

Textbook Prathomsuksa 6

Based on the Basic Education Curriculum B.E. 2551 (Revised Edition B.E. 2560)

Chapter 1 Factors and multiples

The big idea

- 1. Ask the students to look at the picture carefully.
- 2. Ask them these questions to start a discussion:
 - Have you seen these lights before?
 - Where do you see them often?
 - Do all the lights flash at the same time?
 - Let's assume that the red lights flash every 4 seconds and the blue lights flash every 2 seconds, and they are flashing now.
 - After 1 second, will there be any lights flashing?
 - After 2 seconds, will there be any lights flashing?
 - After 3 seconds, will there be any lights flashing?
 - After 4 seconds, will there be any lights flashing?
 - How do you find the answer to the questions posed?



Strand 1: Numbers and algebra

Standard M.1.1 Numbers

Indicators:

- M 1.1 Gr6/4 Find the highest common factor of cardinal numbers not more than 3 numbers.
- M 1.1 Gr6/5 Find the lowest common multiple of cardinal numbers not more than 3 numbers.

M 1.1 Gr6/6 Show mathematical methods of finding the answers of word problems by using the knowledge of the highest common factor and the lowest common multiple.



Lesson 1 Factors

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. List the factors of a number.
- 2. List prime numbers.
- 3. List the prime factors of a number.
- 4. Express a number in the form of prime factorization.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Factor, prime number, prime factor, prime factorization, index notation, repeated short division, factor tree

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Guide the students to understand what factors of a number are. A factor of a whole number is a whole number that divides it exactly leaving no remainder.
- 2. Use the example to explain.

Thinking Corner!

Ask the students these questions to start a discussion:

- a) Can 12 be divided by 1, 2, 3, 4, 5, 6, 7, 8,9, 10, 11 and 12 with no remainders?
- b) What are the factors of 12?
- c) How many factors of 12 are there?

Go Get Maths Teacher's Guide P6 | 2

- 3. Show the students the exact division of 12 to list the factors of 12.
- Guide the students to understand that we can use multiplication to get the factors of a whole number.
- When we multiply two whole numbers, it gives us a product. Then, the whole numbers we are multiplying are the factors of the product because the product is divisible by them.

- 6. Use the examples to explain further.
- Tell the students that to find out if a number is a factor for another number, we need to perform division. Reiterate that when we divide a whole number with its factor, there will be no remainder.
- 8. Use the example to explain further.



Extra notes

Facts on factors:

- A factor of a number is always smaller or equal to the number.
- Except for 0 and 1, every whole number has at least 2 factors, that is 1 and the number itself.
- Factors are only whole numbers or integers, not fractions or decimals.
- All even numbers have 2 as their factor.
- All numbers that end with 5 have 5 as their factors.
- All numbers greater than 0 and ending with 0 have 2, 5, and 10 as their factors.



Activity for Reinforcement

Ask the students to determine if these numbers are prime numbers using the criteria above.

87	159	235	149
158	211	1,036	740

- Inform the students that a prime number is a number that can only be divided by itself and 1 without remainders.
- 2. Use the example to explain further.
- Ask the students if 5 is a prime number. Ask them these questions to start a discussion:
 - a) What are the factors of 5?
 - b) Are the factors 5 and 1 only?
 - c) Is 5 a prime number?
- 4. Repeat with 9, 14 and 17.
- 5. Go through the criteria with the students on how to determine if a number is a prime number.
- 6. Use the examples on how to determine if a number is a prime number to explain further.

- 1. Ask a student to explain *factor*. Ask another student to explain *prime number*.
- 2. Ask them to guess what prime factors are.
- 3. Tell them that a prime factor of a number is a factor of that number which is also a prime number.
- 4. Inform them that in order to find the prime factors of a whole number, we need to list all the factors of the whole number and then from the list, we need to identify the prime numbers.
- 5. Use the examples to explain further.

Fun with Maths!

Materials required: -

Objective of the activity: Identifying prime factors of a whole number

With this activity, the students will remember the steps to find the prime factors of a number.

		Prime factors number which hemselves.	are factors o are prime	f a whole numbers	Č.	•	
					-	-	
	36 = 1 : 36 = 2 :	< 36 < 18	$36 = 3 \times 36 = 4 \times 96$	12 9	36 = 6	× 6	
Among So, the	the factors, 2 prime factors	2 and 3 are prime pr	ime number nd 3.	S.			
Elist un	uie prinie lu	$42 = 1 \times 4$ $42 = 3 \times 1$	2 4	$42 = 2 \times 2$ $42 = 6 \times 7$			
The fac The pri	tors of 42 are me factors of	1, 2 , 3 , 6, 7 , 42 are 2, 3 an	14, 21 and nd 7.	42.			
Fun	Matr	s!					
1. Ge	t into groups	of 5.					
2. Th	e teacher wil	show a whole	e number of	n the board.			
3. 2 p pap Th	persons in eac per. 2 other p c last person	h group will ersons will id will raise hi	list the facto entify the p s/her hand t	ors of the wh rime number to tell the pr	ole num s from tl ime facto	ber on a j he list of ors of the	piece of factors. e whole
1111	LI LI MALO						
nu 4. Th	e fastest grou	p with the co	rrect answer	will get a po	oint.		

- round.
- 6. The group with the most points wins the game.



or visit

?u=oUjlXjVE

https://qr.pelangibooks.com/

- Inform the students that prime factorization is a way of expressing a number as a product of its prime factors.
- Tell them that we can express a number in the form of prime factorization using the repeated short division. Ask them to divide the number by the smallest prime numbers repeatedly until the quotient is 1.
- They can use the factor tree method. In this method, the number is split into its factors, and the factors are further split until all of them are prime numbers.
- 4. Use the examples to explain further.

- 5. Guide them to write the prime factorization form as an index notation.
- 6. Make them realize that $5^3 = 5 \times 5 \times 5$ or $8^5 = 8 \times 8 \times 8 \times 8 \times 8$. Guide them to read 5^3 as *five to the power of three* and 8^5 as *eight to the power of five*.
- Use the examples to show how to use the repeated short division method and the factor tree method. Also, show them how to write the prime factorization as an index notation.
- Guide the students to refer to Starting Point on page 2. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 13 students to answer it. Ask the rest to verify the answers.

We	can write $60 = 2 \times 2 \times 3 \times$	5 as $60 = 2^2 \times 3 \times 5$		
We	read 22 as 2 to the power of	f 2 which means 2 >	< 2.	
		4 ³ 7 ⁵		
We	read 43 as 4 to the power o	f 3 which means 4 >	< 4 × 4.	
We	read 75 as 7 to the power o	f 5 which means 7 >	< 7 × 7 × 7 × 7.	
Thi	s method of expressing the	repeated multiplica	tion is known as index notation	1.
Exp	press 120 in the form of pri	me factorization.		
Me	thod 1: Repeated short div	ision Metho	d 2: Factor tree	
	$\begin{array}{c} 2) 1 2 0 \\ 2) 6 0 \\ 2) 3 0 \\ 3) 1 5 \\ 5) 5 \\ 1 \end{array}$	ź	$\begin{array}{c} 120 \\ 6 \\ 20 \\ 3 \\ 4 \\ 2 \\ 2 \end{array}$	
120	$= 2 \times 2 \times 2 \times 3 \times 5$	120 =	$2 \times 2 \times 2 \times 3 \times 5$	
	$= 2^3 \times 3 \times 5$	=	$2^3 \times 3 \times 5$	
Ū	RY THIS!			
1.	List the factors of			
	(a) 24	(b) 56	(c) 102	
2.	List the first 10 prime num	nbers.		
3.	State if these numbers are	prime numbers.		
	(a) 59	(b) 85	(c) 91	
4.	List the prime factors of			
	(a) 42	(b) 81	(c) 124	
5.	Express these numbers in notation.	the form of prime	factorization. Write them in inde	x
	(a) 165	(b) 88	(c) 216	
			Chapt	er 1 7

Further practices

Get the students to complete the practices on pages 1 to 4 in Go Get Maths Workbook P6.



Lesson 2 Highest common factor (HCF)

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. List the common factors of 2 or more numbers.
- 2. Identify the highest common factor of 2 or more numbers.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Common factor, highest common factor, prime factorization

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Tell the students that the common factors of two or more numbers are a number which divides each of the given numbers exactly.
- 2. Inform the students that to find the common factors:
 - a) List the factors of each number.
 - b) Compare the factors to find numbers that are the same (or common) in each list.
- 3. Guide them how to find out if a given number a common factor for some other numbers.
- 4. Use the examples to explain further.

Go Get Maths Teacher's Guide P6 | 8

 Ask a volunteer for the factors of 16 and another for 20. Then, ask another volunteer to identify the common factors of 16 and 20. Finally, ask another to identify the greatest number among the common factors of 16 and 20.

Factors of 16 = 1, 2, 4, 8, 16Factors of 20 = 1, 2, 4, 5, 10, 20Common factors of 16 and 20 = 1, 2, 4Highest common factors of 16 and 20 = 4

- Tell the students that the highest common factor of two or more numbers is the greatest common factor of the numbers.
- Inform the students that besides listing all the common factors, we can use the repeated short division and prime factorization methods.
- For the repeated short division, ask them to divide the numbers by their common factors until there is no more common factors. The highest common factor is the product of the divisors.
- 5. For the prime factorization method, ask them to express the numbers in the prime factorization form. The highest common factor is the product of the common factors.
- 6. Use the example to explain further.

	The highest common factor (HCF) of two or more whole numbers is the greatest common factor of these numbers.
The factors of 20 are 1,	2, 4, 5, 10 and 20.
The factors of 32 are 1,	2, 4, 8, 16 and 32.
The common factors of 2	20 and 32 are 1, 2 and 4.
The highest common fac	tor (HCF) of 20 and 32 is 4.
Find the HCF of 18 and 2	24.
Method 1: Repeated sho	ort division
2) 18 24 Divi 3) 9 12 - com	ide the numbers with all their mon factors except 1.
	p dividing when there are no
3 4 - Sto mor	e common factors except 1.
$3 \qquad 4 \xleftarrow{\text{sto}}_{\text{mor}}$ HCF of 18 and 24 = 2 × 1 = 6	e common factors except 1.
$3 \qquad 4 \qquad \text{sto} \\ \text{mor} \\ \text{HCF of 18 and } 24 = 2 \times 1 \\ = 6 \\ \text{Method 2: Prime factorial} $	e common factors except 1. 3 - Multiply all the divisors. zation
$3 \qquad 4 \qquad $	e common factors except 1. 3 - Multiply all the divisors. zation Prime factorize all the numbers.
$3 \qquad 4 \qquad \text{sto}_{mor}$ HCF of 18 and 24 = 2 × 3 = 6 $Method 2: \text{ Prime factor:}$ $18 = 2 \times 2 \times 2 \times 3 \times$	e common factors except 1. 3 - Multiply all the divisors. zation Prime factorize all the numbers.



