mathematical sentences and compare to 3.

S ❶ Complete the mathematical sentences by filling in the boxes.
T What did you find compared to task 3.
S ❷ In task 3, the number of leaf increases 1 by 1, but in task 4, the number of leaf remains 5 and the number of peanuts increases 1 by 1.
S Even the 1st and 2nd number of the expressions changes the answer are same.
T Summarise multiplication table of 5. The 1st number is always 5 but the second number increases 1 by 1.

Sample Blackboard Plan

Date: Chapter: Multiplication 1. Topic: What we Learnt in Elementary Lesson Number: 3 of 5

Main Task: Let's discuss the multiplication of 5.

MT

5 Let's make mathematical expression for multiplication.

Students Ideas
Multiplication Expressions

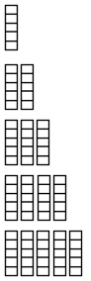
Answer: 6 x 5

6 Let's draw a picture of 3 x 5.

Students Ideas
Drawings for 3 x 5

Sample Answer for 3 x 5

7



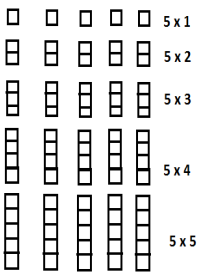
1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25

❶ Students Ideas
Mathematical sentence from 6 to 9 leaves

❷ Students Ideas
Explain the increase in peanuts as 1 leaf is added

As the number of leaves increases by 1, the number of peanuts increases by 5.

8



Multiplication table of 5

5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45

❶ Students Ideas
Complete the Multiplication sentences

❷ Think about the difference compared to task 3.

2 groups of 5

2 x 5 = 10
5 + 5 = 10

5 x 2 = 10
5 groups of 2
2 + 2 + 2 + 2 + 2 = 10

Important Point

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 4 of 5 (Single Period)

Textbook Page : p.47
Actual Lesson 032

Lesson Objectives

- To review the multiplication table 1, 2, 3 and 4.

Prior Knowledge

- Meaning of multiplication
- Structure of multiplication table 1, 2, 3, and 4

Preparation

- Cardboard, drawing paper
- Multiplication Cards of table 1, 2, 3 and 4

Assessment

- Enjoy memorising multiplication table 1, 2, 3 and 4. S
- Memorise multiplication table 1, 2, 3 and 4. F

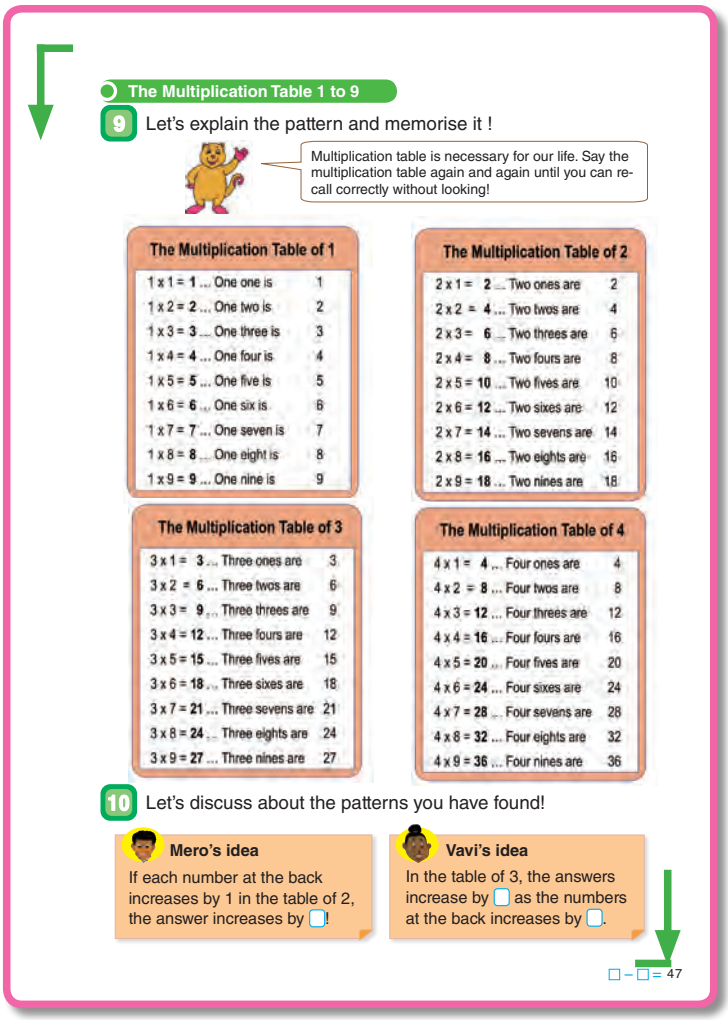
• Teacher's Notes •

Importance of memorising multiplication table

In general, most of the teachers think it is important to teach meaning of multiplication, however they are not serious to let students memorise multiplication. Multiplication table from 1×1 up to 9×9 will be the base for calculating division and further multiplication. If students do not memorise the table it is for sure they will have problem to learn those contents. Therefore, it is extremely important to let the students memorise the table. It takes time to do it but when you continue practice memorising every day, it is for sure one day they can memorise all multiplication table.

How to memorise the table.

Having each student to develop their own multiplication cards from 1×1 to 9×9 using the ideas developed in table 2 and table 5 may help them to memorise well.



The Multiplication Table 1 to 9

9 Let's explain the pattern and memorise it !

Multiplication table is necessary for our life. Say the multiplication table again and again until you can re-call correctly without looking!

The Multiplication Table of 1

1 x 1 = 1 ... One one is	1
1 x 2 = 2 ... One two is	2
1 x 3 = 3 ... One three is	3
1 x 4 = 4 ... One four is	4
1 x 5 = 5 ... One five is	5
1 x 6 = 6 ... One six is	6
1 x 7 = 7 ... One seven is	7
1 x 8 = 8 ... One eight is	8
1 x 9 = 9 ... One nine is	9

The Multiplication Table of 2

2 x 1 = 2 ... Two ones are	2
2 x 2 = 4 ... Two twos are	4
2 x 3 = 6 ... Two threes are	6
2 x 4 = 8 ... Two fours are	8
2 x 5 = 10 ... Two fives are	10
2 x 6 = 12 ... Two sixes are	12
2 x 7 = 14 ... Two sevens are	14
2 x 8 = 16 ... Two eights are	16
2 x 9 = 18 ... Two nines are	18

The Multiplication Table of 3

3 x 1 = 3 ... Three ones are	3
3 x 2 = 6 ... Three twos are	6
3 x 3 = 9 ... Three threes are	9
3 x 4 = 12 ... Three fours are	12
3 x 5 = 15 ... Three fives are	15
3 x 6 = 18 ... Three sixes are	18
3 x 7 = 21 ... Three sevens are	21
3 x 8 = 24 ... Three eights are	24
3 x 9 = 27 ... Three nines are	27

The Multiplication Table of 4

4 x 1 = 4 ... Four ones are	4
4 x 2 = 8 ... Four twos are	8
4 x 3 = 12 ... Four threes are	12
4 x 4 = 16 ... Four fours are	16
4 x 5 = 20 ... Four fives are	20
4 x 6 = 24 ... Four sixes are	24
4 x 7 = 28 ... Four sevens are	28
4 x 8 = 32 ... Four eights are	32
4 x 9 = 36 ... Four nines are	36

10 Let's discuss about the patterns you have found!

Mero's idea
If each number at the back increases by 1 in the table of 2, the answer increases by □!

Vavi's idea
In the table of 3, the answers increase by □ as the numbers at the back increases by □.

□ – □ = 47

Lesson Flow

1 9 10 Think about the patterns of each multiplication table.

T Introduce the main task.
T Let's look at table 1 to 4. Do you notice any pattern?
S The left number is always the same.
S The right number is increasing one by one.
S The answer is increasing by same amount of the left number. For example in table 3, the answer increases by 3.
T Confirms characteristics of multiplication table 2 then move to the next.

2 Memorise the multiplication table 1 to table 4.

S Memorise multiplication table using various methods such as reciting, singing songs etc.

Sample Blackboard Plan

Date: Topic: What we Learnt in Elementary Lesson Number: 4 of 5

Main Task: Let's think about the patterns of each multiplication table.

MT

9 Let's explain the pattern and memorize it.

Students Ideas
Multiplication Expressions

Pattern:

- Multiplicand is the number that is increases one by one.
- Multiplier is the number that is always the same.
- The answer increases by the same amount of number vertically.

Example: Table 4, the answer increases by 4.

2 x 4 = 8 Answer
Multiplier Multiplicand

10 Let's discuss patterns you have found.

Mero's Idea

If each number at the back increases by 1 in the table of 2, the answer increases by 2.

Vavi's Ideas

In the table of 3, the answer increases by 3 as the number at the back increases by 1.

Summary

Increase of the answer is the same as increase of the number at the back.

Unit 3

Unit: Multiplication 1
Sub-unit: 1. What We Learned in Elementary School
Lesson 5 of 5 (Single Period)

Textbook Page : p.48
Actual Lesson 33

Lesson Objectives

- To review the multiplication table of 5, 6, 7, 8 and 9.

Prior Knowledge

- Meaning of multiplication
- Structure of multiplication table of 5, 6, 7, 8 and 9
- Making Multiplication Cards of table 5, 6, 7, 8 and 9

Preparation

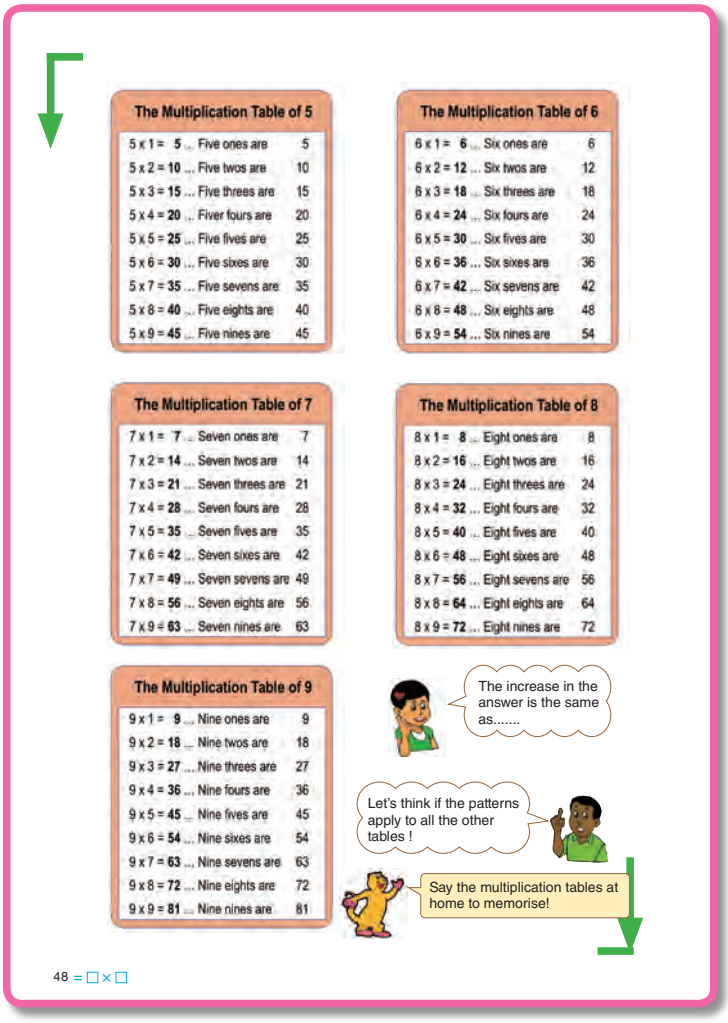
- Cardboard, drawing paper, the multiplication
- Multiplication Cards of table 5, 6, 7, 8 and 9

Assessment

- Enjoy memorising multiplication table of 5, 6, 7, 8 and 9. F
- Memorise multiplication table of 5, 6, 7, 8 and 9. S

• Teacher's Notes •

Emphasis on Keywords:
Multiplicand increases one by one in the table.
It is the number to be multiplied.
Multiplier is always the same number, the number that multiplies.



Lesson Flow

1 Practice multiplication table.

T Introduce with flash cards for multiplication table 1 to table 9.

T Introduce the main task.

2 Confirm the patterns of each multiplication table.

T Let's look at Multiplication table of 6 to 9. Do you notice any pattern?

S The 1st number is always the same.

S The 2nd number is increasing one by one.

S The answer is increasing by same amount of the left number. For example in table 6, the answer increases by 6.

3 Memorise multiplication table.

T Let students memorise multiplication table using various methods such as reciting, singing songs etc. May organise competition in class to assist students memorise the table.

Sample Blackboard Plan

Date: Chapter : Multiplication 1 Topic: What we Learnt in Elementary Lesson Number: 5 of 5

Task: Let's memorise multiplication table.

Introduce Flash Cards

Develop cards for table 1 to 4 with answers in front and expressions at the back of the card.

A student with the card show expression to a friend and the friend gives the answer.

Memorise multiplication table 1 to 9 by:

- Repeating again and again
- Using number cards
- Playing card games with friends

MT

Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 1 of 4 (Double Period)

Textbook Page : p.49-p.50
Actual Lesson 34

Sub-unit Objectives

- To recognise the relationships between multiplicands, multipliers and answer and identify rules and patterns.

Lesson Objectives

- To complete the arrangement of the multiplication table.
- To identify that the answer will be the same even if the order of multiplicand and multiplier changes.
- To explain why the rules are true in properties of multiplication.

Prior Knowledge

- Meaning of multiplication
- Multiplication table 2−9

Preparation

- Blank multiplication table (photocopy and prepare several copies for each student)
- Multiplication table on Chart

Assessment

- To find various rules focusing on order of multiplication table. F
- Understand the rule that the order of multiplier and multiplicand can change but the answer will remain the same. S

• Teacher's Notes •

There are 3 laws of multiplication as you go through the lessons in this sub–unit you will apply them.

1. Commutative law
2. Associative law
3. Distributive law

4 Multiplication 2

1 Rules of Multiplication

1 Completing multiplication table (discussion on the rules of multiplication.)

Let's think about the multiplication table.

1. What are the multiplications to get 14 in the table ?
2. Write all the answers in the blanks.
   2×7, 7×2
3. Look for the answers 27 and 48 in the multiplication table.
   27 is 3×9, 9×3 48 is 6×8, 8×6

Multiplier \ Multiplicand	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	36	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

4. Let's find any patterns in the table and share with your friends.

The number we multiply is called the **multiplier**.
The number to be multiplied is called the **multiplicand**.

2×4=8 ← Answer
↑ Multiplicand
Multiplier

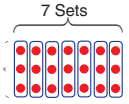
□×□=49

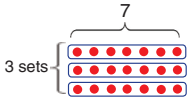
Finding an answer expected to be in the expression or write sentence

2 Let's find various rules from the expression that has the same answer for 7×3.

1. What number goes in the □ below.
   7×3=21 3×7=21

Let's remember what you studied on multiplication in 2nd grade.





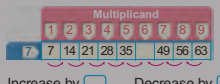
Confirm your answer with the multiplication table.

When you express this in a mathematical sentence, it can be written as follows; 7×3=3×7

"=" is called equal sign. This symbol is not only used for writing the answer of the calculation, but also used for showing that the expressions or numbers on the left side and the right side are equal.

In multiplication, the answer is the same even if the order of the multiplicand and multiplier are changed.

2. How much larger is the answers for 7×6 than answer for 7×5?



Increase by □ Decrease by □

When you express this in a mathematical sentence, it can be written as follows; 7×6=7×5+□

50=□+□

Lesson Flow

1 Play multiplication card game.

S Play multiplication card game as an introduction of the lesson.

T Introduce the main task.

2 ❶ Understand the given task and use prior knowledge to complete the multiplication table.

T Give out the blank copies of the multiplication table.

S ❶ Write two expressions that give 14 in the multiplication table. "2×7 and 7×2"

T "What rules of multiplication can be used to complete the table?"

S ❷ Focus on the arrangement of the multiplication table and find rules of multiplication as they fill in the blanks.

S ❸ Write the expressions for 27 and 48 on the board and explain their answers.

❹ Find patterns with friends.

3 ❷ ❶ What number goes in the box below?

S Look at the multiplication table to confirm the expected number to be represented in the mathematical sentence.

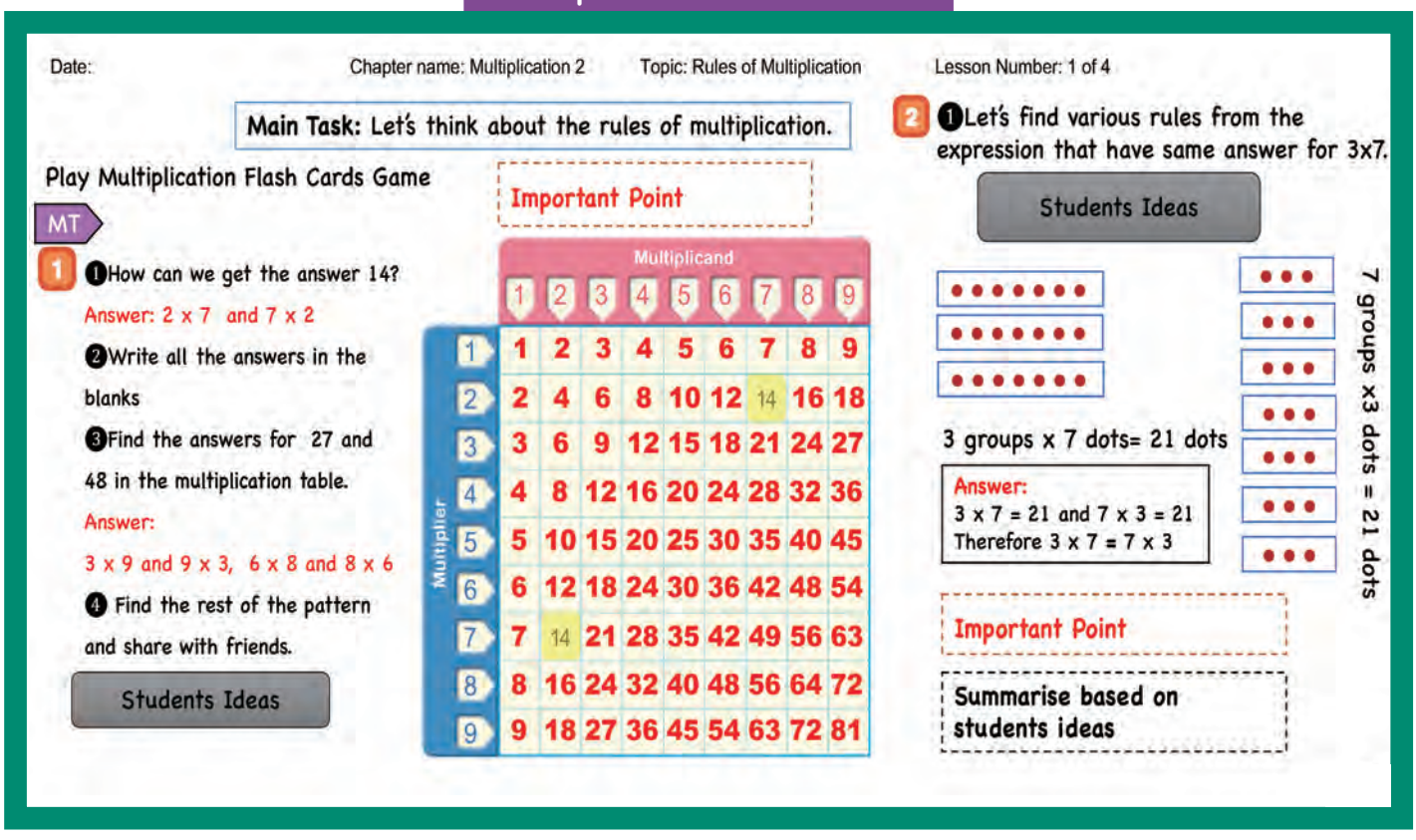
T Introduce new mathematics expression; when we have two mathematics sentences with same answer as 3×7=21 and 7×3=21 we can combine the expressions and write them as 3×7=7×3.

4 Summarise the lesson.

T Explain the important point in the box ⬚ and ⬚.

T Ask students to copy both important points in the box into their exercise books.

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 2 of 4 (Double Period)

Textbook Page : p.50-p.51
Actual Lesson 35

Lesson Objectives

- To complete mathematics sentence using increase and reduce rule of multiplication.
- To split 1st and 2nd number, in total get the same answer.
- To explain characteristic of distributive law and why it works.

Assessment

- Explain rules of multiplication using multiplication table, dot diagram, blocks and so on. F
- Understand the increase and reduce rule when finding the answer in multiplication. F
- Understand that if we calculate by splitting the 1st or the 2nd, in total the answer are the same. S

Prior Knowledge

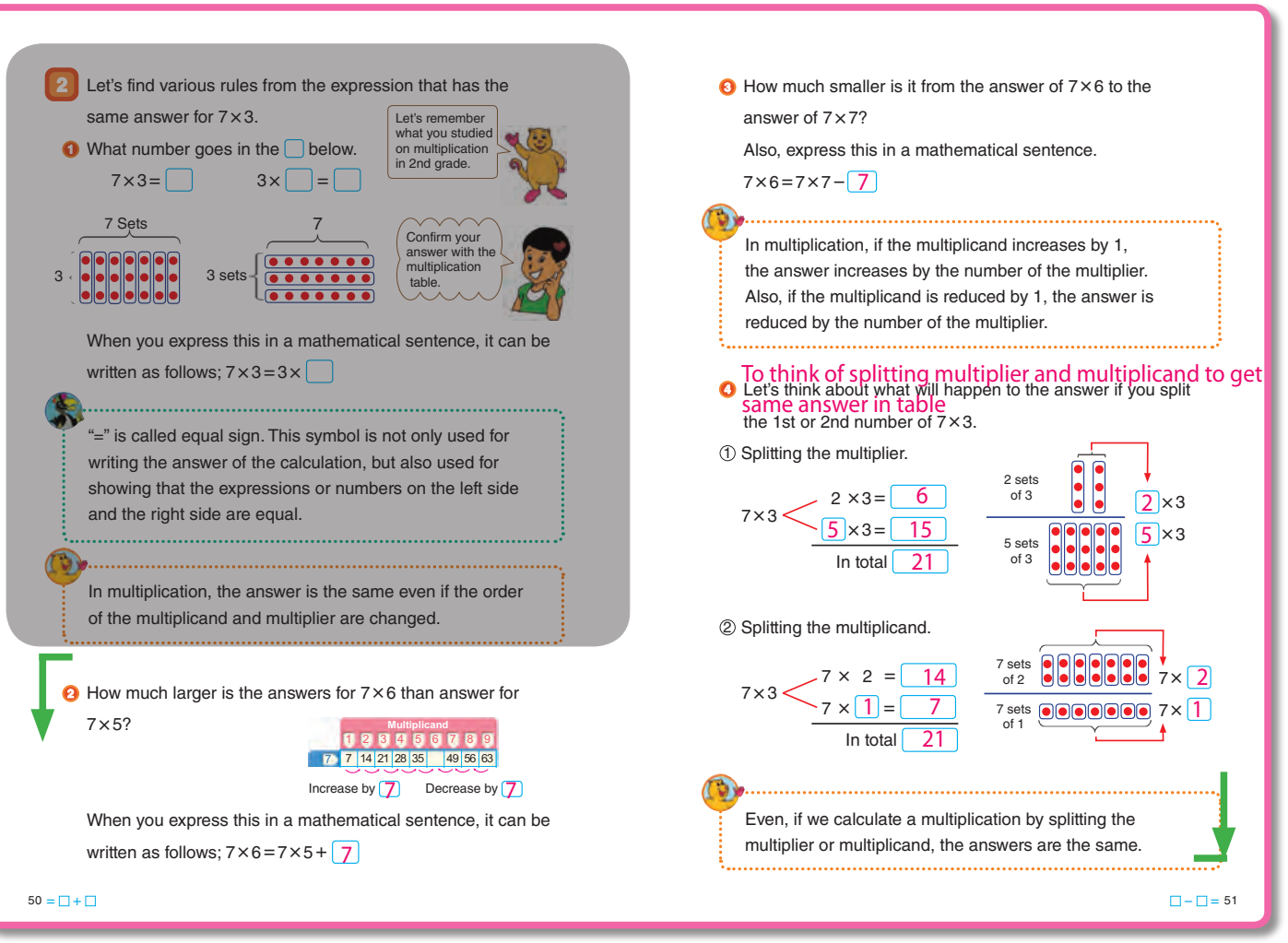
- Multiplication table
- Commutative law of Multiplication

Preparation

- Blank Multiplication table (photocopy and prepare several copies for each student)

• Teacher's Notes •

In this lesson the focus is the distributive law of multiplication. As the students discuss the increase and reduce method in multiplication with the splitting method they should be able to conclude that when we apply the two methods we still end up with the same answer.
Example: $a \times (b+c) = (a \times b) + (a \times c)$.



Lesson Flow

1 ① Let's make a multiplication table of 7.

T What have you learned about the multiplication table and rule on how much the answer increases as the 2nd number increases by 1?

S In multiplication table of 7, as the 1st number increases by 1, the answer increases by 7. As the 2nd number reduces by 1, the answer is reduce by 7.

T Introduce the main task.

2 Let's compare 7×6 and 7×5.

T ② "How much larger is the answer for 7×6 than the answer for 7×5?"

S 7

T How do we express this in a mathematical sentence?

T Allow students to study and express in a mathematical sentence.

T Do the same for ③.

T What can we say about the multiplier and the multiplicand in row 7?

S As the 2nd number increases by 1, the answer is increased by 7. As the 2nd number is reduced by 1, the answer is reduced by 7.

T Ask students to summarise the rule of multiplication in relation to increase and reduce of the 2nd number.

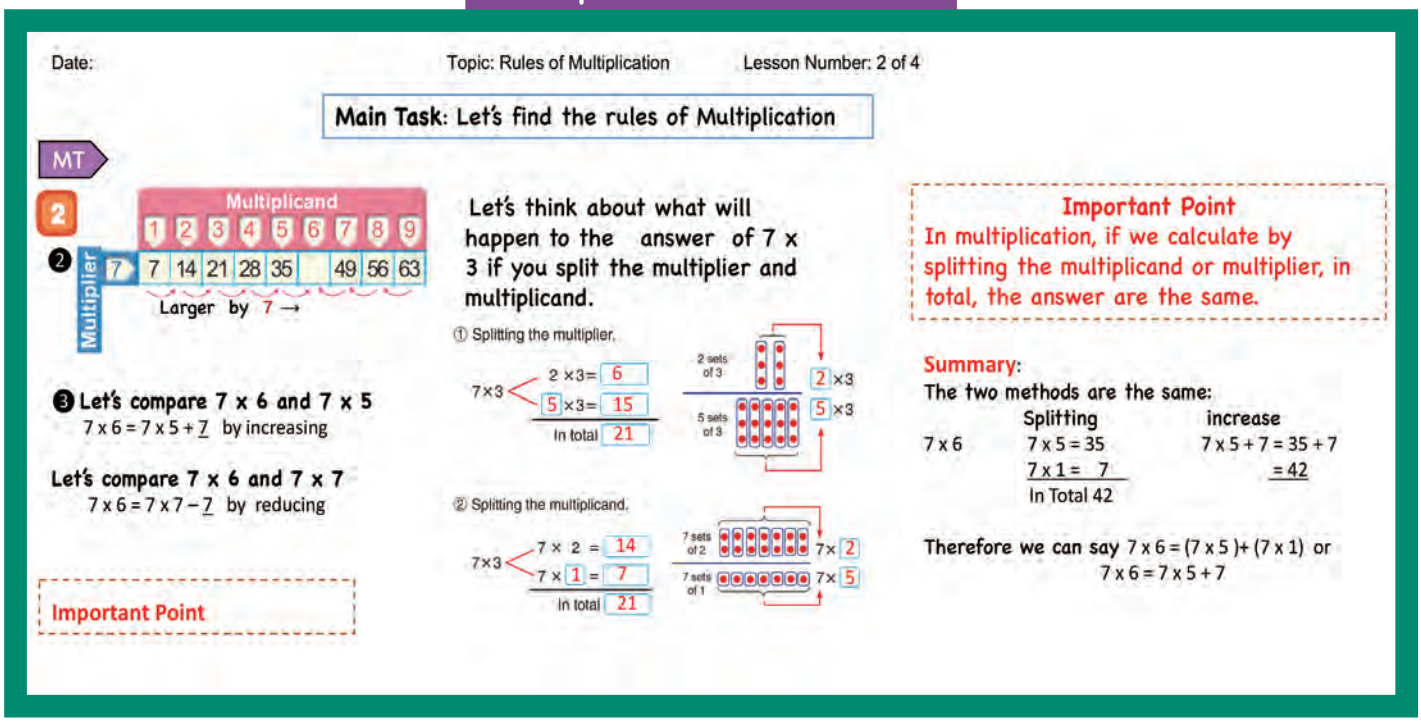
3 ④ Think of splitting 7×6.

S Explain ① Splitting Multiplicand in their own words as well as ② splitting the multiplier.

T What can we say about the rule of splitting in multiplication?

S Assist students to summarise in the box ⬚.

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 3 of 4 (Double Period)

Textbook Page : p.52
Actual Lesson 36

Lesson Objectives

- To represent the rules of multiplication by using mathematics sentence and diagrams.
- To explain and express the rules of commutative and distributive law of multiplication.

Prior Knowledge

- Commutative law and distributive law of multiplication

Preparation

- Dot diagram

Assessment

- Explain the rules of multiplication using mathematics sentences or diagrams. F
- Do the exercises correctly. S

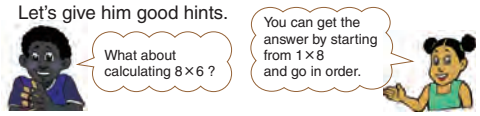
• Teacher's Notes •

The students should be able to master the different rules of multiplication. They should be able to use the mathematical sentence and dot diagram to show their understanding of the rules of multiplication.
Emphasise more on the use of equal sign, so that the students must use it in their conclusion such as: therefore, $9\times4=4\times9$ or therefore $8\times5=8\times4+8$.

To think of the rule of multiplication.

3 Samuel has difficulties in calculating the answer for 6×8.

Let's give him good hints.

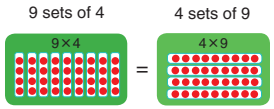


To represent the order by mathematical sentence.

4 Represent the following by using mathematical sentences and diagrams.

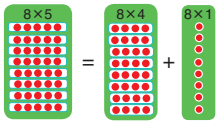
1. If you exchange the order of the 1st and 2nd number in the expression 9×4, the answers will be the same as;

$9\times4=\boxed{4}\times\boxed{9}$



2. The answer for 8×5 will be the same to the answer for 8×4 by adding 8.

$8\times5=\boxed{8}\times\boxed{4}+\boxed{8}$



Same as 8×5

Exercise

Let's find the number which applies to the $\square$.

① $8\times7=\boxed{7}\times8$ ② $9\times\boxed{3}=3\times9$

③ 4×6 is $\boxed{4}$ bigger than 4×5.

④ 5×8 is $\boxed{5}$ smaller than 5×9 .

⑤ $7\times7=7\times\boxed{6}+7$ ⑥ $3\times\boxed{6}=3\times7-3$

$52=\square+\square$

6×8
Splitting multiplicand
6×8 $3\times8=24$
$3\times8=24$
48

6×8
Splitting multiplier
6×8 $6\times4=24$
$6\times4=24$
48

$8\times5=40$ Increase multipier by 1
$8\times6=48$ Increase multiplicand by 8

Lesson Flow

1 ③ Find various ways of calculating 6×8.

T Ask few students to calculate 6×8 using the different rules learned from the previous lessons.

S Go to the black board to write and explain the different ways of calculating 6×8 using the rules of multiplication.

TN May use different methods learned, they may use order rule 6×8=8×6, where 8×5+8=8×6, they may use the increase or reduce method for the row of 6 or row of 8 or they may also use the splitting method to find their answers. Teacher should give enough time for them to express their ideas.

T Introduce the main task.

2 ④ Represent 9×4 and 4×9.

T Put the dot diagram of 9×4 and 4×9 on the board. Let's represent the following by using the mathematical sentence and the diagram.

S ① Study the diagram and try to understand multiplication in different order. They explain the diagram and complete the mathematical sentence.

T ② Put up the dot diagram for 8×5 and ask "Are the answer for 8×5 same to 8×4+8?"

S Explain their answers, they may use the black board or diagram.

T Emphasis more on equal sign; we can use equal sign to show that the mathematical expression on the right is the same as the mathematical expression on the left side.

3 Conclude the lesson.

T Give 9×6 and ask five students to go to the black board and express it in a mathematical sentence.

S 9×6=9×5+9 , 9×6=6×9, 9×6=(5×6)+(4×6), 9×6=(9×3)+(9×3), 9×6=(9×5)+(9×1)

4 Do the exercise.

Sample Blackboard Plan

Date: Topic: Rules of Multiplication Lesson Number: 3 of 4

Main Task: Let's confirm rules of multiplication.

③ What rules of multiplication can we use to calculate 6 x 8?

Students Ideas
Working out and Answer

6 x 8
Splitting Multiplicand
3 x 8= 24
3 x 8 = 24
48

Splitting Multiplier
6 x 4 = 24
6 x 4 = 24
48

Answer: Therefore 6 x 8 = 48

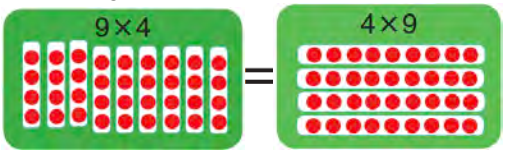
④ Let's represent the 9 x 4 and 8 x 5 by using mathematical sentence and diagram .

Students Ideas

① 9 x 4 = 4 x 9

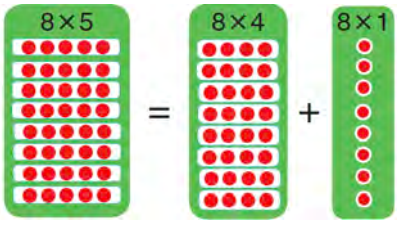
9 groups of 4
9 x 4

4 groups of 9
4 x 9



Answer: Therefore 4 x 9 = 9 x 4

② 8 x 5 = 8 x 4 + 8



Answer: Therefore 4 x 8 = 8 x 4

Summary
How many rules of multiplication did you learn today?

Let's Complete Exercise

MT

Unit 4

Unit: Multiplication 2
Sub-unit: 1. Rules of Multiplication
Lesson 4 of 4 (Single Period)

Textbook Page : p.53
Actual Lesson 37

Lesson Objectives

- To represent diagram with a mathematical sentence.
- To show the order of multiplication using brackets.

Prior Knowledge

- Commutative law and Distributive law of multiplication

Preparation

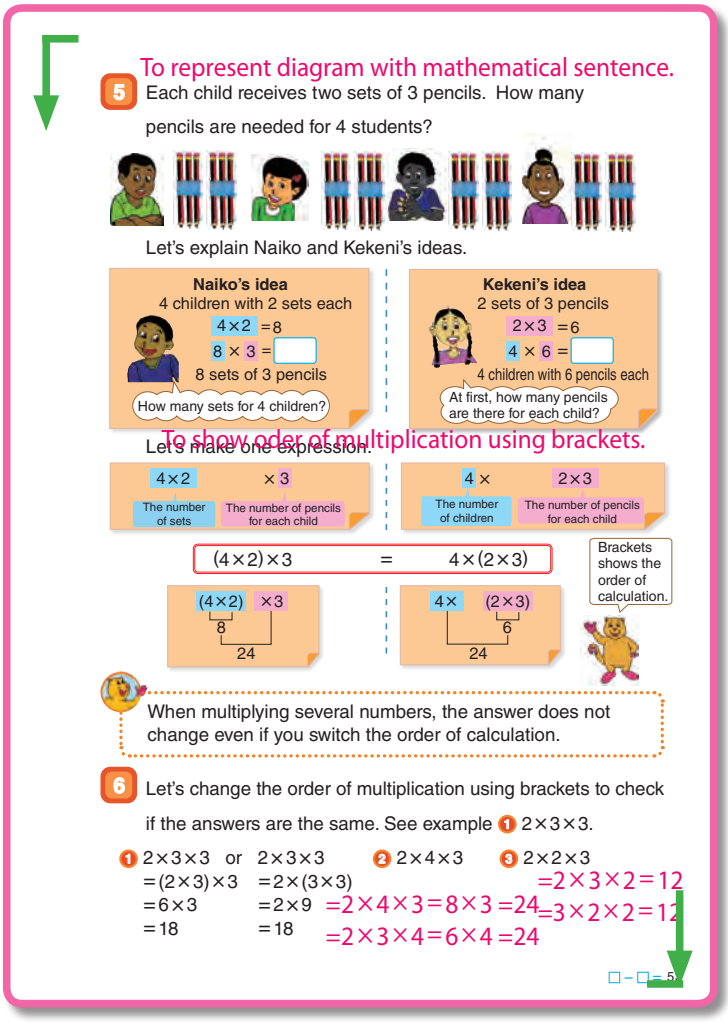
- 18 pencils, rubber band (May use the textbook only where there is no materials)

Assessment

- Solve the word problem considering various ways of multiplication. F
- Do the exercises correctly. S

• Teacher's Notes •

The idea of bracket is first introduced in this lesson, therefore go slowly in the explanation of Naiko and Kekeni's idea. Synthesise the two ideas, Naiko's idea should not be taught separately from Kekeni's.
Brackets show the order of calculation and should be used in the expression that will be calculated first. At the end the students should conclude the final answer with therefore, $(a \times b) \times c = a \times (b \times c)$.



Lesson Flow

1 5 Let's represent objects with a mathematical sentence.

T Introduce the main task.

T Set the pencils on the desk and bind three (3) pencils together. Then ask, "If each child receives two sets of three pencils. How many pencils are needed for 4 students?"

S Work out the expressions for the problem and write them on the black board.

2 Compare Naiko and Kekeni's idea.

T Directs students to page 53; "When do we use the brackets?"

S Try to combine expressions together with brackets.

T Which expression do you want to work with first? We put the brackets in them.

S Work out their answer, switching the order of brackets.

TN This is the first time the students are expose to brackets, work with them slowly so they should see that the answers are the same even if the order of calculation changes.