- 7. Use the example to explain further.
- Inform the students that they can use the same methods to find the greatest common factor for more than two numbers.
- Guide the students to refer to Starting Point on page 8. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 5 to 8 in Go Get Maths Workbook P6.

Lesson 3 Lowest common multiple (LCM)

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. List the multiples of a number.
- 2. List the common multiples of 2 or more numbers.
- Identify the lowest common multiple of 2 or more numbers.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Multiple, common multiple, lowest common multiple

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Guide the students to understand what a multiple of a number is. Multiples are numbers that we get when we multiply one whole number by other whole numbers.
- 2. Guide them to find out if a given number a multiple of another number.
- 3. Use the examples to explain.

Thinking Corner!

Ask the students the quotient when 12 is divided by 12. 1 is the answer. Therefore, 12 is a multiple of 12 as $12 \times 1 = 12$.

11 | Go Get Maths Teacher's Guide P6

L@SSON 3 Starting point 24 is divisible b How do we rela	Lowest com by 2, 4 and 8. Ite 24 to 2, 4 and 8	1 mon r 3?	nultiple (LCM) 24 + 2 = 12 24 + 4 = 6 24 + 8 = 3
Learning to know	Multiples A multiple of of product of th another whole $4 \times 8 = 32$ 32 is als 32 is als	a whole num ne whole n number. Multipl a multiple so a multip	e of 4. e of 8. e of 4.
3 × 1 3 × 2 3 × 3	= 3 3 = 6 3 = 9 3		$3 \times 7 = 21$ $3 \times 8 = 24$ $3 \times 9 = 27$
The first 9 multiple	es of 3 are 3, 6, 9,	12, 15, 18	, 21, 24 and 27.
Is 54 a multiple of	5?		
$5 \times 10 = 50$ $5 \times 11 = 55$ So, 54 is not a mu	ultiple of 5.	or	54 + 5 = 10 R 4 54 cannot be divided exactly by 5. So, 54 is not a multiple of 5.
Thinking EDPT A whole number is	Er! a multiple of itse	lf. Why?	Chapter 1 11



- Tell the students that a common multiple of two or more numbers is a number that is a multiple of each of them.
- 2. Inform the students that to find the common multiple:
 - a) List the common multiples of each number.
 - b) Compare the multiples to find numbers that are the same (or common) in each list.
- Tell the students that we can find the other common multiples of two or more numbers if we know the first common factor. We can multiply the first common multiple with other whole numbers.
- 4. Guide them how to find out if a given number a common multiple for some other numbers.
- 5. Use the examples to explain further.

 Ask a volunteer for the multiples of 2 and another for 4. Then, ask another volunteer to identify the common multiples of 2 and 4. Finally, ask another to identify the smallest number among the common multiples of 2 and 4.

Multiples of 2 = 2, 4, 6, 8, 10, 12,...Multiples of 4 = 4, 8, 12, 16, 20,...Common multiples of 2 and 4 = 4, 8, 12, ...

Lowest common multiples of 2 and 4 = 4

- Tell the students that the lowest common multiple of two or more numbers is the smallest common multiple of the common numbers.
- Inform the students that besides listing all the common multiples, we can use the repeated short division and prime factorization methods.
- 4. For the repeated short division, ask them to keep dividing the numbers by their common factors until all quotients become 1. The numbers that cannot be divided exactly are brought down for the next division. The lowest common multiple is the product of the divisors.
- 5. For the prime factorization method, ask them to express the numbers in the prime factorization form. The lowest common multiple is the product of all the prime factors. However, common factors will be included only once.
- 6. Use the example to explain further.









- 7. Use the example to explain further.
- Inform the students that they can use the same methods to find the lowest common multiple for more than two numbers.
- 9. Use the example to explain further.
- Guide the students to refer to Starting Point on page 11. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 9 to 13 in Go Get Maths Workbook P6.

Lesson 4 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving HCF and LCM.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

 Reiterate the 3 simple steps to solve a word problem.

Step 1: Understand the problem

Step 2: Plan and execute

Step 3: Check the answer

1. Guide them to use the 3 steps in solving the word problems.



Zak has 40 apples, 72 oranges and 112 guavas. He wants to distribute the fruits equally among some friends. What is the maximum number of friends he can distribute to with none of the fruits remaining? How many apples, oranges and guavas will each of his friends receive?

$$40 = 2 \times 2 \times 2 \times 5$$

$$72 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$112 = 2 \times 2 \times 2 \times 2 \times 2 \times 7$$

HCF of 40, 72 and $112 = 2 \times 2 \times 2$ = 8

The maximum number of friends he can distribute to is 8. Number of apples received by each friend = 40 + 8= 5

Number of oranges received by each friend = $72 \div 8$ = 9

Number of guavas received by each friend = $112 \div 8$ = 14

Each of his friends will receive 5 apples, 9 oranges and 14 guavas.

Zoe has 3 pieces of ribbons. The red ribbon is 42 cm long. The blue ribbon is 36 cm long and the yellow ribbon is 54 cm long. She wants to cut them into strips of greatest similar length. How long will each strip be? How many strips of red ribbon will there be?

HCF of 42, 36 and $54 = 2 \times 3$ = 6

Each strip will be 6 cm long.

42 ÷ 6 = 7 There will be 7 strips of red ribbon.

16 | Mathematics Prathomsuksa 6

- In the first word problem, each friend will receive the same number of apples, the same number of oranges and the same number of guavas.
- We need to find the maximum number of sets of apples, oranges and guavas Zak can make, without any remainders. Here, HCF of 40, 72 and 112 will the maximum number of sets of apples, oranges and guavas.
- 4. As 8 is the HCF of 40, 72 and 112, there will be 8 sets of apples, oranges and guavas. It also means that Zak will distribute the fruits to 8 friends.
- To find the number of apples, the number of oranges and the number of guavas each friend will receive, we need to divide the number of each fruit by 8.
- 6. In the second word problem, Zoe wants to cut the 3 ribbons into strips of the greatest similar length.
- As 6 is the HCF of 42, 36 and 54, the length of the shorter strips will be 6 cm. To find the number of red strips, we need to divide the original length of the red ribbon by 6.

1. In this problem, try to guide the students to understand it first. Use the explanation to guide them.



Solving word problems using LCM

Ploy bakes cookies every 2 days and cakes every 4 days. Today, Ploys bakes both cookies and cakes. After how many days later will she bake both cookies and cakes again on the same day?



= 4

She will bake both cookies and cakes again on the same day after 4 days later.

Further explanation:

Day						11	12	13
Cookies	1	1	1	1	1	1		1
Cakes	1		1		1			1

Analyze the table above.

Ploy bakes cookies every 2 days. If she bakes on the 1st day, she will bake cookies again on the 3rd day, then on the 5th day and so on.

Ploy bakes cakes every 4 days. If she bakes on the 1st day, she will bake cakes again on the 5th day, then on the 9th day and so on.

If she bakes both cookies and cakes on the 1st day, she will bake both of them on the 5th day, then on the 9th day and so on. She will bake both cookies and cakes every 4 days.



The shop sells packets of 8 red marbles and packets of 6 blue marbles. Sanit wants to have the same number for both types of marbles. What is the smallest number of packets for each type of marbles that he can buy? How many marbles will he have altogether?

$$8 = 2 \times 2 \times 2$$

$$6 = 2 \times 3$$

$$1 + 2 \times 2 \times 2 \times 3 = 24$$

LCM of 8 and $6 = 2 \times 2 \times 2 \times 3$

$$= 24$$

Number of packets of red marbles = $24 \div 8$

$$= 3$$

Number of packets of blue marbles = $24 \div 6$

$$= 4$$

Total marbles = 24 ± 24

= 48

So, he can buy 3 packets of red marbles and 4 packets of blue marbles. He will have 48 marbles altogether.

We use HCF to solve word problems when they require us to split things into smaller groups arrange things into rows or groups find the greatest number of things. We use LCM to solve word problems when they require us to state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things.	
 split things into smaller groups arrange things into rows or groups find the greatest number of things. We use LCM to solve word problems when they require us to state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things. 	We use HCF to solve word problems when they require us to
 arrange things into rows or groups find the greatest number of things. We use LCM to solve word problems when they require us to state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things. 	• split things into smaller groups
 find the greatest number of things. We use LCM to solve word problems when they require us to state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things. 	 arrange things into rows or groups
We use LCM to solve word problems when they require us to state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things. 	 find the greatest number of things.
 state when 2 or more events will occur at the same time or meet again purchase or get multiples of items in order to have enough find the smallest number of things. 	We use LCM to solve word problems when they require us to
 purchase or get multiples of items in order to have enough find the smallest number of things. 	• state when 2 or more events will occur at the same time or meet again
 find the smallest number of things. 	• purchase or get multiples of items in order to have enough
	• find the smallest number of things.
	hematics Prathomsuksa 6
hematics Prathomaukaa 6	

- In this problem, Sanit wants to have the same number of red marbles and blue marbles, but that number should be the smallest possible number. So, we need to find the smallest possible number of packets of red marbles and blue marbles that he should buy.
- 3. As 24 is the LCM of 8 and 6, this means Sanit should have 24 red marbles and 24 blue marbles. To find the number of packets of red marbles to buy, we divide 24 by 8. To find the number of packets of blue marbles to buy, we divide 24 by 6. To find the total marbles, we add 24 and 24.
- Using the information, guide the students on when to use HCF and LCM to solve word problems. Reiterate to the students that they should try to understand the problems and understand what the HCF or LCM represents.
- 5. Guide the students to refer to **Starting Point** on page 15. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 3 students to answer it. Ask the rest to verify the answers. Work through with them to make them fully understand them.

Further practices

Get the students to complete the practices on pages 14 to 20 in Go Get Maths Workbook P6.





Chapter 2 Fractions

The big idea

- Ask the students to look at the picture carefully. Ask them these questions to start a discussion:
 - a) How many mangoes are there on the tree?
 - b) If the children plucked all the mangoes and found that $\frac{1}{12}$ of the mangoes were rotten,
 - i. how many mangoes were rotten?
 - ii. how many mangoes were in good condition?
 - iii. they divided the good mangoes between themselves equally. How many mangoes did each of them get?
- Now, ask them to read the text in the speech bubble. Ask them if they know how to solve it.

Strand 1: Numbers and Algebra

Standard M.1.1 Numbers

Indicators:

M 1.1 Gr6/1 Compare and arrange a sequence of fractions and mixed numbers from various situations.

M 1.1 Gr6/7 Find the results of mix addition, subtraction, multiplication and division of fractions and mixed numbers.

M 1.1 Gr6/8 Show mathematical methods of finding the answers of 2- to 3-step word problems involving fractions and mixed numbers.