S Summarise the Lesson; "When multiplying several numbers the answer does not change even if you switch the order of calculation" as ____

3 Conclude the lesson.

T Give $2\times3\times3$ to students as practice to conclude lesson.

S Calculate $2\times3\times3$

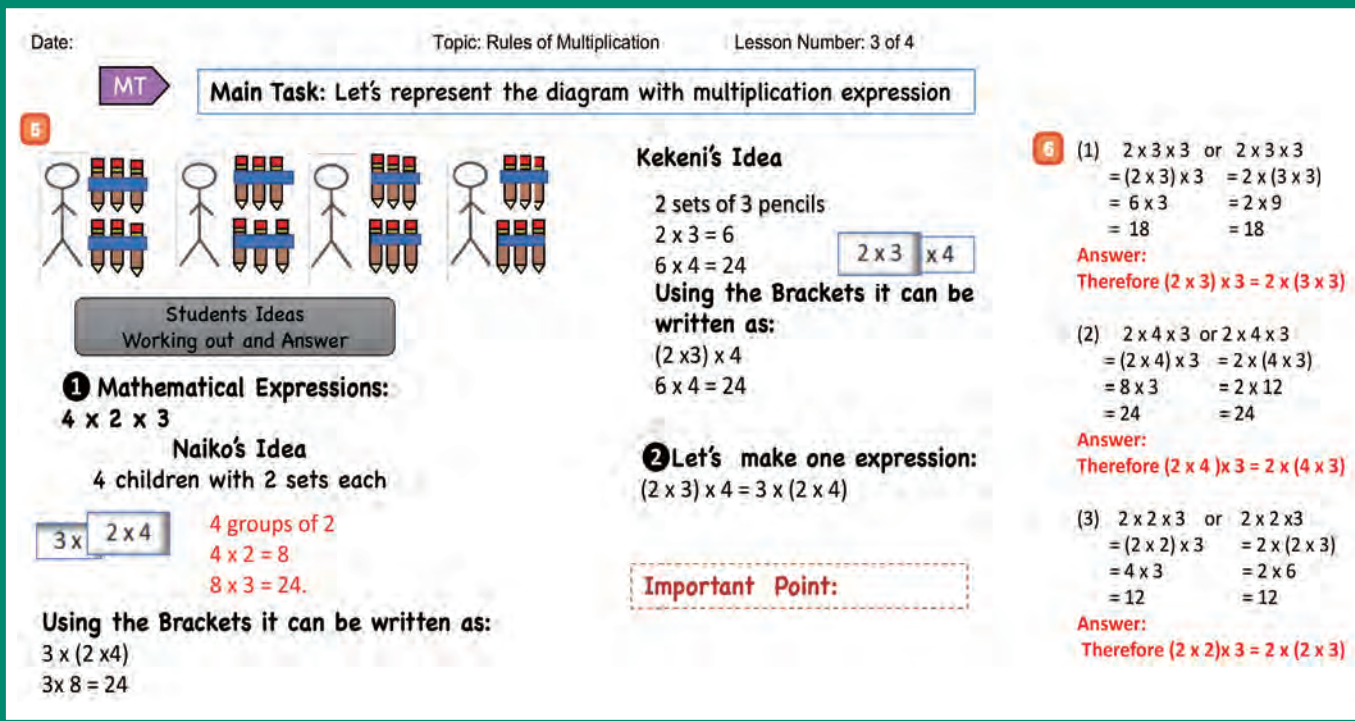
$2\times3\times3=(2\times3)\times3$
$=6\times3$
$=18$

$2\times3\times3=2\times(3\times3)$
$=2\times9$
$=18$

Therefore, $(2\times3)\times3=2\times(3\times3)$

4 Complete 6 .

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 2. Multiplication with 0
Lesson 1 of 2 (Double Period)

Textbook Page : p.54-p.55
Actual Lesson 38

Sub-unit Objectives

- To think about how to find the answer for the multiplication with 0.

Lesson Objectives

- To recognise the rule of multiplication in the Point Scoring Game.
- To write the expression for calculating the total points.
- To write the expression for multiplication with 0.

Prior Knowledge

- Multiplication table of 2 – 9
- Commutative, associative and distributive law of multiplication in mathematical sentences and diagrams

Assessment

- Enjoy playing the game and get the experience of getting zero. F
- Write the multiplication expression with 0. S

Preparation

- Design Point cards with numbers 0, 1, 3, and 5 to be used as point card. (Each student should make and bring at least 5 of each point card to school)
- Bring 10 bottle tops or 20t coins (Students Homework before lesson)
- Make enough copies of the Game Board (see below)for each groups
- Prepare score boards for Tom and Henao's results

• Teacher's Notes •

The aim of the game is for the students to experience zero point.
Once a bottle top gets into a point area, the student should receive a point card for that area. For example a student will receive 0 point card if the bottle top goes into 0 point area.

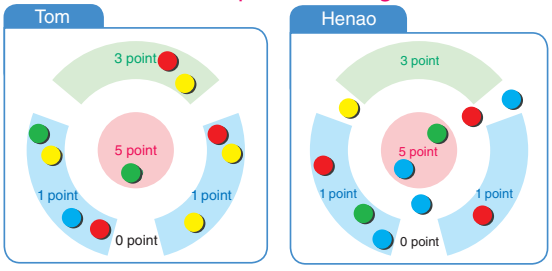
To recognise the rule of multiplication in point scoring game.

2 Multiplication with 0

Point Scoring Game

In this game, you toss the bottle caps and gain point cards according to where the bottle caps stop. When 10 bottle caps are tossed, the team with the higher score wins.

To show oder of multiplication using brackets.



To note number of points in math expression.

54 = □ × □

1 Let's see how many points Tom has.

Tom's points table

Points on card	5	3	1	Total
Number of cards obtained	1	2	7	10
Total points	5	6	7	18

1 card of 5 points: 1 × 5 = 5
2 cards of 3 points: 2 × 3 = 6
7 cards of 1 point: 7 × 1 = 7
(Number of cards × Points on card = Total points)

On Tom's table, 1×5=5 is easier!

2 Let's see how many points Henao has.

Henao's points table

Points on card	5	3	1	0	Total
Number of cards obtained	2	0	4	4	10
Total points	10	0	4	0	14

1 Write the mathematical expressions for finding the total points.

2 cards of 5 points: 2×5
0 card of 3 points: 0×3
4 cards of 1 point: 4×1
4 cards of 0 point: 4×0

What is the mathematical expression for 0 point cards?

Let's think about how to find the answer for the multiplication with 0 later.

□ + □ = 55

Lesson Flow

1 Introduce the Point Scoring Game.

T Set the table and introduce the Bottle Top Point Scoring Game.

S 3 Students play the game in their groups. No replay, once 10 bottle top is used; the child's turn is up and next child plays.

T Picks up most effective cards that can develop the lesson.

T Introduce the main task.

2 1 Study Tom's score Board.

T Put up the prepared table for Tom on the board and ask students to copy.

T "Let's see how many points Tom has, these are the cards for Tom's; 1 card for 5 point area, 2 cards for 3 point area and 7 cards for 1 point area."

T "What is the total score for 5 point area?"

S Count the cards, "5"

T Continue to 3 point and 1point area.

T Ask students to work out the total score for Tom and complete the score board on the black board.

3 Write the mathematical sentence for Tom's scores.

T Assist students to express Tom's score in a mathematical sentence.

S Fill in the Tom's table in their exercise book and write the mathematical sentence for each point.
$5 \times 1 = 5$, $3 \times 2 = 6$, $1 \times 7 = 7$

4 2 Fill in the scores and write mathematical expressions for Henao.

T Put up the table for Henao on the board and ask the student to express each point in mathematical expressions.

S Draw Henao's table into their exercise books and write the mathematical expression for each point.

T 1 Allow the students to write the expression for Henao's score on the board. Then conclude, "We will think about how to find the answer for multiplication with 0 in the next lesson."

S May complete their own table using their cards in hand and express in mathematical sentence.

Sample Blackboard Plan

Date:

Topic: Multiplication with 0

Lesson Number: 1 of 2

Main Task: Let's find the rule of multiplication in a game.

Play the point scoring game.

1. Have point cards label as 1, 3 and 5 points.
2. For every tops that stops at a certain point area the player gets the point card.
3. The cards are then counted and recorded onto the table.

MT

1 Let's see how many points Tom has.

Tom's points table

Points on card	5	3	1	Total
Number of cards obtained	1	2	7	10
Total points				

Students Ideas
Working out and Answer

1 card of 5 points	1	×	5	=	5
2 cards of 3 points	2	×	3	=	6
7 cards of 1 point	7	×	1	=	7
	Number of cards		Points on card		Total points

2 Let's see how many points Henao has.

Henao's points table

Points on card	5	3	1	0	Total
Number of cards obtained	0	2	4	4	4	10
Total points					

1 Write the mathematical expressions for finding the total points.

2 cards of 5 points	2×5
0 card of 3 points	0 × 3
4 cards of 1 point	4 × 1
4 cards of 0 point	4 × 0

Summary
How can we calculate
Expression with 0?
3 x 0
0 x 4

Exercise

Unit 4

Unit: Multiplication 2
Sub-unit: 2. Multiplication with 0
Lesson 2 of 2 (Double Period)

Textbook Page : p.56
Actual Lesson 39

Lesson Objectives

- To find the answer for multiplication with 0 using the reducing method.
- To reduce the Multiplier by 1 in row 1, so the answer becomes 0.
- To discuss the rules of Multiplying any number with 0 and get the answer 0.
- To understand the rules of calculating and multiplying by 0.

Prior Knowledge

- Commutative Law of multiplication

Preparation

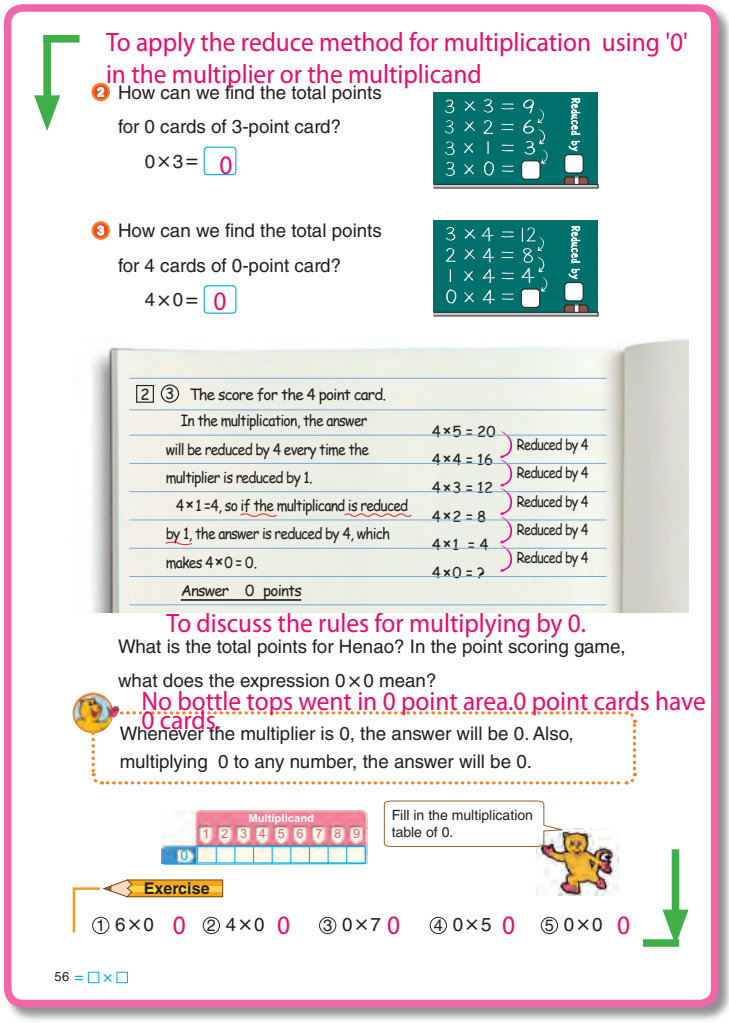
- Henao's score board on the blackboard

Assessment

- Consider the reason why the answer becomes 0 of multiplication with 0 applying the characteristic of multiplication. F
- Recognise the process of multiplying with 0. F
- Do exercise correctly. S

• Teacher's Notes •

Multiplying 3×0, the students can use the reduce method to calculate from 3×3 to 3×1 and 3×0. Assist students to see the pattern as individual column where the multiplicand and the multiplier can be switch but the answer will be the same.
They do the same for 0×4.



Lesson Flow

1 Review of the previous lesson.

T Put up Score board for Henao's point on the black board.
S Read the question and understand the reduced multiplication rule for 0.
T Asks students to look at the mathematics expressions for Henao. "What would the expression with 0 be?"
T Introduce the main task.

2 Calculate the total points of 3 point card and 0 point card.

T ❷ Ask a student to show working out on the board, they can apply their rules in multiplication to explain their answer for multiplier with 0.
S Write and explain their answers on the board.
T Ask students to explain what the expression 4×0 mean in their exercise book.
TN Give more emphasis on number reduced by 3 (same for 4).
S Explain their answer for 4×0 in the point scoring game. "4 times scored 0"
T ❸ What is the total point for Henao?
S Complete Henao's total score.
S Copy notes from the textbook [ ].
(The score for point 3 card and the notes in the summary box)

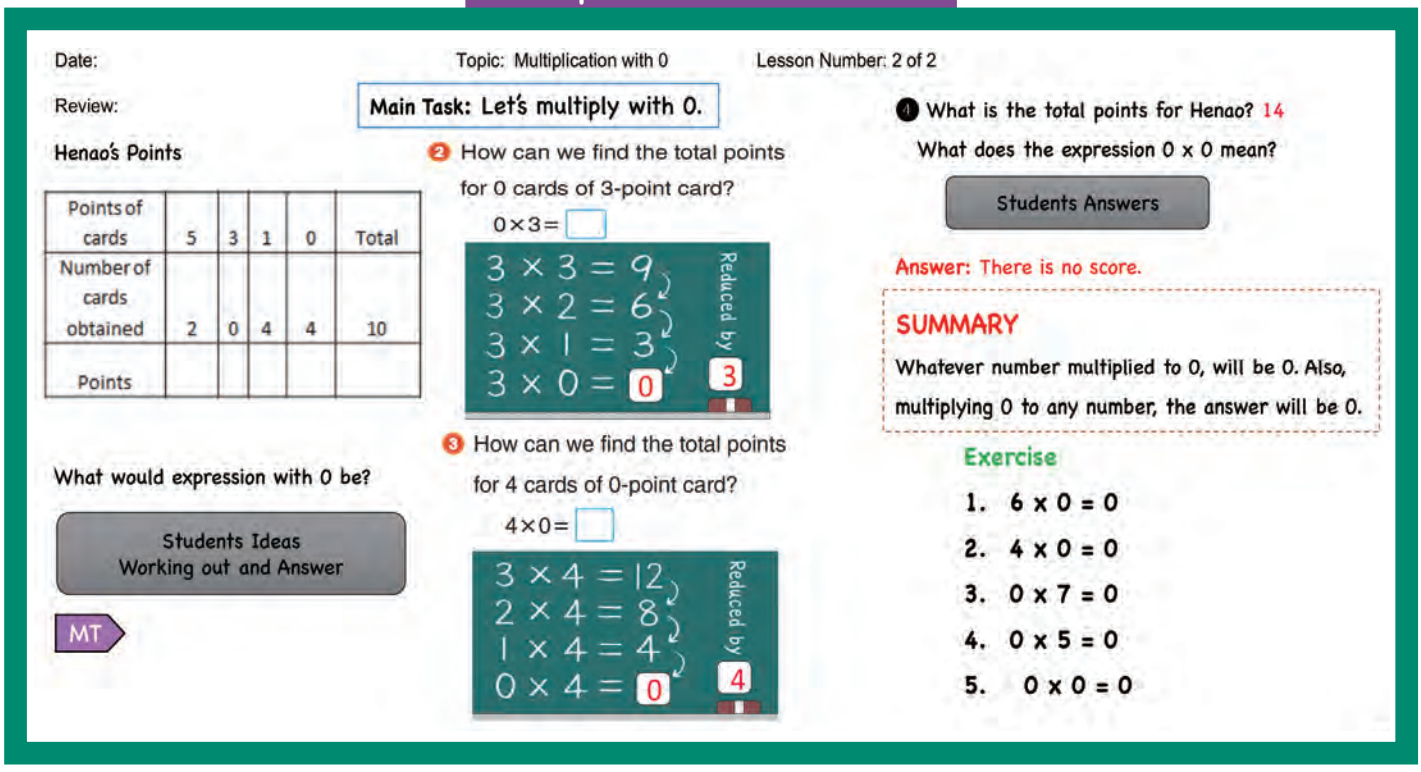
3 Do the exercise.

T Let the students to complete the exercises. Then complete their multiplication table with row of 0 in their exercise books.

4 Conclude the lesson.

S Explain that whatever number multiplied to 0, the answer will be 0. Also multiplying 0 to any number, the answer will be 0.

Sample Blackboard Plan



Unit 4

Unit: Multiplication 2
Sub-unit: 3. Multiplication with 10
Lesson 1 of 1 (Single Period)

Textbook Page : p.57
Actual Lesson 40

Sub-unit Objectives

- To use the rules of multiplication, think about how to multiply using 10.

Lesson Objectives

- To understand the rules of calculating and multiplying by 10.
- To appreciate the splitting rules of multiplication when multiplying by 10.

Prior Knowledge

- Meaning of multiplication
- Multiplication table

Preparation

- Chart of stickers (5×10)

Assessment

- Appreciate the rule of multiplication when multiplying by 10. F
- Do the exercises correctly. S

• Teacher's Notes •

Students may use the following to explain their answers for 5×10 and 10×5.

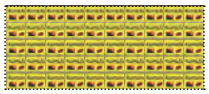
- Splitting 10
- Increase multiplicand from 9
- Switch order and use the table of 5

The focus is to make the table of 10.

To use different multiplication expression to calculate the number of stickers altogether.

3 Multiplication with 10

1 How many stickers are there altogether?



1 Write two mathematical expressions to calculate the total number of stickers.

5 × 10　　10 × 5

Using the rules of multiplication, think about how to multiply using 10.

2 Let's think about how to find the answer for 5×10.

Sare's idea

In the multiplication table of 5, the answer will increase by 5.

5×9=45
5×10=50 Increased by 5

Ambai's idea

Split multiplicand 10 into 2 and 8.

5×10 < 5×2=10, 5×8=40

In total 50

3 Let's think about how to find the answer for 10×5.

Splitting 10 into 7 and 3, will produce 7×5 and 3×5…

Using the rule of multiplication…

Try writing the multiplication table of 10 in the table.

Exercise

1 Let's calculate.

① 6×10 60　② 8×10 80　③ 10×4 40　④ 10×9 90

2 Find the answer for 10×10. 5×10=50
5×10=50
100

□+□=57

Lesson Flow

1 ❶❶ Study the stickers on page 57.

T Put up the stickers on the black board and ask students to write the different multiplication expression for the stickers.

TN Students' possible answer.

1×50 or 50×1
2×25 or 25×2
5×10 or 10×5

T Checks the students' exercise book.

T Introduce the main task.

2 ❷ Think about how to find the answer for 5×10.

T Direct students' attention to Sare and Ambai's idea to work out their answer using the multiplication rules.

S Apply the different rules of multiplication to find their answers.

T Allow two students whose answer is not the same as Sare or Ambai's idea to explain their answer on the black board.

T Write and explain their answers on the black board.

T Now let us think of 5×10.

S Volunteered students try to explain the ideas on the black board.

3 Complete the exercise.

S Complete exercises and allow the teacher to check their exercise book.

Sample Blackboard Plan

Date: Topic: Multiplication with 10 Lesson Number: 1 of 1

Task: Let's think about how to multiply by 10

1

❶ Write two expressions to calculate the number of sticker.

Students Ideas

5 x 10
10 x 5

MT

❷ Show different multiplication rules for 5 x 10.

Students Ideas

Sare's Idea Increase by 5
5 x 9 = 45 increase by 5
5 x 10 = 50

Ambai's Idea Split 10
Split 10 into 2 and 8

5 x 2 = 10
5 x 8 = 40
Total 50. Answer: 50

❸ Let's find answers for 10 x 5

Students Ideas

Splitting 10 into 3 and 7

10 × 5 → 7 x 5 = 35, 3 x 5 = 15
Total 50

SUMMARY

Using rules of multiplication we can multiply with 10.

Exercise

1 Let's calculate
1) 6 x 10 = 60 2) 8 x10 = 80
3) 10 x 4 = 40 4) 10 x 9 = 90

2 Find the answer for 10 x 10
10 x 10 = 100

10 times table

10 × 1 = 10	10 × 7 = 70
10 × 2 = 20	10 × 8 = 80
10 × 3 = 30	10 × 9 = 90
10 × 4 = 40	10 × 10 = 100
10 × 5 = 50	
10 × 6 = 60	

Unit 4

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

Textbook Page : p.58-p.59
Actual Lesson 41

Lesson Objectives

- To review what students learned in the Unit.

Prior Knowledge

- To review what students learned in the Unit.

Preparation

- Evaluation sheet

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

It is impossible to solve all the problem in the lesson. Therefore, choose some questions from each exercise and the rest can be given as homework.

Exercise

To multiply with 0 , 10 and using the brackets.

1 Let's calculate. Pages 56 ~ 61

① 9×0 0 ② 7×0 0 ③ 0×8 0 ④ 0×2 0

⑤ 4×10 40 ⑥ 7×10 70 ⑦ 10×8 80 ⑧ 10×7 70

⑨ 3×2×4 ⑩ 4×2×5 ⑪ 3×3×10

=(3×2)×4 =(4×2)×5 =(3×3)×10

=6×4=24 =8×5=40 =9×10=90

2 Let's find the number which goes in □. Pages 48 ~ 51

① 3×8=8×3 ② 4×6=6×4

③ 7×5=7×4+7 ④ 6×4=6×5−6

⑤ (3×3)×2=3×(3×2) ⑥ 7×(2×4)=7×8

To split multiplicand or multipier and get the same answer in total

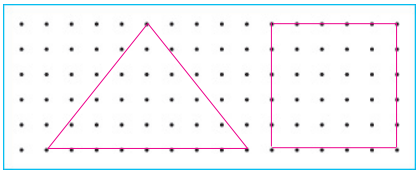
3 Let's find the number which goes in □. Page 55

① 8×7 → 8×3=24, 8×4=32, In total 56

② 9×6 → 9×6=54, 9×0=0, In total 54

Draw triangles and squares by connecting dots with straight lines.

Grade 2 Do you remember?



58 =□−□

Problems

1 Let's find the number which goes in the □.

Understand the rules of calculating and multiplying by 0.

① 0×6=0 ② 1×0=0 ③ 5×6=6×5

④ 3×9 is larger than 3×8 by 3

⑤ 4×3 is smaller than 4×4 by 4

2 Let's calculate the following.

Multiplication with 0, 10 and using the brackets.

① 0×9 0 ② 8×0 0 ③ 0×0 0 ④ 2×10 20

⑤ 10×6 60 ⑥ (2×2)×5 20 ⑦ 4×(2×3) 24 ⑧ (2×5)×9 90

3 A point scoring game was played using bottle caps.

Let's find the total points gained by Mea.

Multiplication with 0 and 10.

Mea's Score

Points on card	0	2	5	10	Total
Number of cards obtained	3	0	4	3	10
Total points	0	0	20	30	50

4 There are 3 boxes of 10 capsules of medicine and 10 boxes of 6 capsules each. How many capsules are there altogether? Express as one expression only and calculate it.

Solving a story problem by developing the expression.

(3×10)+(10×6)
= 30+60
= 90

□+□=59

Lesson Flow

1 ① Various multiplication

TN 1-4: Multiplication with 0
5-8: Multiplication with 10
9-11: Associative law of Multiplication

2 ② Rules of multiplication

TN 1 and 2: Commutative law of Multiplication
3 and 4: Multiplication and addition or subtraction
5 and 6: Associative law of Multiplication

3 ③ Find the number which goes in the box.

4 ① ② Various multiplication

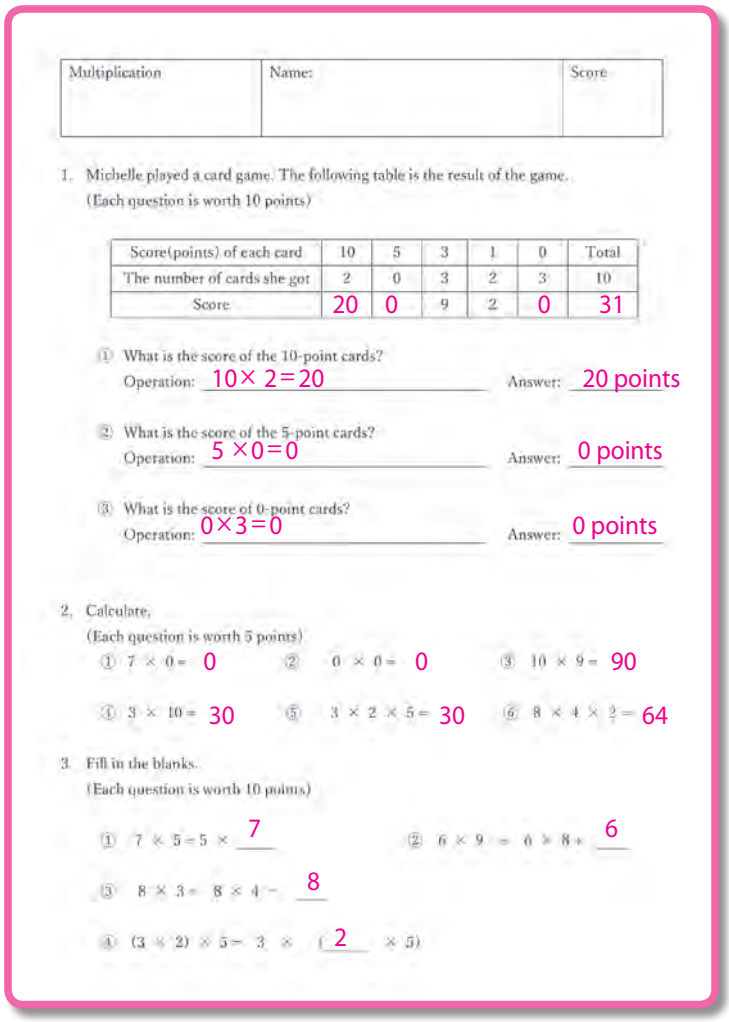
5 ③ Multiplication with 0 and 10

6 ④ Word problem of multiplication.

TN Solve using Associative law of Multiplication.

7 Do the evaluation.

T Distribute the evaluation sheet to individual students.
S Complete the sheet and submit to the teacher.
T Mark the sheet for individual student and give them feedback.



Multiplication	Name:	Score

1. Michelle played a card game. The following table is the result of the game.
(Each question is worth 10 points)

Score(points) of each card	10	5	3	1	0	Total
The number of cards she got	2	0	3	2	3	10
Score	20	0	9	2	0	31

① What is the score of the 10-point cards?
Operation: 10× 2=20 Answer: 20 points

② What is the score of the 5-point cards?
Operation: 5 ×0=0 Answer: 0 points

③ What is the score of 0-point cards?
Operation: 0×3=0 Answer: 0 points

2. Calculate.
(Each question is worth 5 points)
① 7 × 0 = 0 ② 0 × 0 = 0 ③ 10 × 9 = 90
④ 3 × 10 = 30 ⑤ 3 × 2 × 5 = 30 ⑥ 8 × 4 × 2 = 64

3. Fill in the blanks.
(Each question is worth 10 points)
① 7 × 5 = 5 × 7 ② 6 × 9 = 6 × 8 + 6
③ 8 × 3 = 8 × 4 − 8
④ (3 × 2) × 5 = 3 × (2 × 5)

Unit 5

Unit: Thinking about How to Calculate

Lesson 1 of 1 (Double Period)

Textbook Page : p.60 - p.61
Actual Lesson 42

Sub-unit Objectives

- To think about how to calculate and explain using expression.

Lesson Objectives

- To think about how to calculate 4×12 by yourself using the multiplication table and rules of multiplication.

Prior Knowledge

- Multiplication table

Preparation

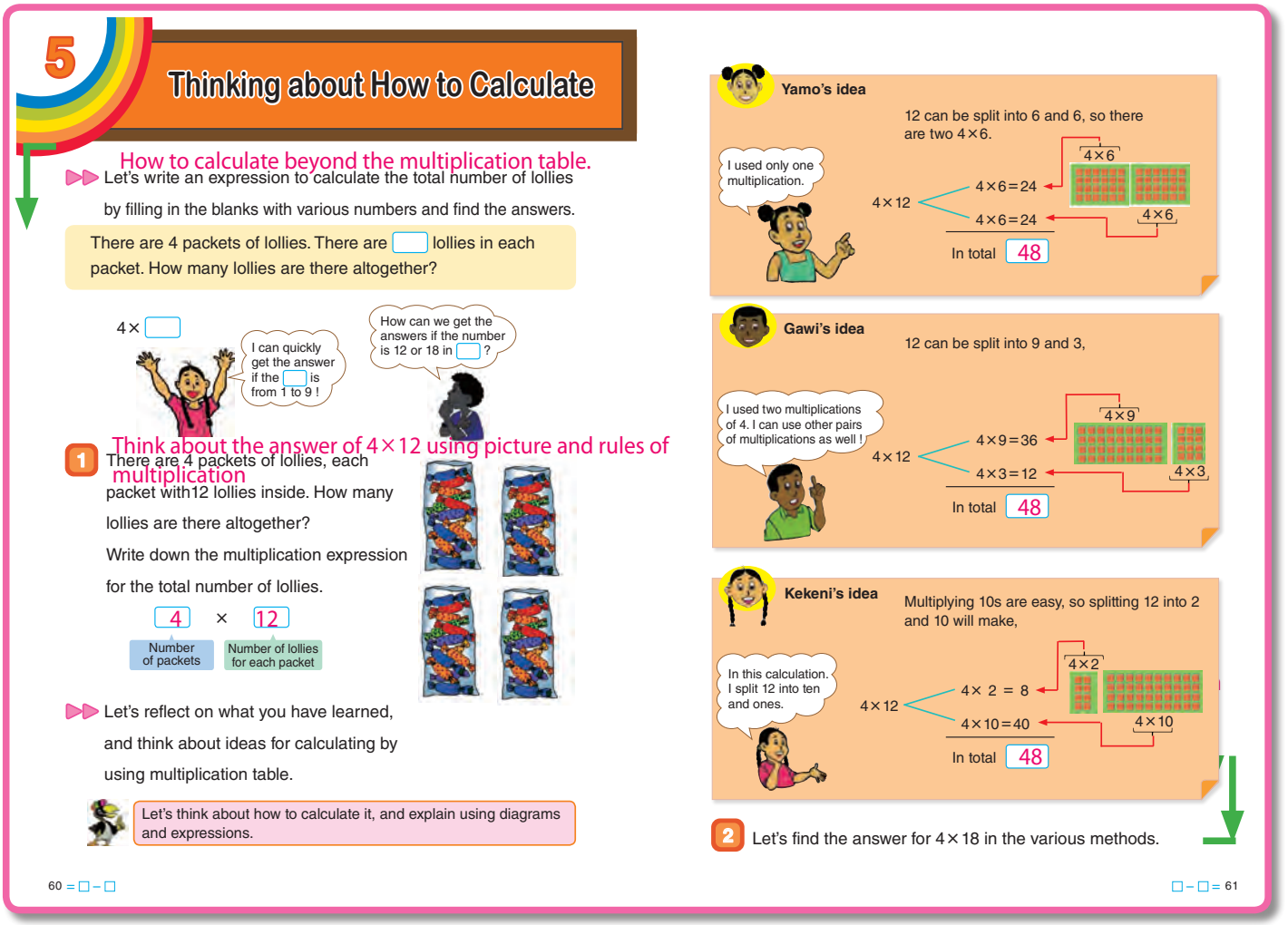
- Block diagram of 4×12

Assessment

- Try to solve the problems using prior knowledge of multiplication. F
- Express their thought using concrete objectives, diagram, operations and so on, and think of solution using prior knowledge of multiplication. F
- Understand that there are various ways of solving. S

• Teacher's Notes •

The 3 ideas express the understanding of calculating 1-digit by 2-digit.
Using the prior knowledge based on table 1-9, the students will work out 4×12.
Allow for students to explain each idea on the board to show their understanding.



Lesson Flow

1 Make mathematical expressions inserting your favourite number from 1 to 9 and find the answer.

T Read the problem.
T Insert your favourite number from 1 to 9 in the square and find the total number of lollies.
TN Let the students remember the table of multiplication in this step.
T Introduce the main task.

2 1 Make a mathematical expression in the case of 12 lollies in one bag, and let them think about the difference from what they have learned.

T Make a mathematical expression to find the answer.
S 4×12
T What is the difference compared with what we have learned before?
S We have to multiply 2-digit numbers.

3 Present the methods.

T Let's present your idea on how to calculate 4×12.
TN Show three ideas in the textbook.
Yamo's idea: Split 12 into half and half (6 and 6).
Gawi's idea: Split 12 into 9 and 3
Kekeni's idea: Split 12 into 10 and 2.

4 Discuss the ideas presented by students.

T Are there any same or different points to your idea?
TN Let the students notice that it is good to divide 12 to 1-digit number so that you can calculate using the multiplication table.

5 2 Solve the task.

S Solve the task applying learned knowledge.

Sample Blackboard Plan

Date: Chapter Name: Thinking about how to Calculate Topic: Thinking about how to calculate Lesson Number: 1 of 1

Main Task: Let's think about how to calculate 2 – digit numbers when multiplying.

1 There 4 packets of lollies, each packet with 12 lollies inside.
How many are there altogether?

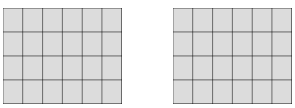
Students Ideas

MT

Math Expression:
4 x 12

Yamo's Idea is to split 12 into 6 and 6

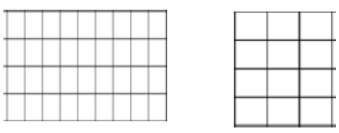
4 x 6 4 x 6



4 x 12 < 4 x 6= 24 / 4 x 6 = 24
In Total 48

Gawi's Idea is to split 12 into 9 and 3.

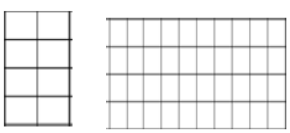
4 x 9 4 x 3



4 x 12 < 4 x 9 = 36 / 4 x 3 = 12
In Total 48

Kekeni's Idea is to split 12 into 10 and 2.

4 x 2 4 x 10



4 x 12 < 4 x 2 = 8 / 4 x 10 = 40
In Total 48

2 Let's find the answer for 4 x 18

Students Ideas
Working out and Answers

End of Chapter Test: Chapter 3-5 **Date:**

Multiplication	Name:	Score

1. Michelle played a card game. The following table is the result of the game.
(Each question is worth 10 points)

Score(points) of each card	10	5	3	1	0	Total
The number of cards she got	2	0	3	2	3	10
Score			9	2		

① What is the score of the 10-point cards?
Operation: _____ Answer: _____

② What is the score of the 5-point cards?
Operation: _____ Answer: _____

③ What is the score of 0-point cards?
Operation: _____ Answer: _____

2. Calculate.
(Each question is worth 5 points)

① $7 \times 0 =$ ② $0 \times 0 =$ ③ $10 \times 9 =$

④ $3 \times 10 =$ ⑤ $3 \times 2 \times 5 =$ ⑥ $8 \times 4 \times 2 =$

3. Fill in the blanks.
(Each question is worth 10 points)

① $7 \times 5 = 5 \times$ ____ ② $6 \times 9 = 6 \times 8 +$ ____

③ $8 \times 3 = 8 \times 4 -$ ____

④ $(3 \times 2) \times 5 = 3 \times ($____ $\times 5)$

Chapter 6 Duration and Time

1. Unit Objective

- To know about seconds. (3. 2. 3. a)
- To understand duration of time. (3.2.3.b)
- To find out time and duration needed for everyday life. (3.2.3.c, d and e)

2. Teaching Overview

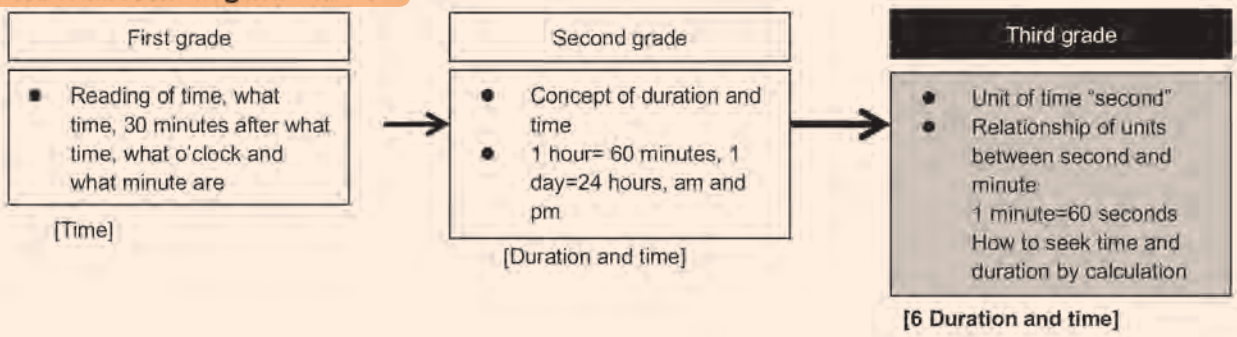
This chapter is for learning and calculating durations and time in daily life. In grade 2, students learned minutes, hours and days.

Short Duration: They learn seconds for the first time in this topic. Through the activity of measuring durations of standing with a leg, they experience again and again that 60 seconds make a minute and get the sense of how short a second is.

Air Niugini Timetables: Students practice reading and hearing time in both am-pm and 24-hour systems before learning the next topic. They need to be fluent in reading and hearing time such as understanding 20 to 8 pm means 19:40.

Duration and Time: Number lines will assist students to understand the difference between duration and time easily. For calculating time and durations, they should be able to identify what and by what they are going to find, which is time or duration, by addition or subtraction. In vertical calculations, students are expected to understand carrying and borrowing 60 to the next unit. This is base 60 calculation.

3. Related Learning Contents



[6 Duration and time]

Unit 6

Unit: Duration and Time
Sub-unit: 1. Short Duration
Lesson 1 of 2 (Double Period)

Textbook Page : p.62 - p.63
Actual Lesson 043

Sub-unit Objectives

- To know about time units of “seconds” which are shorter than minutes.
- To record short time accurately by using stopwatch.
- To convert time units of seconds and minutes.
- To understand how to read timetables and expressed with 24 hour clock.

Lesson Objectives

- To think about how to record duration shorter than minutes.
- To think about time units of “seconds” which are shorter than minutes.
- To record short time accurately by using a stopwatch.

Prior Knowledge

- Concepts of Time and Duration and their difference
- Read time from clock.
- 24 hours = 1 day and 60 minutes = 1 hour

Preparation

- Stop watch, watch or clock or mobile phone
- Chart

Assessment

- Enjoy the game and measure time using stopwatch. F
- Calculate time and duration. S
- Understand the relationship between “minute” and “second”. S

• Teacher’s Notes •

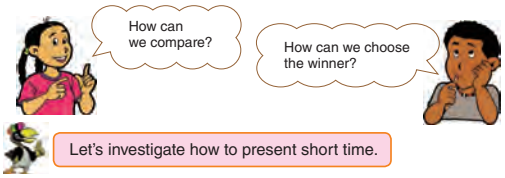
Let students to have the feel of seconds. Other activities may include short sprint or timing something for few seconds/minute. For the first activity, apply distractions if students go beyond 3 minutes.

6 Duration and Time

Let’s challenge standing on one foot while closing one eye.
How long can you stand? Ready to go!

1 Short Duration

1 Let’s stand on one foot with closing an eye.
Who stands the longest ?



Let’s investigate how to present short time.

Seconds are time units shorter than 1 minute.
1 minute = 60 seconds

Using a stopwatch, let’s record the duration of how long you can stand on one foot?

The Time Taken on One Foot	
Name	Time (seconds)

2 The table on the right shows the time that Bethel and other students who stood on one foot. Who stood the longest?

Name	Time
Bethel	1 minute 38 seconds
Fred	1 minute 47 seconds
Jeff	104 seconds

1 Let’s represent the time using only seconds, then fill in the blanks.
Bethel: 1 minute 38 seconds = 98 seconds
Fred: 1 minute 47 seconds = 107 seconds

3 8
+ 6 0 (1 minute)

2 Let’s represent the duration of time using minutes and seconds.
Jeff: 104 seconds = 1 minutes 44 seconds

1 0 4
− 6 0 (1 minute)

3 Let’s record the time taken for a paper airplane flight, and record many other time represented by different situation.

62 = □ + □

□ + □ = 63

Lesson Flow

1 ❶ Think about how to choose the winner who can stand on one foot the longest time.

T Ask students to stand on one foot closing eyes. Count with students using mobile phone to see how many students can stand longer.
T Who had the longest time?
S It's difficult to decide orders when everyone do not start together.
S It's difficult to choose the winner when there is only little difference of time.
T Introduce the main task.

2 Think about how to choose the winner.

T How can we choose the winner?
S Record the time one by one with a mobile.

3 To know about time units of "seconds" which are shorter than minute.

T Have students to know 1 minute = 60 seconds.
T Let the students to summarise by using their own words.

4 ❷ Think about representing with "○ minutes △ seconds".

T Let's see the table who stands the longest?
S Cannot compare "how many seconds" and "how many minutes and seconds". It needs to be the same time units.
Bethel: 60 + 38 = 98 (seconds), Fred: 60 + 47 = 107 (seconds), Jeff: 104 − 60 = 1 minute and 44 seconds

5 ❸ Record the time taken for paper airplane flight.

S Throw paper airplane in air while others record the time of flight.
T Let student carefully use a stopwatch without dropping and hitting and have them learn pushing the buttons on starting and finishing using a stopwatch.

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Short Duration Lesson Number: 1 of 2

Main Task: Let's find out how to represent and calculate Short time.

1 **Let's stand on one foot. Who had the Longest Time?** What were some of the difficulties found in the game?

Students share difficulties found in the game.

It's difficult to choose the winner when there is only little difference of time.

MT

How can we choose a winner?
- Compare by using mobile phone stopwatch.
- Record the time one by one with clock

Important Point

Time can be recorded accurately by using a stop watch which can record seconds that is shorter time than 1 minute.

2 **Who stood the longest?**

Name	Time
Bethel	1 minute 38 seconds
Fred	1 minute 47seconds
Jeff	104 seconds

❶ **Let's represent time using only seconds**
Hint: 1 minute = 60 seconds
Bethel 38 + 60 = 98 (seconds)
Fred 47 + 60 = 107 (seconds)
Jeff 104 (seconds)

38
+60 (1 minute)
98 seconds

❷ Jeff timing is 104 seconds
= 1 minute 44 seconds

104
− 60 (1 minute)
44 seconds

3 Let's do more practice of measuring time using seconds using different situations.
- Record time for paper plane
- Record time for leaking plastic bottle
- Measure Radio commercial break

Summary
How many seconds in 1 minutes? 60 seconds
What did you learn about time today?
Time can be recorded accurately by using a stop watch which can record seconds that is shorter time than 1 minute.

Unit 6

Unit: Duration and Time
Sub-unit: 1. Short Duration
Lesson 2 of 2 (Single Period)

Textbook Page : p.64
Actual Lesson 044

Lesson Objectives

- To understand how to read a timetable expressed with the 24 hour clock and convert into 12 hour clock.

Prior Knowledge

- How to read a timetable expressed with the 12 hour clock.

Preparation

- Enlarge copy of Flight Schedule, pictures with various times and a clock
- Have a chart of a Flight schedule written.
- Time line drawn representing 24 hours time on a chart.

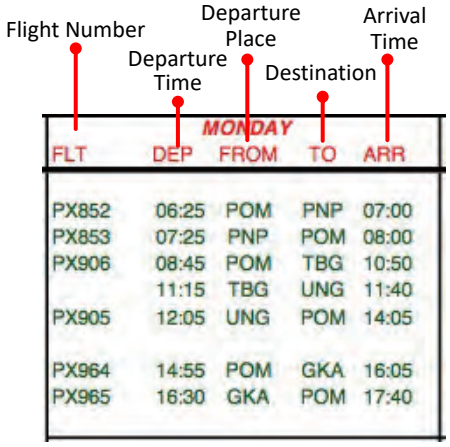
Assessment

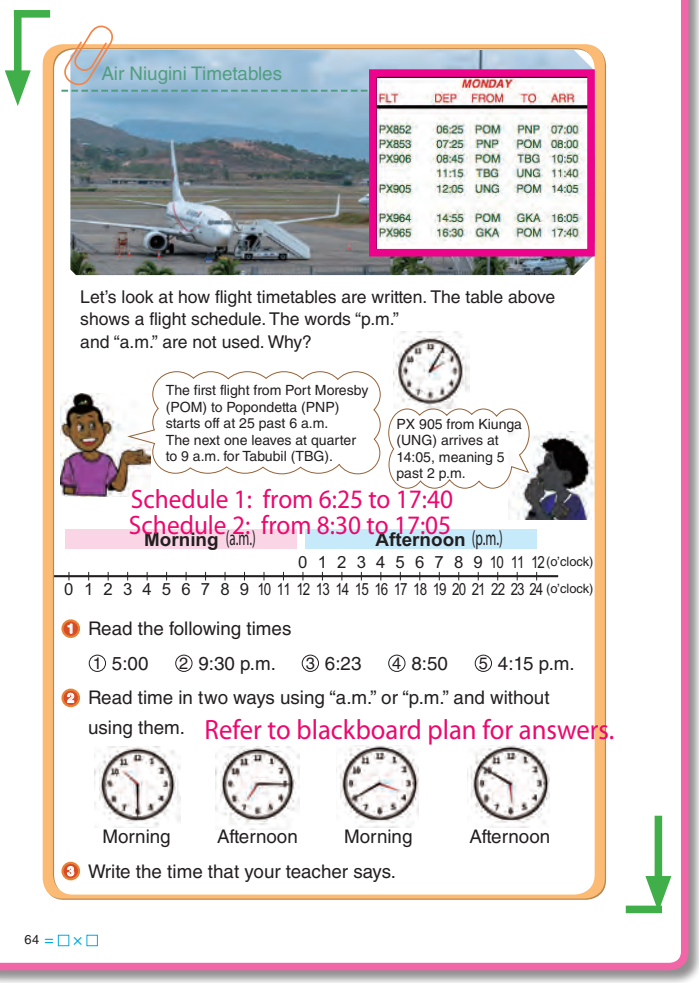
- Investigate the structure of the time table converting the time expressed with the 12 hour clock into 24 hour clock, and to convert vice versa. F
- Notice that it is nice to express without using words “morning” and “afternoon” in timetables. F
- Convert the time with 12 hour clock into 24 hour clock and vice versa. S

• Teacher’s Notes •

- Conversion of 12 hours to 24 hours is a new topic to students. Help students using the clock face then to time line for the students to understand.
- Morning is from 0:00 – 12:00. Afternoon time is 12:00 – 24:00. We do not say morning and afternoon in 24 hour time.
- When telling time;
  a.m: stands for **a**nte **m**eridiem (from Latin), meaning before mid-day.
  p.m: stands for **p**ast **m**id-day
- Assist students to read the Flight details on the Chart. For example:
  PX 852 is flight number for plane travelling from Port Moresby (POM) to Popondetta (PNP), leaving Port Moresby at 6:25 and arriving 7: 00 in the morning.

Air Nugini Flight Schedule on Monday





Lesson Flow

1 Think about why the words "morning" and "afternoon" in Flight Timetables.

T Place the enlarged copy of flight time table on the board. If you cannot use a copy on the blackboard, use textbook directly. 'Why are the words morning and afternoon not recorded?'

S Think of posed questions on why the words "morning" and "afternoon" are not used in flight timetables.

T Let students notice timetables are expressed with the 24 hour clock by having them realise that the words "morning" and "afternoon" are not used.

S Realise that the 24 hour clock is common by showing timetables other than flight timetables.

T Introduce the main task.

2 Think about how to convert the time expressed with 24 hour clock into 12 hour clock.

S ❶ Read the time in various ways.

T For example, The question (4) 8:50 can be read as 'eight fifty' or 'ten to nine'.

S ❷ Read the time in two ways.

T Ask students to see the number line for changing 12 hour clock to 24 hour clock.

T ❸ Tell the following time to students to write.

(1) Four thirty a.m.

(2) Half past 3 in the afternoon

(3) Twelve to ten in the evening

TN Let students practice more for reading and telling the time both in 12 and 24 hours.

3 Find situations where the time is expressed with 24 hour clock in our everyday life.

T Let's think about where the time is expressed with 24 hour clock in our life.

S On the receipts, time on the mobile phone, on the printed photos.

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Short Duration Lesson Number: 2 of 2

Main Task: Let's express time in 24 hour.

MONDAY				
FLT	DEP	FROM	TO	ARR
PX852	06:25	POM	PNP	07:00
PX853	07:25	PNP	POM	08:00
PX906	08:45	POM	TBG	10:50
	11:15	TBG	UNG	11:40
PX905	12:05	UNG	POM	14:05
PX964	14:55	POM	GKA	16:05
PX965	16:30	GKA	POM	17:40

What can you notice about the departure time?
- The numbers written are larger than 12.
- There is no *morning* or *afternoon* written after the time.

MT

❶ Read the following time
1) 5: 00 2) 9: 30 p.m
3) 6:23 4) 8: 50 5) 4: 15 p.m

➢ Why are the words "*a.m*" and "*p.m*" not used?

There are 12 hours in the morning

There are 12 hours in the afternoon.

We use a.m and p.m to tell time in the morning and in the afternoon.

In total there are 24 hours

We do not use the words *a.m and p.m* are not used in 24 hour time because time continues.

❷ Read the clock using "a.m" and "p.m" and without using them.

Morning	Afternoon	Morning	Afternoon
10:30 a.m 10:30	7:15p.m 19:15	3:40am 3:40	5:50p.m, 17:50

❸ Write the time your teacher says.

Now let's find situation where tie is expressed in 24 hours.

Possible Answers
- on receipt
- On mobile phones
- On printed photos

Summary
- We use a.m and p.m to tell time in the morning and in the afternoon.
- We do not use the words *a.m and p.m* are not used in 24 hour time because time continues.

Unit 6

Unit: Duration and Time
Sub-unit: 2. Duration and Time
Lesson 1 of 2 (Single Period)

Textbook aPage : p.65-p.66
Actual Lesson 045

Sub-unit Objectives

- To find out the time duration based on arrival and departure time.
- To find the duration of two time in total.
- To find the arrival and departure time based on departure time, arrival time and how long it takes to arrive.

Lesson Objectives

- To know the difference between the duration of time passed and time as both durations end.
- To calculate duration and time.

Prior Knowledge

- Conversion of time from hours to minutes and minutes to seconds.

Preparation

- Picture with map of PNG, two clocks for demonstration, number line (clock in bar – style).
- Time line drawn on the chart.

Assessment

- Understand the situation and think about how to calculate time which carries up or borrows by using concrete objects, diagrams and expressions. F
- Calculate the duration of time. S

• Teacher's Notes •

How to calculate duration
Consider the following when finding out duration and time by calculations.

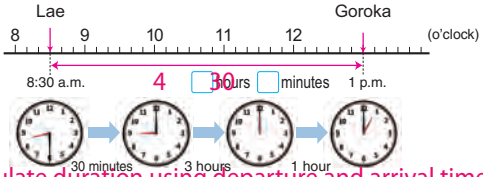
- Calculate by using the same time units
- Convert to "hour" after addition becomes more than 60 minutes.
- Calculate by converting 1 hour into 60 minutes when minute of time minuend are larger than that of time subtracted.

Example:
Minutes calculation:
(60 + 55) – 56 = 59 or 55 + (60 – 56) = 59

2 Duration and Time

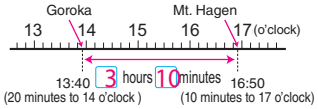
1 Asa wants to travel the highlands highway from Lae to Mt. Hagen. He thought about the duration which will take him to reach there.

1 If he leaves Lae at 8:30 a.m. and arrives in Goroka at 1:00 p.m., how long will it take him from Lae to Goroka?



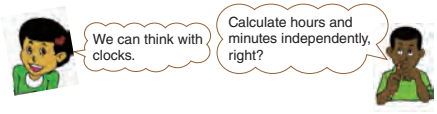
Calculate duration using departure and arrival time.

2 If he will board another bus from Goroka to Mt. Hagen and the bus departs Goroka at 13:40, he will arrive in Mt. Hagen at 16:50. How many hours and minutes will it take him to reach Mt. Hagen from Goroka?



Mathematical expression: 16:50 – 13:40

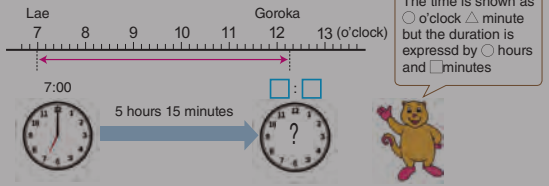
o'clock	minutes
16	50
– 13	40
hours	minutes



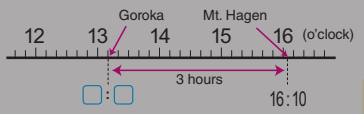
□ + □ = 65

3 If you board both buses at 1 and 2, how long will it take you in total by bus? Answer in hours and minutes?
7 hours and 40 minutes

4 The bus "Tulait Tulait" leaves Lae city at 7o'clock, it will take the duration of 5 hours and 15 minutes to reach Goroka town. At what time will it reach Goroka town?



5 The bus will arrive in Mt. Hagen at 16:10 from Goroka. It will take the duration of 3 hours to reach Mt.Hagen from Goroka. What time will it leave Goroka town?



When subtracting the duration of 3 hours change it to 3:00 for the calculation.

16	10
– 3	00
hours	minutes

Mathematical expression: 16:10 – 3:00

Exercise

1 Ray was reading from 4:40 in the afternoon to 5:25 in the afternoon of the same day. How many minutes did he spend reading?

2 If you leave your house at 40 past 9 in the morning, and it took you the duration of 1 hour and 30 minutes to reach the garden. At what time in the morning will you reach the garden?

66 = □ – □

Lesson Flow

1 ❶ Think about how long it takes based on departure and arrival time.

T Let students read duration between the two times in 1 and 2 by associating with a clock board and number line.

TN Find out how long it takes with the bus based on departure and arrival. Have the students to find a relationship between duration and time by showing that from the clock board to the number line.

T ❶ Let's think about how many hours and minutes it took.

TN Give students advice to count duration by using the clock boards (departure and arrival time) and to think about that by expressing in the number line.

S Count duration between the departure time of 8:30 and arrival time of 1:00p.m through imagining the clock.

T Introduce the main task.

2 ❷ Find the duration from Goroka to Mt. Hagen by calculation.

S Calculate to find the duration of time which departs Goroka at 13:40 and arrive in Mt.Hagen at 16 : 50.

S Calculate by subtraction in vertical form.

3 ❸ Find out the duration of time in total from Lae to Mt. Hagen.

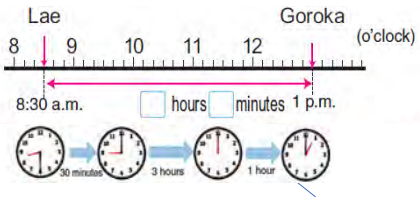
S 4 hours 30 minutes + 3 hours 10 minutes = 7 hours 40 minutes

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Duration and Time Lesson Number: 1 of 2

Main Task: Let's think about how long it takes using departure and arrival time.

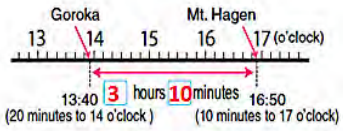
1 ❶ Lets think about how many hours and minutes it took from Lae to Goroka?



Answer: Duration of 4 Hours and 30 minute

MT

❷ How many hours and minutes will it take to reach Mt. Hagen from Goroka?



Mathematical expression: 16:50 – 13:40

o'clock	minutes	
16	50	(Time)
– 13	40	(Time)
3	10	(Duration)
hours	minutes	

❸ Now let's find the total time for ❶ and ❷.

Students Ideas

o'clock	minutes	
4	30	(Time)
+ 3	10	(Time)
7	40	(Duration)

Answer: 7 hours 40 minutes

Summary
To calculate time. Calculate hours and minutes independently.

Unit 6

Unit: Duration and Time
Sub-unit: 2. Duration and Time
Lesson 2 of 2 (Single Period)

Textbook Page : p.66
Actual Lesson 046

Lesson Objectives

- To calculate duration and time.

Prior Knowledge

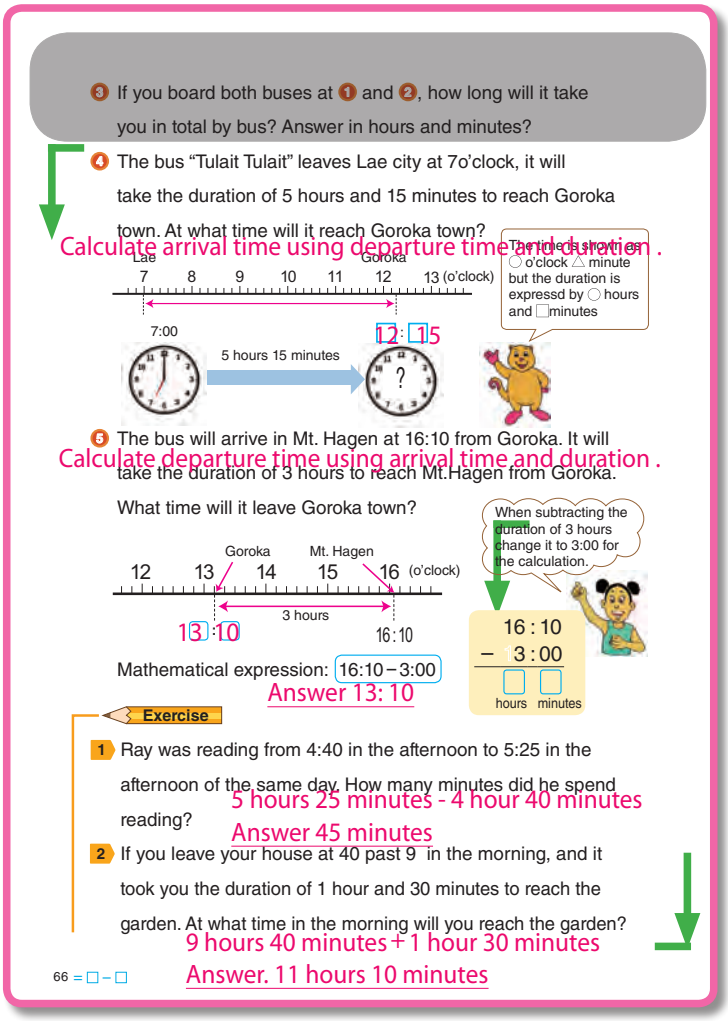
- Calculate duration using departure and arrival time.

Preparation

- Picture with map of PNG, two clocks for demonstration, number line.

Assessment

- Find out about arrival and departure time based on a departure time, arrival time, and how long it takes to arrive. F
- Do the exercise correctly at the end of the lesson. S



3 If you board both buses at 1 and 2, how long will it take you in total by bus? Answer in hours and minutes?

4 The bus "Tulait Tulait" leaves Lae city at 7o'clock, it will take the duration of 5 hours and 15 minutes to reach Goroka town. At what time will it reach Goroka town?

Calculate arrival time using departure time and duration .

Lae 7 8 9 10 11 12 13 (o'clock) Goroka

7:00 — 5 hours 15 minutes — 12 : 15

The time duration is ○ o'clock △ minute but the duration is expressd by ○ hours and □ minutes

5 The bus will arrive in Mt. Hagen at 16:10 from Goroka. It will take the duration of 3 hours to reach Mt.Hagen from Goroka.

Calculate departure time using arrival time and duration .

What time will it leave Goroka town?

Goroka Mt. Hagen 12 13 14 15 16 (o'clock)

3 hours

13 : 10 — 16:10

When subtracting the duration of 3 hours change it to 3:00 for the calculation.

16 : 10
− 3 : 00
□ □
hours minutes

Mathematical expression: 16:10 − 3:00

Answer 13: 10

Exercise

1 Ray was reading from 4:40 in the afternoon to 5:25 in the afternoon of the same day. How many minutes did he spend reading?

5 hours 25 minutes - 4 hour 40 minutes

Answer 45 minutes

2 If you leave your house at 40 past 9 in the morning, and it took you the duration of 1 hour and 30 minutes to reach the garden. At what time in the morning will you reach the garden?

9 hours 40 minutes + 1 hour 30 minutes

Answer. 11 hours 10 minutes

66 = □ − □

• Teacher's Notes •

Addition and Subtraction of Duration of time. When making expressions to calculate in vertical form, it is important to differentiate the numbers in vertical form whether they are specific times or the duration of times.

1) When thinking about the time after a certain duration of time based on a specific time, we can add the duration onto the time to get the new time.
(Time) + (Duration) = (Time)

Example: 3: 40 (Time)
+ 2: 10 (2 hours 10 minutes: Duration)
5: 50 (Time)

2) When thinking about the duration of time between two certain times, we add them to get the combined duration.
(Time + Time = Duration of Time)

Example: 15 minutes (Time)
+ 35 minutes (Time)
50 minutes (Duration)

3) When thinking about the specific time before the duration based on a certain time, we subtract the duration from the time after to find the time before.
(Time After) − (Duration) = (Time before)

Example: 7 : 20 (Time)
− 3 : 10 (3 hours 10 minutes- Duration)
4 : 10 (Time)

4) When converting time units,
1 hour and 40 minutes = x minutes
60 minutes + 40 minutes = 100 minutes
(Time) + (Time) = (Time)

Lesson Flow

1 ❹ Find out an arrival time based on a departure time and how long it takes to arrive.

T Introduce the main task.

T The bus departs Lae at 7:00 and it takes 5 hours and 15 minutes to arrive in Goroka. Let's think about the time it arrives in Goroka.

T Have students to discover that the question is to find time although the previous lessons were to find the duration of time by using a diagram of a number line.

T Give students' advice to confirm which time is asked by filling in the duration of time and time already known in the number line.

S Make an addition because it leaves Lae at 7:00 and arrives in Goroka after 5 hours and 15 minutes. It will be (7 o'clock) + (5 hours and 15 minutes), which is 12:15.

2 ❺ Find out departure time based on arrival time and how long it takes to arrive.

T From Goroka, it takes 3 hours to arrive in Mt. Hagen at 16:10. Let's think about the time it departs Goroka.

T Which operation shall we use to find the answer?

S This time we know an arrival time but don't know the departure time so we need to reverse the time. So it will be subtraction.

S 16:10 − 3 hours = 13:10

3 Complete the exercises.

Sample Blackboard Plan

Date: Chapter Name: Duration and Time Topic: Duration and Time Lesson Number: 2 of 2

Review

MT

1

What are the ways we can use to calculate duration of Time

Students Ideas

Answer:
We can use the clock or we can calculate hours and minutes independently.

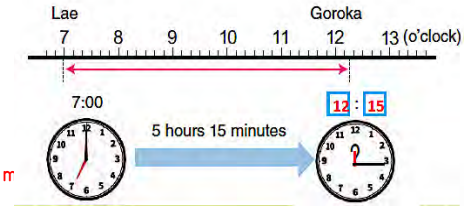
Main Task: Let's find the departure and arrival time.

❹ Lets think about the arrival time for a bus travelling from Lae to Goroka. At what time will it reach Goroka town?

Students Ideas

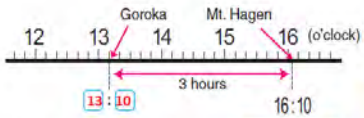
o'clock	minutes	
7	00	(Time)
+ 5	15	(Duration)
12	15	(Time)

7 hour 0 minutes plus 5 hour 15 m
Answer: Arrival Time 12 : 15



❺ Bus will arrive at Mt. Hagen in 16: 10 at what time will it depart Goroka?

Students Ideas



Mathematical expression: 16:10 − 3:00

16 : 10 (Time)
− 3 : 00 (Duration)
13 10 (Time)
hours minutes

EXERCISE

1 How many minutes did Ray spend reading?

5: 25 − 4 : 40 = 45 minutes.

2 At what time in the morning will you reach the garden?

9: 40 + 1 Hour and 30 minutes

9 : 40 (Time)
+ 1: 30 (Time)
11: 10 (Duration)

Summary

What did you learn about time in today's lesson?

Unit 6

Unit: Duration and Time
Sub-unit: Excercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page :
p.67-p.68
Actual Lesson 047

Lesson Objectives

- To deepen the understanding of what has been learned in the unit.

Prior Knowledge

- All contents of the unit.

Preparation

- Evaluation sheet for the students.

Assessment

- Solve the exercises confirming what has been learned in the sub-unit. F S

• Teacher's Notes •

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

Exercise

Page 63

1 Let's write the correct number in the following ☐.

① 1 minute = 60 seconds

② 1 minute 20 seconds = 80 seconds

③ 180 seconds = 3 minutes

2 Vali and Utu participated in the town running. Vali finished the marathon in 5 minutes and 43 seconds. Utu finished the marathon 25 seconds later than Vali's time. What was Utu's record?

Page 63

5 minutes 43 seconds + 25 seconds. Answer : 6 minutes 8 seconds

3 One Sunday morning, Tim read a book for 1 hour and 10 minutes, and later read for 45 minutes in the afternoon. In total, how long did Tim read that Sunday?

Pages 65 ~ 66

1 hour 10 minutes + 45 minutes Answer : 1 hour 55 minutes

4 Sandy attended soccer practice from 9:30 to 11:10 in the morning. How many hours and minutes did she practice?

Pages 65 ~ 66

11 hours 10 minutes - 9 hours 30 minutes

Answer : 1 hour 40 minutes

5 It takes 25 minutes from Rui's home to the bus stop. To board the bus leaving at 10 minutes past 10 hours in the morning, at what time would she have to leave her home?

Pages 65 ~ 66

10 hours 10 minutes - 25 minutes

Answer : 9 hours 45 minutes

Let's calculate. Grade 3 Do you remember?

① 4×0 0 ② 1×0 0 ③ 0×3 0 ④ 0×9 0

⑤ 7×10 70 ⑥ 5×10 50 ⑦ 10×3 30 ⑧ 10×6 60

Problems

1 Arrange the duration of time in order from the longest.
● Understanding units and duration of time.

15 hours (2) 1 day (1) 3 hours 45 minutes (3)

75 seconds (5) 60 minutes (4)

2 Let's write numbers in the ☐.
● Understanding the relationship between units.

① 3 minutes = 180 seconds

② 1 minute 40 seconds = 100 seconds

③ 125 seconds = 2 minutes 5 seconds

④ 2000 seconds = 33 minutes 20 seconds

3 Let's write the units of time which fits in the ☐.
● Using units of time correctly.

① The duration you took to eat breakfast: 20 minutes.

② The duration you took to run 50 m: 13 seconds.

③ The duration you took for a school trip: 7 hours.

4 A class period is 30 minutes long. If the class starts at 10 minutes after 10 o'clock, when does the class end?
● Getting time by using calculation.

10:40

How Long Is the Duration of 3 Minutes?

How long is the duration of 3 minutes? Please guess the time with your eyes closed. Close your eyes, count in your mind after the start sign. Then raise your hand when you counted 3 minutes.
Please measure your time using stopwatch.
Let's find out something in the duration of 3 minutes.

☐ + ☐ = 67 68 = ☐ − ☐

Lesson Flow

1 ① **Convert the unit of time.**

TN Confirm if students understand the relationship among hour, minute and second.

2 ② ③ ④ ⑤ **Solve word problem about time.**

3 **Do the exercise "Do you remember".**

4 ① **Compare the time considering the unit.**

TN Confirm that 1 day = 24 hours, 1 hour = 60 minute, 1 minute = 60 second.

5 ② **Convert the unit of time.**

TN Typical error of students is as follows: 125 seconds = 1 minute and 25 second, 1 minute and 40 seconds = 140 seconds. Let the students confirm repeatedly 1 minute = 60 seconds.

6 ③ **Convert the unit of time.**

TN Let students improve a sense of time imagining their daily life.

7 ④ **Solve the word problem.**

TN Let students read the problem carefully and think of using addition or subtraction.

8 **Evaluation**

T Distribute the evaluation sheet to each student and let them complete.

Duration and Time	Name:	Score

1. Fill in the blanks.
   - ① 130 seconds = 2 minutes and 10 seconds
   - ② 90 minutes = 1 hour and 30 minutes
   - ③ 1minute 40 seconds = 100 seconds
   - ④ 1 hour and 20 minutes = 80 minutes
2. Answer the following questions
   - ① What is the duration between 9:20 and 11:00. 1 hour 40 minutes
   - ② What time is 1 hour and 45 minutes after 2: 00 3:45
3. Rupert went for Rugby practice on Sunday morning from 8:30 to 11:00. How many hours and minutes did he practice for?

   2 hours 30 minutes
4. If you leave your house at 7:30 and it takes 40 min to reach your school, at what time will you reach your school?

   8:10
5. Ruwena studied Mathematics for 40 minutes in the morning and 1 hour 30 minutes in the afternoon. In total, how many hours and minutes did she study for?

   2 hours 10 minutes
6. It takes 1 hour 10 minutes to go to school. School starts at 8:30. What time should you leave the house?

   7:20

End of Chapter Test: Chapter 6 **Date:**

Duration and Time	Name:	Score

1. Fill in the blanks.

   ① 130 seconds = _____ minutes and _____ seconds

   ② 90 minutes = _____ hour and _____ minutes

   ③ 1minute 40 seconds = _____ seconds

   ④ 1 hour and 20 minutes = _____ minutes

2. Answer the following questions

   ① What is the duration between 9:20 and 11:00. _____

   ② What time is 1 hour and 45 minutes after 2: 00 _____

3. Rupert went for Rugby practice on Sunday morning from 8:30 to 11:00. How many hours and minutes did he practice for?

   _____

4. If you leave your house at 7:30 and it takes 40 min to reach your school, at what time will you reach your school?

   _____

5. Ruwena studied Mathematics for 40 minutes in the morning and 1 hour 30 minutes in the afternoon. In total, how many hours and minutes did she study for?

   _____

6. It takes 1 hour 10 minutes to go to school. School starts at 8:30. What time should you leave the house?

   _____

Chapter 7 Multiplication in Vertical Form

1. Unit Objectives

- To deepen the understanding of multiplication, delete to calculate confidently and to develop ability to use multiplication properly. (3.1.3 a)
- To think about how to multiply 2-digit or 3-digit numbers by 1 digit number, and to understand that these can be calculated based on basic calculations such as the multiplication table. Also to understand how to calculate these in vertical form. (3.1.3. a, b and c)
- To be able to multiply confidently and use it properly. (3.1.3.d)
- To represent a relation among quantities with expressions, and relate expressions with diagrams. (3.1.3. d)

2. Teaching Overview

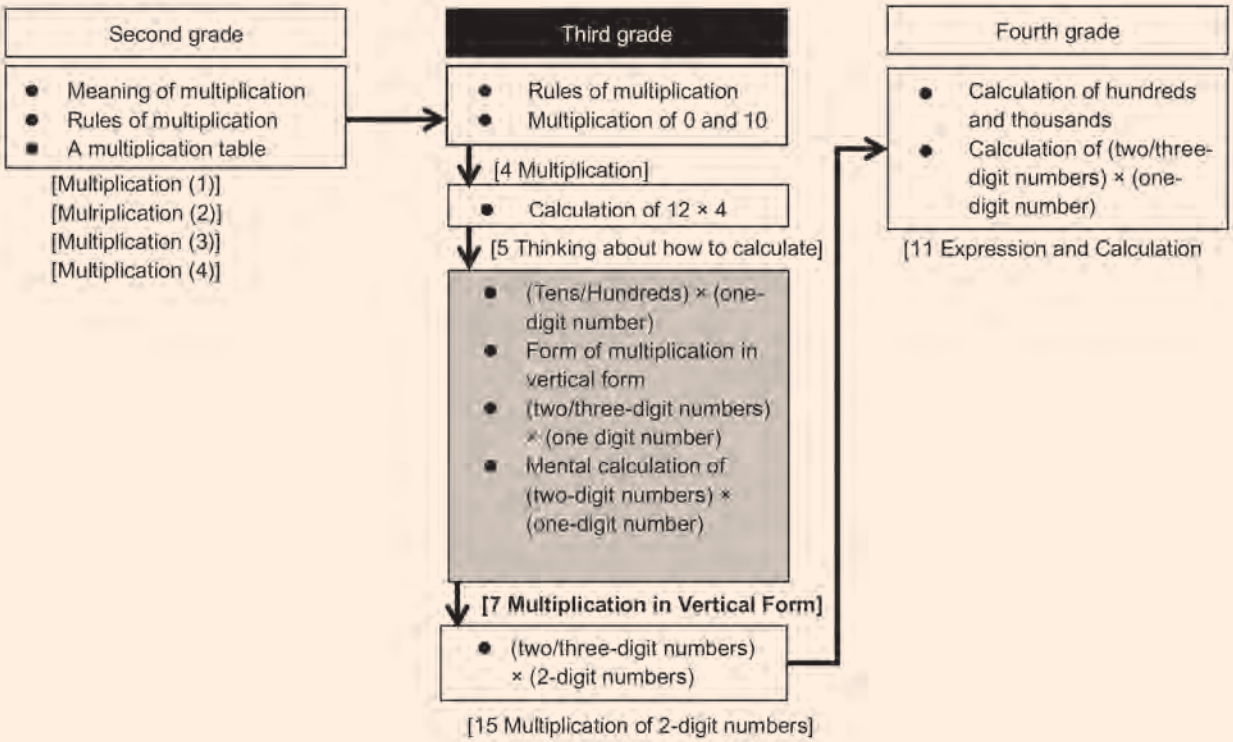
Multiplication with Tens and Hundreds: First, they are supposed to be able to recall all multiplications of 1-digit numbers. Students will understand multiplications with tens/hundreds by connecting and manipulation of numbers and its meaning in daily life. This topic will be the foundation of learning vertical multiplication in the following topics

How to Calculate (2-digit numbers) × (1-digit number): In this topic, students are expected to start thinking "How can we solve it by utilising multiplications of 1-digit numbers that we know?" to solve given problems. This is how students recognise the necessity of splitting a 2-digit numbers into 10s and 1s since they remember multiplications with numbers up to 9. If they recognise the necessity of splitting 2-digit numbers, they will discover that any 2-digit numbers can be multiplied by 1-digit number respectively; splitting into tens and ones.

How to Calculate (3-digit numbers) × (1-digit number): Here students can utilise the idea that they experienced when thinking how to calculate (2-digit numbers) × (1-digit number).

Mental Calculation: For improving skills for mental calculations, it is important that students can explain what they mentally do to make friends understand his/her ideas. Please note that it is not enough that only teacher understands what s/he says. Teacher's role here is to facilitate the discussion to be understood by everyone.

3. Related Learning Contents



Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 1. Multiplication with Tens and Hundreds
Lesson 1 of 1 (Double Period)

Textbook Page : P.69
Actual Lesson 048

Sub-unit Objectives

- To understand the meaning and how to find out answers of (tens)×(1-digit number) and (hundreds)×(1-digit number).

Lesson Objectives

- To find out answers of multiplication when multiplicands or multipliers are tens and hundreds by thinking about how many sets of 10 and 100, by using the multiplication table.