Go Get Maths Teacher's Guide P6 | 20

Lesson 1 Comparing and ordering fractions

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Compare fractions with different denominators.
- 2. Order fractions with different denominators.

Suggested teaching time

3 periods (4 x 50 minutes)

Vocabulary

Lowest common multiple

Materials needed

Numbered cards (1 to 20)

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- 1. Write $\frac{3}{4}$ and $\frac{4}{5}$ on the board. Ask the students how to compare them.
- Guide them to find the LCM of 4 and
 Then, guide them to find the equivalent fractions with the LCM as the common denominator. Lastly, ask them to compare the numerators.
- 3. Use the example to explain further.



Activity for Reinforcement

The students need to be familiarized themselves with the method to find LCM. Ask them to find the LCM of the following sets of numbers.

a)	2, 6
b)	4, 10
c)	15, 20
d)	4, 8, 10
e)	2, 3, 4, 7
f)	6, 12, 20, 30



Extra Notes

When comparing fractions and/or mixed numbers, here are some guidelines:

- a) If there are only mixed numbers, compare the whole numbers first.
- b) If there are mixed numbers and improper numbers, convert the mixed numbers into improper numbers first.
- c) If the denominators are not the same, find the LCM of the denominators. Then, convert the fractions into their equivalent fractions with the LCM as the common denominator. Finally, compare the numerators.

- Tell the students that when comparing mixed numbers, always compare the whole numbers first.
- If the whole numbers are the same, then proceed to compare the fractional parts.
- Inform the students that when comparing a mixed number and an improper number, it is better to convert the mixed number into an improper number first.
- 7. Use the examples to explain first.

- Tell the students that when ordering fractions with different denominators, we need to find the LCM of the denominators as the common denominator first.
- 2. Use the example to explain.
- Inform the students that they should always ensure the LCM is correct. They can have a quick check by dividing each of the denominators by the LCM. It should give a quotient without any remainder.



Extra notes

Tips to remember the ascending and descending orders:

- Ascending: the "A" points upwards
- Descending is "Down"-sending





- 4. Use the example to explain.
- Guide the students to refer to Starting Point on page 21. Ask them to answer the questions. Have a discussion to conclude the lesson.

Fun with Maths!

Materials required: Numbered cards (1 to 20)

Objective of the activity: Ordering fractions

In this activity, the students are tested for their accuracy and speed in finding the LCM and the equivalent fractions and comparing the numerators.

Try This!

Get 9 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 21 to 26 in Go Get Maths Workbook P6.

Fun with Matha! 1. Make groups of 4. 2. Each group is given 20 pieces of cards numbered 1 to 20. 3. Each student takes 2 cards and makes a fraction with the number on the first card as the numerator and the number on the second card as the denominator. 4. Compare the fractions. 5. The person who can tell the greatest fraction among the 4 fractions correctly wins a point. 6. Return the cards and shuffle them. Repeat the game for 5 times. 7. The person with the most points wins. TRY THIS! **1.** Fill in the blanks with > or <. (a) $1\frac{5}{12}$ $\frac{23}{14}$ (b) $\frac{11}{12}$ $\frac{7}{8}$ (c) $\frac{23}{15}$ $\frac{31}{20}$ (d) $\frac{7}{4}$ $\frac{17}{10}$ (e) $2\frac{9}{14}$ $2\frac{13}{21}$ (f) $5\frac{7}{9}$ $\frac{35}{6}$ 2. Arrange these fractions. (a) In ascending order: $\frac{2}{5}$ $\left(\frac{3}{10}\right)$ $\left(\frac{3}{8}\right)$ (b) In descending order $\left(\frac{5}{9}\right)\left(\frac{7}{12}\right)\left(\frac{2}{3}\right)$ (c) In ascending order $\left(1\frac{8}{15}\right)\left(\frac{17}{10}\right)\left(1\frac{2}{5}\right)\left(\frac{19}{12}\right)$



Lesson 2 Addition and subtraction of fractions

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Add fractions with different denominators.
- 2. Subtract fractions with different denominators.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Materials needed

-

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- 1. Ask the students if they can add $\frac{3}{10}$ and $\frac{5}{6}$ directly. Why?
- Tell the students that they need to convert them into equivalent fractions with a similar denominator. The similar denominator is the LCM of the given denominators.
- 3. Guide them to find the LCM of 10 and 6, and to convert $\frac{3}{10}$ and $\frac{5}{6}$ into $\frac{9}{30}$ and $\frac{25}{30}$ respectively. Then, guide them to add the fractions.
- 4. Use the example to explain further.

Go Get Maths Teacher's Guide P6 | 26

- 5. Guide the students to add an improper fraction and a mixed number. Advise them to add the fractional part of the mixed number with the improper number first before adding the sum with the whole number of the mixed number.
- 6. Use the example to explain.
- Guide the students to add mixed numbers. Advise them to add the fractional part of the mixed numbers first before adding the sum with the whole numbers of the mixed number.
- 8. Use the example to explain.



Activity for Reinforcement

The students need to practice more in order to add correctly. Get a few students to write these questions on the board and answer them. Get others to verify the answers.





- 1. Ask the students if they can subtract $\frac{5}{12}$ from $\frac{4}{9}$ directly. Why?
- Tell the students that they need to convert them into equivalent fractions with a similar denominator. The similar denominator is the LCM of the given denominators.
- 3. Guide them to find the LCM of 9 and 12, and to convert $\frac{4}{9}$ and $\frac{5}{12}$ into $\frac{16}{36}$ and $\frac{15}{36}$ respectively. Then, guide them to subtract the fractions.
- 4. Use the example to explain further.
- Guide the students to subtract a mixed number from another mixed number. Advise them convert them into improper fractions first before converting them into their equivalent fractions with the LCM as the common denominator.
- 6. Use the example to explain.
- Emphasize that it is always better to convert any mixed numbers into improper fractions for subtraction.

- Guide the students to subtract a mixed number from an improper fraction.
 Advise them convert the mixed number into an improper fraction first before converting them into their equivalent fractions with the LCM as the common denominator.
- 9. Use the example to explain. Guide the students to refer to **Starting Point** on page 26. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 16 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 27 to 29 in Go Get Maths Workbook P6.





Activity for Reinforcement

The students need to practice more in order to subtract correctly. Get a few students to write these questions on the board and answer them. Get others to verify the answers.





Lesson 3 Mixed operations of fractions

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Explain the order of operations.
- Apply the correct order of operations of fractions.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary Order of operations

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Inform the students that we need to follow some orders when solving mathematical problems.
- Tell them that any operations in brackets are the most prioritized. They must do the operations in the brackets first, then followed by multiplication/ division and lastly addition/ subtraction.
- Inform them that multiplication and division have the same priority. When they have both multiplication and division in the same problem, they should solve them from left to right.
- 4. This goes the same for addition and subtraction.
- 5. Use the examples to explain further.

Go Get Maths Teacher's Guide P6 | 30

6. To make the fractional multiplication simpler, we can reduce the fractions by cancelling off with the common factors.



- 7. Use the examples to explain further.
- Guide the students to refer to Starting Point on page 30. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 8 students to answer it. Ask the rest to verify the answers.



Further practices

Get the students to complete the practices on pages 30 and 31 in Go Get Maths Workbook P6.





Lesson 4 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

- Solve word problems involving fractions with different denominators.
- 2. Solve 2-step and 3-step word problems with fractions with different denominators.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

 Reiterate the 3 simple steps to solve a word problem.

Step 1: Understand the problem

- Ask the students to read the number story and the question silently. Then, read together with the students. Explain further the number story and the question if the students do not understand.
- Ask the students these questions to ensure they understand:
 - What information is given?
 - What do you need to find?
 - Are you comparing the items?

Go Get Maths Teacher's Guide P6 | 32

Step 2: Plan and execute

- Ask the students to draw the suitable bar model including the knowns and unknowns.
- Ask them to find the keyword in the problem that indicates the operation whether to add, to subtract, to multiply or to divide.
- Analyze the bar model drawn.
- Then, write the number equation and solve it.

Step 3: Check the answer

- Always ask the students to check their answer. They need to check if the answer makes sense and is reasonable.
- 2. Work with them the 3 steps in solving the word problems.

The red cable is $5\frac{1}{10}$ m long. The blue cable is $1\frac{4}{15}$ m shorter than the red cable. What is the length of the blue cable?



The length of the blue cable is $3\frac{5}{6}$ m.

Janet spent $1\frac{1}{6}h$ to draw the picture. Then, she spent another $1\frac{1}{4}h$ to color it. How much time did she spend on drawing and coloring the picture altogether?





- For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The fraction of the cupcakes given to John
 - The fraction of the cupcakes given to Kai
 - The number of cupcakes left after given to John and Kai
 - b) What do I need to find at the end?
 - The number of cupcakes at first
 - c) What do I need to find out first?
 - The fraction of the cupcakes left after given to John and Kai
- 2. For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The number of local stamps and foreign stamps altogether
 - The fraction of the local stamps given away
 - That the number of local stamps and the number of foreign stamps are the same after given the stamps away
 - b) What do I need to find at the end?
 - The number of foreign stamps at the end
 - c) What do I need to find out first?
 - The parts/units of the foreign stamps

- 3. For the first part of the example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The fraction of marbles that are red
 - The number of friends Zak divided the blue marbles equally to
 - b) What do I need to find at the end?
 - The fraction of the total marbles that each friend gets
 - c) What do I need to find out first?
 - The fraction of the marbles that are blue
- For the second part of the example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The fraction of marbles that are red
 - The number of friends Zak divided the blue marbles equally to
 - The fraction of the marbles that each friend gets
 - b) What do I need to find at the end?
 - The number of marbles that each friend gets

Zak has some red and blue marbles. $\frac{1}{4}$ of the marbles are red. He divides the blue marbles equally among his 6 friends. (a) What fraction of the total marbles does each of his friends get? (b) If Zak has 48 marbles, how many marbles does each of his friend get? (a) Red marbles Blue marbles Divided among 6 friends $1 - \frac{1}{4} = \frac{3}{4}$ $\frac{3}{4}$ of Zak's marbles are blue.

 $\frac{3}{4} \div 6 = \frac{3}{4} \times \frac{1}{6}$ $=\frac{1}{2}$

Each of his friends gets $\frac{1}{8}$ of the total marbles.

(b) $48 \times \frac{1}{8} = 6$

Each of his friends gets 6 marbles.

35 | Go Get Maths Teacher's Guide P6


- For the example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The difference in length between rope A and rope B
 - The difference in length between rope C and rope B
 - The total length of all the ropes
 - b) What do I need to find at the end?
 - The length of rope B
 - c) What do I need to find out first?
 - The length of 3 rope B altogether
- Guide the students to refer to Starting Point on page 32. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 3 students to answer it. Ask the rest to verify the answers.