Prior Knowledge

- Meaning of multiplication and expressions
- Multiplication tables of 2–9
- Multiplication by 1, 10s and 100s
- Increased and splitting method in multiplication
- Decomposing and composing of numbers
- Associative law in multiplication

Preparation

- Charts

Assessment

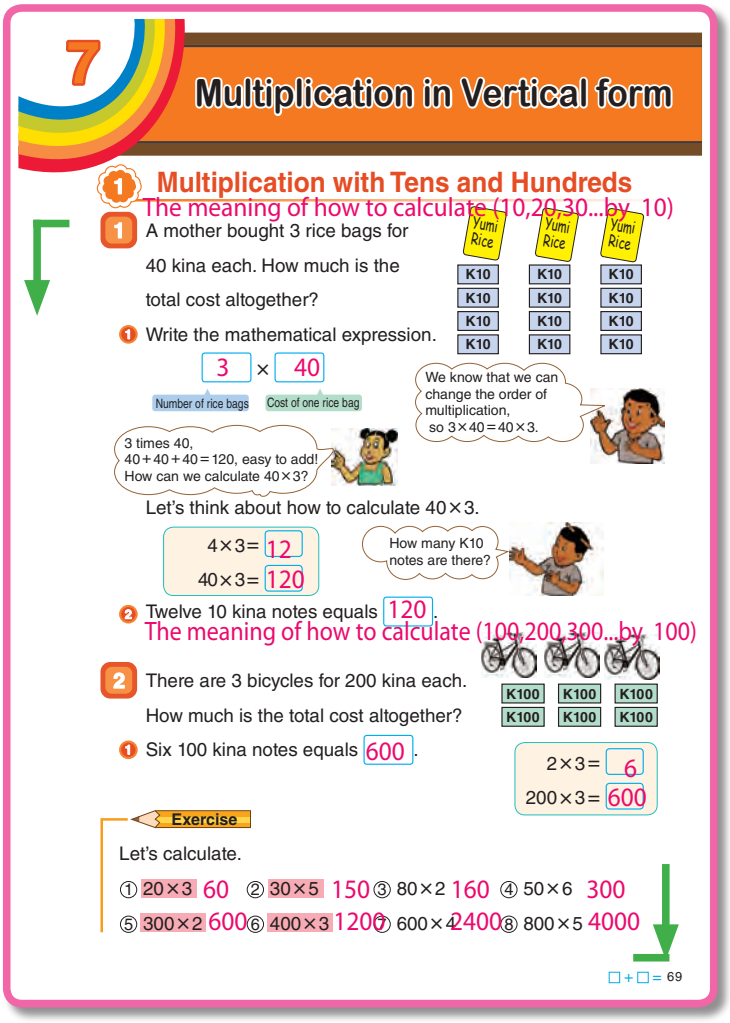
- Understand the situation and find out an answer by focusing on sets of 10 and 100. F
- Do the exercises correctly. S

• Teacher's Notes •

Multiplication by 10 is a necessary skill for students to learn in order to multiply by 2-digit numbers. Multiplication by 10s becomes easy when children use decomposing. Example: 3×60 can be decomposed to 3×6×10, and using associative law we multiply 3×6 first, so we have 18×10=180. We can just multiply the digits then add a 0.

When asking students to calculate 200×3, some students put 0 in the answer of 2×3. Only few students can explain the reason why it can be calculated in this way when asked.

So in this lesson it is important to have students understand with confidence why the answer 200×3 can be calculated with using 2×3 by having them use model money and blocks. By doing so, students are able to realise that 200×3 has 2 sets of 100, and that of 3 sets, so it can be calculated with "2×3" in the multiplication table, and the answer shows the number of 100 sets.



Lesson Flow

1 ❶ Think about how to calculate total cost of the Yumi rice.

S ❶ Write an expression based on the idea that the total cost of Yumi rice can be calculated by (number of rice bags) 3×(Cost of one rice bag) 40.
TN It can be calculated as 40×3 by using rules of multiplication.
T Let's think about how to calculate 40×3.
S Pay attention to the number of rice by showing a diagram and explain by using it.
T ❷ How much in total?
S There are twelve 10 kina notes which are equal to 120 kina.
T We can also calculate 1-digit by 1-digit then add the zero. (4×3=12 then bring zero gives 120).
T Introduce the main task.

2 ❷ Think about how to calculate the total cost of bicycles.

T ❶ Make an expression.
S 3×200
S There are six 100 kina notes which are equal to 600 kina.
T ❷ Let's think about how to calculate 200×3.
S 2×3=6, then add two zeros to make 600.

3 Summarise how to calculate.

S Confirm whether students understood that it can be calculated using the multiplication table focusing on sets of 10 and 100. For example, when multiplying by sets of 10 or 100 add one 0 or two 0 to the product.

4 Do the exercise.

S Complete 1, 2, 5 and 6. The rest can be for homework.

Sample Blackboard Plan

Date: Chapter Name: Multiplication in Vertical Form Topic: Multiplication with Tens and Hundred Lesson Number: 1 of 1

Main Task: Let's calculate using 10s and 100s by thinking about adding zeros.

1

K10	K10	K10
K10	K10	K10
K10	K10	K10
K10	K10	K10

Mathematics Expression
40 x 3 No. of rice Bag
❶ Cost of 1 rice

We know that twelve 10 kina notes is 120 kina.
Also price of 3 rice bags is 40 + 40 + 40.
Therefore,

4×3= 12
40×3= 120

40 x 3 can be calculated as 4 x 3 then add the 0 to get 120.

MT

2 Let's think about how to calculate total cost of 3 bicycle for price of 200 kina.

100 Kina	100 Kina	100 Kina
100 Kina	100 Kina	100 Kina

❶ Mathematical Expression
200 x 3
No. of bicycle Cost of 1 bicycle

We know that six 100 kina notes is 600 kina.
Also price of 3 bicycles are 200 + 200+ 200
Therefore,

2×3= 6
200×3= 600

It is easier to multiply 2 x 3 then add the 00 to get 600.

Summary:
When multiplying with 10s and 100s, we can multiply the digits first then add the zeros.
Example:

40 x 3 can be calculated as 4 x 3 then add the 0 to get 120.

Also 2 x 3 can be calculated then add the 00 to get 600.

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 2. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 1 of 2 (Single Period)

Textbook Page : p.70 - p.71
Actual Lesson 049

Sub-unit Objectives

- To try to find an answer of (2-digit numbers)×(1-digit number) by using multiplication table with ways such as breaking down multiplicands.
- To understand how to calculate (2-digit numbers)×(1-digit number).
- To understand how to calculate (2-digit numbers)×(1-digit number) in vertical form.

Lesson Objectives

- To think about how to calculate 21×3.
- To divide a multiplicand into each place value in vertical form in order to use the multiplication table.
- To calculate (2-digit numbers)×(1-digit number).

Prior Knowledge

- Meaning of multiplication and expressions
- Multiplication tables of 2–9
- Multiplication by 1, 10s and 100s
- Increased and splitting method in multiplication
- Decomposing and composing of numbers
- Associative law in multiplication

Preparation

- Blocks

Assessment

- Think about how to calculate (2-digit numbers)×(1-digit) decomposing a multiplicand into each place value in vertical form in order to use the multiplication table. F
- Do the exercises correctly. S

• Teacher's Notes •

When calculating 21×3 in vertical form, 2×3=6 is done and 6 is written in tens place. It important to explain clearly why 6 is written in tens place.
This is because 2×3=6 acutually means 20×3=60.
Please explain clearly the process of 1 3.

2 How to Calculate (2-digit numbers)×(1-digit number)

The meaning of how to calculate (2-digit) x (1-digit)

1 Teacher bought 21 chocolates which cost 3 kina each for a class party. How much is the total cost of chocolates altogether?

1 Write an expression to find the total cost.

21 (Number of chocolates) × 3 (Cost of one chocolate)

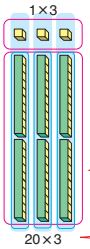
If we change the order of multiplication, how can we find the answer?

2 Let's think about how to calculate 21×3.

Can we use the multiplication table?

Let's think about how to calculate (2-digit numbers)×(1-digit number).

Considering How to Calculate 21×3



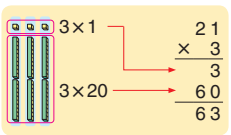
Using the place values, 21 split into 1 on ones and 2 on tens. We can calculate 1×3 and 20×3.

21×3 < 1×3=3, 20×3=60, Total 63

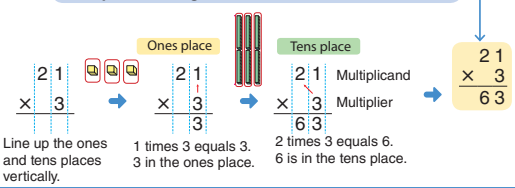
3 For calculating multiplication, we can use vertical form. Let's explain how to multiply 21×3 in vertical form.

$$\begin{array}{r} 21 \\ \times\ 3 \end{array}$$

Using the row of the multiplier in the multiplication table makes the calculation easier. When multipying vertically, we swap the order of multiplication.



Multiplication Algorithm for 21×3 in Vertical Form



Exercise

Let's multiply in vertical form.

① 34×2 68 ② 23×3 69 ③ 42×2 84 ④ 11×4 44

Lesson Flow

1 Read and understand the given situtation ❶.

S Think about the given situation.
T ❶ Let's think about the mathematical expression.
S Write an expression based on the idea that the total cost of chocolates can be calculated by (number of chocolate) 21 × (Cost of one chocolate) 3.
TN It can be calculated as 21 × 3 by applying rules of multiplication.
T Let's think about how to calculate 21 × 3.
T Introduce the main task.

2 ❷ Develop ways to solve the problem.

T Have students express their ideas on how to solve the problem using diagrams, expressions and words.
TN Possible responses:
1. (Find out with addition) 21 + 21 + 21 = 63
2. (Break down a multiplicand) 21 = 7 + 7 + 7 so 7 × 3 = 21,(7 × 3 = 21, 7 × 3 = 21, 7 × 3 = 21), 21 + 21 + 21 = 63
3. (Break down a multiplicand) 21 = 20 + 1, 20 × 3 = 60, 1 × 3 = 3, 60 + 3 = 63

T Write students' responses on the black board as discussion.

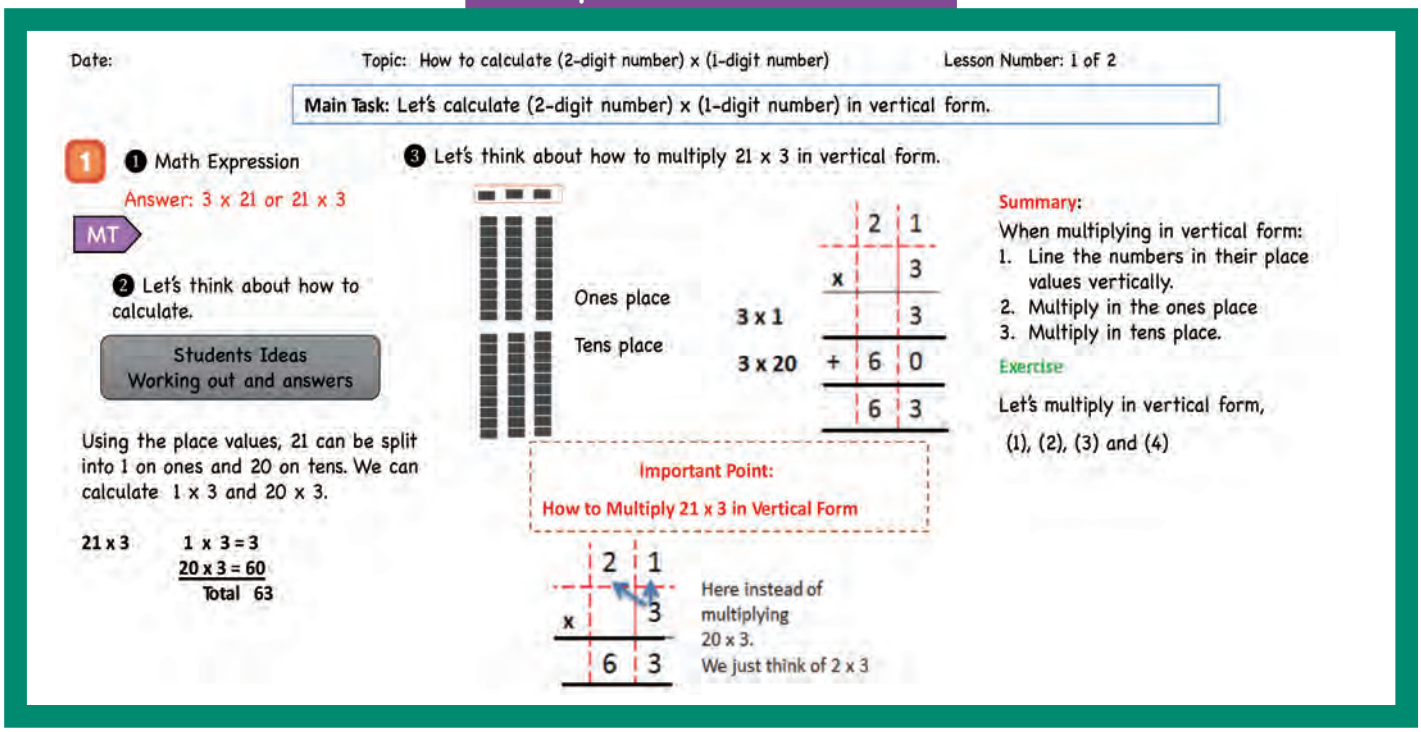
3 ❸ Think about how to calculate 21 × 3 in vertical form.

S Discuss with others on how to calculate 1 × 3 = 3 and 20 × 3 = 60 in vertical form.
T Confirm the meaning of each operation which is 3 × 1 and 3 × 20.
Also confirm the place of where the products will be written.
T/S Conclude how to calculate 21 × 3 using the explanation in the textbook.

4 Complete the exercises.

S Complete 1 - 4.

Sample Blackboard Plan



Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 2. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 2 of 2 (Double Period)

Textbook Page : p.72-p.73
Actual Lesson 050

Lesson Objectives

- To calculate (2-digit numbers)×(1-digit number) with carrying in vertical form.

Prior Knowledge

- How to calculate (2-digit numbers)×(1-digit number)in vertical form.

Preparation

- Refer to the black board plan.

Assessment

- Think about how to calculate (2-digit numbers)×(1-digit) in vertical form. F
- Do the exercises correctly. S

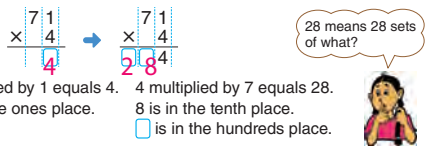
• Teacher's Notes •

The sequence 71×4, 13×7 and 95×3 reflect the increasing complexity when calculating multiplication of (2-digits)×(1-digit) in vertical form.
71×4 has carry over to hundreds place without addition.
13×7 students need to do addition with the carry over.
95×3 students will carry over and add in the tens place and carry over to the hundreds place.
46×7 students will add and carry in the tens place as well as in the hundreds place.
Prioritised Exercises
(1) Carries up to hundreds place.
(5) Add a number carried up to tens place.
(9) Carries up to the tens and hundreds place.
(11) Adding a number up to the hundreds place.

(2-digit) × (1-digit) with carrying

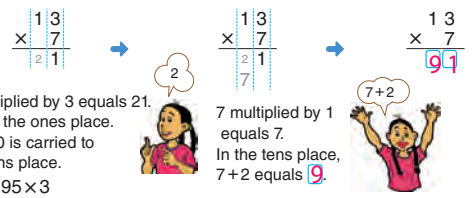
2 Let's think about how to multiply in vertical form.

1 71×4



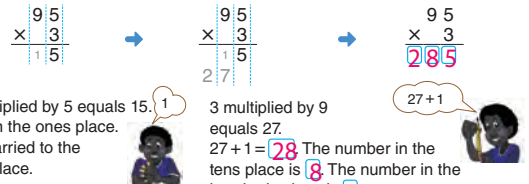
4 multiplied by 1 equals 4. [ ] is in the ones place.
4 multiplied by 7 equals 28. 8 is in the tenth place. [ ] is in the hundreds place.

2 13×7



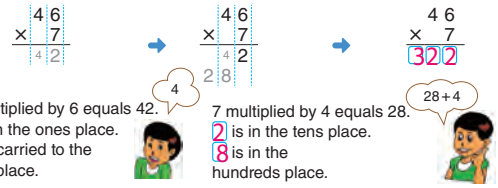
7 multiplied by 3 equals 21. 1 is in the ones place. 2 of 10 is carried to the tens place.
7 multiplied by 1 equals 7. In the tens place, 7+2 equals 9.

3 95×3



3 multiplied by 5 equals 15. 5 is in the ones place. 1 is carried to the tens place.
3 multiplied by 9 equals 27. 27+1=28. The number in the tens place is 8. The number in the hundreds place is 2.

3 Let's think about how to multiply 46×7 in vertical form.



7 multiplied by 6 equals 42. 2 is in the ones place. 4 is carried to the tens place.
7 multiplied by 4 equals 28. 2 is in the tens place. 8 is in the hundreds place.

72 = □ × □

Exercise

Let's multiply in vertical form.

① 93×3 279	② 41×5 205	③ 63×2 126	④ 30×8 240
⑤ 14×7 98	⑥ 13×5 65	⑦ 24×3 72	⑧ 49×2 98
⑨ 64×3 192	⑩ 85×9 765	⑪ 18×6 108	⑫ 26×4 104
⑬ 59×7 413	⑭ 35×9 315	⑮ 65×8 520	⑯ 84×6 504

Exercise

1 Let's multiply in vertical form. Pages 71 ~ 73

① 15×3 45	② 24×4 96	③ 47×2 94	④ 12×6 72
⑤ 42×6 252	⑥ 63×7 441	⑦ 58×4 232	⑧ 74×9 666
⑨ 38×8 304	⑩ 35×6 210	⑪ 80×4 320	⑫ 500×6 3000

2 Kazu bought 4 piglets. 1 piglet costs 55 kina. Page 70
How much is the total cost altogether?
4×55=220 A. 220 kina

3 Make a phrase by arranging in order of putting the following letters from the lowest to the largest answer. Pages 72

Ⓣ 73×8 584 Ⓢ 87×9 783 Ⓗ 93×8 744 Ⓥ 68×4 272 Ⓞ 30×9 270
Ⓐ 57×8 456 Ⓜ 42×9 378 Ⓘ 12×8 96 Ⓔ 46×6 276 Ⓛ 31×5 155

「ⒾⓁⓄⓋⒺⓂⒶⓉⒽⓈ」

□ − □ = 73

Lesson Flow

1 Review the previous lesson.

2 ② Understand how to multiply in vertical form.

T Introduce the main task.
T Present students with 71×4, and have them compare with the calculations without carrying over in the previous lesson.
S Understand that "how to calculate with carrying over" will be the task to solve in this lesson.
T Let's think about and explain how to calculate in vertical form.

3 ① Think about how to calculate 71×4 in vertical form.

S Find the answer by recalling how to calculate by splitting a multiplicand into tens and ones place like that in the previous lesson.
TN It is important to multiply (bottom number)×(top number). Explain using arrows.
T 4×7=28, 28 means 28 sets of what?
S 10
T Where should we write 28?
S Hundreds place and tens place.
S Solve in the same way as the previous one.

4 ② Think about how to calculate 13×7 in vertical form.

S Solve in the same way as the previous one.
T Discuss how to remember the number of carrying over.
TN As for a number carried over, in order to lead to calculate mentally, it is recommended in the textbook to add the number which carried over to the superior place value instead of writing down a partial product one by one.

5 ③ Explain how to calculate 95×3 in vertical form.

S Explain how to calculate 95×3.

6 ④ Calculate 46×7.

S Explain how to calculate 46×7.

7 Complete the exercise.

S Complete 1 - 4 and 6, and the rest can be given as homework.

Sample Blackboard Plan

Date:

Topic: How to calculate (2 – digit number) x (1 – digit number)

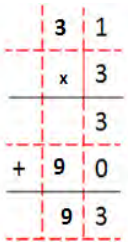
Lesson Number: 2 of 2

Main Task: Let's think about how to multiply with carrying.

MT

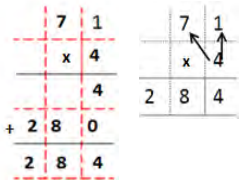
Review:
Explain the calculation of 31 x 3 in vertical form.

Students Ideas
Working out and answers



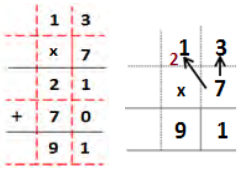
2 Let's think about how to multiply in vertical form.

1 71 x 4



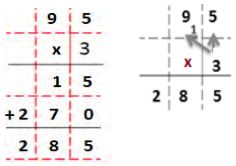
There is carry over once without adding.

2 13 x 7



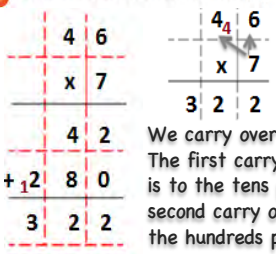
There is carrying over once with adding.

3 95 x 3



We carry over twice here with addition. The first carrying over is to the tens place which is added and carried to the hundreds place.

3 Let's think about how to multiply 46×7 in vertical form.



We carry over and add twice here. The first carrying over and adding is to the tens place, and the second carry over and adding is in the hundreds place.

Summary:

When multiplying in vertical form with carry over:

1. Line the numbers in their place values vertically.
2. Multiply in the ones place
3. Carry over when needed.
4. Multiply in tens place.
5. Carry over

Exercise

1, 2, 3, 4 and 6

EXERCISE (for Home Work)

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 3. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 1 of 2 (Double Period)

Textbook Page : p.74
Actual Lesson 051

Sub-unit Objectives

- To understand the meaning of (3-digit numbers)×(1-digit number) and to be able to calculate in vertical form accurately.
- To be able to explain how to calculate (3-digit numbers)×(1-digit number) by using the method of how to calculate (2-digit numbers)×(1-digit number).

Lesson Objectives

- To think about and explain how to calculate (3-digit numbers)×(1-digit number) by using splitting method.
- To understand how to calculate (3-digit numbers)×(1-digit number) in vertical form, without carrying over.

Prior Knowledge

- How to calculate (2-digit numbers)×(1-digit number) in vertical form (Previous lesson).

Preparation

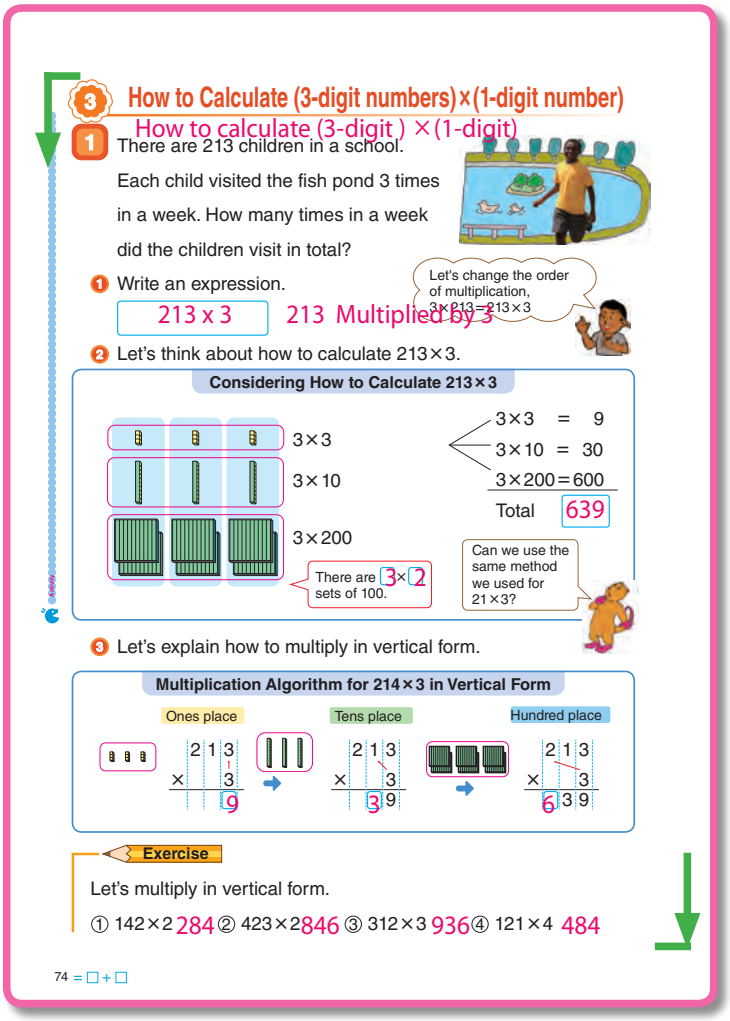
- Blocks

Assessment

- Think and explain about how to calculate (3-digit numbers)×(1-digit). F
- Do exercises correctly. S

• Teacher's Notes •

Help the students to think individually on how to calculate (3-digits)×(1-digit) in vertical form without carry over. They may use the splitting method to assist themselves if they have problems with direct calculation using the vertical form.



3 How to Calculate (3-digit numbers)×(1-digit number)

1 How to calculate (3-digit) ×(1-digit)

There are 213 children in a school. Each child visited the fish pond 3 times in a week. How many times in a week did the children visit in total?

1 Write an expression.

213 x 3　213 Multiplied by 3

Let's change the order of multiplication, 3×213=213×3

2 Let's think about how to calculate 213×3.

Considering How to Calculate 213×3

3×3
3×10
3×200

3×3 = 9
3×10 = 30
3×200=600
Total 639

There are 3×2 sets of 100.

Can we use the same method we used for 21×3?

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

Multiplication Algorithm for 214×3 in Vertical Form

Ones place　Tens place　Hundred place

Exercise

Let's multiply in vertical form.

① 142×2 284 ② 423×2 846 ③ 312×3 936 ④ 121×4 484

74 =□+□

Lesson Flow

1 ❶ Read and understand the problem.

T ❶ Have students to read and understand the situation and make an expression.
T Ask the students to discuss the difference from previous calculations.
S Identify that in the previous lesson, it was (2-digits)×(1-digit). Now it's (3-digits)×(1-digit).
T Introduce the main task.

2 ❷ ❸ Think about how to calculate 213×3.

S Calculate by recalling methods used for the calculation of (3-digit numbers)×(1-digit number).
T Observe students whether they can calculate and have them solve the problem. Demonstrate how to calculate (3-digit numbers)×(1-digit number) in case many students have no idea.

3 Present one's own method and consider each method.

TN Many students might calculate in vertical form . In that case, have them explain why such procedures are appropriate (procedures of how to calculate in vertical form).

4 Summarise how to calculate (3-digit numbers)×(1-digit number).

S Split into each place value and multiply 1-digit number.
T Confirm that calculations in vertical form are made with thinking of how many sets of 10 and 100 for tens and hundreds places each just like 1-digit number and that is based on the same idea of (2-digit numbers)×(1-digit number) and as well as 1-digit number calculations.

5 Complete the exercises.

S Complete 1 - 4.

Sample Blackboard Plan

Date: Topic: How to Calculate (3-digit) x (1-digit) Lesson Number: 1 of 2

Main Task: Let's calculate (2-digit number) x (1- digit number) in vertical form.

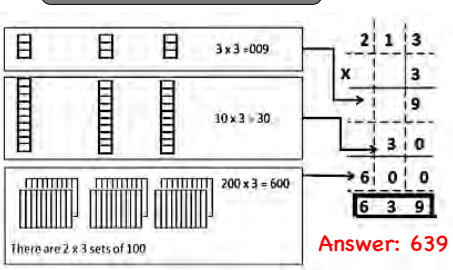
1

❶ Mathematical Expression
Answer: 213 x 3

MT

❷ Let's think about how to calculate 213 x 3.

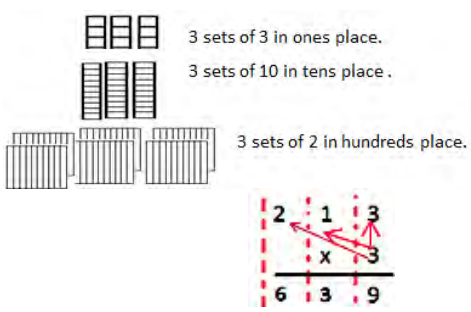
Students Ideas
Working out and answers



Answer: 639

❸ Let's explain how to multiply in vertical form.

Students Ideas
Working out and answers



Summary

- We can get the answer by adding the total of each set.

We can get the answer by multiplying in vertical form using the same method as 21 x 3. When multiplying in vertical form with carry over:

1. Line the numbers in their place values vertically.
2. Multiply in the ones place
3. Carry over when needed.
4. Multiply in tens place.
5. Carry over

- When we multiply in vertical form we think of how many sets of 10s and 100s in tens and hundreds place values.

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 3. How to Calculate (2-digit numbers)×(1-digit number)
Lesson 2 of 2 (Single Period)

Textbook Page : p.75
Actual Lesson 052

Lesson Objectives

- To calculate (3-digit numbers)×(1-digit number) with carrying over in vertical form.
- To calculate (3-digit numbers)×(1-digit number) with 0 as the product.

Prior Knowledge

- How to calculate (3-digit numbers)×(1-digit number)in vertical form (Previous lesson).

Preparation

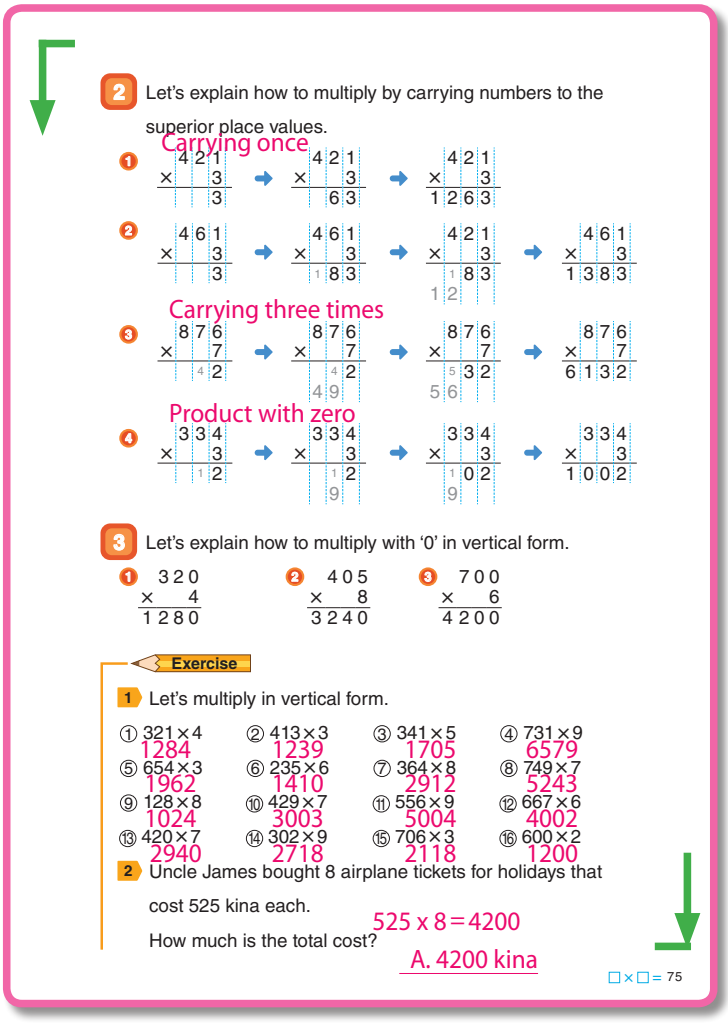
- Prepare according to the black board plan.

Assessment

- Think about how to calculate (3-digit numbers)×(1-digit) with carrying up and with a multiplicand having (zero) empty place in vertical form. F
- Do exercises confirming the steps of multiplication in vertical form. S

• Teacher's Notes •

Students may use their prior knowledge on calculating tens and hundreds to do estimation before calculation. For example: For 461×3, have students to calculate 400×3 to get their estimate product of 1200. Then they can think that the answer will be larger than 1200 before calculating 461×3.
This is to help students avoid making mistakes. For example in 207×8;
Some students may calculate the numbers but not the zero. They will get 207×8=216. By estimating the product they will notice that the product will be larger than 1600 (200×8). This will assist them to avoid making mistake in the calculation of 207×8=1656



Lesson Flow

1 ❷❶ Think about how to calculate 421×3.

T Introduce the main task.
TN Task 2 activity 1 - 4, encourage students to estimate the product before calculating.
S Estimate the largeness of the product by calculating 400×3.
S Think about how to calculate it in vertical form considering carrying over once.
T Have them think about on which place values for an answer to be written.
For example: 421×3; 3×1, 3×20 and 3×400

2 ❷ Think about how to calculate 461×3.

S Do the same as activity ❶.
S Think about how to calculate in vertical form considering carrying over twice.
T Have them think about the place values for an answer to be written.
For example: 461×3; 3×1, 3×60 and 3×400

3 ❸ Think about how to calculate 876×7.

S Estimate and Calculate.
S Think about how to calculate it in vertical form considering carrying over three times.
T Have them think about the place values for an answer to be written.
For example: 876×7; 7×6, 7×70 and 7×800

4 ❹ Think about how to calculate 334×3.

S Estimate and Calculate.
TN This activity focuses on the calculation with 0 in the product.

5 ❸ Solve the problems of ❶, ❷ and ❸ using one's ideas.

S Do the activity ❶-❸ and identify the differences between these problems and the previous problems.
TN Let students calculate in vertical form. Emphasis on multiplying with 0 and write 0 in the appropriate place value.

6 Complete the exercises.

S Complete ①, ⑤, ⑨ and ⑬. The rest can be for homework.

Sample Blackboard Plan

Date: Topic: How to Calculate (3-digit) x (1-digit) Lesson Number: 1 of 2

Main Task: Let's calculate (2-digit number) x (1- digit number) in vertical form.

MT

❷ ❶ 421 x 3, the answer should be over 1200.

$$\begin{array}{r} 421 \\ \times \quad 3 \\ \hline 1263 \end{array}$$

There is carry over once without adding.

❷ 461 x 3, the answer should be over 1200.

$$\begin{array}{r} {\scriptstyle 1}\,461 \\ \times \quad 3 \\ \hline 1383 \end{array}$$

There is carry over twice with adding.

❸876 x 7, the answer should be over 5600.

$$\begin{array}{r} {\scriptstyle 5\ 4}\,876 \\ \times \quad 7 \\ \hline 6132 \end{array}$$

We carry over three times here with addition. The first carrying over is to the tens place which is added and carried to the hundreds place. The third carry over is to the thousands place.

❹334 x 3, the answer should be over 900.

Product is with zero.

$$\begin{array}{r} {\scriptstyle 1\ 1}\,334 \\ \times \quad 3 \\ \hline 1002 \end{array}$$

❸ The multiplicand is with zero.

❶ 320 x 4, the answer should be over 1200.

$$\begin{array}{r} 320 \\ \times \quad 4 \\ \hline 1280 \end{array}$$

❷ 405 x 8, the answer should be over 2400.

$$\begin{array}{r} 405 \\ \times \quad 8 \\ \hline 3240 \end{array}$$

❸700 x 6, the answer should be 4200 .

$$\begin{array}{r} 700 \\ \times \quad 6 \\ \hline 4200 \end{array}$$

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: 4. Mental Calculation
Lesson 1 of 1 (Single Period)

Textbook Page : p.76
Actual Lesson 053

Sub-unit Objectives

- To calculate (2-digit numbers)×(1-digit number) mentally based on an estimation of multiplication.
- To understand that multiplication starts with larger place values in calculating mentally.

Lesson Objectives

- To calculate (2-digit number)×(1-digit number) mentally based on an estimation of multiplication.

Prior Knowledge

- How to calculate (3-digit numbers)×(1-digit number)in vertical form (Previous lesson).

Preparation

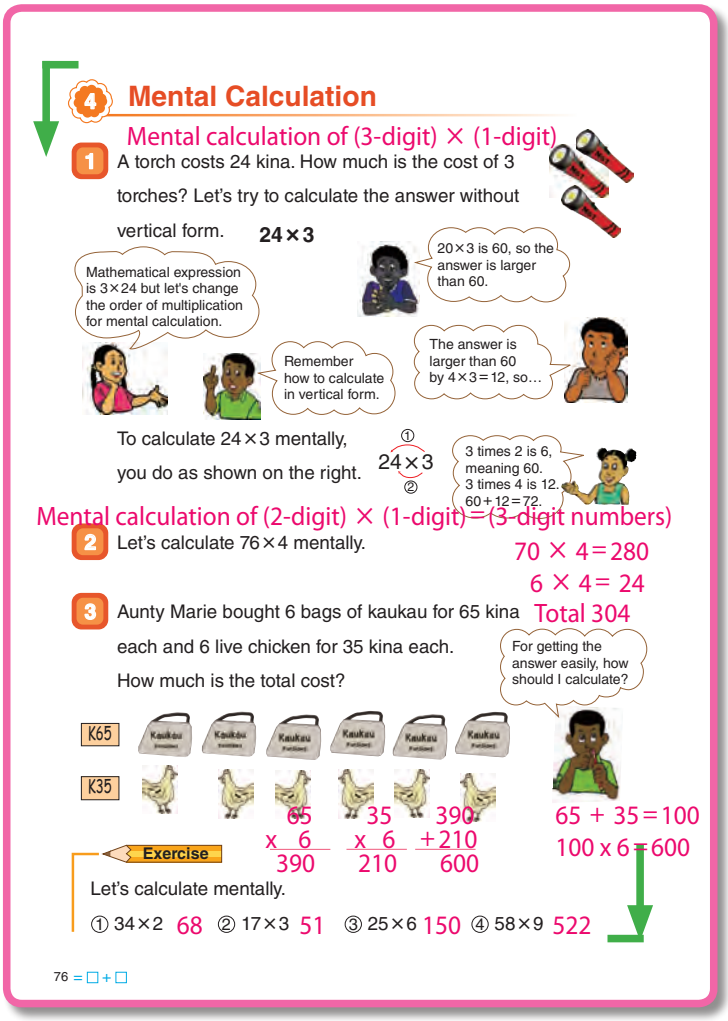
- Prepare according to the black board plan.

Assessment

- Think about how to calculate (2-digit or 3-digit numbers)×(1-digit) mentally. F
- Calculate (2-digit or 3-digit numbers)×(1-digit) mentally. F S
- Do the exercises correctly. S

• Teacher's Notes •

For mental calculation it is important that the students work from tens and hundreds place then to the ones place.
For example: 24×3
Students think of 20×3=60, estimate product to be larger than 60.
In their head they should work out 20×3=60 then 4×3=12, in total 60+12=72.



Lesson Flow

1 ① Read and understand the given situation. Let's think about an expression to calculate the total cost of 3 battery torches for 24 kina each.

T Introduce the main task.
S Matematical expression: 24×3
T What can we do to get the answer?
S I think the answer is larger than 60 because 24×3 is larger than 20×3.
S We can calculate separately splitting 24 into 20 and 4.
S We can do the same as calculating in vertical form.
S 20×3=60
4×3=12
60+12=72
TN Respect and appreciate students method. Put more emphasis on vertical calculation and estimation. Refer to teachers note.

2 ② Calculate 76×4 mentally.

T Remind students to carry up with doing the calculation.

3 ③ Solve problems mentally.

S Read and interpret the picture of the situation and present the ideas of mental calculation.
TN There are two ways to find answer.
a: 65×6=390, 35×6=210, 390+210=600 (Calculate kaukau and chicken separately and add.)
b: 65+35=100, 100×6=600 (Add the cost of 1 kaukau bag and 1 chicken, then multiply their cost by 6 (The number of groups of bags and chickens).

4 Complete the Exercises.

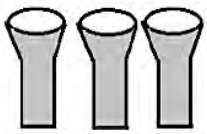
S Complete 1 - 4.

Sample Blackboard Plan

Date: Topic: Mental Calculation Lesson Number: 1 of 1

Main Task: Let's do Mental Calculation.

1 One torch cost 24 kina. How much is the cost of 3?



Math Expression:
24 x 3

Estimation price should be over 60 kina.

20 x 3 = 60
4 x 3 = 12
Hence 60 + 12 = 72

MT

Answer: 72 kina

2 Let's calculate 76 x 4 mentally.
76 x 4

Students Ideas
Working out and answers

70 x 4 = 280
6 x 4 = 24
Total 304

Answer: 304

3 Aunty Marie bought 6 bags of kaukau for 65 Kina each and 6 live chicken for 35 kina each. How much is the total cost?

Students Ideas
Working out and answers

Math Sentence
Bags of kaukau 65 x 6 = 390
Live chicken 35 x 6 = 210
Total cost 390 + 210 = 600

Or add total cost 35 + 65 = 100
6 sets of 100 is 100 x 6 = 600
Answer: 600 Kina

Summary:

For getting the answer easily how should you calculate?

- Estimate, multiply from tens to the ones.
- We can add total then multiply with the number of items when the number of items are same.

Unit 7

Unit: Multiplication in Vertical Form
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.77-p.79
Actual Lesson 054

Lesson Objectives

- To deepen the understanding of things learned already.
- To make sure careful calculations are done concerning the rule of multiplication.

Prior Knowledge

- All the contents in this Unit.

Preparation

- Exercise sheets for all students.

Assessment

- Solve the exercises correctly. F S

• Teacher's Notes •

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

Exercise

1 Let's calculate mentally. Pages 72 ~ 75

① 33×3 99　② 76×8 608　③ 43×7 301
④ 56×4 224　⑤ 29×5 145　⑥ 94×6 564
⑦ 324×2 648　⑧ 254×6 1524　⑨ 483×5 2415
⑩ 112×9 1008　⑪ 527×7 3689　⑫ 638×8 5104

Mental calculation

2 Let's fill in the ☐ with an appropriate number.

For calculating 84×7, we split it into 4×7 and 80×7
and then add the answers for the total. Pages 72 ~ 75

(3-digits) × (1-digit) word problem

3 Father purchased 6 boat tickets each costing 125 kina.
How much is the total cost? Pages 74 ~ 76

125 × 6 = 750

Answer K750

4 There is a park which is 340 metres in perimeter near Roni's house. Roni ran around the park 4 times.
How many metres did he run in total? Pages 74 ~ 76

(3-digits) × (1-digit) word problem

340 × 4 = 1360

Answer 1360 m

Grade 3 Do you remember?

Let's find the number which applies in the ☐.

① 5×8=8×5　② 7×3=3×7
③ 3×6=3×5+3　④ 9×4=9×5−9
⑤ (3×3)×2=3×(3×2)　⑥ 7×2×4=7×8

□×□= 77

Problems

1 Let's fill in the ☐ with an appropriate number.
● Understanding how to calculate (3-digit number)× (1-digit number).

For calculating 384×7, split the calculation into 7×4, 7×80 and 7×300 and then add the answers for the total.

384×7
- 7×4= 28
- 7×80= 560
- 7×300=2100

Total 2688

2 Let's calculate in vertical form. (2 or 3-digits) × (1-digit)
● Understanding how to calculate in vertical form.

① 50×3 150　② 300×3 900　③ 600×7 4200
④ 22×4 88　⑤ 45×6 270　⑥ 64×8 512
⑦ 223×3 669　⑧ 379×7 2653　⑨ 584×5 2920

3 Let's find the mistakes in the vertical calculations below and calculate the correct answer.
● Finding mistakes in calculations and calculate in the appropriate ways.

① Find mistakes (2 or 3-digits) × (1-digit)

85 × 3 = 2415 (255)　276 × 4 = 804 (1104)　504 × 2 = 108 (1008)

(3-digits) × (1-digit) word problem

4 If you buy 8 sets of sports shoes and socks when one pair of shoe costs 125 kina and socks which costs 10 kina, how much is the total cost?
● Distinguishing the situations for the multiplication and calculate the answer.

125 + 10 = 135　135 × 8 = 1080

Answer 1080 kina

78 = □×□

Lesson Flow

1 ① Calculate in vertical form.

T Have students to complete exercise 1 using vertical form. Try to time them in the first half of the lesson.

① to ⑥:(2-digit)×(1-digit)

① : without carrying

② to ⑥:with carrying

⑦ to ⑫:(3-digit)×(1-digit)

⑦: without carrying

⑧ to ⑫:with carrying

2 ② Fill in the blank.

T Have students remember that multiplication is addition of product of each digit.

3 Let's calculate the word problem ③ and ④.

S Have students to complete Exercise 3 and 4.

S They may use any method of multiplication that they have learned to complete the exercise.

4 Complete the problems ① - ④.

① 3 adults and 3 children went to Mailu from Alotau by boat. The fare costs 60 kina for a child and 120 kina for an adult. What was the total cost?

● Distinguishing the situations for the multiplication and calculating the answer.

3×60=180 3×120=360 180 + 360=540 A. 540 kina

② There is a set of number cards from 0 to 9, one card for each number. Using these cards, make calculation problems for a (2-digit number)×(1-digit number).

×

① Find a calculation with the largest answer. 87×9=783

② Find a calculation with the largest answer with 2-digits numbers. Also, explain why that is the largest answer.

● Making calculation problems with estimation. 98×1=98, 49 × 2=98

③ There is a 3-digit number. If you multiply 3 to that number, the answer is shown below. In the same letter, the same number fits in. Think about a 3-digit number A B C.

```
  A B C
×     3
-------
4 C A
```

A=1
B=5
C=7

Explain how you found the 3-digit number in order.

● Thinking about the vertical form.

□ − □ = 79

Multiplication in Vertical Form	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 54 × 8

```
  54
×  8
-----
 432
```

② 649 × 5

```
 649
×  5
-----
3245
```

③ 580 × 6

```
 580
×  6
-----
3480
```

④ 300 × 3

```
 300
×  3
-----
 900
```

⑤ 109 × 4

```
 109
×  4
-----
 436
```

2. Fill in the blanks.

For calculating 372×4, we split it into 2 × 4, 70 × 4 and 300 × 4 and then we add the answers for the total.

3. You bought 6 fish. Each fish costs 16 kina. How much is the total cost?

Mathematical sentence: 16 × 6=96

Answer: 96 kina

4. There are 234 students in the school. 6 pencils are to be given to each student. How many pencils are needed in total?

Mathematical sentence: 234 × 6=1404

Answer: 1404 pencils

End of Chapter Test: Chapter 7 **Date:**

Multiplication in Vertical Form	Name:	Score

(Each question is worth 10 points)

1. Calculate.

① 54 × 8

② 649 × 5

③ 580 × 6

④ 300 × 3

⑤ 109 × 4 =

2. Fill in the blanks.

For calculating 372×4, we split it into 2 × _____, 70 × _____ and 300 ×_____, and then we add the answers for the total.

3. You bought 6 fish. Each fish costs 16 kina. How much is the total cost?

Mathematical sentence: _____

Answer: _____

4. There are 234 students in the school. 6 pencils are to be given to each student. How many pencils are needed in total?

Mathematical sentence: _____

Answer: _____

Chapter 8 Division

1. Unit Objectives

- To know when division is used. (3.1.5.a)
- To recognise relationship between division and multiplication or subtraction. (3.1.5.c)
- To calculate division of 1 digit of divisor and quotient. (3.1.5.a)
- To read a situation and make operation of division. (3.1.5.a)
- To understand the meaning and how to divide by 1 and 0. (3.1.5 b)

2. Teaching Overview

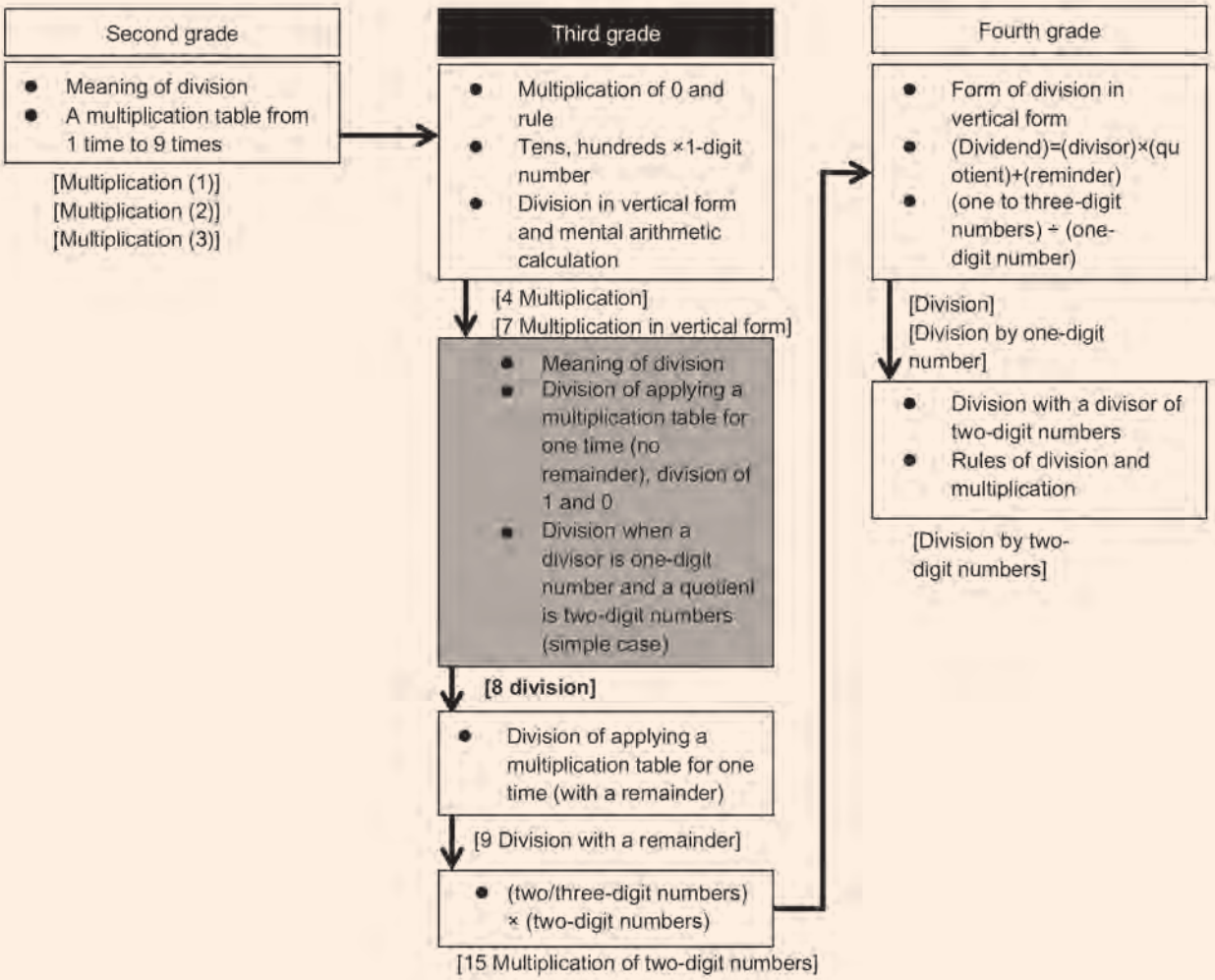
In this chapter, students learn division in relation to sharing. Note that division is based on equal sharing.

Division : 2 different types of division: One is called partitive division based on situations to make each share equal. Partitive divisions are to find quantity for each share. Another one is called quotative division based on situations of equal distributions. Quotative divisions are to find how many shares are made by equal distributions. Students should become friendly to both situations by relating to multiplication.

Division with 1 and 0 : It is important for students to understand division with 0 and 1. Teacher should not just impart the results but make students understand the reasons with concrete examples.

Finding Patterns in Divisions : Students are to find patterns by comparing multiplications and divisions with the same multipliers and divisors. The way of thinking here will help students understand vertical divisions.

3. Related Learning Contents



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 1 of 6 (Double Period)

Textbook Page : p.80~p.83
Actual Lesson 055

Sub-unit Objectives

- To understand the situation of partitive and quotative division, and how to make operations to find the answer.

Lesson Objectives

- To recognise the difference of the meaning 'dividing' and 'dividing equally' and to find the number for each person through manipulation.

Prior Knowledge

- Meaning of multiplication (Unit 2).
- Memorisation of Multiplication table (Elementary).

Preparation

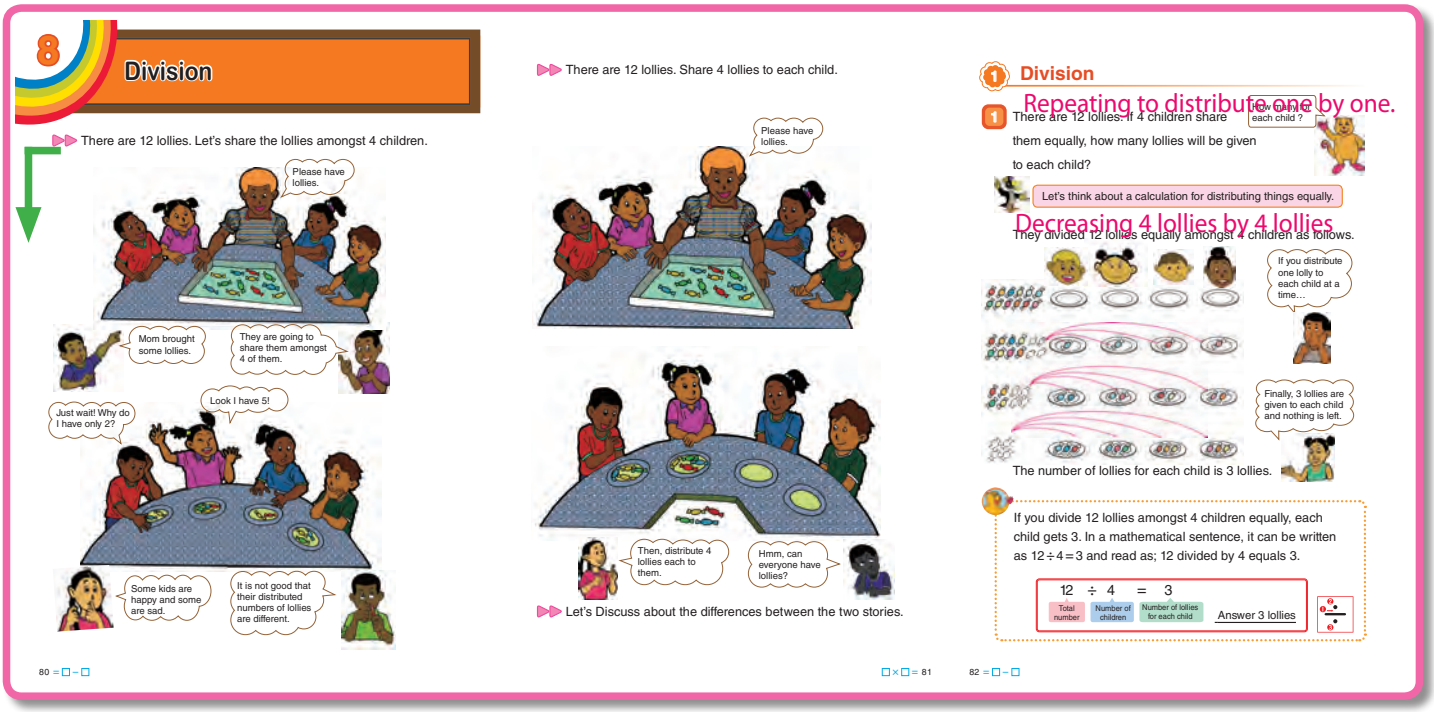
- Paper blocks or other items that can be used as replacement for lollies. eg stones, lids, seeds, etc.

Assessment

- Enjoy and recognise the situation of dividing lollies. F
- Make mathematical expressions of the situation of division and to find the answer. S

• Teacher's Notes •

This is the first lesson of division that the students will have. The first part of the lesson is to get students to practically share items so they can experience the feeling of dividing equally. The second part of the lesson is for the students to share the items one by one so that they can observe the increase in each person's share and the decrease in the total number of items before distribution.



Lesson Flow

1 Look at the pictures and find the difference of how to divide 12 lollies.

S Discuss the difference between 'dividing' and 'dividing equally' by observing the pictures.

TN Let the students notice that :

- When we do not divide equally, not all will get an equal share.
- Important to divide equally and obtain an equal amount.

2 1 Understanding the situation.

T Explain the situation of sharing 12 lollies for 4 children. And tell students to think about a calculation for distributing things equally.

3 Manipulate blocks and find the number of Lollies for each child.

TN Let the students:

- Predict how many lollies each child will get before using blocks.
- Notice the importance of 'dividing equally'

S Divide the blocks to each plate in their own way.

4 Understanding how to divide one by one.

TN Advise students that if you divide one by one, you decrease 4 blocks from the total and increase 1 block to each child each time, you divide.

T Introduce the main task.

T If you divide one by one, how many lollies decrease at one time?

S "4 at one time"

T How many lollies increase in each person's plate each time?

S "1 lolly increases each time on a plate".

5 Think about the operations.

S Make various operations of what they did and discuss the reasons for the operations.

6 Understand the sign '÷' and the meaning of '12÷4=3'.

TN Let the students understand the meaning of each number 12, 4 and 3.

T What is '12' ?

S The total number of lollies.

T What is '4'?

S The number of children.

T What is '3'?

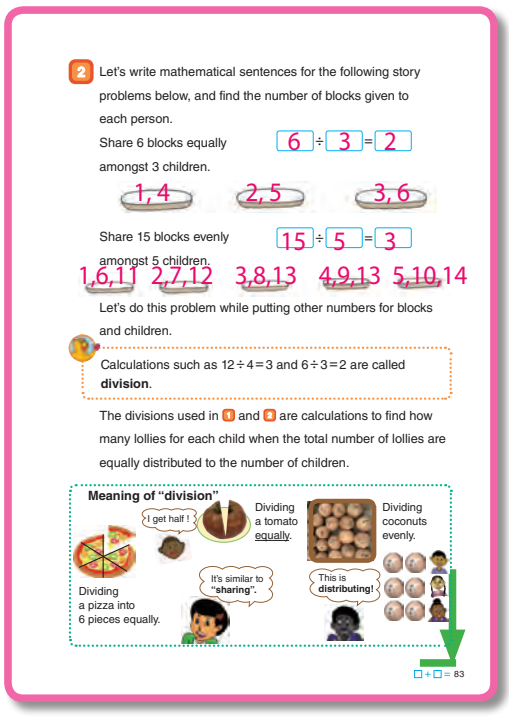
S The number of lollies for each child after dividing equally to 4 children.

T Summarise Kapuls explanation. Teach how to write the sign of division ÷.

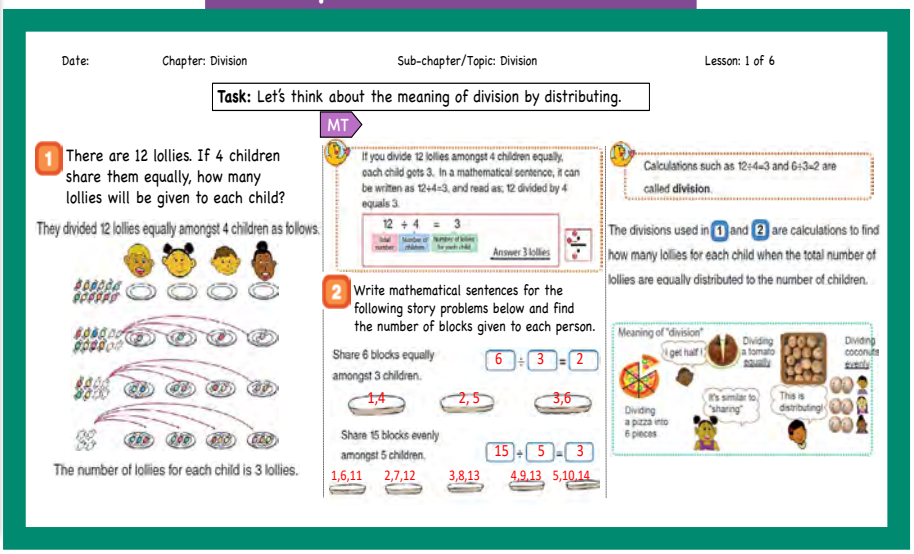
7 2 Manipulate blocks, write a mathematical expression and find the answer.

S Manipulate the blocks one by one and write mathematical expressions.

S Read the summary and know the meaning of the term 'division'



Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 2 of 6 (Single Period)

Textbook Page : p.84-p.85
Actual Lesson 056

Lesson Objectives

- To find the answer of partitive division using multiplication.

Prior Knowledge

- Meaning of division (Previous lesson).

Preparation

- Blocks and cups

Assessment

- Find the answers of partitive division using multiplication. F S

• Teacher's Notes •

Partitive division

If the number of groups is known, and you are trying to find the number in each group, then the problem is called partitive division problem. In partitive division, we know the number of groups. We do not know how many items each group can get.

Unit of Decilitre

Decilitre as a unit of measurement of volume.
10 dL = 1 litre.
1dL = 0.1 litre, $\frac{1}{10}$ litre

How to find the answer of partitive division

3 Divide 15 blocks equally amongst 3 children.

How many blocks does each one receive?

If each child gets 2, 2×3 is 6, so everyone can get more!

Connection between multiplication table of 3 and dividing blocks.

3 blocks for each child	3 × □ = 9	Number of children	Blocks per child	Blocks in total
4 blocks for each child	3 × □ = 12			
5 blocks for each child	3 × □ = 15			

The answer to 15 ÷ 3 is in the box in 3 × □ = 15.
The answer is found by using the the multiplication table of 3.

15 ÷ 3 = 5
Three threes are 9.
Four threes are 12.
Five threes are 15.

How to make a math sentence of partitive division with quantity.

4 Divide 10 dL of juice equally amongst 5 children.

How many dL of juice does each child receive?

10 ÷ 5 = 2

Answer: 2 dL

Which column of the multiplication table should we use?

Exercise

1 Divide a 18 m skipping rope equally amongst 6 children.

How many metre (m) does each child receive?

18 m
unit for one child

18 ÷ 6 = 3 Answer : 3 m

2 Which column or row of the multiplication table should you use to do these division problems? Mention the column or row and find the answer.

① 8 ÷ 2 4 Row 2 ② 21 ÷ 7 3 Row of 7 ③ 72 ÷ 9 8 Row of 9 ④ 28 ÷ 4 7 Row of 4
⑤ 20 ÷ 5 4 Row 5 ⑥ 56 ÷ 8 7 Row of 8 ⑦ 21 ÷ 3 7 Row of 3 ⑧ 54 ÷ 6 9 Row of 6

5 Make a problem of equal sharing that is solved by division and by looking at the picture.

① 8 Chocolates

The problem developed by Asa

□ chocolates are divided equally among □ children. How many chocolates are given to each child?

②

6 Let's divide.

① 14 ÷ 2	② 4 ÷ 2	③ 27 ÷ 9	④ 40 ÷ 5	⑤ 32 ÷ 8
⑥ 12 ÷ 2	⑦ 18 ÷ 3	⑧ 45 ÷ 9	⑨ 42 ÷ 7	⑩ 16 ÷ 8
⑪ 24 ÷ 4	⑫ 25 ÷ 5	⑬ 12 ÷ 6	⑭ 49 ÷ 7	⑮ 24 ÷ 3

84 = □ − □

□ + □ = 85

Lesson Flow

1 Review the previous lesson which is how to divide equally.

TN As a review of the previous lesson, let the students practice dividing 6 blocks equally amongst 3 people.

S Should confirm that the mathematical expression will be 6÷3, and divide blocks equally amongst 3 people to find the answer.

2 3 Understand that the objective is finding the answer without manipulating blocks.

TN Let the students think about how they can find the answer without the use of blocks.

S Try to find answers using their own ways.
- using multiplication, drawing pictures, counting and so on.

T Introduce the main task.

3 Present their methods and make connections.

T Ask students to connect the method of drawing diagram or counting to the method of using multiplication.

S Realise that they will use multiplication table of 3 because the question is to divide equally amongst 3 people.

4 Think about the relationship of dividing one by one and using multiplication.

TN From the picture of dividing one by one, the situation is expressed in an operation of multiplication '□×3'. Dividing block finishes at '5×3=15'.

5 Understand the relationship '15÷3=□ and '□×3=15' and how to find the answer.

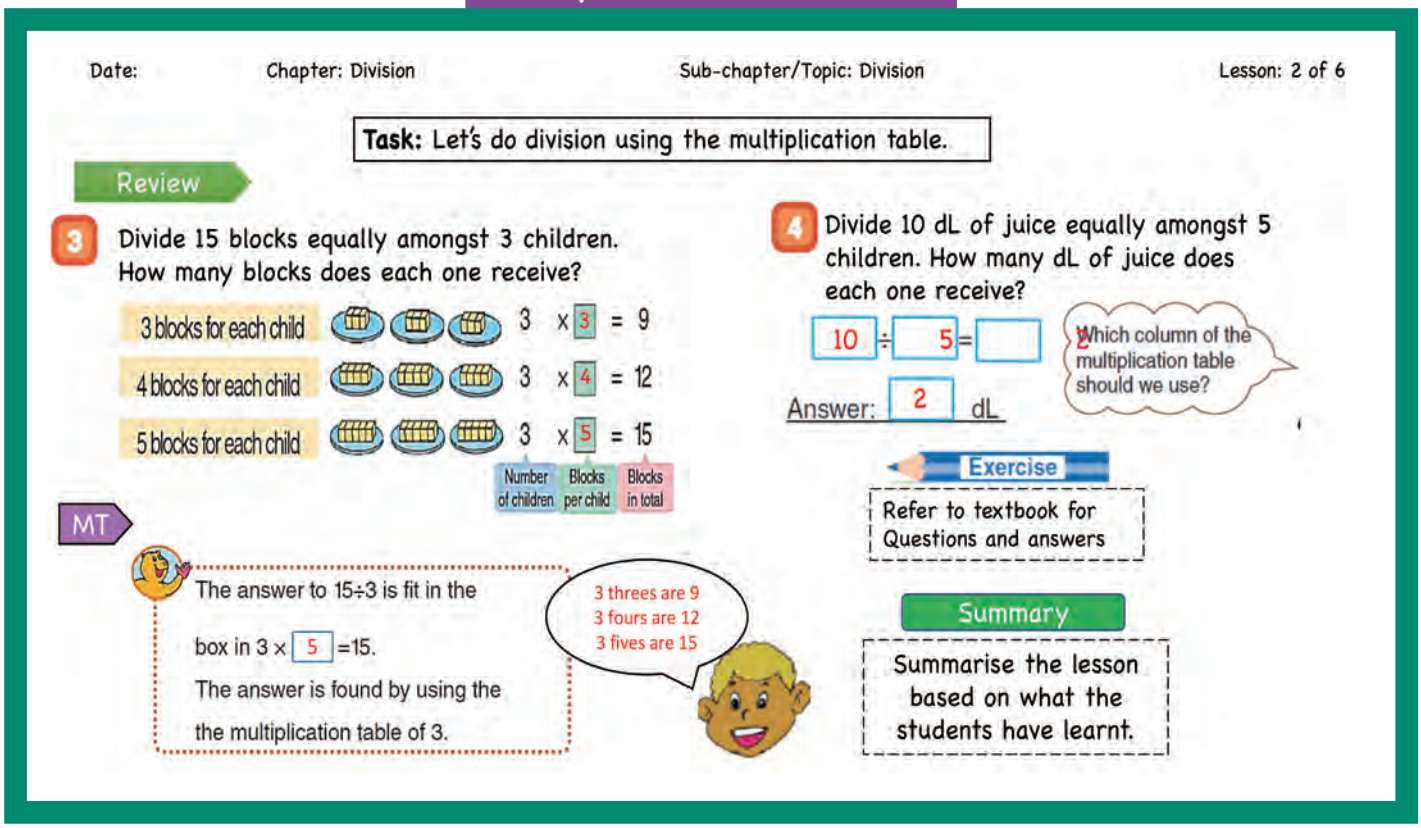
T Let the students remember '□×3=3×□, and recognise that the answer can be found using table of 3 which is the divisor of the operation in division.

6 4 Recognise how to use division with continuous quantity.

TN For the students who have difficulty of understanding how to divide 10 dL, show 10 of 1dL and divide them into 5 cups.

7 Complete the exercise 1 and 2.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 3 of 6 (Single Period)

Textbook Page : p.85
Actual Lesson 057

Lesson Objectives

- To make word problems of partitive division when sharing equally.

Prior Knowledge

- Meaning of division
- Finding answers of partitive division using multiplication (Previous lesson).

Preparation

- Blocks and cups

Assessment

- Enjoy making word problems by thinking about the situation. F
- Solve the exercises of division. F
- Do the exercises correctly. S

• Teacher's Notes •

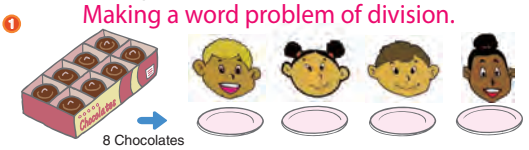
The calculation is to find how many items each child will receive when the number of items is equally distributed to the number of children.

2 Which column or row of the multiplication table should you use to do these division problems? Mention the column or row and find the answer.

① 8÷2 ② 21÷7 ③ 72÷9 ④ 28÷4
⑤ 20÷5 ⑥ 56÷8 ⑦ 21÷3 ⑧ 54÷6

5 Make a problem of equal sharing that is solved by division and by looking at the picture.

① Making a word problem of division.



8 Chocolates

The problem developed by Asa

8 chocolates are divided equally among 4 children. How many chocolates are given to each child?

8 ÷ 4 = 2 Answer : 2 chocolates

② 18 dL of juce is shared equally into 9 cups. How much dL is in one cup?

18 ÷ 9 = 2 Answer: 2 dL

6 Let's divide.

① 14÷2 7 ② 4÷2 2 ③ 27÷9 3 ④ 40÷5 8 ⑤ 32÷8 4
⑥ 12÷2 6 ⑦ 18÷3 6 ⑧ 45÷9 5 ⑨ 42÷7 6 ⑩ 16÷8 2
⑪ 24÷4 6 ⑫ 25÷5 5 ⑬ 12÷6 2 ⑭ 49÷7 7 ⑮ 24÷3 8

□+□=85

Lesson Flow

1 Review the previous lesson.

T Introduce the main task.

2 5 1 Make word problems of partitive division.

TN Ask the students 'What and how many are dividing?' 'To how many people?' and 'What do we want to know?' so that students find it easier to make a problem.

S Make a problem each and share with friends.

S Find the answer using multiplication.

3 2 Make word problem using diagram representation.

T Confirm the key words: '18 dL juice' , '9 cups' and 'divide the same amount'.

S Make a word problem using key words and share with friends.

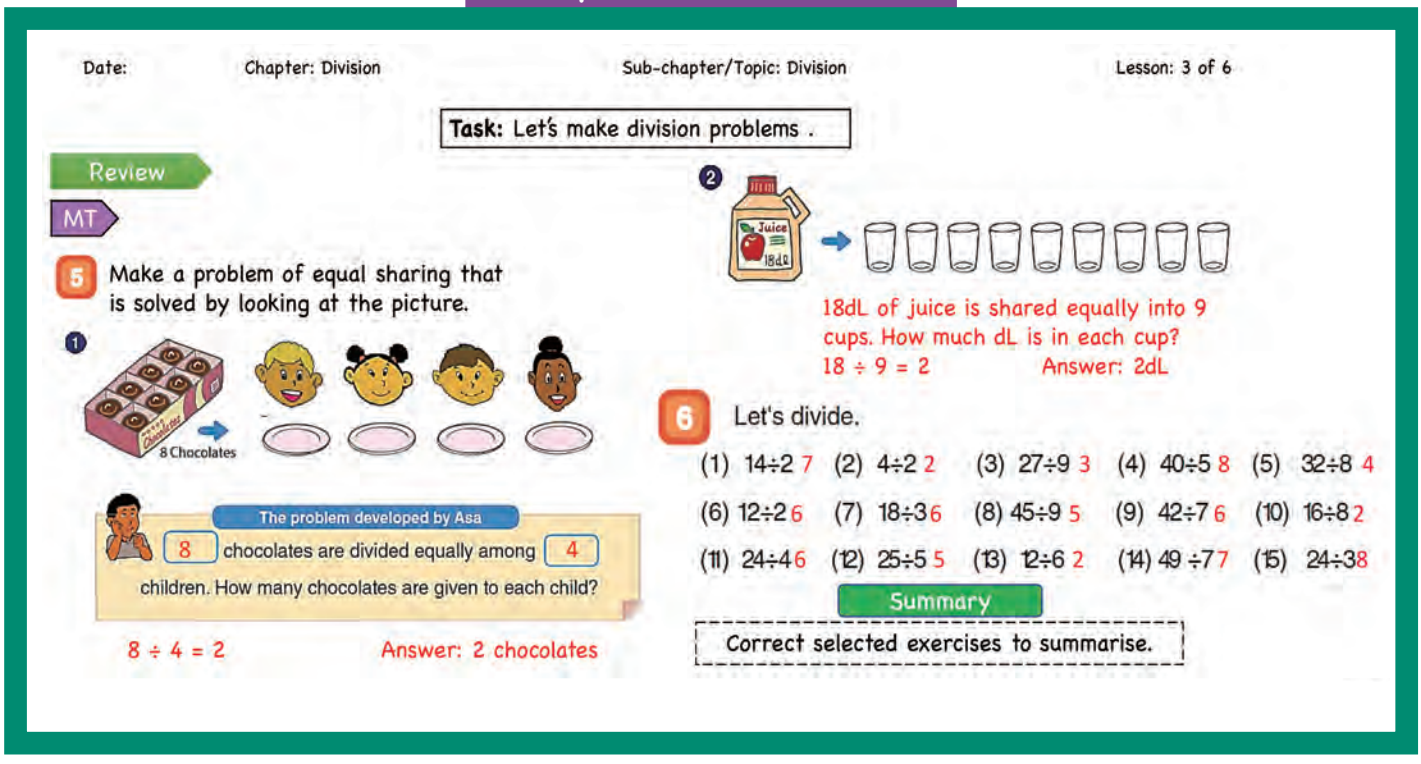
S Find the answer using division.

4 6 Solve the problems.

T Use multiplication to solve problems

TN Assist the students individually who still do not understand how to calculate.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 4 of 6 (Double Period)

Textbook Page : p.86
Actual Lesson 058

Lesson Objectives

- To solve problems of quotative division.
- To compare and understand partitive and quotative division.
- To recognise the situation which is applied to quotative division and express the situation by mathematical expression.

Prior Knowledge

- Meaning of division.
- Finding answers of partitive division using multiplication.

Preparation

- Blocks and cups or other materials such as stones, marbles etc.

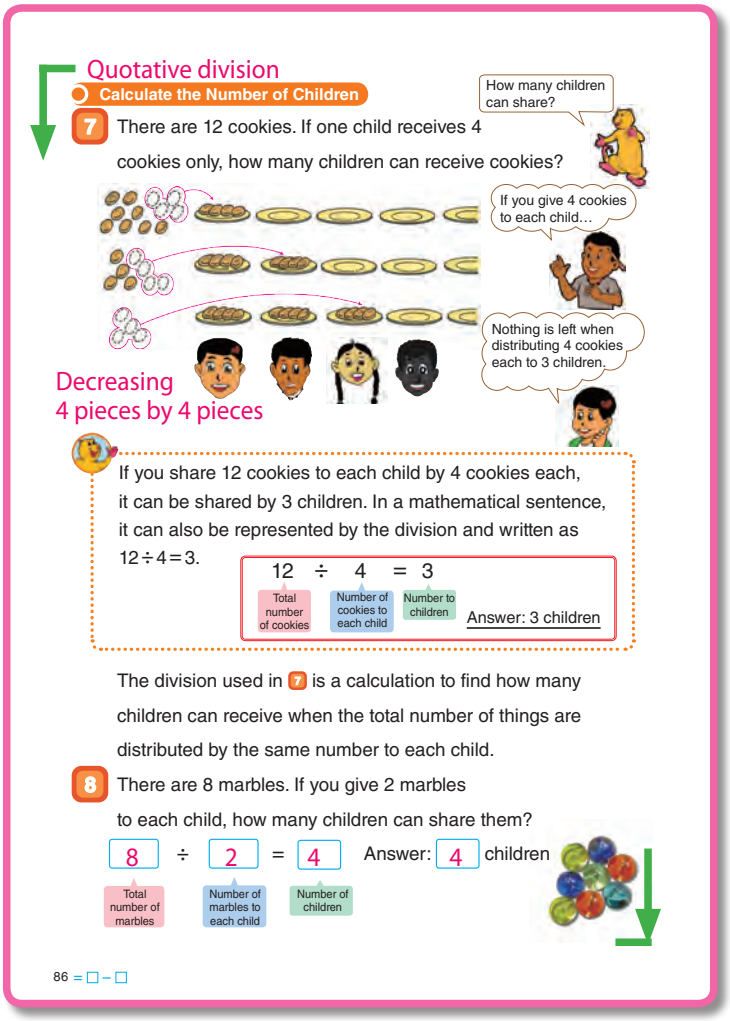
Assessment

- Enjoy solving word problems by thinking about the situation. F
- Identify the difference between partitive and quotative division. F
- Complete task 8. S

• Teacher's Notes •

Quotative division

If the number in each group is known, and you are trying to find the number of groups, then the problem is called quotative division problem. In quotative division, we know the number of items each group can get. We do not know to how many groups we can distribute the items.



Quotative division

Calculate the Number of Children

7 There are 12 cookies. If one child receives 4 cookies only, how many children can receive cookies?

How many children can share?

If you give 4 cookies to each child…

Nothing is left when distributing 4 cookies each to 3 children.

Decreasing 4 pieces by 4 pieces

If you share 12 cookies to each child by 4 cookies each, it can be shared by 3 children. In a mathematical sentence, it can also be represented by the division and written as 12 ÷ 4 = 3.