Further practices

Get the students to complete the practices on pages 32 to 39 in Go Get Maths Workbook P6.

Chapter 3 Decimals

The big idea

- 1. Ask them these questions to start a discussion:
 - a) What is the currency of our country?
 - b) Do other countries such as Malaysia use Thai Baht too as their currency?
 - c) If you are going to other country such as Malaysia, how are you going to get its currency to be used in that country?
- 2. Ask the students to look at the table carefully. Ask them these questions to start a discussion:
 - a) Can you read the decimals in the table?
 - b) What are the currencies for USA, UK, Malaysia, Singapore, Australia and Chine?
 - c) Do you know what currency exchange rates are?
 - d) What do you know about the buying rate and selling rate?



Strand 1: Numbers and Algebra

Standard M.1.1 Numbers

Indicators:

M 1.1 Gr6/8 Find the result of the decimals which divisors and the results has no more than 3 decimal places.

M 1.1 Gr6/10 Show mathematical methods of finding the answers of 3-step word problems involving addition, subtraction, multiplication and division of decimals.



Lesson 1 Decimals and fractions

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Relate decimals and fractions.
- 2. Convert fractions into decimals.
- 3. Convert decimals into fractions.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary Fraction, decimal

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- 1. Ask the students what they understand by $\frac{1}{10}$. If there are 10 parts, how many parts does $\frac{1}{10}$ represent?
- 2. Guide them to understand that $\frac{1}{10}$ also means 1 tenth. Ask them to represent 1 tenth in decimals.
- 3. Repeat with $\frac{8}{10'} \frac{1}{100'} \frac{57}{100'} \frac{1}{1,000}$ and $\frac{734}{1,000}$.
- 4. Use the examples to explain further.

- 1. Tell the students that we can convert a fraction into a decimal.
- For fractions with denominators of 10, 100 or 1,000, we can write the numerator and then put the decimal point in the correct spot with a space from the right for every zero in the denominator.



- 3. In general, we can convert the fractions into decimals by 2 methods:
 - a) Converting the fraction into its equivalent fraction with the denominator of 10, 100 or 1,000
 - b) Dividing its numerator by its denominator
- 4. Use the example to explain.





- For mixed number, we can just convert the fractional part into a decimal, before adding the decimal with the whole number of the mixed number.
- 6. Use the examples to explain.

- 7. Tell them that sometimes it is not possible to convert a fraction into its equivalent fraction with a denominator of 10, 100 or 1,000. For such fractions, it is better to divide the numerator by the denominator to turn them into decimals.
- However, these decimals may have more than 3 decimal places. You may need to round them to the number of decimal places as given.
- 9. Use the example to explain further. Ask them to convert $\frac{1}{9'} \frac{2}{11}$ and $\frac{15}{13}$ into decimals with 3 decimal places.



- 1. Tell the students that we can convert a decimal into a fraction.
- Write 1.2 on the board. As 1.2 = 1 + 0.2, we convert the 0.2 into a fraction first before adding it with 1. Guide them to convert 0.2 into a fraction by writing 2 as the numerator and 10 as the denominator. Here we use 10 as the denominator because the rightmost digit in the decimal is in the tenths place.

$$1.2 = 1 + 0.2$$
$$= 1 + \frac{2}{10}$$
$$= 1 + \frac{1}{5}$$
$$= 1\frac{1}{5}$$

- 3. Remind the students to always give the fraction in its simplest form.
- 4. Use the example to explain further.
- 43 | Go Get Maths Teacher's Guide P6







5. Write 0.58 on the board. Guide them to convert it into a fraction by writing 58 as the numerator and 100 as the denominator. Here we use 100 as the denominator because the rightmost digit in the decimal is in the hundredths place.

$$0.58 = \frac{58}{100} = \frac{29}{50}$$

6. Write 25.924 on the board. As 25.924 = 25 + 0.924, we convert the 0.924 into a fraction first before adding it with 25. Guide them to convert it into a fraction by writing 924 as the numerator and 1,000 as the denominator. Here we use 1,000 as the denominator because the rightmost digit in the decimal is in the thousandths place.

$$25.924 = 25 + 0.924$$
$$= 25 + \frac{924}{1,000}$$
$$= 25 + \frac{231}{250}$$
$$= 25\frac{231}{250}$$

- 7. Remind the students to always give the fraction in its simplest form.
- Guide the students to refer to Starting Point on page 40. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 15 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 40 to 44 in Go Get Maths Workbook P6.

Lesson 2 Division of decimals by decimals

Lesson objectives

By the end of the lesson, the students should be able to: 1. Divide a decimal by a decimal.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Decimal, division

Materials needed

Starting point

_

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

10 ÷ 2 = 5 100 ÷ 20 = 5 1,000 ÷ 200 = 5 10,000 ÷ 2,000 = 5

- Ask the students to analyze the above division. When both the dividend and the divisor are multiplied by 10, 100 or 1,000, the quotients are the same.
- 2. Inform the students that dividing a decimal by a decimal directly is complex. It is easier to divide by a whole number. So, we multiply the divisor by 10, 100 or 1,000 until it is a whole number. When we do so, we need to do the same to the dividend.
- 3. This applies when we write the division in a fraction form.
- 4. Use the examples to explain further.







Activity for Reinforcement

The students need to practice more in order to divide correctly. Get a few students to write these questions on the board and answer them. Get others to verify the answers.



Teaching ideas

- When we have turned the division into a fraction with a whole number as a denominator, then we can divide using the long division method.
- 6. Use the examples to explain further.
- Guide the students to refer to Starting Point on page 45. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 8 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 45 to 47 in Go Get Maths Workbook P6.



Lesson 3 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Solve the word problems involving fractions and mixed operations.
- 2. Solve the word problems involving currency exchange.

Suggested teaching time

5 periods (5 x 50 minutes)

Vocabulary

Currency exchange

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- For this example, guide the students to set them thinking about these questions:
 - a) What do I know?
 - The cost of a pencil
 - The cost of a pens
 - b) What do I need to find at the end?
 - The cost of 12 pencils and 9 pens altogether
 - c) What do I need to find out first?
 - The cost of 12 pencils
 - The cost of 9 pencils





- 2. For this example, guide the students to set them thinking about these questions:
 - a) What do I know?
 - The mass of flour that Preeda has
 - The difference in mass of flour that Malee and Preeda have
 - The difference in mass of flour that Malee and Ahtit have
 - b) What do I need to find at the end?
 - The mass of flour that Malee, Ahtit and Preeda have altogether
 - c) What do I need to find out first?
 - The mass of flour that Malee has
 - The mass of flour that Ahtit has
- 3. For this example, guide the students to set them thinking about these questions:
 - a) What do I know?
 - The number of sheets per a roll of kitchen paper
 - The perimeter of a sheet of kitchen paper
 - The shape of a sheet of kitchen paper
 - b) What do I need to find at the end?
 - The length of 6 rolls of kitchen paper
 - c) What do I need to find out first?
 - The length of each sheet of kitchen paper
 - The length of each roll of kitchen paper

Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 48 to 51 in Go Get Maths Workbook P6.





Extra notes

A **currency** is the medium of exchange of goods and services, that is money. It is usually accepted in the country that issues it. For example, the currency of Thailand is Thai Baht and the currency of Malaysia is Ringgit Malaysia.

When we travel to a country, we need to change our currency for that country's currency. However, the values of different currencies are different. For example, 10 Baht is about 1.30 Ringgit. This is called the **exchange rate**. The exchange rate changes every day and it is determined by many factors.

- Show the students some of our currency and the currencies of other countries.
- 2. Ask the students these questions to start the discussion about currency:
 - a) What is the currency of our country?
 - b) What is the use of our currency?
 - c) Does every country have the same currency?
 - d) What are the currencies of Malaysia, Indonesia and Singapore?
 - e) How do we get the currencies of other countries?
- Tell the students that we can buy (change) our currency for other currencies. There is a rate for the exchange of currency and it is known as the currency exchange rate.
- 4. Ask the students to analyze the table. Tell them this about the buying rate:
 - a) We will use this rate if we have the foreign currency and want to exchange it into Thai Baht.
 - b) We will give the foreign currency to the bank and the bank will give (buy) us the Thai Baht.
- 5. Tell them this about the selling rate:
 - a) We will use this rate if we want the foreign currency.
 - b) We will give Thai Baht to the bank and the bank will give (sell) us the foreign currency.
- The buying rate is always lower than the selling rate as the bank will earn some money form the currency exchange.

- For the first part of the problem, Panit wants to exchange 500 THB into EUR. This means Panit will give 500 THB to the bank and the bank will give Panit the EUR. So, the bank is selling the EUR. Therefore, we need to refer to the selling rate.
- The table says the selling rate is 39.20 THB. Discuss with the students what this means. It means we can get 1 EUR for 39.20 THB.
- For the second part of the problem, Dao wants to exchange 160 EUR into THB. This means Dao will give 160 EUR to the bank and the bank will give Dao the THB. So, the bank is buying the EUR. Therefore, we need to refer to the buying rate.
- 10. The table says the buying rate is 38.40 THB. Discuss with the students what this means. It means for 1 EUR, we can get 38.40 THB.
- Ensure the students are able to distinguish between the selling and buying rates, and when to use them.
- 12. Ask the students to take note that the rule of three is used here to solve the problem.

	Buying rate	38.40 THB		
	Selling rate	39.20 THB		
(a) If Panit wants to e	exchange 500 THB i	nto EUR, how much will	he get?	
(b) If Dao wants to ex	xchange 160 EUR in	to THB, how much will	she get?	
(Round the answers to	o 2 decimal places.)			
(a) Panit wants to exe	change THB into EU	R. We refer to the selling	rate	
39 20 THB	1 FUR			
1 THB	(1 + 39 20) EU	When we ex	change THB into	
500 TUD	1 : 20 20 ·· 500	EUR with the sells EUR to u	hen we exchange THB into IR with the bank, the bank IIs EUR to us. So, we need to	
500 IIIB	→ 1÷39.20 x 500	refer to its s	elling rate.	
	$=\frac{1}{39.20} \times 500$			
	$=\frac{10}{392} \times 500$			
	$=\frac{5,000}{392}$		7	
	≈ 12.76 EUR			
Panit will get abo	ut 12.76 EUR.			
(b) Dao wants to excl	hange EUR into TH	3. We refer to the buying	rate.	
1 EUR	38.40 THB			
160 EUR	38.40 × 160			
	= 6,144 THB			
Dao will get 6,14	4 THB.		44110	
When w bank, th	ve exchange EUR into e bank buys EUR from to its buying rate	THB with the		



- 13. For the first problem, Somsak has THB and wants to exchange for SGD. Here the exchange rate of 23.83 THB = 1 SGD is actually the selling rate.
- 14. For the second problem, Malai has MYR and she wants to exchange them for THB. Here the exchange rate of 1 MYR = 7.95 THB is actually the buying rate.
- 15. Guide them to use the rule of three to solve the problems.
- Guide the students to refer to Starting Point on page 47. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 52 to 54 in Go Get Maths Workbook P6.