12 ÷ 4 = 3

Total number of cookies / Number of cookies to each child / Number to children

Answer: 3 children

The division used in 7 is a calculation to find how many children can receive when the total number of things are distributed by the same number to each child.

8 There are 8 marbles. If you give 2 marbles to each child, how many children can share them?

8 ÷ 2 = 4 Answer: 4 children

Total number of marbles / Number of marbles to each child / Number of children

86 = □ − □

Lesson Flow

1 Review the previous lesson.

2 7 Read the problem and find the difference of division learned previously.

T What are the similarilties and differences compared to the previous problem in task 1.

S Same: There were 12 lollies and cookies.
Different: Dividing 4 each
How many children can receive?

T Introduce the main task.

3 Investigate the same and different points to partitive division by observing pictures or manipulating blocks.

S Same: After dividing 4 each, each child gets the same amount.
Answer is same, 3.
Different: Before, it was divided 1 by 1 but this time dividing 4 by 4.
Answer is 3 but the meaning is different.

4 Recognise that this method is also expressed by mathematical expression of division.

S Form a mathematical sentence considering '12 cookies, '4 cookies each' ' divided to 3 children'.

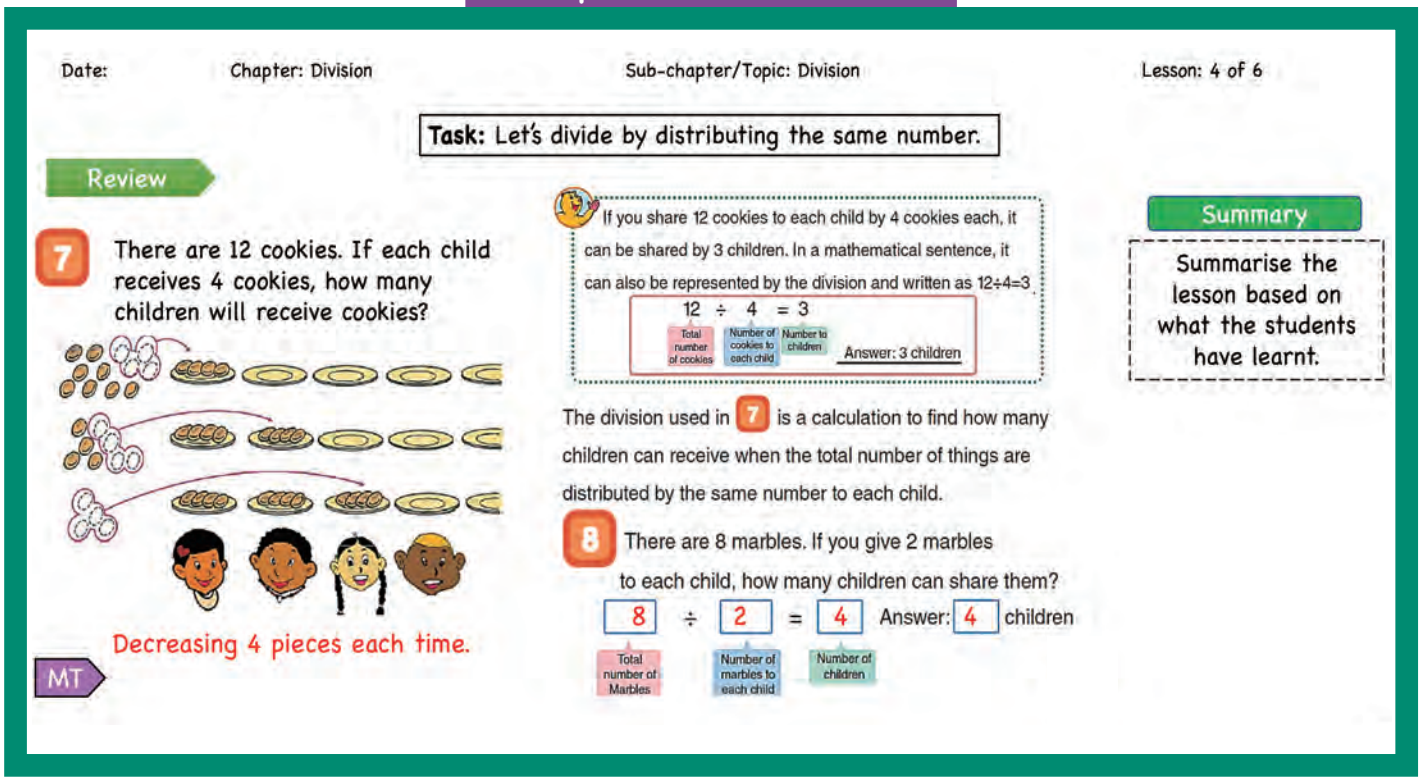
T Show; 'Total number' ÷ the number of each child get' = 'the number of children', and let the students notice the difference to the previous.

5 8 Consider which meaning of division is used.

S Read the problem, make mathematical expression and find the answer.

S Consider which meaning of division is used to solve the problem.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 5 of 6 (Double Period)

Textbook Page : p.87
Actual Lesson 059

Lesson Objectives

- To find the answers of quotative division using multiplication.

Prior Knowledge

- Meaning of division.
- Finding answers of quotative division.

Preparation

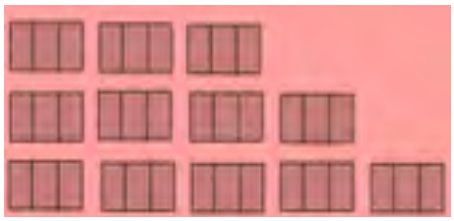
- Blocks and cups or other materials such as stones or marbles etc.

Assessment

- Think about 2 different types of division. F
- Enjoy making division story. F
- Do exercises correctly. S

• Teacher's Notes •

In this division problem help the students to visualise the division of sharing using the idea of removing the same amount. How many times can we remove the same amount till none remains?

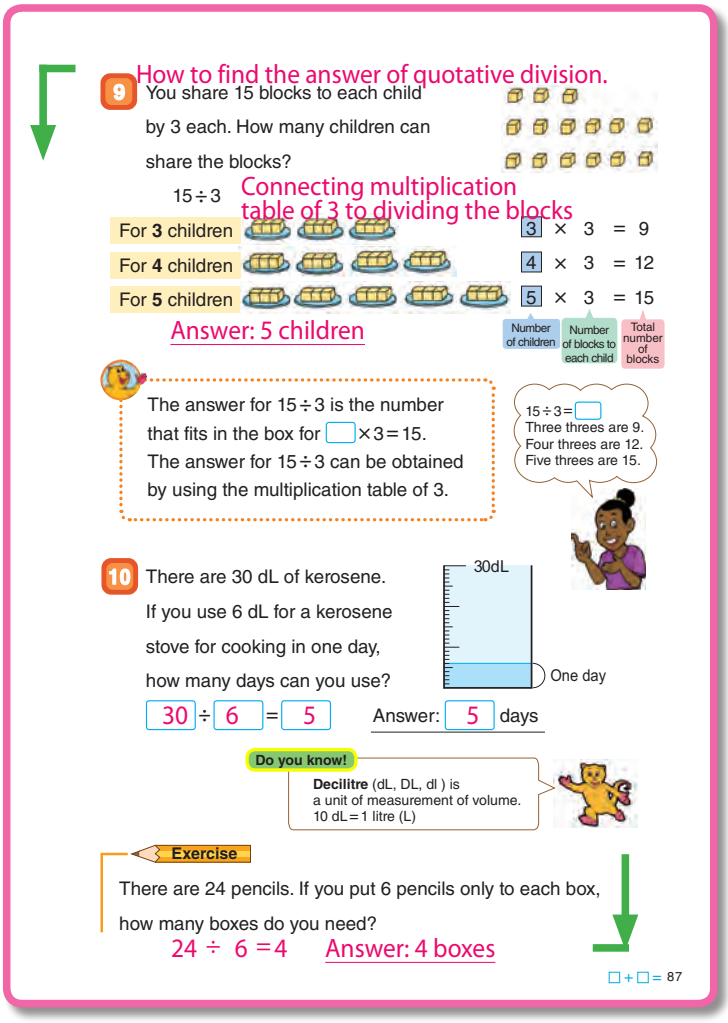


Using Multiplication

3×3=9

4×3=12

5×3=15



9 How to find the answer of quotative division.

You share 15 blocks to each child by 3 each. How many children can share the blocks?

15÷3

Connecting multiplication table of 3 to dividing the blocks

For 3 children 3 × 3 = 9

For 4 children 4 × 3 = 12

For 5 children 5 × 3 = 15

Number of children | Number of blocks to each child | Total number of blocks

Answer: 5 children

The answer for 15÷3 is the number that fits in the box for □×3=15.
The answer for 15÷3 can be obtained by using the multiplication table of 3.

15÷3=□
Three threes are 9.
Four threes are 12.
Five threes are 15.

10 There are 30 dL of kerosene. If you use 6 dL for a kerosene stove for cooking in one day, how many days can you use?

30dL

One day

30 ÷ 6 = 5 Answer: 5 days

Do you know!

Decilitre (dL, DL, dl) is a unit of measurement of volume.
10 dL = 1 litre (L)

Exercise

There are 24 pencils. If you put 6 pencils only to each box, how many boxes do you need?

24 ÷ 6 = 4 Answer: 4 boxes

□+□= 87

Lesson Flow

1 Review the previous lesson.

2 9 Connect division using multiplication.

S Read and understand the problem and write a mathematical expression.
S Use multiplication table to identify the answer.
T Summarise the important point in the box .
T Introduce the main task.

3 10 Solve problem.

S Read and understand the problem and write a mathematical expression.
S Use the multiplication table to identify the answer. □×6=30 and 6×□=30

4 Complete the exercise.

Sample Blackboard Plan

Date: Chapter: Division Sub-chapter/Topic: Division Lesson: 5 of 6

Task: Let's do division by multiplying.

Review

9 You share 15 blocks to each child by 3. How many children can share the blocks?

15 ÷ 3

For 3 children 3 x 3 = 9
For 4 children 4 x 3 = 12
For 5 children 5 x 3 = 15

Number of children | Number of blocks | Total number of blocks

Answer: 5 children

The answer for 15÷3 is the number that fits in the box for □×3=15. The answer for 15÷3 can be obtained by using the multiplication table of 3.

MT

10 There are 30 dL of kerosene. If you use 6 dL for a kerosine stove for cooking in one day, how many days can you use?

30 ÷ 6 = 5 Answer: 5 days

Do you know!! Decilitter (dL,DL, dl) is a unit of measurement of volume. 10dL = 1litter (L)

Exercise

Refer to textbook for Questions and answers.

Summary

Summarise the lesson based on what the students have learnt.

Unit 8

Unit: Division
Sub-unit: 1. Division
Lesson 6 of 6 (Double Period)

Textbook Page : p.88
Actual Lesson 060

Lesson Objectives

- To recognise the difference of partitive division and quotative division.
- To make partitive and quotative division problems from one mathematical expression.

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

- Refer to the blackboard plan.

Assessment

- Think about the 2 different types of division. F
- Enjoy making division story. F
- Do the exercises correctly. S

• Teacher's Notes •

Through this Lesson the students will identify the difference between the two divisions. It is not necessary for the students to know their names.

The main difference between the two divisions:

1. Sharing equal quantities to find out how many people can receive from the total quantity.

Example; sharing 12 lollies among 4 children, how many will each child receive?

Using Multiplication

$4 \times 3 = 12$

2. Sharing amongst a group to find out how many each member can receive.

Example; sharing 12 lollies by 3 to each child. How many children can receive the lollies?

Using Multiplication

$4 \times 3 = 12$

Making a story problem of partitive and quotative divisions

11 Look at the tomatoes on the right and make a story problem for **10 ÷ 5**.

Division to find the number of tomatoes in each plastic bag.
① Divide 10 tomatoes equally into 5 plastic bags.
How many ☐ are in each ☐ ?
tomatoes plastic bag
10 ÷ 5 = 2

Division to find the number of plastic bags.
② There are 10 tomatoes.
5 tomatoes are distributed into each plastic bag. How many ☐ are needed?
plastic bags
10 ÷ 5 = 2

① is a calculation to find the number in the box for 5 × ☐ = 10.

② is a calculation to find the number in the box for ☐ × 5 = 10.

Both answers can be calculated by the multiplication of 5 and 2 giving 10.

The Answer to a division problem can be calculated by using the multiplication table of divisor (In this case, 5)

10 ÷ 5 = 2
Dividend Divisor Answer

12 Let's make a story problem for 32 ÷ 8.

Exercise

Let's calculate the following divisions. Which column or row of the multiplication table will you use to find the answer?

① 9 ÷ 3 = 3 row of 3
② 24 ÷ 8 = 3 row of 8
③ 10 ÷ 2 = 5 row of 2
④ 32 ÷ 4 = 8 row of 4
⑤ 35 ÷ 5 = 7 row of 5
⑥ 6 ÷ 2 = 3 row of 2
⑦ 36 ÷ 9 = 4 row of 9
⑧ 45 ÷ 5 = 9 row of 5
⑨ 14 ÷ 7 = 2 row of 7
⑩ 48 ÷ 6 = 8 row of 6
⑪ 20 ÷ 4 = 5 row of 4
⑫ 56 ÷ 7 = 8 row of 7
⑬ 48 ÷ 8 = 6 row of 8
⑭ 40 ÷ 8 = 5 row of 8
⑮ 81 ÷ 9 = 9 row of 9

88 = ☐ − ☐

Lesson Flow

1 Review the previous lesson.

2 11 Think about how to divide 10 tomatoes applying the expression '10÷5'.

T Introduce the main task.
T Let's make stories of '10÷5' using 10 tomatoes.
S Explore and come up with their own stories.
T What are they looking for in each story.
S Eg: Number of bags, friends, children or Number of tomatoes in each bag.
TN Let the students recognise making partitive and quotative of division from one expression.

3 Think about what kind of number and word should be in the boxes to make '10÷5'.

S Read two stories in the textbook and fill in the boxes.
T Explain the bubbles to the students : The two types of division with relation to the meaning of multiplicaiton.
(1) 5 bags times 2 tomatoes (5 set of 2),
(2) 2 bags times 5 tomatoes (2 sets of 5)
T Summarise the important point in the box .
T Let the students understand the term 'dividend' and 'divisor' and their meaning because they will be used from now on.

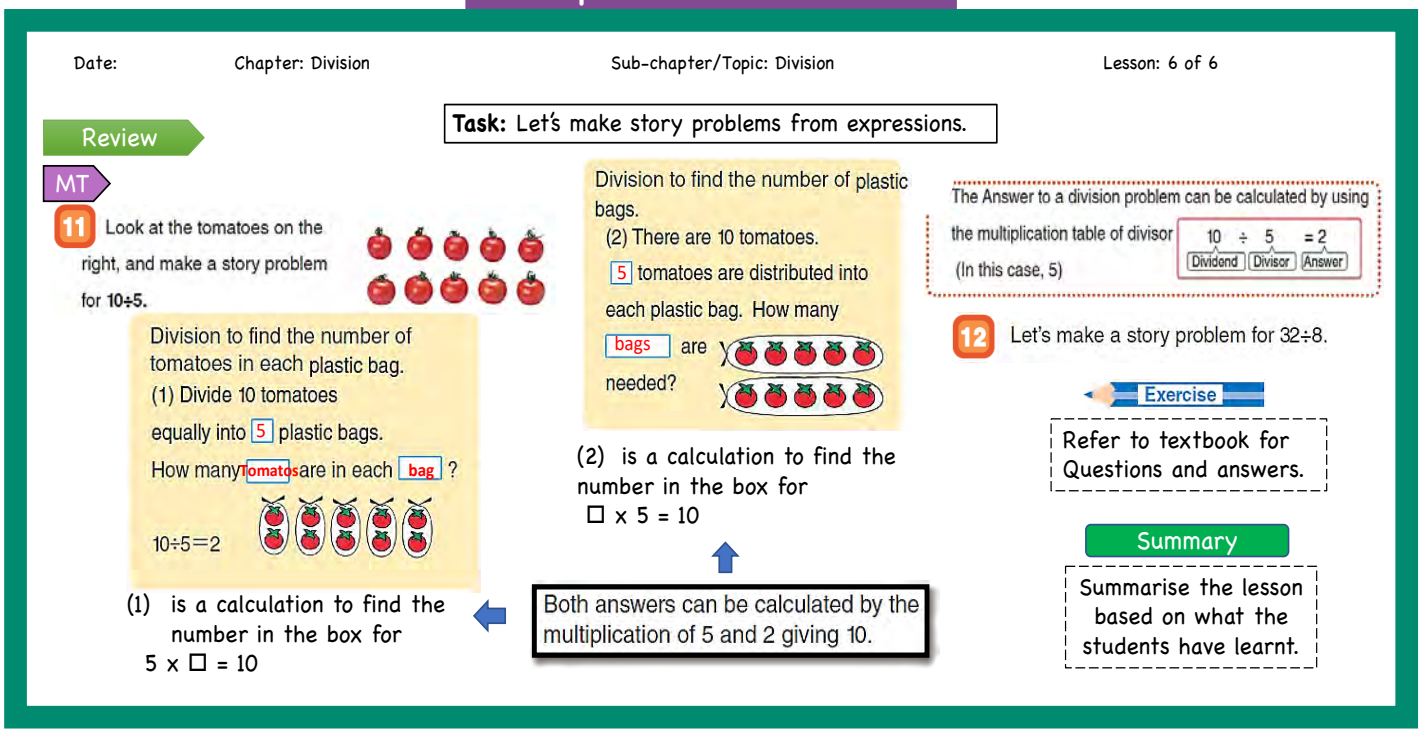
4 12 Make two types of story problems of '32÷8'.

S Make problems and share with friends to confirm if they are correct or not.

5 Complete the exercises.

T Complete from (1) to (5). The rest can be given as homework.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 2. Division with 1 and 0
Lesson 1 of 1 (Single Period)

Textbook Page : p.89
Actual Lesson 061

Sub-unit Objectives

- To understand the meaning and how to find the answer of the following 3 types.
  1. a ÷ a (Answer is 1)
  2. 0 ÷ a (Answer is 0)
  3. a ÷ 1 (Answer is a)

Lesson Objectives

- Same as Sub-Unit objectives

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

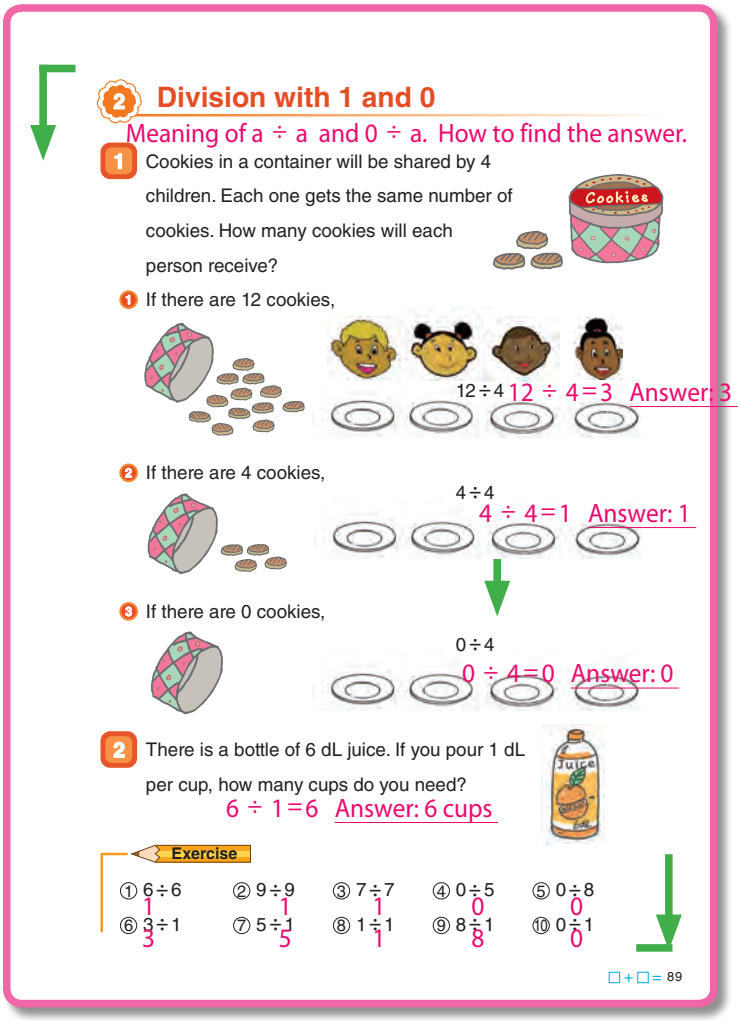
- 12 blocks and 4 cups or other materials such as stones or marbles etc.

Assessment

- Think of the meaning of a ÷ a, 0 ÷ a and a ÷ 1, and solve the problems. F
- Do the exercises correctly. S

• Teacher's Notes •

When learning these types of division, students should be able to imagine the situation to calculate. Therefore, it is important to ask students to draw pictures of the problem given in the introduction part. Students use pictures to help them to understand 3 types of division.



2 Division with 1 and 0

Meaning of a ÷ a and 0 ÷ a. How to find the answer.

1 Cookies in a container will be shared by 4 children. Each one gets the same number of cookies. How many cookies will each person receive?

1 If there are 12 cookies,

12÷4 12 ÷ 4 = 3 Answer: 3

2 If there are 4 cookies,

4÷4 4 ÷ 4 = 1 Answer: 1

3 If there are 0 cookies,

0÷4 0 ÷ 4 = 0 Answer: 0

2 There is a bottle of 6 dL juice. If you pour 1 dL per cup, how many cups do you need?

6 ÷ 1 = 6 Answer: 6 cups

Exercise

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

□ + □ = 89

Lesson Flow

1 **1 Think about the mathematical sentence and answer of problems that 12, 4 and 0 cookies are divided by 4 people.**

T Give the 3 cases of situations and facilitate.
(1) Share 12 to 4 children
(2) Share 4 to 4 children
(3) Share 0 to 4 children

S Make mathematical expression of case (1), (2) and (3) , and find the answer using multiplication table of 4.

S Discuss the finding from each case.

T Generalise two cases. (a÷a and 0÷a)
(2) If the dividend and divisor are the same, the answer is 1
(3) If the dividend is 0, the answer is 0.

T Introduce the main task.

2 **2 Solve the word problem.**

S Make mathematical expression and find the answer.

T Generalise the case. (a÷1) If the divisor is 1, the answer is the same as the dividend

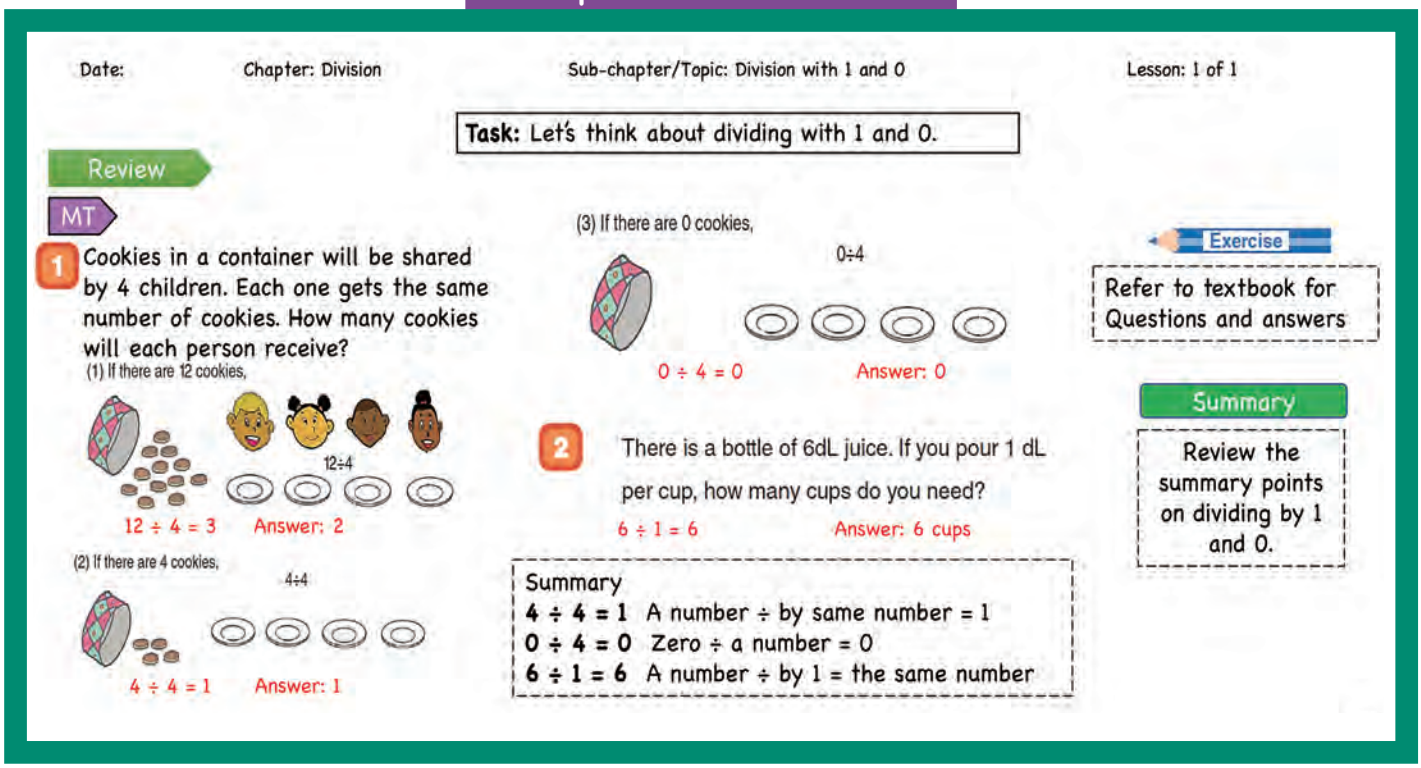
3 **Complete the exercises.**

S Complete (1) (4) (6) and the rest can be given as homework.

4 **Summarise the lesson.**

T/S Emphasise the 3 cases.

Sample Blackboard Plan



Unit 8

Unit: Division
Sub-unit: 3. Using Rules of Calculation
Lesson 1 of 1 (Double Period)

Textbook Page : p.90
Actual Lesson 062

Sub-unit Objectives

- To understand how to calculate division (divisor is 1-digit and answer is 2-digits).

Lesson Objectives

- Pay attention to patterns of numbers in divisions with fixed divisors.
- To find the relationship between multiplication and division.
- To find the relationship of the increase of dividends and answer.

Prior Knowledge

- Meaning of quotative and partitive division.
- How to calculate the mathematical expression of division.

Preparation

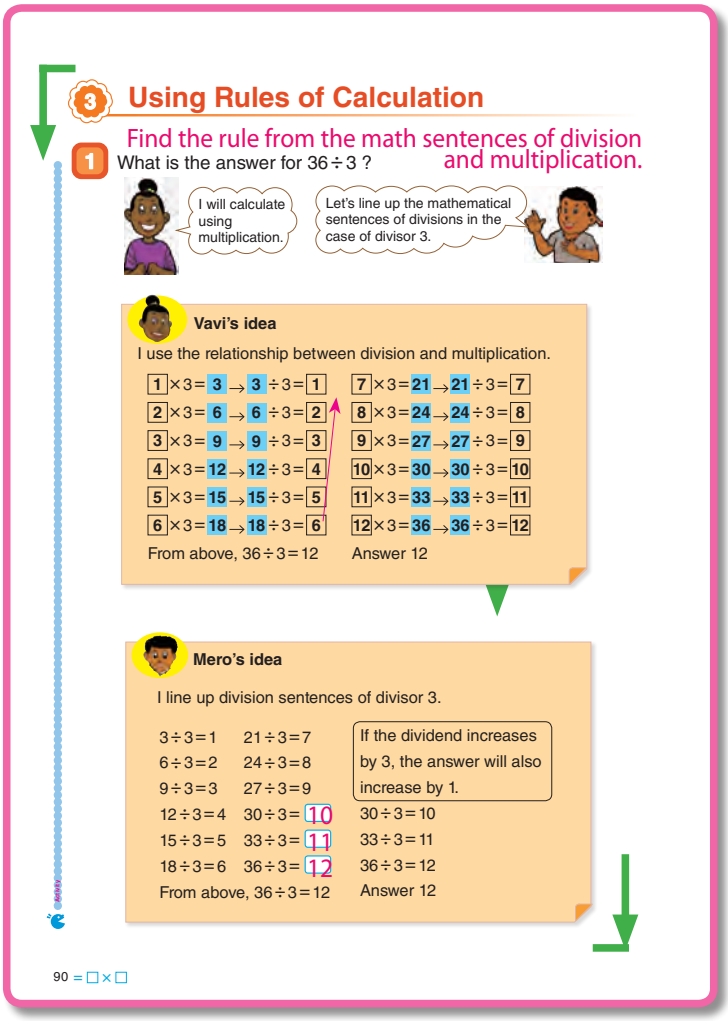
- Student: the same set of numbers for groups consisting of 12 cards of '□×3=□' and 12 cards of '□÷3=□'
- Teacher: 1 set of cards mentioned above, blue tac.

Assessment

- Find the rules between multiplication and division. F
- Find the rules of increase of dividends and quotients. F
- Solve exercise 24÷2 by using two ideas. S

• Teacher's Notes •

The lessons focus is on the relationship of division and multiplicaiton.
Vavi and Mero's ideas are based on table of 3.
Help students to see that they can use their multiplication to find their answer to division.



3 Using Rules of Calculation

1 Find the rule from the math sentences of division and multiplication.

What is the answer for 36÷3 ?

I will calculate using multiplication.

Let's line up the mathematical sentences of divisions in the case of divisor 3.

Vavi's idea

I use the relationship between division and multiplication.

1×3=3 → 3÷3=1	7×3=21 → 21÷3=7
2×3=6 → 6÷3=2	8×3=24 → 24÷3=8
3×3=9 → 9÷3=3	9×3=27 → 27÷3=9
4×3=12 → 12÷3=4	10×3=30 → 30÷3=10
5×3=15 → 15÷3=5	11×3=33 → 33÷3=11
6×3=18 → 18÷3=6	12×3=36 → 36÷3=12

From above, 36÷3=12 Answer 12

Mero's idea

I line up division sentences of divisor 3.

3÷3=1	21÷3=7	If the dividend increases by 3, the answer will also increase by 1.
6÷3=2	24÷3=8	
9÷3=3	27÷3=9	
12÷3=4	30÷3=10	30÷3=10
15÷3=5	33÷3=11	33÷3=11
18÷3=6	36÷3=12	36÷3=12

From above, 36÷3=12 Answer 12

90 =□×□

Lesson Flow

1 Think about how to calculate 36 ÷ 3.

T Which multiplication table should we use to solve 36 ÷ 3?
S Multiplication table of 3.
T Introduce the main task.

2 Think about Vavi's idea.

TN Try to find the answer using prior ideas before introducing divison in vertical form.
T/S (Showing a card one by one up to 4 × 3 written □ × 3 = □) Can you make a mathematical sentence by putting a number in each box?
S Complete 5 × 3 = 15 and more.
T (Showing a card one by one up to 12 ÷ 3 written □ ÷ 3 = □) What about this division?
S Complete 15 ÷ 3 = 5 and more.
TN All cards should be arranged in order from smallest to largest.
S The answer of the multiplication is the dividend of division so 36 ÷ 3 = 12.

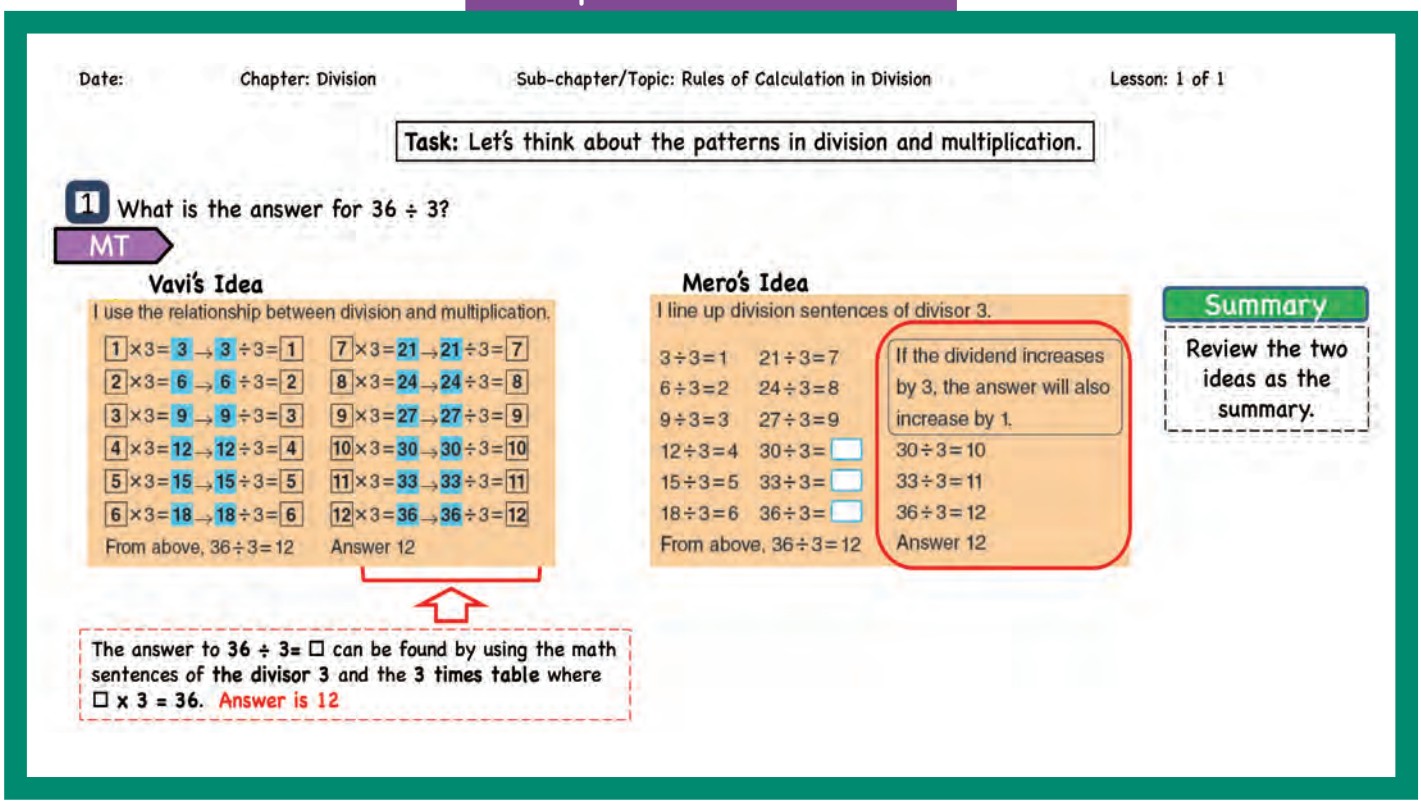
3 Think about Mero's idea.

T Look at Mero's idea in the textbook.
TN Focus on the division part of Mero's idea and relate it to Vavi's idea.
T Have you found any rules? Explain.
S The answer of divisions are increasing by one as the dividends increase by 3 so 36 ÷ 3 = 12.

4 Do the exercise 24 ÷ 2 by using two ideas.

S Apply Vavi or Mero's Idea 24 ÷ 2 = 12

Sample Blackboard Plan



Unit 8

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

Textbook Page : p.91-p.92
Actual Lesson 063

Lesson Objectives

- To deepen the understanding of things learned in this unit.

Prior Knowledge

- All the contents in this Unit.

Preparation

- Evaluation sheet for all students.

Assessment

- Solve the exercises correctly and confidently. F S
- Enjoy solving exercises confirming understanding of what they learned. F

• Teacher's Notes •

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

Exercise

1 Let's divide. Pages 84, 85, 88, 89

① 35÷7 = 5　② 72÷9 = 8　③ 18÷6 = 3　④ 28÷4 = 7
⑤ 12÷3 = 4　⑥ 21÷3 = 7　⑦ 20÷4 = 5　⑧ 30÷5 = 6
⑨ 64÷8 = 8　⑩ 36÷6 = 6　⑪ 8÷2 = 4　⑫ 16÷2 = 8
⑬ 81÷9 = 9　⑭ 63÷7 = 9　⑮ 42÷6 = 7　⑯ 4÷1 = 4
⑰ 8÷8 = 1　⑱ 0÷2 = 0　⑲ 69÷3 = 23　⑳ 84÷4 = 21

2 Let's find the number which applies to the □. Pages 84, 87

① 5×3=15　② 7×5=35
③ 3×8=24　④ 9×4=36
⑤ 7×6=42　⑥ 3×3=9
⑦ 8×4=32　⑧ 6×8=48

3 There are 28 cookies. Page 86

① If you distribute 4 cookies to each friend, how many can each friend receive?
28 ÷ 4 = 7　Answer: 7 friends

② If you distribute the same number of cookies to 4 friends, how many cookies can each friend receive?
28 ÷ 4 = 7　Answer: 7

Let's calculate. Grade 3 Do you remember?

① 24×6 = 144　② 72×7 = 504　③ 56×8 = 448　④ 62×5 = 310
⑤ 284×3 = 852　⑥ 643×7 = 4501　⑦ 206×9 = 1854　⑧ 999×9 = 8991

Problems

1 Distribute 36 sheets of coloured papers.
● Finding out how many to each person and how many persons.

① If you distribute the same number to 9 children, how many does one child get?
36 ÷ 9 = 4　Answer: 4 sheets

② If you distribute 9 papers to each child, how many children can receive?
36 ÷ 9 = 4　Answer: 4 children

2 Let's calculate the following divisions.
● Using the multiplication table to calculate division.

① 27÷3 = 9　② 30÷6 = 5　③ 18÷2 = 9　④ 56÷8 = 7　⑤ 36÷4 = 9
⑥ 20÷5 = 4　⑦ 21÷7 = 3　⑧ 63÷9 = 7　⑨ 15÷5 = 3　⑩ 42÷6 = 7
⑪ 16÷4 = 4　⑫ 49÷7 = 7　⑬ 28÷7 = 4　⑭ 54÷9 = 6　⑮ 72÷8 = 9
⑯ 7÷1 = 7　⑰ 3÷3 = 1　⑱ 0÷6 = 0　⑲ 2÷1 = 2　⑳ 5÷5 = 1

3 Let's make a story problem for 32÷4. Write a number or word which applies to the □.
● Making a story problem from expression.

①
Division to Find the Number for Each
There are 32 pencils distributed to 4 friends equally. How many pencils can 4 friends receive?

②
Division to Find the Number of Times
There are 32 pencils. 4 pencils are distributed to each friend. How many friends can receive?

□ + □ = 91　92 = □ − □

Lesson Flow

1 ① Calculate in vertical form.

TN (1) to (6) : (2-digits)×(1-digit)
(1) : without carrying
(2) to (6) :with carrying
(7) to (12) : (3-digits)×(1-digit)
(7): without carrying
(8) to (12) : with carrying

2 ② Fill in the blank.

T Have students remember that multiplication is addition of product of each digit.

3 ③ Solve the word problem.

S Use any method of multiplication to complete the exercise.

4 Do you remember?

TN (1) and (2) Commutative law of multiplication (3) and (4) When multiplicand increase 1, the product increase a number of multiplier.
(3) and (4) Associative law of multiplication

5 ① Solve the problems of partitive and quotative division.

T The math expression will be 36÷9 in both question. What is the difference of those two questions?

S How to divide the paper and the meaning of the answer. The first question is separating paper for 9 people but second question, finding the number of people when 9 papers are distributed.

6 ② Practice division.

T If there are students who have difficulty of multiplication in certain rows, let them practice those rows.

7 ③ Make two types of division and find the answers.

T Let the students understand the situation of each problem and the difference of what to divide and how to divide.

Division	Name:	Score

1. There are 20 apples. (Each question is worth 5 points)
① If you distribute the same number to 4 people, how many does each person get?
Mathematical sentence: 20 ÷ 4=5
Answer: 5 apples
② If you distribute 2 apples to each person, how many people can receive apples?
Mathematical sentence: 20 ÷ 2=10
Answer: 10 apples

2. Calculate the following divisions.
(Each question is worth 5 points)
① 9 ÷ 3 =3 ② 16 ÷ 8 =8 ③ 48 ÷ 6 =8 ④ 81 ÷ 9 =9
⑤ 6 ÷ 6 =1 ⑥ 5 ÷ 1 =5 ⑦ 0 ÷ 1 =0 ⑧ 60 ÷ 5 =12

3. My class has 30 children. We are divided into 6 groups with the same number of children. How many children are in each group?
Mathematical sentence: 30 ÷ 6=5
Answer: 5 apples

4. Make a mathematics story problem for 28÷7.
Tobby found 28 mud shells along the mangroves. He decide to cook 7 daily. How many days will it take for him to cook all the shells?

End of Chapter Test: Chapter 8 **Date:**

Division	Name:	Score

1. There are 20 apples. (Each question is worth 5 points)

   ① If you distribute the same number to 4 people, how many does each person get?

   Mathematical sentence: _____

   Answer: _____

   ② If you distribute 2 apples to each person, how many people can receive apples?

   Mathematical sentence: _____

   Answer: _____

2. Calculate the following divisions.

   (Each question is worth 5 points)

   1. $9 \div 3$ ② $16 \div 8$ ③ $48 \div 6$ ④ $81 \div 9$

   ⑤ $6 \div 6$ ⑥ $5 \div 1$ ⑦ $0 \div 1$ ⑧ $60 \div 5$

3. My class has 30 children. We are divided into 6 groups with the same number of children. How many children are in each group?

   Mathematical sentence: _____

   Answer: _____

4. Make a mathematics story problem for $28 \div 7$.

Chapter 9 Division with Remainders

1. Unit Objectives

- Understand a meaning of division with remainders and how to calculate it. (3.1.6 a)
- Understand a relation between a divisor and largeness of remainders.(3.1.6 c)
- Understand how to confirm division with remainders. (3.1.6 b)
- To solve various problems of division with remainder (3.1.6 c)

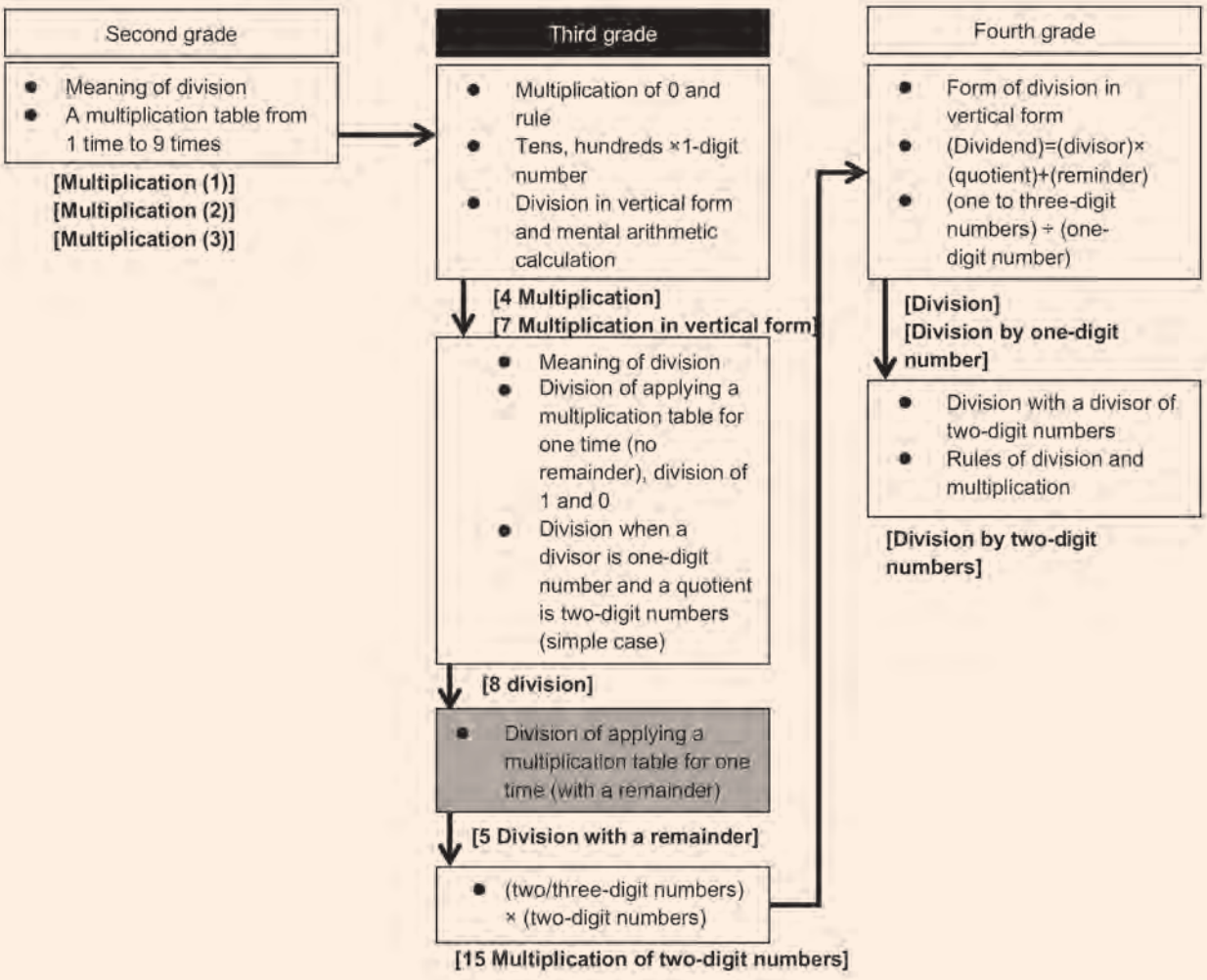
2. Teaching Overview

The difference between the last and this chapters is if there are remainders or not. Students are to think about the meaning of remainders and relationship between remainder and divisor.

Division with Remainders : In this topic, students think about indivisible situations. Students are to compare divisible and indivisible situations and think about the meaning of remainders and relationship between sizes of divisor and remainder. They should have a habit to check if their division is calculated correctly by multiplication and addition.

Let's solve various problems : In this topic, students are to get familiar with various situations and how to deal with remainders. Depending on what is asked, the answer will be changed (See Question 2). They also should be familiar with division situations by making maths stories.

3. Related Learning Contents



Unit 9

Unit: Division with Remainders
Sub-unit: 1. Division with Remainders
Lesson 1 of 2 (Double Period)

Textbook Page : p.93 - p.94
Actual Lesson 064

Sub-unit Objectives

- To understand the meaning of division with remainders and how to calculate it.
- To understand the relationship between a divisor and the largeness of remainders.
- To understand how to confirm division with remainders.

Lesson Objectives

- To know that an expression of division can also be made with remainders and find out an answer by using multiplication table.

Prior Knowledge

- Meaning of division.
- Division without remainder (2 or 3-digits) ÷ (1-digit).
- Using multiplication to calculate division.

Preparation

- Pictures of fruits and counters such as blocks or stones etc.

Assessment

- Enjoy investigating expression of division made with remainders and finding out an answer by using the multiplication table. F
- Do the exercises correctly. S

• Teacher's Notes •

Use semi-concrete materials or images of oranges and apples for students to understand the meaning of division with remainders.
Teacher should read and explain the key ideas to the students.
Remember the terms divisible, dividend, divisor, answer and remainder can be used. Quotient and its meaning will be discussed in Grade 4.

9 Division with Remainders

Division with no remainders

Division with remainders

There are 20 apples and 23 oranges.

Put 4 of each type of fruits into separate bags.

1 Division with Remainders

1 There are 23 oranges. If you put 4 oranges into each bag, how many bags can you use?

Meaning of division with remainders (Partitive division)

❶ Write an expression.

23 ÷ 4

23: Total number; 4: Number to each bag

This is a calculation distributing the same number to each unit, so we can use division.

Is there any number that fit □ in 4×□=23?

❷ Let's think about how to calculate.

Let's think about how to calculate divisions with remainders.

□+□=93

Sare's idea

I circled groups of 4 oranges.

Ambai's idea

I used the column of 4 in the multiplication table.
For 4 bags, 4×4=16, 7 oranges remainder.
For 5 bags, 5×4=20, 3 oranges remainder.
Total 23
For 6 bags, 6×4=24, 1 orange short.

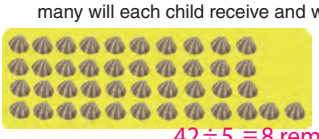
There are 5 bags and 3 remainders.

We will write this as follows: 23÷4=5 remainder 3

Answer: 5 bags and a remainder of 3 oranges

As in 23÷4, if we have a **remainder**, it is called "**not divisible**". In other words, the dividend 23 is not divisible by divisor 4. In 20÷4, if we have no remainder, it is called "**divisible**". In other words, the dividend 20 is divisible by divisor 4.

2 There are 42 shells distributed to 5 children equally. How many will each child receive and what will be the remainder?



Five nines is 45, it's too much, so how about five eights is 40?

42÷5 =8 remainder 2
Answer : 8 shells and remainder 2

Exercise

There are 34 cards. If they give 6 cards to each child, how many children can receive cards and what is the remainder?

34÷6 =5 remainder 4
Answer : 5 children, 4 cards remainder

94 =□+□

Lesson Flow

1 Think about the situation of 20 apples.

T "If you put 4 apples into each plastic bag, how many plastic bags do you have?"
S Make the expression and solve the problem because 20÷4 is prior knowledge.
T Confirm that it will actually be 5 plastic bags without remainders.

2 1 Think about the situation of 23 oranges.

T "If you put 23 oranges into each plastic bag, how many plastic bags do you use?"
S Make the expression and solve the problem.
T What is the answer of 23÷4?
S There is no answer of 23 in the multiplication table of 4.

3 Think about how to calculate division of 23÷4 with remainders.

S Arrange 23 oranges and divid into groups of 4 oranges using blocks.(Sare's idea)
S Identify that 5 bags and 3 oranges are left.
T Explain Ambai's idea using the multiplication table of 4.
4×4=16, 7 oranges left
5×4=20, 3 oranges left
6×4=24, 1 orange more than the actual number of oranges.
S Identify the meaning of 5 bags and 3 oranges to complete the mathematical sentence.
T Confirm that 23÷4 will be "5 remainder 3" and the answer of problem will be "5 bags and remainder of 3 oranges."
T Summarise important point in the box.
T Introduce the main task.

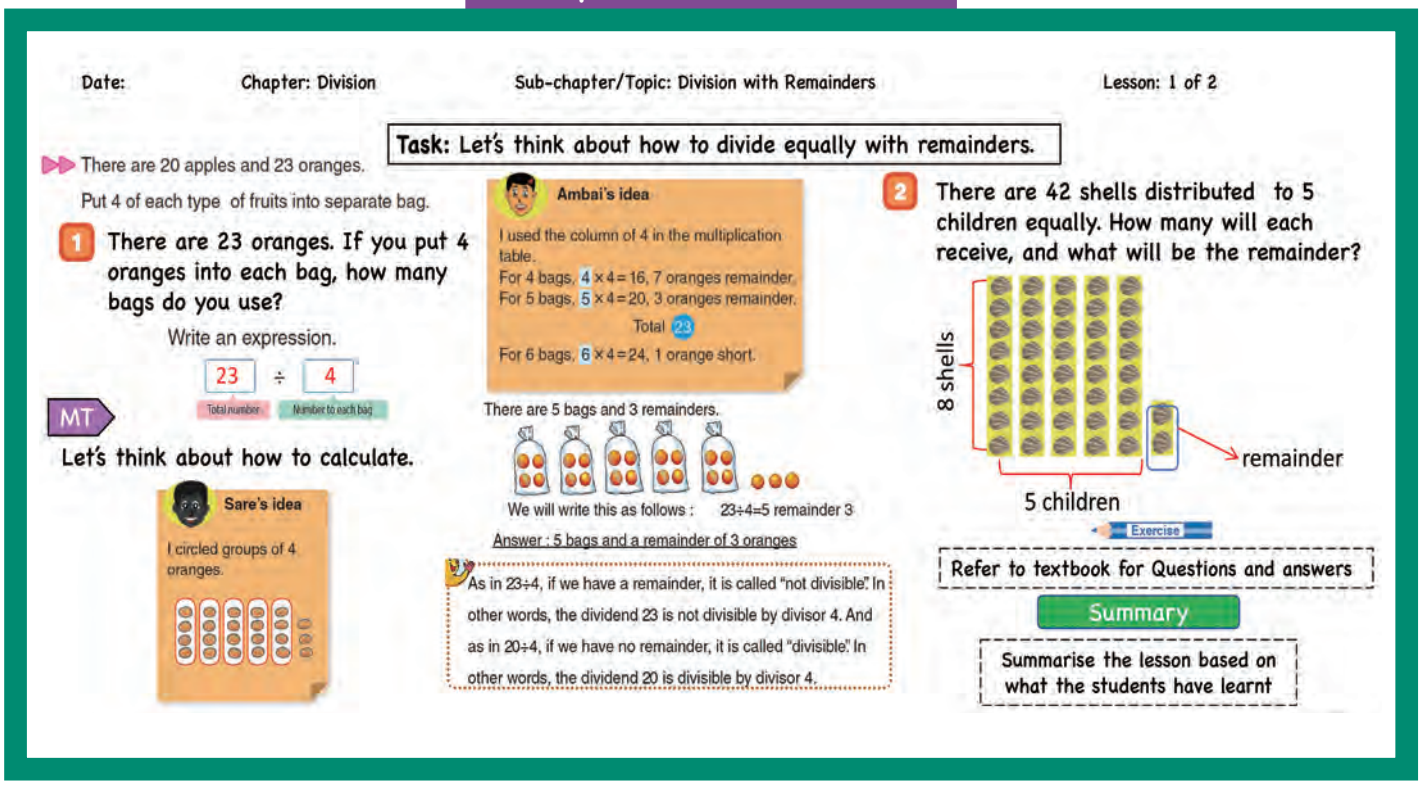
4 2 Solve the problem.

S Make mathematical expression 42÷5.
S Find the answer using multiplication table. (Ambai's idea)
T Confirm the answer 42÷5=8 remainder 2.

5 Solve the exercises.

S Solve the exercises using the multiplication table.

Sample Blackboard Plan



Unit 9

Unit: Division with Remainders
Sub-unit: 1. Division with Remainders
Lesson 2 of 2 (Single Period)

Textbook Page : p.95
Actual Lesson 065

Lesson Objectives

- To check divisors and remainders of division and know about the relationship between divisors and remainders.
- To understand how to check calculations of division.

Prior Knowledge

- Division with remainder (Previous lesson).

Preparation

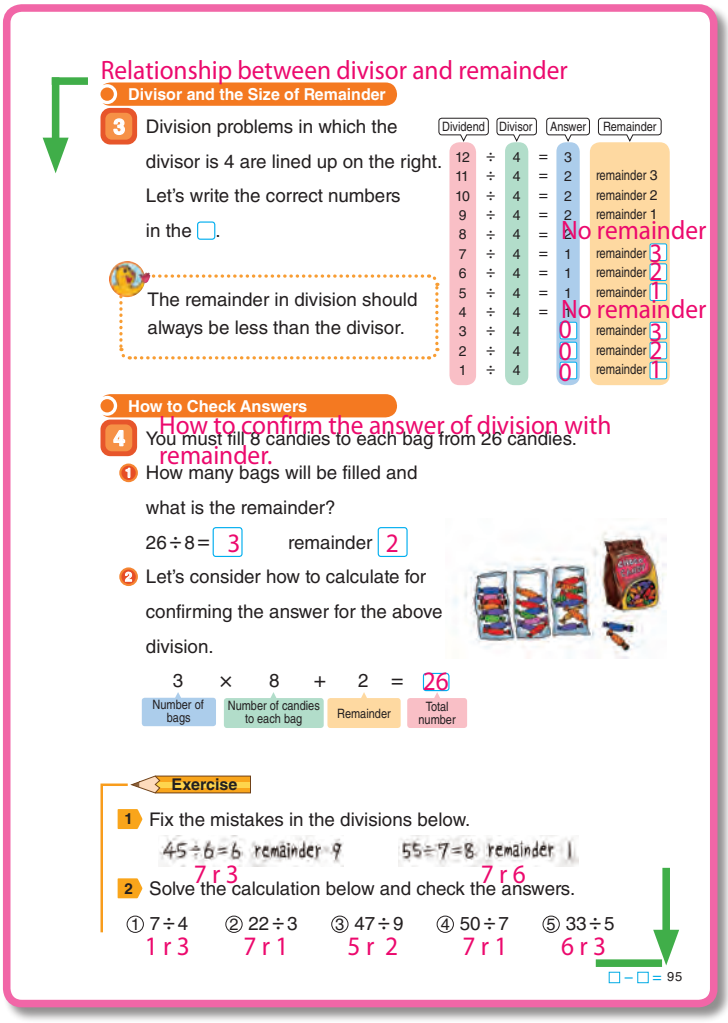
- Cards of division with a divisor of 4 (Dividend of 0 to15) for demonstration.

Assessment

- Investigate the relationships between divisors and remainders. F
- Understand how to confirm the answer of division with remainder. F
- Do the exercises correctly. S

• Teacher's Notes •

Encourage students to confirm answers using "How to Check Answers" for every divisional problems.



Relationship between divisor and remainder

Divisor and the Size of Remainder

3 Division problems in which the divisor is 4 are lined up on the right. Let's write the correct numbers in the □.

The remainder in division should always be less than the divisor.

Dividend		Divisor		Answer	Remainder
12	÷	4	=	3	
11	÷	4	=	2	remainder 3
10	÷	4	=	2	remainder 2
9	÷	4	=	2	remainder 1
8	÷	4	=	2	No remainder
7	÷	4	=	1	remainder 3
6	÷	4	=	1	remainder 2
5	÷	4	=	1	remainder 1
4	÷	4	=	1	No remainder
3	÷	4		0	remainder 3
2	÷	4		0	remainder 2
1	÷	4		0	remainder 1

How to Check Answers

4 How to confirm the answer of division with remainder.
You must fill 8 candies to each bag from 26 candies.

1 How many bags will be filled and what is the remainder?
26 ÷ 8 = 3 remainder 2

2 Let's consider how to calculate for confirming the answer for the above division.

3 × 8 + 2 = 26
Number of bags / Number of candies to each bag / Remainder / Total number

Exercise

1 Fix the mistakes in the divisions below.
45 ÷ 6 = 6 remainder 9 → 7 r 3
55 ÷ 7 = 8 remainder 1 → 7 r 6

2 Solve the calculation below and check the answers.
① 7 ÷ 4 → 1 r 3
② 22 ÷ 3 → 7 r 1
③ 47 ÷ 9 → 5 r 2
④ 50 ÷ 7 → 7 r 1
⑤ 33 ÷ 5 → 6 r 3

□ − □ = 95

Lesson Flow

1 (3) Think about the relationship between a divisor and the size of the remainder.

T Let's find out rules of division with a divisor of 4.
S Remainders will decrease as 3, 2, 1 and the next will be divisible with no remainder.
S Remainders repeat as 3, 2, 1, and 0.
S Remainders will not be larger than the divisor of 4.

2 Understand that 'remainder' is smaller than the 'divisor'.

S Discuss their findings.
T Summarise the important point in the box.
T Introduce the main task.

3 (4) Solve the task.

S (1) Read the problem and make complete mathematical sentence.

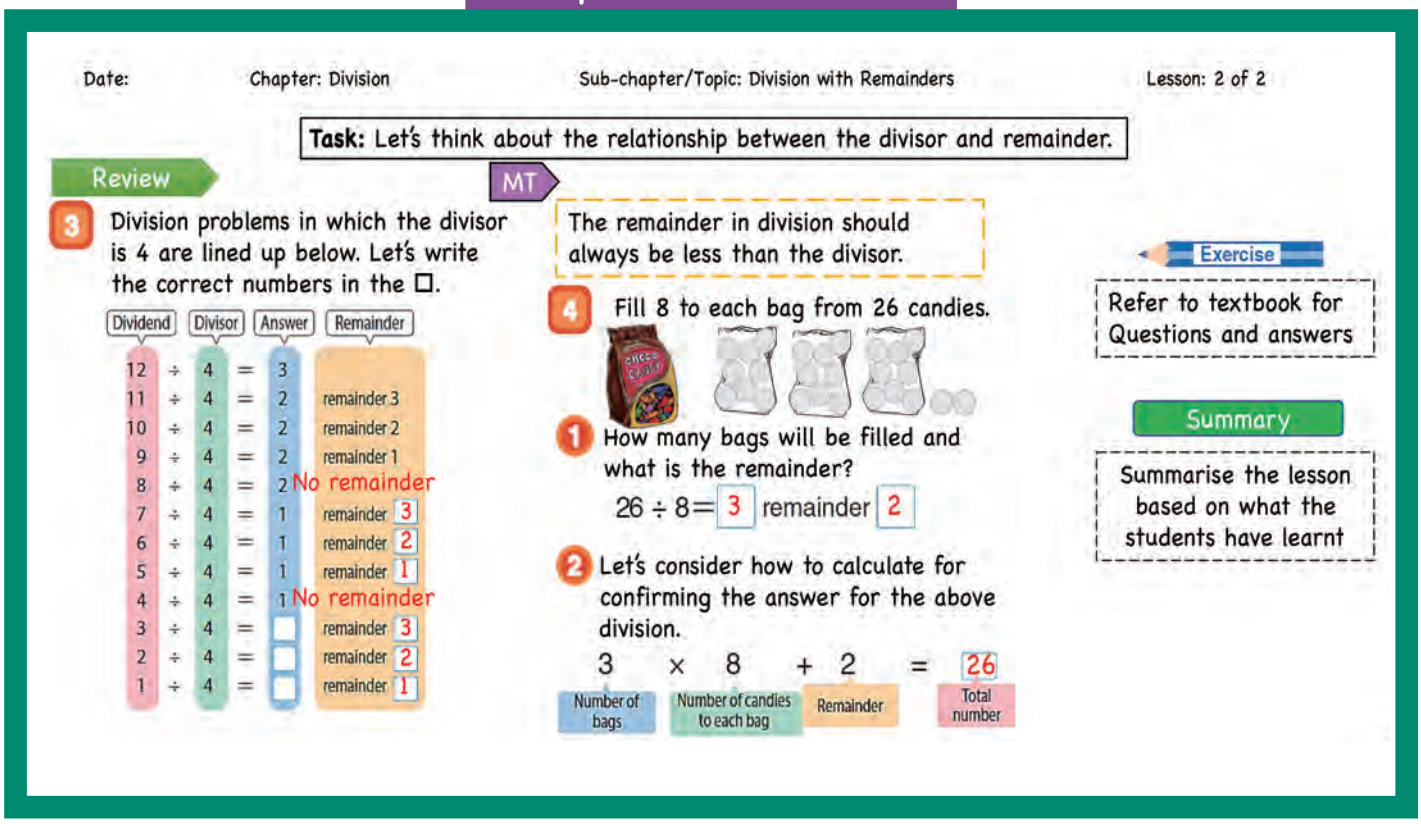
4 (2) Confirm the answer of division.

T Think about each number and check by looking at the pictures.
S Think about 8×3+2=26 and explain it.
T/S Summarise how to check answers.

5 Solve the exercise.

S Complete 1 and 2.
TN To fix the mistake compare the divisor and the reminder.

Sample Blackboard Plan



Unit 9

Unit: Division with Remainders
Sub-unit: 2. Let's Solve Various Problems
Lesson 1 of 1 (Double Period)

Textbook Page : p.96
Actual Lesson 066

Sub-unit Objectives

- To solve various problems of division with remainders and deepen an understanding on division.

Lesson Objectives

- To solve problems of division with remainders and deepen the understanding on division.

Prior Knowledge

- Meaning of division.
- Division (2-digit) ÷ (1-digit) without remainder.
- Division with remainders.
- Relationship between dividend, divisors, quotient and remainder.

Preparation

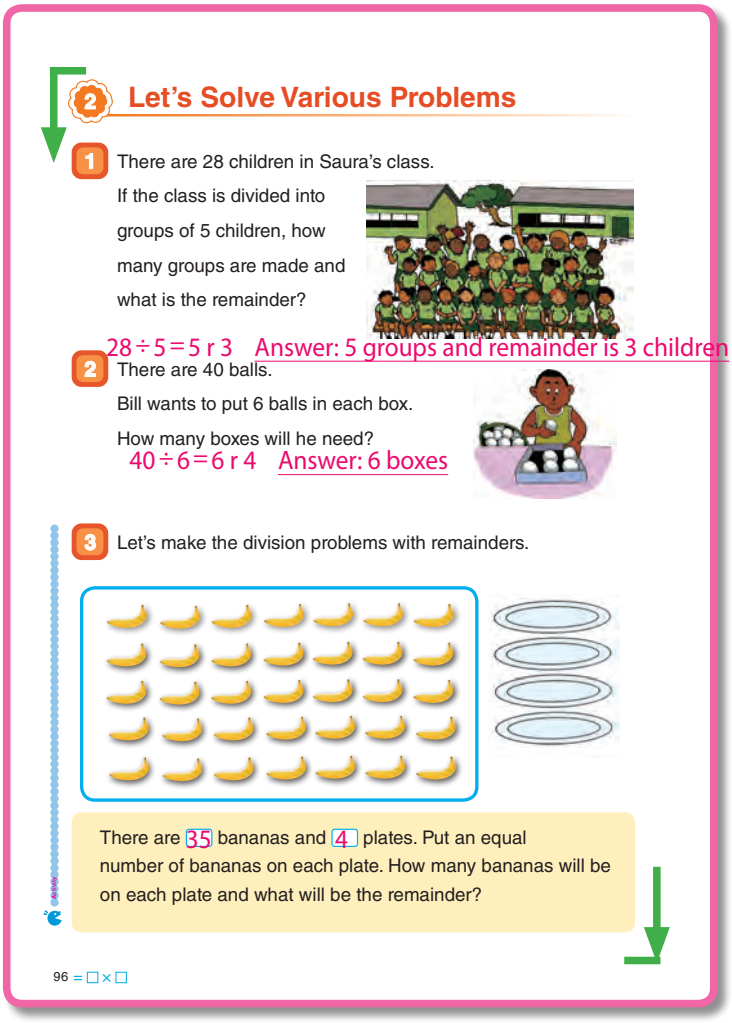
- Blocks and counters.

Assessment

- Enjoy solving problems of division with remainders and deepen understanding on division. F
- Solve the tasks correctly. F S

• Teacher's Notes •

Word problem may need more time for students in Grade 3. Double Period should give enough time for students to complete each task. Encourage them to recall their multiplication through problem solving and do checking at the end of their calculations.



2 Let's Solve Various Problems

1 There are 28 children in Saura's class.
If the class is divided into groups of 5 children, how many groups are made and what is the remainder?

28 ÷ 5 = 5 r 3 Answer: 5 groups and remainder is 3 children

2 There are 40 balls.
Bill wants to put 6 balls in each box.
How many boxes will he need?

40 ÷ 6 = 6 r 4 Answer: 6 boxes

3 Let's make the division problems with remainders.

There are 35 bananas and 4 plates. Put an equal number of bananas on each plate. How many bananas will be on each plate and what will be the remainder?

96 = □ × □

Lesson Flow

1 ① Read the problem and make an expression.

T Introduce the main task.
S Read the given problem and make a mathematical expression and solve it.
S 28÷5=5 remainder 3
S Confirm that the answer is 5×5+3=28.

2 ② Read the word problem, understand its situation well and solve it.

T Make a mathematical expression and solve it.
S 40÷6=6 r 4
T What is the meaning of each number?
S 40 balls, 6 balls in each box, 6 balls in 6 boxes can be made and 4 balls remaining.
T How do we have to treat the remainder.
S 4 balls of remainder also needs a box, so 6+1=7 Answer: 7 boxes
TN The expression will be "40÷6=6 remainder 4," students realise that one more box will be needed to put the remainder of 4 balls.

3 ③ Make a word problem of division with remainders.

T Have the students to fill in numbers in the boxes to complete the word problem.
S Make an expression and solve it.
S 35÷4=8 r 3, 8 bananas and 3 remainder. 8 bananas in each plate and 3 remain.
S Make another word problem and share ideas in groups.

Sample Blackboard Plan

Date: Chapter: Division Sub-chapter/Topic: Solving Problems Lesson: 1 of 1

Task: Let's solve division problems with remainders.

Review

MT

1 There are 28 children in Saura's class. If the class is divided into groups of 5 children, how many groups are made and what is the remainder?

Expression: 28 ÷ 5

Math Sentence:
28 ÷ 5 = 5 remainder 3

Answer:
5 groups and a remainder of 3 children

2 There are 40 balls. Bill wants to put 6 balls in a box. How many boxes does he need?

Expression: 40 ÷ 6

Math Sentence:
40 ÷ 6 = 6 remainder 4

Answer:
6 boxes and remainder of 4 balls

3 Let's make division problems with remainders.

There are 35 bananas and 4 plates. Put an equal number of bananas on each plate. How many banana will be on each plate, and what will be the remainder?

Math Sentence: 35 ÷ 4 = 8 remainder 3
Answer: 8 bananas on each plate and remainders 3 bananas.

Summary

Summarise the lesson based on what the students have learnt

Unit 9

Unit: Division with Remainders
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.97-p.98
Actual Lesson 067

Lesson Objectives

- To review what has been learned.
- To make sure careful calculations of divisions with remainders are done by using a multiplication table and also knowing about the relationship between divisors and size of remainders.

Prior Knowledge

- All the contents in this unit.

Preparation

- Evaluation sheet for all students.

Assessment

- Enjoy solving problems confirming what they learned in this unit. F
- Solve the problems correctly. S

• Teacher's Notes •

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

Exercise

1 Let's calculate and check the answers. Page 94

① 29 ÷ 3 = 9 r 2 ② 36 ÷ 5 = 7 r 1 ③ 17 ÷ 6 = 2 r 5
④ 43 ÷ 9 = 4 r 7 ⑤ 34 ÷ 7 = 4 r 6 ⑥ 55 ÷ 8 = 6 r 7

2 There are 48 pencils. The same amount will be distributed to 7 children. How many pencils can be distributed to each child and what will be the remainder? Page 96

48 ÷ 7 = 6 r 6 A. 6 pencils and remainder is 6 pencils.

3 There are 66 cards. Pages 94 ~ 96

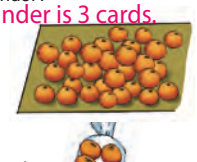
If the same amount is distributed to 9 children, how many cards will each child get and what will be the remainder?

66 ÷ 9 = 7 r 3 A. 7 cards and remainder is 3 cards.

If 9 cards are distributed to each child, how many children can receive and what will be the remainder?

66 ÷ 9 = 7 r 3 A. 7 children remainder is 3 cards.

4 There are 30 oranges. You will put these oranges in each plastic bag. In each bag, 4 oranges can fit. In order to put all the oranges in the plastic bag, how many plastic bags do you need? Page 96



30 ÷ 4 = 7 r 2 A. 8 plastic bags.

Solve the calculations below. Grade 3 Do you remember?

① 595 − 288 = 307 ② 460 − 132 = 328 ③ 906 − 742 = 164
④ 892 − 625 = 267 ⑤ 1234 − 695 = 539 ⑥ 1006 − 759 = 247
⑦ 5613 − 3424 = 2189 ⑧ 7411 − 5079 = 2332 ⑨ 9000 − 8021 = 979

□ + □ = 97

Problems

1 Let's find the mistakes in the following calculations?

Write the correct answer in the □.

● Understanding the meaning of the division with remainder.

28 ÷ 3 = 8 remainder 4 → 9 r 1
37 ÷ 5 = 8 remainder 3 → 7 r 2

Remainder is larger Quotient isn't too large

2 There are 46 tomatoes. They will be divided equally amongst 6 people.

● Considering the remainder depending on the story.

① How many tomatoes can be distributed to each person and what will be the remainder?

46 ÷ 6 = 7 r 4 A. 7 tomatoes and remainder is 4 tomatoes.

② How many more tomatoes do you need to distribute 8 to each person?

2 tomatoes

3 Let's calculate.

● Perform divisions with remainders.

① 33 ÷ 8 = 4 r 1 ② 48 ÷ 5 = 9 r 3 ③ 17 ÷ 4 = 4 r 1
④ 26 ÷ 7 = 3 r 5 ⑤ 56 ÷ 9 = 6 r 2 ⑥ 41 ÷ 6 = 6 r 5
⑦ 11 ÷ 2 = 5 r 1 ⑧ 39 ÷ 7 = 5 r 4 ⑨ 74 ÷ 9 = 8 r 2

4 There are 11 plastic bottles of juice in total. 4 plastic bottles of 2 L and 7 plastic bottles of 1 L. If you distribute equally amongst 3 people, what are the possible methods?

● Considering the various ways of distributions.

98 = □ − □

Lesson Flow

1 ① Calculate and check the answers.

TN There are some students who still have difficulty in multiplication table or some have a difficulty of division with remainder. Therefore, the teacher has to find out their difficult part and review that part by taking time.

2 ② Read the problem and think about how to calculate the division with remainders.

T Let students imagine the situation of dividing 48 pencils amongst 7 children equally by using pictures, blocks or counters. Teacher can draw picture on the blackboard if students do not understand well.

3 ③ Make an expression in a situation and find out a quotient and remainder by using the multiplication table.

TN Let the students confirm that
(1) : (Amount of 1 person) × (9 people) = (Amount of total cards) We have to find the amount of 1 person

T What is the mathematical expression?
S 66 ÷ 9
S Each child receives 7 cards and 3 card are remainder.
TN Let the students confirm that (2) : (9 cards) × (The number of people) = (Amount of total cards) We have to find the number of people
T What do we have to find?
S The number of people we can distribute to.
T What is the mathematical expression?
S 66 ÷ 9
S 7 people and 3 cards are remainder.

4 ④ Read the problem and think about how to find the answer.

TN Identify and understand the meaning of 30 and 4 and write an expression. Then use plastic bags to distribute the same number of oranges

5 Solve the exercise 'Do you remember'.

6 ① Find any mistakes done in the following calculations and write corrections to them.

T Let the students focus on the relationship among the dividend, divisor, quotient and remainder.

7 ② Read the word problem and solve it.

S 46 ÷ 6
T What is the answer ?
S 46 ÷ 6 = 7 r 4 (7 tomatoes and remainder of 4 tomatoes)
T How many tomatoes do you need to distribute for 8 people?
S 8 × 6 = 48
T How many more do we need ?
S 48 − 46 = 2 2 tomatoes

8 ③ Calculate the following divisions with remainders.

TN Assist students individually who still have difficulty of calculation.

Division with Remainders	Name:	Score

(Each question is worth 10 points)

1. Calculate the following divisions and check the answers.

① 15 ÷ 4 = 3 remainder 3 Check the answer: 3 x 4 + 3 = 15

② 62 ÷ 7 = 8 remainder 6 Check the answer: 8 x 7 + 6 = 62

③ 6 ÷ 5 = 1 remainder 1 Check the answer: 1 x 5 + 1 = 6

④ 87 ÷ 9 = 9 remainder 6 Check the answer: 6 x 9 + 6 = 8

2. Find the mistakes and write the correct answers.

① 17 ÷ 3 = 4 remainder 4
17 ÷ 3 = 5 remainder 2

② 23 ÷ 4 = 6 remainder 1
23 ÷ 4 = 5 reaminder 3

3. There are 60 balls. Jayden wants to put 7 balls in each box. How many boxes does he need?

Mathematical sentence: 60 ÷ 7 = 8 remainder 4

Answer: 9 boxes

4. There are 46 cakes. You will need to distribute the same number of cakes to 8 people equally.

① How many cakes does each person get and how many cakes are left?
46 ÷ 8 = 5 remainder 6
Each person gets 5 cakes and 6 cakes are left.

② How many cakes are needed to distribute 6 cakes to each person?
8-6 = 2 2 cakes

End of Chapter Test: Chapter 9 **Date:**

Division with Remainders	Name:	Score

(Each question is worth 10 points)

1. Calculate the following divisions and check the answers.

   ① 15 ÷ 4 = Check the answer: _____

   ② 62 ÷ 7 = Check the answer: _____

   ③ 6 ÷ 5 = Check the answer: _____

   ④ 87 ÷ 9 = Check the answer: _____

2. Find the mistakes and write the correct answers.

   ① 17 ÷ 3 = 4 remainder 4 ② 23 ÷ 4 = 6 remainder 1

   _____ _____

3. There are 60 balls. Jayden wants to put 7 balls in each box. How many boxes does he need?

   Mathematical sentence: _____

   Answer: _____

4. There are 46 cakes. You will need to distribute the same number of cakes to 8 people equally.

   ① How many cakes does each person get and how many cakes are left?