2. Kiet i of 1 0	is going to China CNY = 4.82 TIIB	. He wants to ex . How many CN	change 7,000 TH Y will he get?	B into CNY at th	ie rate
He w	ill get CN	IY.			
3. The t	able below shows	s the currency ex	change rates of a	bank.	
	Country	Currency	Buying rate	Selling rate	
	Philippines	PHP	0.53 THB	0.67 THB	
	New Zealand	NZD	22.53 THB	23.40 THB	
(b) Z	Aike will get about	It PHP.	to THR How m	nch will she get?	
(0) Z Z	loe will get	TIIB.	ito THB. HOW M	uen win sne get?	Chapter 3 53



Chapter 4 Ratios

The big idea

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) How many fish are there?
- b) How many turtles are there?
- c) How many crabs are there?
- d) What does the text in the speech bubble mean?
- e) What is ratio?

Strand 1: Numbers and Algebra

Standard M.1.1 Numbers

Indicators:

M 1.1 Gr6/2 Write ratios to compare 2 quantities from texts or situations by each quantity is a cardinal number.

- M 1.1 Gr6/3 Find ratios equivalent to the given ratios.
- M 1.1 Gr6/11 Show mathematical methods of finding the answers of ratio word problems.

Lesson 1 Ratios

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Understand the concept of ratio.
- 2. Write the given quantities as ratios and explain their meaning.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary Ratio

Materials needed

Things around you

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- Show the students 2 similar books and 3 similar pencils. Tell them the ratio of the number of books to the number of pencils is 2 : 3, and the ratio of the number of pencils to the number of books is 3 : 2. Ask them what they can say about ratio.
- 2. Define ratio to the students. Use the examples to explain further.
- 3. Guide them how to read a ratio.
- 4. Emphasize the importance of the order of the quantities. We should not jumble up the order.





- 5. Ask the students to refer to the balloons in the book. Tell them that there are a few ratios we can make from them. Guide them to realize that they can make a ratio by comparing the number of the yellow balloons to the number of all the balloons (a part to a whole lot).
- 6. Ask them to be extra careful with the order of the quantities.
- Tell them that when writing ratios, we do not include the units. But remember, when you find the ratio of two quantities, they must be in the same units.
- 8. Use the examples to explain further.

- 9. Reiterate that the units of the quantities have to the same first before we write the ratio, and there are no units in ratios.
- 10. Use the examples to explain further.
- 11. Tell them that we can write a ratio for 3 quantities. Reiterate that they must be extra careful with the order of the quantities.
- 12. Use the example to explain further.

	() 20 mm	- 0 - m
		o cm
20 mm = 2 cm		8 cm
The ratio of the	length of the paper clip to the length	n of the pencil is 2 : 8.
	For comparison, the units used in t quantities must be the same.	he Par
The gummy bea	r candy costs 50 Satang. The candy	cane costs 2.50 Baht.
2.50 Baht = 250	50 Satang	2.50 Baht
The ratio of the c	ost of the gummy bear candy to the c	ost of the candy cane is 50 : 25
The ratio of the	cost of the candy cane to the cost	st of the gummy bear candy
There are 9 sea	animals.	
	***	5•113•113•113
The ratio of the starfish to the nu	number of crabs to the number of umber of fish is 2 : 4 : 3.	Always follow the correct order of the quantities.
The ratio of the	number of starfish to the number of er of crabs is $4:3:2$.	



57 | Go Get Maths Teacher's Guide P6



The ratio of the number of circles to the number of rectangles is 6:2. The ratio of the number of triangles to the number of rectangles to the number of circles is 4:2:6.

The ratio of the total number of shapes to the number of rectangles is 12 : 2.

Funant Mathal

- 1. Work in pairs.
- 2. Find 2 or 3 groups of things around you.
- 3. Make a ratio to compare their quantities.
- 4. Repeat 2 more rounds with different groups of things.

TRY THIS! Fill in the blanks



Teaching ideas

- 13. Use the example to explain further.
- Guide the students to refer to Starting Point on page 55. Ask them to answer the questions. Have a discussion to conclude the lesson.

Fun with Maths!

Materials required: Things around you Objective of the activity: Making ratios After the activity, the students should be able to understand ratios and make ratios fast.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 55 and 56 in Go Get Maths Workbook P6.

Lesson 2 Equivalent ratios

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Identify equivalent ratios.
- 2. Simplify ratios.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Equivalent ratio

Materials needed

Learning to knowIdentifying equivalent ratiosMother mixes 1 / of juice concentrate with 3 / of water to make some fruit punch. The
ratio of the volume of juice concentrate to the volume of water is 1 : 3.Image: Image: Image

Lesson 2 Equivalent ratios

1:3, 2:6 and 3:9 are equivalent ratios.

What are equivalent ratios?

Starting point

× 2 ÷ 3

When each part in a ratio is multiplied or divided by the same number, the new ratio is an **equivalent ratio** to the original ratio.

1:3

2:6

3:9

Chapter 4 | 59

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Tell the students that if two ratios have the same value, then they are equivalent, even though they may look very different.
- 2. Use the example to explain equivalent ratios.
- To find an equivalent ratio, multiply or divide all the quantities by the same number.
- 4. Use the example to explain further.



 $4:8:12,1:2:3 \mbox{ and } 2:4:6 \mbox{ are equivalent ratios.}$

Teaching ideas

- 5. Guide them to understand how equivalent ratios can be made.
- 6. Use the example to explain further.

Go Get Maths Teacher's Guide P6 | 60

- Guide them to identify the equivalent ratios by multiplying or dividing all the quantities in a ratio by the same number.
- 8. Use the examples to explain further.
- Inform the students that we can find different equivalent ratios by multiplying or dividing the original ratio with many different numbers.
- 10. Use the example to explain.

Thinking Corner!

Ask the students the numbers that we can use to multiple or divide the quantities in a ratio. It will be uncountable. Therefore, there are many equivalent ratios. Which ratio is equivalent to 54:45,6:5 or 27:22?



So, 6:5 is equivalent to $54:45,\,27:22$ is not equivalent to $54:45,\,$



 $+3 \begin{pmatrix} 18:15\\6:5 \end{pmatrix} +3$

(b) 18 : 15 = 6 :

So, 18 : 15 = 6 : 5

State 4 ratios equivalent to 32 : 96 : 72.



4 ratios equivalent to 32:96:72 are 64:192:144,16:48:36,4:12:9 and 96:288:216.

Thinking corner!

There are unlimited number of ratios equivalent to 32 : 96 : 72. Why?





- Tell the students that a ratio is in its simplest form if the quantities of a ratio have no common factor other than 1. It is just the same as a fraction in its simplest form.
- 2. Ask a student how to simplify $\frac{24}{40}$. We divide both the numerator and denominator by their HCF which is 8.
- 3. Ask a student to show how to find the HCF of 18 and 24, and 36, 60 and 72.
- 4. Use the examples to guide them to simplify the ratios.
- Guide the students to refer to Starting Point on page 59. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 8 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 57 to 62 in Go Get Maths Workbook P6.

Lesson 3 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving ratios.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

_

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

 Reiterate the 3 simple steps to solve a word problem.

Step 1: Understand the problem

- Ask the students to read the number story and the question silently. Then, read them together with the students. Explain further the number story and the question if the students do not understand.
- Ask the students these questions to ensure they understand:
 - What information is given?
 - What do you need to find?
 - Are you comparing the items?

63 | Go Get Maths Teacher's Guide P6





Step 2: Plan and execute

- Ask the students to draw the suitable bar model including the knowns and unknowns.
- Ask them to find the keyword in the problem that indicates the operation whether to add, to subtract, to multiply or to divide.
- Analyze the bar model drawn.
- Then, write the number equation and solve it.

Step 3: Check the answer

- 4. Guide them to realize that we use the rule of three to solve the problems.
- Guide the students to refer to Starting Point on page 63. Ask them to answer the question. Have a discussion to conclude the lesson.

The ratio of the mass of the mangoes to the mass of the durians to the mass of the guavas is 2:5:4. The mass of the guavas is 12 kg. Find the total mass of the fruits. Mangoes Durian Guavas 12 kg 4 units ----- 12 kg 1 unit \longrightarrow 12 ÷ 4 = 3 kg 11 units — 11 × 3 = 33 kg The total mass of the fruits is 33 kg. When Annie was born, her mother was 30 years old. Now, the ratio of her mother's age to Annie's age is 7 : 2. How old are Annie and her mother now? Mother 30 years The difference in their ages is always the same. 5 units -→ 30 years 1 unit \longrightarrow 30 ÷ 5 = 6 years 2 units \longrightarrow 6 x 2 = 12 years 7 units \longrightarrow 6 x 7 = 42 years Annie is 12 years old and her mother is 42 years old now. er 4 | 65



Try This!

Get 5 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 63 to 68 in Go Get Maths Workbook P6.

	Type of trees	Number
	Papaya	16
	Banana	?
	Pomelo	8
There are There are The ratio of the cc tarts and 6 slices much does a slice	banana trees. st of a tart to the co of cake and pays 4: of cake cost?	ost of a slice of a 30 Baht. How m



Chapter 5 Percentages

The big idea

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) Have you seen the banners saying certain percentages are off during sales? What does it mean?
- b) Why do we always use % to tell the customers how much is given as a discount for an item?
- c) Will it be easier to tell the customers the amount given as a discount for an item? Why?
- d) If a discount of 20% is given to an item that is priced at 12,000 Baht, how much would a customer pay for it? How do you find out?

Strand 1: Numbers and Algebra

Standard M.1.1 Numbers

Indicators:

M 1.1 Gr6/12 Show mathematical methods of finding the answers of 2- to 3- step percentages word problems.

Go Get Maths Teacher's Guide P6 | 68

Lesson 1 Percentage of a quantity

Lesson objectives

By the end of the lesson, the students should be able to:

1. Find the number when given a percentage.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Percentage

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Ask the students to try to understand the first example. Guide them to realize that 20% represents 5 and we are looking for the number represented by 100%. Ask them to use the rule of three to solve it, by finding the number represented by 1% first.
- In the second example, 15% represents 18 apples and we are looking for the number of apples represented by 100%. Ask them to use the rule of three to solve it, by finding the number of apples represented by 1% first.



There are some apples in the basket. 15% of the apples are rotten. 18 apples are rotten. How many apples are there in the basket?



Activity for Reinforcement

The students need more practices for the basic concept of percentage. Ask them to find:

- a) 20% of 100
- b) 50% of 40
- c) 70% of 50

(Guide them to realize what is represented by 100%.)

- d) If 30% of a number is 9, what is the number?
- e) If 80% of a number is 40, what is the number?f) If 15% of a number is 3, what is the number?(Guide them to understand what they need to find.)



Activity for Reinforcement

The students need more practices for the basic concept of percentage. Ask them to find:

- a) If 20% of a number is 6, what is 40% of the number?
- b) If 50% of a number is 20, what is 80% of the number?
- c) If 90% of a number is 120, what is 30% of the number?

Ask them if we need to find the number represented by 100%. Why?

Teaching ideas

- 3. In the first example, we need to find the percentage that represents the boys first. As 44% represents 528 students, we are looking for the number of students represented by 100%. Ask them to use the rule of three to solve it, by finding the number of students represented by 1% first.
- In the second example, 20% represents 16 balls and we are looking for the number of balls represented by 35%. Ask them to use the rule of three to solve it, by finding the number of balls represented by 1% first.
- Guide the students to refer to Starting Point on page 69. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 69 to 71 in Go Get Maths Workbook P6.

Lesson 2 Percentage increase and decrease

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the percentage of increase and decrease.
- 2. Find the increased and decreased quantities.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Percentage increase, percentage decrease, decrease, increase

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Tell the students that a percentage increase is the difference between the original value and the new value. It shows an increase from the original value expressed as a percentage. So, we need to identify the original value, new value and/or its increase before calculating the percentage increase.
- 2. Introduce the formula of percentage increase to the students.
- For each example, guide them to identify the values first before using the formula.
- 71 | Go Get Maths Teacher's Guide P6



The percentage increase in the number of marbles is 60%.




- 4. Tell the students that a percentage decrease is the difference between the original value and the new value. It shows a decrease from the original value expressed as a percentage. So, we need to identify the original value, new value and its decrease before calculating the percentage increase.
- 5. Introduce the formula of percentage decrease to the students.
- 6. In the first example, guide them to understand that the
 - a) original value = 5
 - b) decrease = 3
- 7. In the second example, guide them to understand that the
 - a) original value = 50
 - b) decrease = 5
- 8. In the third example, guide them to understand that the
 - a) original value = 1,050
 - b) new value = 1,260
 - c) increase = 210
- 9. Guide them to draw the suitable bar model that represents each scenario.

- 10. In the example, guide them to understand that the
 - a) original value = 80
 - b) new value =50
 - c) decrease = 30
- 11. Guide them to draw the suitable bar model that represents the scenario.



- In the example, guide them to understand that the
 - a) original value (100%) = 25 kg
 - b) % increase = 20%
 - c) we need to find the new value (120%)

Guide them to draw the bar model to understand better and to use the rule of three to solve the problem.



Thinking Corner!

Ask the students what the percentage increase compares. It tells how much has increased compared to the original value. Thus, the original value is represented by 100%. The new value, after added the increased value, is represented by 120%.



- 2. In the example, guide them to understand that the
 - a) original value (100%) = 37 Baht
 - b) % decrease = 10%
 - c) we need to find the new value (90%)

Guide them to draw the bar model to understand better and to use the rule of three to solve the problem.

- 3. In the example, guide them to understand that the
 - a) % increase = 4%
 - b) new value (104%) = 31,200 Baht
 - c) we need to find the original value (100%) and the increased value (4%)

Guide them to draw the bar model to understand better and to use the rule of three to solve the problem.

- 4. In the example, guide them to understand that the
 - % decrease = 25%
 - decreased value (25%) = 32 participants
 - we need to find the original value (100%) and the new value (75%)

Guide them to draw the bar model to understand better and to use the rule of three to solve the problem.

5. Guide the students to refer to **Starting Point** on page 71. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 72 to 76 in Go Get Maths Workbook P6.

num	ber of participants.
(a) 1	How many participants were there at first?
(b) 1	How many participants were there at the end of the seminar?
(a)	25% 32 participants
	$1\% \longrightarrow \frac{32}{2}$ participants
	32 32 32
	$100\% \longrightarrow \frac{32}{25} \times 100$
	= 128 participants 25% 75%
,	There were 128 participants at first.
(b) '	75% $32 \times 75 = 96$ participants
(0)	25
	128 - 32 = 96 participants
	There were 96 participants at the end of the seminar.
TR	Y THIS!
1	Han's mass was 50 kg. He lost 7 kg after joining a gym. What is the percentage
	decrease in his mass?
	The percentage decrease in his mass is 9%.
2.	The price of the gold necklace last year was 3,500 Baht. It increased by 525 Bah this year. What is the percentage increase in the price of the necklace?
	The percentage increase in the price of the necklace is%.
3.	The plant grew 6 cm since last week. The percentage increase in its height is 15%. What was its height last week? What is its height now?
3.	The plant grew 6 cm since last week. The percentage increase in its height is 15%. What was its height last week? What is its height now? Its height was cm last week. Its height is cm now.
3. 4.	The plant grew 6 cm since last week. The percentage increase in its height is 15%. What was its height last week? What is its height now? Its height was cm last week. Its height is cm now. Ken bought a watch at a discount. He paid 1,521 Baht. This was 90% of the usua price. What was its usual price? How much was the discount?



Lesson 3 Profit and loss

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the profit or loss.
- 2. Find the profit or loss as a percentage on the cost price.
- 3. Find the cost price and selling price.

Suggested teaching time 5 periods (5 x 50 minutes)

- p - - - - (- - - -

Vocabulary

Profit, loss, selling price, cost price, percentage profit, percentage loss

Materials needed

.

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Introduce the terms profit, selling price and cost price using the example.
- 2. Guide them to find the profit.
- 3. Ask them these questions to start a discussion:

A seller bought some pens for 50 Baht. Then, he sold the pens for 70 Baht.

- a) Is 50 Baht the selling price or the cost price? Why?
- b) Is 70 Baht the selling price or cost price?
- c) Did the seller make a profit? How do you know?
- d) How much was his profit?

Go Get Maths Teacher's Guide P6 | 76

- 4. Introduce the term loss using the example.
- 5. Guide them to find the loss.
- 6. Ask them these questions to start a discussion:

A seller bought a shirt for 300 Baht. Then, he sold the shirt for 250 Baht.

- a) Is 300 Baht the selling price or the cost price? Why?
- b) Is 250 Baht the selling price or cost price?
- c) Did the seller make a profit or a loss? How do you know?
- d) How much was his profit or loss?
- Use the example to explain further. Ask the students to always identify the cost price and selling price first. Then, ask them to determine if a profit or loss is made.
- Guide them to draw the bar model for the transaction. Help them to identify the part of the bar model that represents the loss or profit.



Activity for Reinforcement

Introduce some more examples to reinforce the students' understanding of profit and loss. Here are some examples which the students need to identify

- a) the cost price and selling price,
- b) the profit or loss of each transaction.
- The seller bought some apples worth 1,000 Baht. He managed to sell them for 1,300 Baht.
- 2. John spent 780 Baht on the sport shoes. He then sold the shoes to his friend for 500 Baht.
- 3. Kim bought 450 Baht's worth of food. Mimi bought the food from Kim for 600 Baht.

			? Bah
Cost price = 170 Baht Salling price = 220 Baht	Cost price	170 Baht	Profi
Selling price > cost price	Collins and a		1
So, Min made a profit.	Selling price	220 Baht	
= 220 - 170 = 50 Baht His profit was 50 Baht.			
Cost price	e < selling pric	$e \Rightarrow profit$	
Cost pric	e > selling pri	$ce \Rightarrow loss$	
L			
Ken paid 7,500 Baht for a refrigera	ator. He incurr	ed a loss of 850 Baht	when he so
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig	ator. He incurr erator for?	ed a loss of 850 Baht	when he so
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht	ator. He incurr erator for?	ed a loss of 850 Baht	when he so
Ken paid 7,500 Baht for a refriger it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht	ator. He incurr erator for? Cost price	ed a loss of 850 Baht	when he so
Ken paid 7,500 Baht for a refriger, it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850	ator. He incurr erator for? Cost price	ed a loss of 850 Baht	when he so
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht	ator. He incurr erator for? Cost price Selling price	ed a loss of 850 Baht 7,500 Baht 2 Baht	when he so
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht He sold his refrigerator for 6,650 E	ator. He incurr erator for? Cost price Selling price Baht.	ed a loss of 850 Baht 7,500 Baht 2 Baht	Loss 850 Baht
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refriger Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht He sold his refrigerator for 6,650 E	ator. He incurr erator for? Cost price Selling price Baht.	ed a loss of 850 Baht 7,500 Baht 2 Baht	Loss 850 Baht
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price - loss = 7,500 - 850 = 6,650 Baht He sold his refrigerator for 6,650 E Anong sold her new bag for 760 Ba she buy the bag?	ator. He incurr erator for? Cost price Selling price Baht. aht. She made :	ed a loss of 850 Baht of 7,500 Baht 2 Baht 2 Baht 2 Baht	Loss 850 Baht ow much c
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht He sold his refrigerator for 6,650 E Anong sold her new bag for 760 Ba she buy the bag? Selling price = 760 Baht	ator. He incurr erator for? Cost price Selling price Baht. aht. She made a	ed a loss of 850 Baht of 7,500 Baht ?? Baht ?? Baht ?? Baht	when he so Loss 850 Baht ow much c
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price - loss = 7,500 - 850 = 6,650 Baht He sold his refrigerator for 6,650 E Anong sold her new bag for 760 Ba she buy the bag? Selling price = 760 Baht Profit = 120 Baht	ator. He incurr erator for? Cost price Selling price Baht. aht. She made	ed a loss of 850 Baht 7,500 Baht ? Baht a profit of 120 Baht. H	boss boss boss boss bosht commune comm
Ken paid 7,500 Baht for a refrigera it. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht He sold his refrigerator for 6,650 E Anong sold her new bag for 760 Ba she buy the bag? Selling price = 760 Baht Profit = 120 Baht Cost price = selling price – profit	ator. He incurr erator for? Cost price Selling price Baht. aht. She made	ed a loss of 850 Baht 7,500 Baht 2 Baht a profit of 120 Baht. H 2 Baht	Loss 850 Baht ow much c
Ken paid 7,500 Baht for a refrigera t. How much did he sell the refrig Cost price = 7,500 Baht Loss = 850 Baht Selling price = cost price – loss = 7,500 – 850 = 6,650 Baht He sold his refrigerator for 6,650 E Anong sold her new bag for 760 Ba the buy the bag? Selling price = 760 Baht Profit = 120 Baht Cost price = selling price – profit = 760 – 120	ator. He incurr erator for? Cost price Selling price Baht. aht. She made : Cost price Selling price	ed a loss of 850 Baht 7,500 Baht 2 Baht a profit of 120 Baht. H 2 Baht 760 Baht	uvhen he so Loss 850 Baht ow much d

- 9. Use the first example to explain further. Ask the students to always identify the cost price and selling price first. Then, ask them to determine if a profit or loss is made.
- Guide them to draw the bar model for the transaction. Help them to identify the part of the bar model that represents the profit.
- Reiterate that if the cost price is more than the selling price, a loss is made. If the selling price is more than the cost price, a profit is made.
- 12. For the second example, read with them and guide them to identify each of the values given. Guide them to draw the bar model. Since a loss is made, the selling price is less than the cost price. Guide them to find the selling price.
- 13. For the last example, read with them and guide them to identify each of the values given. Guide them to draw the bar model. Since a profit is made, the selling price is more than the cost price. Guide them to find the cost price.