   _____

   ② How many cakes are needed to distribute 6 cakes to each person?

   _____

Chapter 10 Circles and Spheres

1. Unit Objectives

- To focus on elements to form shapes through activities such as observing and forming shapes, and are able to understand shapes. (3.3.2a,c and d)
- To know about circles and spheres, and also to understand about their centre, radius and diameters. (3.3.2b)

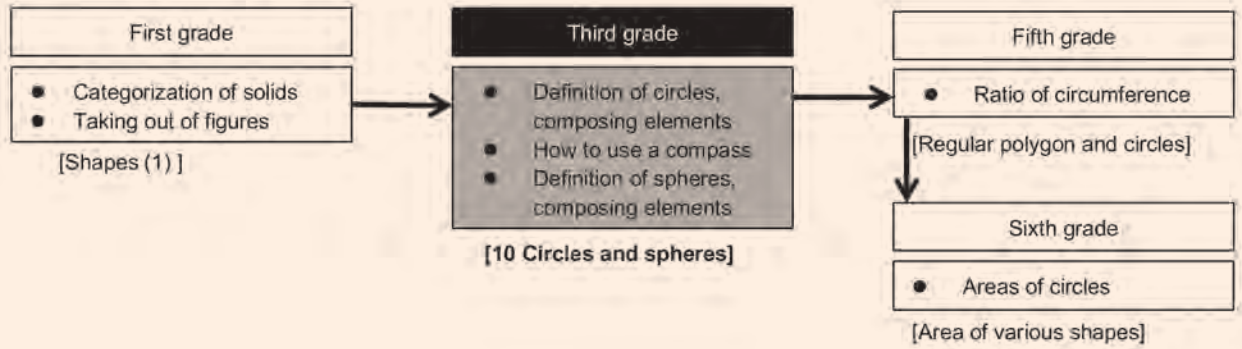
2. Teaching Overview

Students have knowledge of circles as "round shapes" in an intuitive manner. However, learning of shapes in mathematics requires proper investigations with mathematical definitions as evidences for proving. Another important aspect to learn shapes is to capture properties of each shape by cutting, projecting and observing the shade, opening to observe the net, rolling, observing where we commonly find each shape etc.

Circles : Teacher should practice how to use compasses before teaching the topic. Students are to find that many points which are in equal distances from a certain point (centre) looks like a proper circle through several activities and learn the definition afterwards. Students are also required to practice drawing proper circles with compasses. Note that they should also draw the centre properly to identify for verification if all points on the circumference are in the same distance as its radius.

Spheres : In the same manner of circles, the sphere should be understood based on the definition. If spheres are recognised as "similar shape of balls", it is not enough. If a shape is a sphere, every cross section should be circles. For understanding spheres, physical models will help student understand where they can find radius, which cross section is maximum in size, etc.

3. Related Learning Contents



Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 1 of 4 (Double Period)

Textbook Page : p.99~p.100
Actual Lesson 068

Sub-unit Objectives

- To understand the definition of circles through the mathematical activities.
- To have students realise the functions of compass.
- Students are able to use compass to draw circles and transfer line segments.
- To understand terms such as “radius, diameter, and centre” of circles and be able to explain about circles.

Lesson Objectives

- To realise that putting many points at an equal distance from a certain point will gradually form a round shape.

Prior Knowledge

- Shapes (Grade 2)

Preparation

- Sets of ring toss (several sets), ropes to measure and compare distances, worksheets for taking a look at a standing position for ring toss.

Assessment

- Enjoy playing the game and thinking about the shape. F
- Realise that when having more children, points of their standing positions will gradually form a line and it will become closer to a round (circle). S

Lesson Flow

1 Enjoy playing ring game freely altogether.

T Introduce the main task.
T Have students to play the game of ring toss from wherever points first and then realise the importance of making rules to play the game with fairness.
S Play the game of ring toss freely on the playground.

2 Think about how everyone can play the ring toss on the same conditions.

S Make rules to play ring toss game on the same condition.
T Have students to understand differences of distances from a pole of ring toss to standing positions.
T Have students discuss about their opinions on various standing positions.
TN Study positions (A), (B) and (C) on the textbook and confirm the fairness of the game.
S Realise that (B) is the answer because of the equal distance from the centre.

3 Think about what shape standing positions of everyone will form when adding more children.

T Guess what shape will be formed? Is it a shape you know.
S Stand at an equal distance from a pole by using a rope, and guess what shape will be formed.
T Have the students put their exercise book or anything on their standing positions and have them confirm standing positions expressed with points when viewed from a little higher place.
S Draw everyone's standing positions as points in the worksheets on which pole is drawn as a centre and think about the shape by themselves.
T/S Summarise the activity.
S Describe the circle in their own words.

• Teacher's Notes •

- If the surrounding of playing ring toss is not convenient, then try use textbook or improvise, this will also apply to drawing a circle with a 2 m radius on the playground using a rope.
- This lesson is to have students experience that throwing the above point through mathematical activities can help and have them identify the definitions. We would like to show students how a circle will be formed by visualising steps for gradually adding points at an equal distance from a certain point and in order.
- Also, have students develop familiarity with and have them realise that circles are used by finding things that are shaped like a circle in their life. This will help increase their motivation for learning about circles.

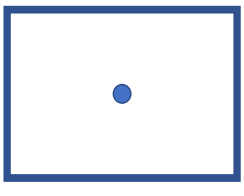
Sample Blackboard Plan

Date: Chapter Name: Circles and Sphere Topic: Circles Lesson Number: 1 of 4

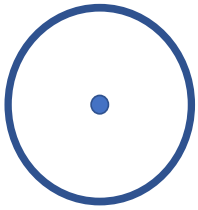
Main Task: Let's think about how we should line up for a fair game.

MT

Standing in a straight line or in a square and throw. The students at the far end will not have a fair try.



Standing around and throw. The students at every end will not have a fair try.



Summary

The circle have equal distance from the round to the center and so the students had fair play in circle.

Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 2 of 4 (Double Period)

Textbook Page : p.100~p.101
Actual Lesson 069

Lesson Objectives

- To understand the definitions, natures and the relationship of elements of circles.
- To draw circles of given size by using instruments.

Prior Knowledge

- Notion of circle (Previous lesson)

Preparation

- Ruler(30 cm), A4 papers, craft papers, thumb pins, instrument to make hole, rubber band, coloured papers and grid papers
- 1 m ruler, 2 m rope and 2 sticks

Assessment

- Think about the natures of circles through activities such as drawing and folding. F
- Understand definitions and the meaning of the terms of circles. S

• Teacher's Notes •

- If the surrounding of playing ring toss is not convenient, then try use textbook or improvise, this will also apply to drawing a circle with a 2 m radius on the playground using a rope.
- This lesson is to have students experience that through mathematical activities they identify the definition and thus allows them to draw a circle by using an instrument which has made holes in the craft paper as in the picture shown. This is based on thoughts that a circle is sets of points at an equal distance from a fixed point.
  Do not call the point as "centre point" but "centre"

1 Circles

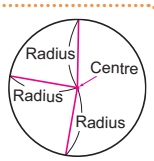
How to draw round shape.

1 Let's think about how to draw a round shape.

1 Draw many points that are all 3 cm from point A.

2 Using an instrument below, draw a round shape.

A round shape that has the same distance from one point is called a circle. This point is called the centre.
The straight line from the centre to any point on the circle is called the radius.



The circle you drew in 1 has a radius of 3 cm. Point A and the pin is the centre of the circle.

100 = □ × □

2 Draw a circle using rope.

2 Let's draw a circle with a 2 m radius in the school ground using a rope.

3 A compass is a tool used for drawing circles.

1 Draw a circle with a 4 cm radius using a compass.

① Open the compass to the length of the radius.

② Rotate the compass to draw a circle.

2 Draw another circle with a different radius and the same centre.

□ + □ = 101

Lesson Flow

1 Review previous lesson.

T Introduce the main task.

2 1 Think about how to draw a round shape and understand the terms of the circle.

T Let students think about how to draw a round shape and share ideas.

S 1 Draw many points that are all 3 cm from point A using a ruler (refer to the textbook) to plot dots like a round shape.

S 2 Draw a round shape using a grid paper with 3 cm distance from thumb pin to pencil point (refer to the textbook).

TN Steps to draw a round shape:

- The paper should be placed on the soft surface.
- The grid paper is pinned in the centre with a thum pin.
- Make a hole at 3 cm from the centre with the pencil.

3 2 Understand the definitions, natures and the relationship of elements of circles.

T Explain the important point in the box .

4 Let's draw a circle with a 2 m radius on the playground.

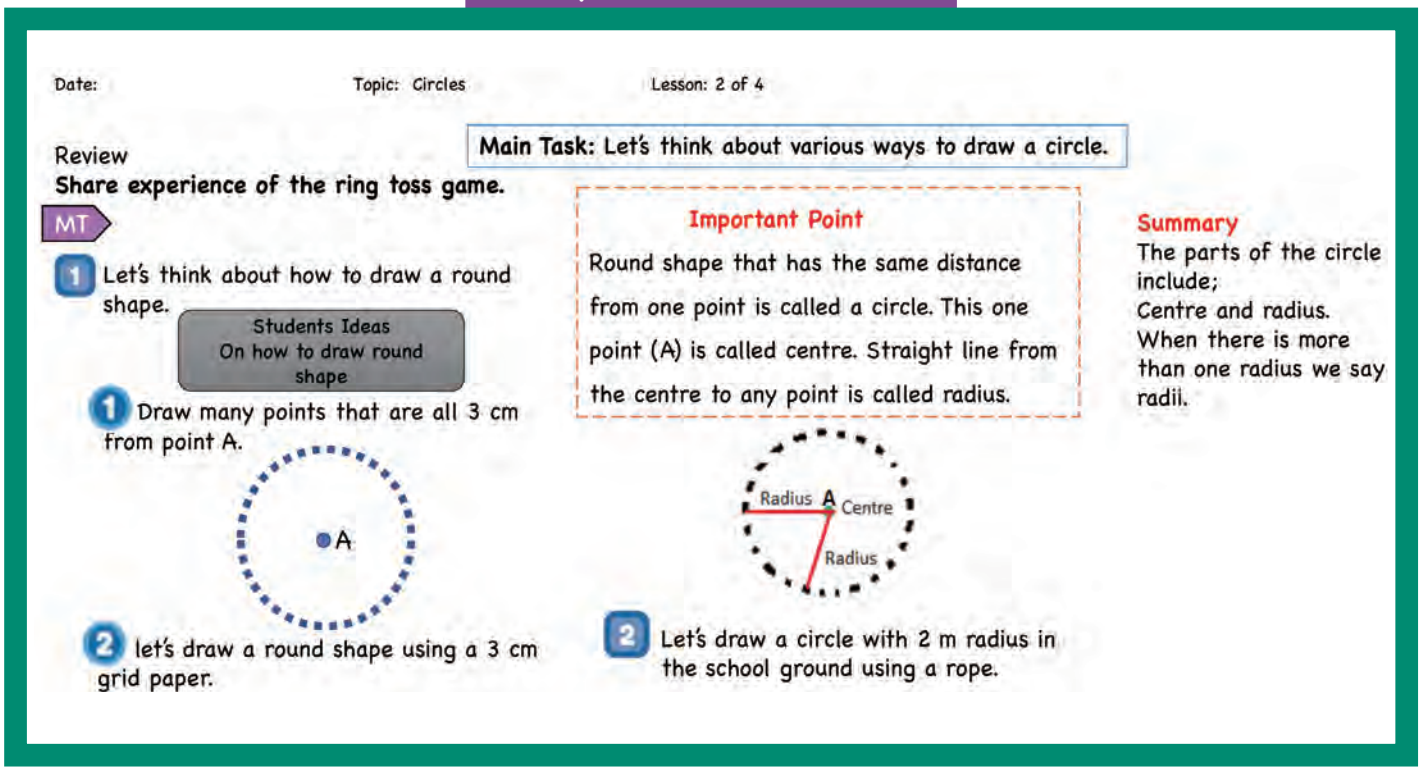
T Allow students to measure 2 m rope and draw the circle with the rope.

S Measure and draw the circle using the idea of the previous activity.

5 Summarise the definition, nature and the relationship of the elements of a circle.

T/S Summarise the lesson as on the blackboard plan.

Sample Blackboard Plan



Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 3 of 4 (Double Period)

Textbook Page : p.101~p.102
Actual Lesson 070

Lesson Objectives

- To draw circles with radius using compass.
- To explore natures of diameter through activities of folding a circles.

Prior Knowledge

- Parts of the circle(Previous lesson)

Preparation

- Compass, ruler(30 cm), A4 papers

Assessment

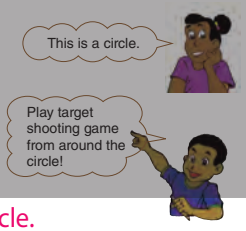
- Enjoy drawing circle and finding characteristics of circle. F
- Understand the meaning and characteristics of diameter. S

• Teacher's Notes •

How to use a compass to draw a circle:

- For accurate shapes and drawings we will need to use a drawing compaass correctly.
- Measure radius of the circle to be drawn with a ruler.
- Holding the top of the compass as shown in the Textbook.
- Pointer must be firm before rotating the pencil to draw.
- Pointer must be pushed strongly on the paper not to move the centre.
- Do not change the length of the radius while drawing.

2 Let's draw a circle with a 2 m radius in the school ground using a rope.



Characteristics of circle.

3 A compass is a tool used for drawing circles.

❶ Draw a circle with a 4 cm radius using a compass.

How to use a compass.

① Open the compass to the length of the radius.

② Rotate the compass to draw a circle.

❷ Draw another circle with a different radius and the same centre.

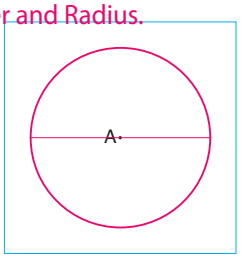
Relationship between Diameter and Radius.

Radius and Diameter

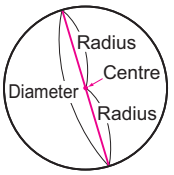
4 Draw a circle with A as the centre.

❶ Draw a circle with radius of 3 cm.

❷ Draw a straight line from one side of the circle to the other through the centre.



A straight line drawn from one point on the circle passing through the centre of the circle to the other point on the circle is called the diameter.
The lenght of the diameter is twice the length of the radius.



Characteristics of diameter.

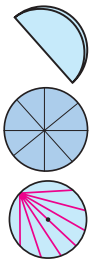
5 Let's fill in the blanks with correct words and numbers.

❶ A diameter is [2] times the radius.

❷ If you fold a circle along a [diameter], there are two equal sections.

❸ There are many diameters in a circle and all diameters have the [equal] length.

❹ A [diameter] is the longest straight line between two points in the circle.



Exercise

Draw circles with the following diameters.

① 8 cm ② 12 cm ③ 14 cm

□ + □ = 101 102 = □ − □

Lesson Flow

1 Review important note in the summary of previous lesson.

T Introduce the main task.

2 3 Think about how to use compassess for drawing circles.

T Explain the steps on how to draw a circle using compass.
S Draw a circle with a 4 cm radius using a compass.
TN Refer to the Teachers' note for the instruction.
T Have the students try drawing another circle with a different radius and the same centre.

3 4 Draw a circle with A as the centre using a compass.

T Draw a circle with a radius of 3 cm and then extend the radius to the circumference.
S Have the students draw a circle with its radius and then extending the radius to the circumference to understand that the straight line extended from the radius passing through the centre of the circle to the circumference is called a diameter.

4 Understand the meaning of diameter.

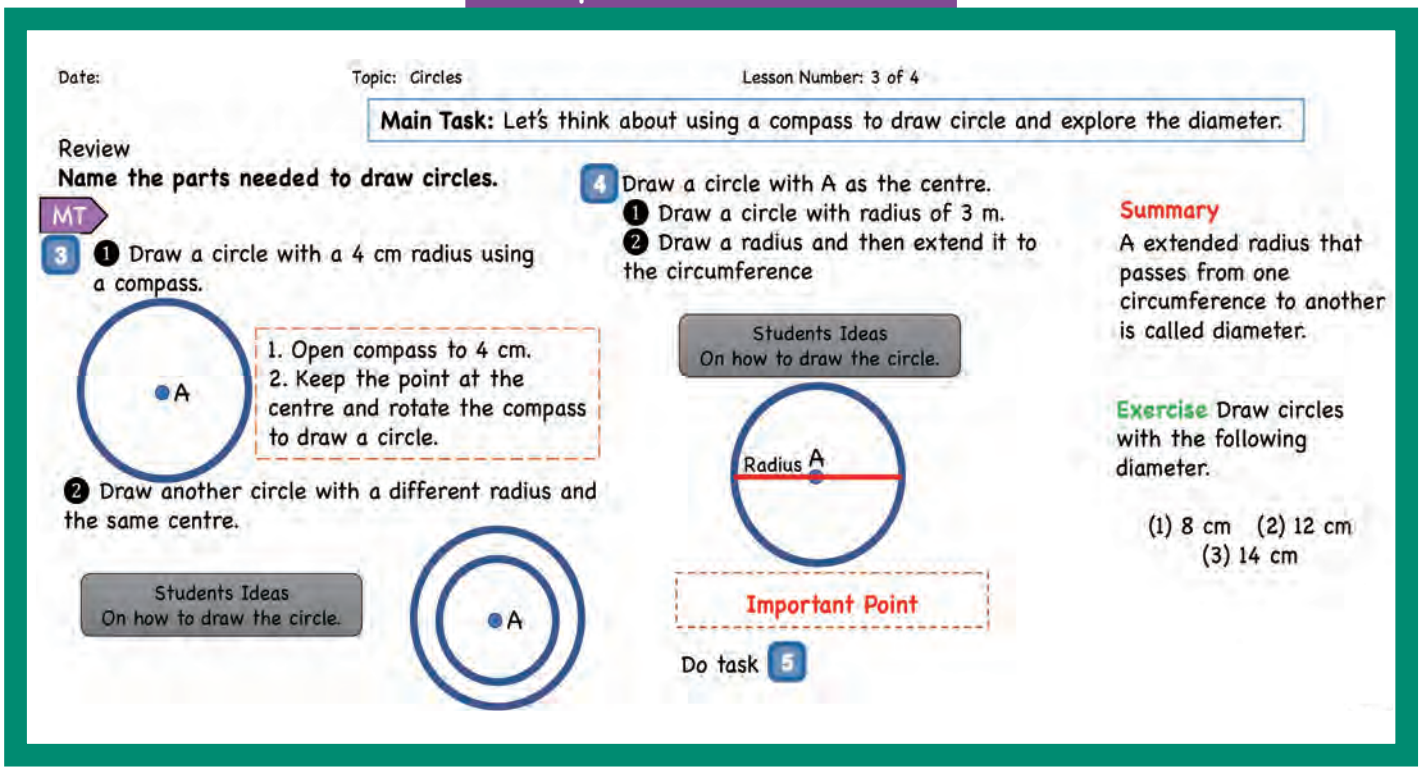
S Understand the meaning of a diameter concerning the relationship with radius.
T/S Summarise the relationship between radius and diameter.
(Diameter) = (Radius) × 2

5 5 Solve the task.

T Have the students fill in the blanks with correct words and numbers concerning characteristics of a circle.
T How to fold a circle to find a diameter?
S We have to fold exactly in half.

6 Complete the exercise.

Sample Blackboard Plan



Unit 10

Unit: Circles and Spheres
Sub-unit: 1. Circles
Lesson 4 of 4 (Double Period)

Textbook Page : p.103-p.104
Actual Lesson 071

Lesson Objectives

- To find centres of the circles.
- To draw various sizes of circles by using compasses.
- To get used to using compasses through designing patterns.
- To understand the various ways of using a compass.

Prior Knowledge

- How to use a compass (Previous lesson).
- Parts of the circle

Preparation

- Compass, Ruler(30 cm), A4 papers

Assessment

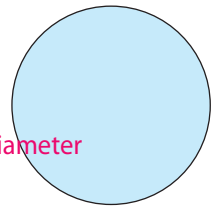
- Think about how to find the centres of the circles based on characteristic of diameters. F
- Do the exercises correctly. S

• Teacher's Notes •

This lesson is for students to explore the use of compass to make beautiful patterns. They may integrate their arts lesson in this mathematics lesson.

How to find the centre of the circle.

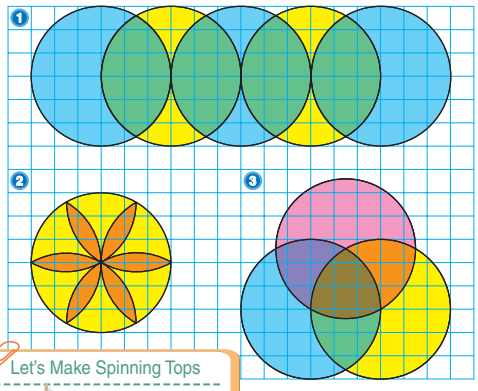
6 Draw a circle that is the same size as the circle on the right using a compass.

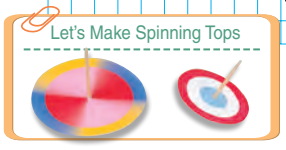


1. What do you need to have for drawing the circle? Centre and diameter
2. How can you find the centre of the circle? Fold in half

Designing Patterns

7 Let's draw different patterns and pictures using a compass.



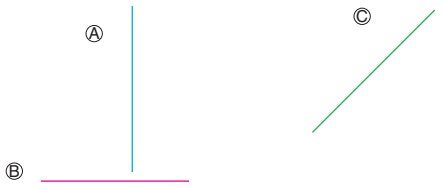


Functions of a Compass

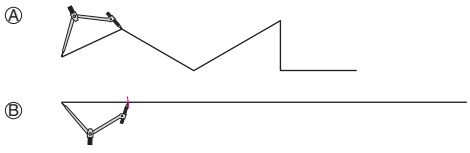
A compass can be used for other purposes other than drawing a circle.

① You can divide a straight line into sections of the same length. Try making 3 cm sections on the line below.

② You can compare the lengths of Ⓐ, Ⓑ and Ⓒ. Which of these straight lines is the longest?



③ You can transfer lengths. Transfer line Ⓐ to line Ⓑ. How long is line Ⓐ compared with line Ⓑ.



□ + □ = 103　　104 = □ × □

Lesson Flow

1 Review how to use the compass.

2 6 How to find the centre of the circle.

S Draw a circle that is the same size as the circle on the right by tracing.

T ❶ What do you need to have for drawing the circle?

S Centre and diameter.

T ❷ How can you find the centre of the circle?

S Fold the paper in half and then a quarter.

S Draw the same circle using compass to confirm the centre and diameter.

T Introduce the main task.

3 7 Draw beautiful patterns using a compass.

TN Let the students notice that they can make various patterns and shapes by drawing circles systematically changing centre of the circle.

How to draw ❶

1. Draw a line.
2. Draw a circle putting the centre on the line.
3. A point which crosses the circle and the straight line is a centre of the next circle.
4. Draw a next circle with the same radius.
5. Repeat the steps from 1-4.

How to draw ❷

1. Draw a circle.
2. Draw another circle by putting the centre on the arc of the circle.
3. Draw another circle by putting the centre on the crossing point of the 2 circles.

4 Discuss other use of a compass.

S How can we use a compass in addition to drawing other circles?

TN Let the students notice that compass can be used for separating lines with same length or transferring the same length of line to another place.

5 Let's make a Spinning Top.

TN If time does not allow, remind students to do as homework or as an assignment for assessment.

Sample Blackboard Plan

Date: Topic: Circles Lesson Number: 4 of 4

Main Task: Let's draw circle of same size and make patterns.

Review

What is the relationship of Radius and Diameter.
A radius is straight line from centre to any point on the circumference.
Diameter is the straight line that passes from one circumference to the other circumference passing through the centre point.
We can say a diameter is 2 radii in a straight line.

6 Let's draw a circle that is the same size as the circle in the textbook using a compass.

Students Ideas
On how to use compass to draw the circle.

❶ What do you need to have for drawing the circle?
Centre and Diameter
❷ How can you find the centre of the circle?
By tracing and folding
By measuring the radius and diameter.

MT

7 Let's draw different patterns and pictures using compass.

Students Ideas
Display their patterns

Summary
What did you learn about the compass today?
- Compass can be used to draw different circle as well as other beautiful patterns.
- Compass can be used for separating lines with same line or transferring the same length to another place.

Unit 10

Unit: Circles and Spheres
Sub-unit: 2. Spheres
Lesson 1 of 1 (Double Period)

Textbook Page : p.105-p.106
Actual Lesson 072

Sub-unit Objectives

- To be able to find out centres, radius and diameters of spheres by cutting spheres, etc.
- To understand that a circle made by cutting through a centre of a sphere will be the largest and the radius are all the same length.

Lesson Objectives

- To understand spheres' properties by linking them with circles.

Prior Knowledge

- Properties of circles

Preparation

- Ball, a toy shaped like a sphere, 3D models of sphere in which the cross-sections can be seen (teacher).

Assessment

- Investigate the characteristics of a sphere. F
- Understand the definitions of spheres and the nature and its relationship among elements. S

• Teacher's Notes •

In this lesson the students will study the structure of sphere to understand that when a sphere is cut at any point, the cross – sections are called the centre, radius and the diameter. In other words, they will find the shape of a circle. The students will also discover that the largest circle in a sphere is found when cutting in the centre.

Meaning, characteristics and components of a sphere.

2 Spheres

1 Explore the shape of a ball.

1 What is the shape of the ball when viewed from the above and the side?

From above | From above

(a) Circle from any side
(b) certain side cannot see circle

From the side | From the side

2 Roll a ball.

(a) Rolled smoothly
(b) Can not roll smoothly

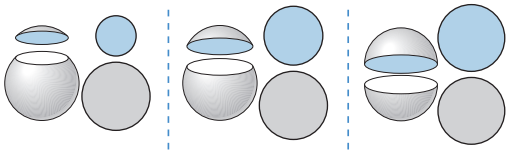
An object that looks like a circle from any direction is called a **sphere**.

3 Look for things shaped like a sphere.

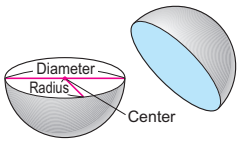
4 What is the shape of the cross-section of a sphere?

Where should we cut to make the largest cross-section from a sphere?

When cuting in the centre.

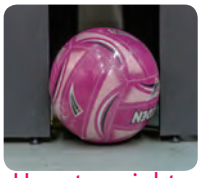


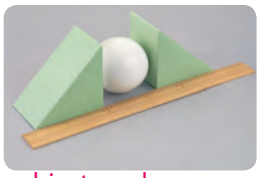
When a sphere is cut in half, the centre, the radius, and the diameter of the cross-sections are called the **centre, radius and diameter** of the sphere.



How to measure diameter of sphere.

5 How can we find the diameter of a sphere?



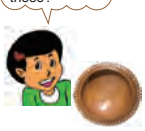


Have two right angle objects and then measure the diameter.

Let's Find Circles and Spheres

Let's look for things shaped like circles and spheres.

Can you find the centre and the radius of these?



Floats for fishing net

□ + □ = 105 106 = □ × □

Lesson Flow

1 Review properties of circles.

T Introduce the main task.

2 ❶ Explore the shape of a ball.

T ❶ What kind of shape will be seen when viewing the ball and the balloon from various directions?

S Circle.

T ❷ Roll a ball and a balloon to understand its properties, the meaning of sphere and find out spheres from things around us.

S Roll a ball.

T Roll a ball and a balloon and compare how spheres and sphere like (balloon) roll.

S ❸ Look for things shaped like a sphere in our environment.

3 ❹ Think about and explore in what cases the cross-sections will be the same.

T What is the shape of the cross-section of a sphere?

S Circle.

T Let's think about where we should cut to make the largest cross-section from the sphere.

T Confirm shapes and sizes of cross-sections.

T Explain the important points in the box .

4 Think about how to explore diameter of a sphere, and find things shaped liked circles and spheres around us.

T ❺ Find out the diameter.

T Have the students realise that diameter of spheres are the largest in the widths of spheres.

TN • Place the ball between two right angle (parallel) objects. (Refer to the textbook image)
• Measure the distance between the two objects.

S Measure balls and models of spheres by using a method as in the picture

5 Think about more things shaped like circles and spheres.

S Find out things shaped liked circles as wheels and things shaped liked spheres as roly-poly bugs around us and think about centres and lengths of radius.

TN In case of no time, it's ok to make the above activity as homework.

Sample Blackboard Plan

Date:

Topic: Spheres

Lesson Number: 1 of 1

Main Task: Let's explore the shape of a ball.

Review

What are the properties of Circle?

A circle have a centre, radius and diameter.
The radius is the length from the centre to the circumference.
When a radius extends from the centre to the circumference in a straight line, we call it diameter

MT

1 ❶ What kind of shape will be seen when viewing a ball and balloon? Circle

❷ What happens when we roll the two?

Students Ideas
Give their Explanation

Ball rolls smoothly.
The balloon does not roll smoothly.

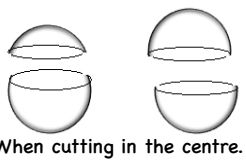
Important Point

❸ Name some of the things that look like a sphere

Students Ideas
Give their Examples

❹ What will be the cross - section of a sphere?
Where will we cut to make the largest cross - section from a sphere?

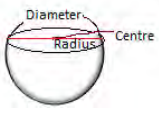
Students Ideas
Give their Explanation



When cutting in the centre.

❺ How can we find the diameter of a sphere?

Students Ideas
Give their Explanation



Summary

When a sphere is cut in half, the cross - sections are called centre, radius and diameter of a sphere.

Unit 10

Unit: Circles and Sphere
Sub-unit: Exercise and Evaluation
Lesson 1 of 1 (Double Period)

Textbook Page : p.107~p.108
Actual Lesson 073

Lesson Objectives

- To deepen the understanding of what they learned in this unit.
- To confirm contents learned in the unit.

Prior Knowledge

- All the contents in this unit

Assessment

- Solve exercises correctly. F S

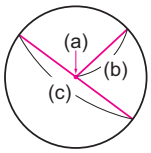
• Teacher's Notes •

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

Exercise

Component of a circle.

1 Answer these questions about the circle shown on the right. Page 100



① What is point (a) called? (a) centre.

② What is the name given to the straight lines (b) and (c) ? (b) radius (c) diameter

2 Write the correct words or numbers in the ☐. Page 102

Characteristics of a circle.

① A straight line through the centre between 2 points on a circle is called diameter.

② The length of a diameter is 2 times the radius.

How to draw a circle.

3 Draw the following circles. Pages 101, 104

① A circle with a diameter of 4 cm.

② A circle with a radius of 4 cm.

Use of a compass.

4 Compare the lengths of the following straight lines. C, A, B

Ⓐ Ⓑ Ⓒ

Change of unit.

Let's fill in the boxes. Grade 2 Do you remember?

① 10 mm = 1 cm ② 100 cm = 1 m

③ 1dL = 100 mL ④ 2000 mL = 2 L

Problems

How to draw a circle.

1 Draw the following circles.
● Drawing circles with a given radius or diameter.

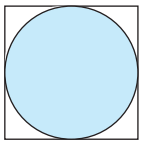
① A circle with a 6 cm radius.

② A circle with a 10 cm diameter.

Use the characteristics of a circle.

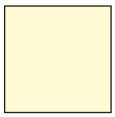
2 A circle is put in a square of the same size as shown on the right.

Find its radius and draw another circle of the same size.
● Understanding the properties of a diameter.



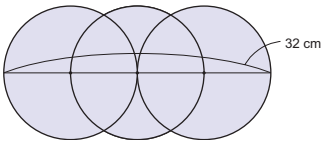
Use of a compass.

3 Which is longer around its edges, the rectangle or the square? Find the answer by using a compass.
● Understanding how to compare the lengths of lines by using a compass.



Relationship between a diameter and a radius.

4 There are 3 circles of the same size below. Find the diameter of one of these circles.
● Understanding the radius and diameter of combined circles.



☐ + ☐ = 107 108 = ☐ − ☐

Lesson Flow

1 ① Understand the components of circles.

T Evaluate if students understand very well the components of circles.

T Students confirm the terminology and meaning of centre, radius and diameter.

2 ② Understand the characteristics of circles.

T Evaluate if students understand very well the characteristics of circles.

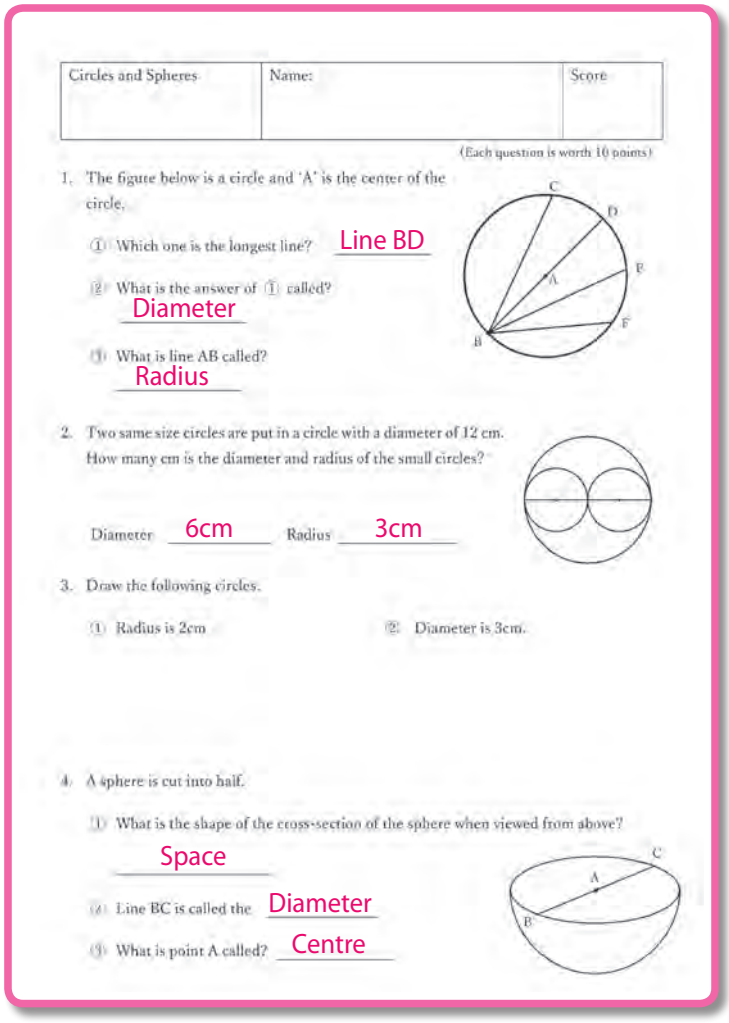
T Let students draw circle to understand its characteristics.

3 ③ Draw circles with a given diameter.

T Confirm if students can draw circles with a given diameter.

T Check if students use compass appropriately and assist the students individually who are not able to draw properly.

T Evaluate if students can compare and order from the longest to the shortest.



Circles and Spheres	Name:	Score

(Each question is worth 10 points)

1. The figure below is a circle and 'A' is the center of the circle.

① Which one is the longest line? Line BD

② What is the answer of ① called? Diameter

③ What is line AB called? Radius

2. Two same size circles are put in a circle with a diameter of 12 cm. How many cm is the diameter and radius of the small circles?

Diameter 6cm Radius 3cm

3. Draw the following circles.

① Radius is 2cm ② Diameter is 3cm.

4. A sphere is cut into half.

① What is the shape of the cross-section of the sphere when viewed from above? Space

② Line BC is called the Diameter

③ What is point A called? Centre

4 ④ Compare the length by using a compass.

T Evaluate if students can compare the length by using a compass.

5 Review of measurement in grade 2.

S Fill in the ☐ with numbers.

1 ① Draw a circle with a given radious or diameter.

T Evaluate if student can draw circles with a given radius or diameter.

T Confirm students understanding on the properties of a diameter and radius.

S ① and ② will be the same circle.

2 ② Think about the relationship between diameter and square.

T Confirm that the side of a length of a square becomes the diameter of a circle.

T How many cm is the radius?

S 2 cm because the radius is half of the diameter.

3 ③ Compare the length of a rectangle and a square.

T Let's think about how to compare the perimetre of a rectangle and a square.

T Draw a line. Measure each side of the figure and add the lengths using the line you drew.

4 ④ Know the relationship between diameter and a radius.

S Confirm that half of 32 cm (diameter) becomes a radius of a circle.

5 Find the centre of the circle.

T If students can copy the diagram on the exercise book, let them copy and cut. If it not possible, discuss the method to draw a original circle.

T What do we have to do to draw a circle?

S We have to find a centre.

T How do we have to find a centre?

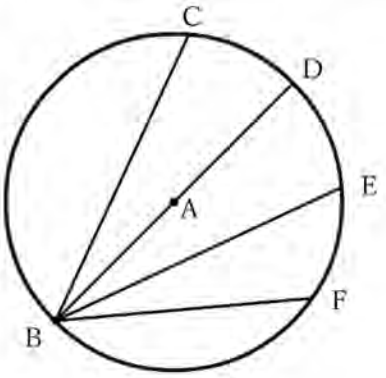
S Fold twice.

End of Chapter Test: Chapter 10 **Date:**

Circles and Spheres	Name:	Score

(Each question is worth 10 points)

1. The figure below is a circle and 'A' is the center of the circle.



① Which one is the longest line? _____

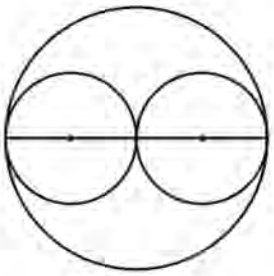
② What is the answer of ① called?

_____

③ What is line AB called?

_____

2. Two same size circles are put in a circle with a diameter of 12 cm. How many cm is the diameter and radius of the small circles?



Diameter _____ Radius _____

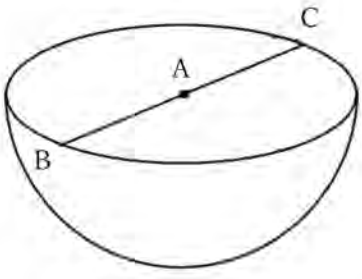
3. Draw the following circles.

① Radius is 2cm ② Diameter is 3cm.

4. A sphere is cut into half.

① What is the shape of the cross-section of the sphere when viewed from above?

_____



② Line BC is called the _____

③ What is point A called? _____