- Tell the students that a percentage profit is the amount of profit expressed in term of percentage. A percentage loss is the amount of loss expressed in term of percentage. This percentage profit or loss is based on the cost price.
- Use the example to explain further. Tell them that there are two ways to solve it, using either the rule of three or the formula.
- Ask the students to always identify the cost price and selling price first. Then, ask them to determine if a profit or loss is made and its value.
- 4. Guide them to draw the bar model. Remind them that a profit is made.
- When using the rule of three, the cost price (300 Baht) is represented by 100%. This is because the percentage profit or loss is based on the cost price. We need to find the percentage that represents the profit (30 Baht).
- 6. When using the formula, we just need to put in the cost price and profit.

Percentage profit = $\frac{\text{profit}}{\text{cost price}} \times 100\%$ Percentage loss = $\frac{\text{loss}}{\text{cost price}} \times 100\%$

Finding profit or loss as a percentage on the cost price

A shopkeeper bought 1 box of apples for 300 Baht. He sold it for 330 Baht. What is the percentage profit on the cost price?

Method 1:

Cost price = 300 Baht	_	100%	~~~
Selling price = 330 Baht	Cost price	300 Baht	Profit
Profit = 330 - 300 $= 30 Baht$	Selling price	330 Baht	
$300 \text{ Baht} \longrightarrow 100\%$ $1 \text{ Baht} \longrightarrow \frac{100}{300}\%$			
30 Baht $\rightarrow \frac{100}{300} \times 30\%$	= 10%		

apter 5 | 79

The percentage profit on the cost price is 10%.

Method 2:

Cost price = 300 Baht Selling price = 330 Baht Profit = 330 - 300 = 30 Baht Percentage profit = $\frac{\text{profit}}{\text{cost price}} \times 100\%$ = $\frac{30}{300} \times 100\%$ = 10%

The percentage profit on the cost price is 10%.

79 | Go Get Maths Teacher's Guide P6



- 7. Use the example to explain further.
- Ask the students to always identify the cost price and selling price first. Then, ask them to determine if a profit or loss is made and its value.
- 9. Guide them to draw the bar model. Remind them that a loss is made.
- 10. When using the rule of three, the cost price (650 Baht) is represented by 100%. This is because the percentage profit or loss is based on the cost price. We need to find the percentage that represents the loss (130 Baht).
- 11. When using the formula, we just need to put in the cost price and loss.

- 12. Use the example to explain further.
- 13. In this example, the profit and selling are given. Ask the students on how to determine the cost price.
- 14. Guide them to draw the bar model. Remind them that a profit is made.
- 15. When using the rule of three, the cost price (30,000 Baht) is represented by 100%. This is because the percentage profit or loss is based on the cost price. We need to find the percentage that represents the profit (1,500 Baht).
- 16. When using the formula, we just need to put in the cost price and profit.

A computer was sold at a profit of 1,500 Baht. Its selling price was 31,500 Baht. What was the percentage profit on the cost price? Method 1: Cost price 30,000 Baht Profit 1,500 Baht



The percentage profit on the cost price was 5%.

Method 2:

```
Profit = 1,500 Baht
Selling price = 31,500 Baht
Cost price = 31,500 - 1,500
= 30,000 Baht
Percentage profit = \frac{\text{profit}}{\cos t \text{ price}} \times 100\%
```

```
= \frac{1,500}{30,000} \times 100\%= 5\%
```

The percentage profit on the cost price was 5%.

hapter 5 | 81



- In the first example, the cost price and the percentage profit are given. We need to find the selling price.
- 2. Guide them to draw the bar model. Remind them that a profit is made.
- When using the rule of three, the cost price (520 Baht) is represented by 100%. This is because the percentage profit or loss is based on the cost price. We need to find the selling price which is represented by 110% since the percentage profit is 10%.
- 4. In the second example, the selling price and the percentage loss are given. We need to find the cost price.
- 5. Guide them to draw the bar model. Remind them that a loss is made.
- When using the rule of three, the selling price (2,100 Baht) is represented by 60% since the percentage loss is 40%. We need to find the cost price which is represented by 100%.

- In the example, the cost price and the percentage loss are given. We need to find the selling price.
- 8. Guide them to draw the bar model. Remind them that a loss is made.
- When using the rule of three, the cost price (3,500 Baht) is represented by 100%. This is because the percentage profit or loss is based on the cost price. We need to find the selling price which is represented by 70% since the percentage loss is 30%.
- Guide the students to refer to Starting Point on page 76. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 77 to 81 in Go Get Maths Workbook P6.







Lesson 4 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve 2-step and 3-step word problems involving percentage.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The number of questions
 - The percentage of questions that Penny answered correctly
 - The number of questions that Sunny answered correctly more than Penny
 - b) What do I need to find at the end?
 - The percentage of questions Sunny answered correctly
 - c) What do I need to find out first?
 - The number of questions Penny answered correctly
 - The number of questions Sunny answered correctly

Go Get Maths Teacher's Guide P6 | 84

- 2. For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The total number of people
 - The number of men
 - The percentage of women less than men
 - The number of girls
 - b) What do I need to find at the end?
 - The percentage of boys
 - c) What do I need to find out first?
 - The number of women
 - The number of boys

In an exhibition, there were 380 participants. 150 of them were men. There were 30% fewer women than men. 49 girls attended the exhibition. What percentage of the participants were boys?

		100%	
/	Nen	150	
Wor	nen	>	
		70%	30%
100%	people		
$1\% \longrightarrow \frac{150}{100}$	people		
$70\% \longrightarrow \frac{150}{100}$	× 70 = 105 pe	eople	
There were 105 worr	en.		
380 - 150 - 105 = 12	5		
There were 125 child	ren.		
100 00 00			
125 - 49 = 76			
There were 70 boys.			
	Ad	ults + girls	76 boys
			?%
	380	participants (100%)	?%
380 participants	380 → 100%	participants (100%)	?%
380 participants —— 1 participant ——	$380 \rightarrow 100\% \rightarrow \frac{100}{380}\%$	participants (100%)	?%
380 participants — 1 participant — 76 participants —	$380 \rightarrow 100\% \rightarrow \frac{100}{380}\% \rightarrow \frac{100}{380} \times 76$	participants (100%) = 20%	2%
380 participants — 1 participant — 76 participants — 20% of the participan	380 $\rightarrow 100\%$ $\rightarrow \frac{100}{380}\%$ $\rightarrow \frac{100}{380} \times 76$ ats were boys.	participants (100%) s = 20%	2%
 380 participants — 1 participant — 76 participants — 20% of the participant 	380 100% $\frac{100}{380}\%$ $\frac{100}{380} \times 76$ ats were boys.	participants (100%)	2%



- For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The number of marbles Aroon has
 - The percentage of marbles given to Ice
 - The percentage of the remaining marbles given to Ken
 - The percentage of the remaining marbles given to Chat
 - b) What do I need to find at the end?
 - The percentage of marbles given to Chat
 - c) What do I need to find out first?
 - The number of marbles given to Ken and Chat
 - The number of marbles given to Chat

- 4. For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The initial price of the blouse
 - The percentage discount Anne got for the blouse
 - The percentage profit Anne got for selling it to Ying
 - b) What do I need to find at the end?
 - The selling price of the blouse sold to Ying
 - c) What do I need to find out first?
 - The cost price of the blouse for Anne





- For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The cost price of the laptop
 - The percentage expected profit of the laptop on the price tag
 - The percentage discount of the laptop based on the price tag
 - b) What do I need to find at the end?
 - If the shop made a profit or loss and its value
 - c) What do I need to find out first?
 - The price on the price tag
 - The selling price of the laptop

- For this example, guide the students to use the 3 steps. Set them thinking about these questions:
 - a) What do I know?
 - The amount of money Aranya has
 - The percentage of Aranya's money for investment
 - The percentage profit Aranya would get from the investment
 - b) What do I need to find at the end?
 - The amount of money Aranya would have after a year
 - c) What do I need to find out first?
 - The amount of money Aranya wants to invest
 - The amount of dividend she would receive after a year
- Guide the students to refer to Starting Point on page 84. Ask them to answer the question. Have a discussion to conclude the lesson.

gives a dividend of 4% a year. Find the total amount of money Aranya would have after one year. Unit trust 65% 35% 24,000 Baht $100\% \rightarrow 24,000$ Baht $1\% \rightarrow \frac{24,000}{100}$ Baht $65\% \rightarrow \frac{24,000}{100} \times 65 = 15,600$ Baht

Aranya has 24,000 Baht. She wants to invest 65% of her money in a unit trust that

Aranya wants to invest 15,600 Baht in a unit trust.



TRY THIS!
 There are 3,600 beads in the box. 40% of the beads are red and the rest are blue and yellow beads. The number of blue beads is the same as the number of yellow beads. How many yellow beads are there in the box?
There are yellow beads in the box.
2. Somehai gave 40% of his 500 marbles to Sanit. Then, he sold 60% of his remaining marbles. How many marbles did he have left?
He had marbles left.3. In a test, Jack answered 37 out of 50 questions correctly. How many more questions should he answer correctly in order to get 90% marks?
He should answer more questions correctly in order to get 90% marks.

Try This!

Get 5 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 82 to 88 in Go Get Maths Workbook P6.

4. Dao bought a sofa for 8,500 Baht. A year later, she sold it to a second-hand shop at a loss of 60% on the cost price. Then, the shop sold it at a profit of 10% on the cost price. How much did the shop sell the sofa?
The shop sold the sofa for Baht.
5. Nina sold her television to Anong with a loss of 20% on the cost price. Anong then sold it to Malai with a profit of 10% on the cost price. She sold it to Malai for 4,950 Baht. How much did Nina buy the television?
Nina bought the television for Baht.



Chapter 6 Patterns

The big idea

- 1. Ask them these questions to start a discussion:
 - a) Have you stacked blocks before?
 - b) Will the stack of blocks be stable if the top layers are wider than the bottom layers?
 - c) How should you stack the blocks so that it would not tumble down?
- 2. Ask the students to look at the picture carefully. Ask them these questions:
 - a) How many blocks are there on the first row from the top?
 - b) How many blocks are there on the second row from the top?
 - c) How many blocks are there on the third row from the top?
 - d) If the blocks are stacked in the same pattern, how many blocks will there be in the fourth row from the top?
 - e) If the blocks are stacked in the same pattern, how many blocks will there be in the fifth row from the top?

Strand 1: Numbers and Algebra

Standard M.1.2 Numbers

Indicators:

M 1.2 Gr6/1 Show the thinking process and finding the answers of pattern problems.

Lesson 1 Geometric and number patterns

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Understand geometric patterns.
- 2. Understand number patterns.

Suggested teaching time

5 periods (5 x 50 minutes)

Vocabulary

Geometric pattern, number pattern

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- Tell the students that there are many different types of geometric shapes and there is no one specific way to solve the problems related to geometric shapes.
- For this example, draw the pattern on the board. We need to identify the 11th and 21st shape.
- 3. Guide them to realize that this pattern is made of repeating groups of a rectangle, a triangle and a circle.
- Using just this group of a rectangle, a triangle and a circle, guide them to find the 4th shape and the 6th shape. Then, ask them to find the 11th and 21st shapes.







- 5. For the first example, draw the pattern on the board. We need to identify the next shape.
- Guide them to identify the differences between any two consecutive shapes. What is added to the next shape? A rectangle is added to the center of the base of the previous shape to make the next shape. So, for the next shape, we add a rectangle to the center of the base of the 4th shape.
- In the first part of the second example, ask the students to analyze the shapes and the number of cubes to make a layer of the shape. A layer of cubes is added to the previous shape to make the next shape.
- Guide them to use the rule of three to find out the number of cubes to make a shape with 6 layers.
- For the second part of the second example, guide them to use the rule of three to find number of layers with 96 cubes.

- Ask the students to analyze the shapes.
 How many shapes are there on the first, second and third rows?
- 11. For the first part of the example, we need to find the number of shapes on the fourth row.
 First row 8 shapes
 Second row 7 shapes
 Third row 6 shapes
 The number of shapes is reduced 1 when going down each row. So, there will be 5 shapes on the fourth row.
- 12. For the second part of the example, we need to find the number of rows if the pattern is continued. It is easier to explain with the table as shown. Each row has 1 less shape than the row on top of it.
- 13. For the third part of the example, we will just need to add up the number of shapes in each row until the last row.





or visit https://qr.pelangibooks.com/ ?u=33vnPbou Niran makes some shapes using some matchsticks as shown below. The shapes form a pattern. How many matchsticks does he need to make Figure 6 and Figure 11?



Figure	Number of new matchsticks added to Figure 1	Total ma	atchsticks
1	0	3	\Rightarrow 3 + (0 × 2)
2	2 or 1 × 2	3 + 2	\Rightarrow 3 + (1 × 2)
3	4 or 2 × 2	3+2+2	\Rightarrow 3 + (2 × 2)
4	6 or 3 × 2	3 + 2 + 2 + 2	\Rightarrow 3 + (3 × 2)

Do you realize the relation between the number of matchsticks in any figures with the number of matchsticks in Figure 1?



Figure 2 has (1×2) new matchsticks added to Figure 1.

Figure 3 has (2×2) new matchsticks added to Figure 1. Figure 4 has (3×2) new matchsticks added to Figure 1.

Figure n has $[(n - 1) \times 2]$ new matchsticks added to Figure 1.

Figure 6 has $[(6-1) \times 2]$ or 10 new matchsticks added to Figure 1. 3 + 10 = 13 So, he needs 13 matchsticks to make Figure 6.

Figure 11 has $[(11-1) \times 2]$ or 20 new matchsticks added to Figure 1. 3 + 20 = 23 So, he needs 23 matchsticks to make Figure 11.

96 | Mathematics Prathomsuksa 6

- Ask the students to analyze the shapes. Ask the difference of number of matchsticks in any 2 consecutive shapes. Two matchsticks are added to the previous shape to make the next shape.
- 15. Guide the students to understand the table. We can derive a formula to find the number of matchsticks used to make a shape based on the position of the shape in the pattern.
- 16. With the formula, we can find the numbers of matchsticks to make Figure 6 and Figure 11.
- 17. Ask the students to find the number of matchsticks to make Figure 15 and Figure 22 to gage their understanding.

- 18. Ask the students to analyze the arrangement of tables and chairs. How many chairs are added when 1 table is added?
- For the first part of the example, guide them to draw the arrangement of tables and chairs for 4 tables and 5 tables. Ask them to reconfirm the number of added chairs for 4 tables and 5 tables,
- 20. For the second part of the example, guide the students to understand the table. We can derive a formula to find the number of chairs for an arrangement based on the number of tables.
- 21. With the formula, we can find the numbers of chairs for 12 tables.
- 22. Ask the students to find the number of chairs for 18 tables to gage their understanding

A hall has a table with 4 chairs. When another table is added, 2 chairs are added. This pattern continues.





(b) How many chairs will there be if there are 12 tables?

Number of tables	Number of new chairs added to 1 table	Total numbe	r of chairs
1	0	4	$\Rightarrow 4$
2	2	4 + 2	\Rightarrow 4 + (1 × 2)
3	4	4 + 2 + 2	\Rightarrow 4 + (2 × 2)
4	6	4 + 2 + 2 + 2	\Rightarrow 4 + (3 × 2)
5	8	4 + 2 + 2 + 2 + 2	\Rightarrow 4 + (4 × 2)

2 tables have (1×2) new chairs added to 4 chairs of 1 table.

- 3 tables have (2×2) new chairs added to 4 chairs of 1 table.
- 4 tables have (3×2) new chairs added to 4 chairs of 1 table. n tables have $[(n-1) \times 2]$ new chairs added to 4 chairs of 1 table.

12 tables have $[(12 - 1) \times 2]$ or 22 new chairs added to 4 chairs of 1 table.

4 + 22 = 26

So, if there are 12 tables, there will be 26 chairs.





- 1. Ask the students to analyze the number pattern in the example.
 - a) Is it increasing or decreasing?
 - b) Is the difference between any two consecutive numbers the same?What is the difference?
- Guide them to create a formula to find the value of a term. Use the formula to find the values for the 10th and 23rd terms.
- Ask the students to find the values of the 15th and 28th terms to gage their understanding

- 4. Ask the students to analyze the number pattern in the example.
 - a) Is it increasing or decreasing?
 - b) Is the difference between any two consecutive numbers the same?What is the difference?
- 5. Guide them to create a formula to find the value of a term. Use the formula to find the value for the 8th term.
- Ask the students to find the values of the 10th and 12th terms to gage their understanding.
- Guide the students to refer to Starting Point on page 93. Ask them to answer the questions. Have a discussion to conclude the lesson.





Try This!

Get 5 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 89 to 98 in Go Get Maths Workbook P6.





The waiter was placing cookies on plates. She put 3 cookies on the first plate, 5 cookies on the second plate, 7 cookies on the third plate, 9 cookies on the fourth plate and 11 cookies on the fifth plate. If she continued with this arrangement, how many cookies would she put on the eighth plate?



The number of cookies is increased by 2 from the previous number.

1st plate:	3	$\Rightarrow 3$
2nd plate:	5 = 3 + 2	\Rightarrow 3 + (1 × 2)
3rd plate:	7 = 3 + 2 + 2	\Rightarrow 3 + (2 × 2)
4th plate:	9 = 3 + 2 + 2 + 2	\Rightarrow 3 + (3 × 2)
5th plate:	11 = 3 + 2 + 2 + 2 + 2	\Rightarrow 3 + (4 × 2)
nth plate \Rightarrow	$> 3 + [(n-1) \times 2]$	
Number of	cookies on the 8th plate =	$= 3 + [(8 - 1) \times 2]$
	=	= 3 + 14
	-	= 17
She would	put 17 cookies on the eight	hth plate.

100 | Mathematics Prathomsuksa 6

Lesson 2 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving geometric and number patterns.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

 Reiterate the 3 simple steps to solve a word problem.

Step 1: Understand the problem Step 2: Plan and execute Step 3: Check the answer

- 2. Read with them the problem and ensure they understand it.
- 3. Guide them to draw the number pattern to analyze it.
- 4. Then, guide them to derive a formula to find the number of cookies on a plate based on the position of the plate, and find the answer.

- 5. For the first problem, ask the students to analyze the stacks of blocks. Take note that the blocks are arranged in alphabetical order with block A at the top of the stacks, and 1 block is added to the previous stack to form the next stack.
- 6. Ask the students to realize that in the first stack, there is only block A. In the second stack, there are 2 blocks with block B at the bottom. B is the second letter in the alphabetical order. In the third stack, block C is at the bottom and C is the third letter in the alphabetical order. Ask them if the fourth and fifth stacks have the similar arrangement.
- Ask them the position of K in the alphabetical order and find the position of the stack of blocks with block K at the bottom.
- For the second problem, guide the students to realize that there is a repeating set of balls given out, which consists of a red ball, a blue ball and a yellow ball, and there are 14 students which means 14 balls are given out.
- Use the table to explain to the students how to find the number of red balls given out and the color of the ball given to the 12th student.

Pheng stacks the alphabet blocks in the pattern as shown below.



In which stack will Pheng place the K block at its bottom?

The number of blocks in a stack is increased by 1 from the previous stack.

Position of stack	1st	2nd	3rd	4th	5th
Number of blocks	1	2	3	4	5

K is the 11th letter in the alphabetical order.

There will be 11 blocks in the stack with the K block at its bottom. So, Pheng will place the K block at the bottom of the 11th stack.

There are 14 students in a row. The first student is given a red ball. The second student is given a blue ball. The third student is given a yellow ball. This pattern of giving out colored balls is repeated with the rest of the students. (a) How many red balls are given out?

(b) What is the color of the ball given to the 12th student?

13th student

	Red ball	Blue ball	Yellow ball
	1st student	2nd student	3rd student
	4th student	5th student	6th student
	7th student	8th student	9th student
1	0th student	11th student	12th student

14th student

(a) 5 red balls are given out.

(b) The color of the ball given to the 12th student is yellow.

```
Jenny's grandmother gave her 500 Baht to start a book fund in
      May. Her grandmother would add 200 Baht to the fund if Jenny
      added 50 Baht to the fund every month, starting May. Jenny
      added 50 Baht to the fund every month.
      (a) How much money would there be in the fund at the end of
          the 6th month?
      (b) Jenny used 1,200 Baht to buy some books at the end of
          the 14th month. What percentage of the money in the fund
          Jenny used?
     (a) Amount of money added to the fund every month = 200 + 50
                                                             = 250 Baht
          1st month: 500 + 250 = 750
                                                  \Rightarrow 750 Baht
         2nd month:750 + 250\Rightarrow 750 + (1 \times 250) Baht3rd month:750 + 250 + 250\Rightarrow 750 + (2 \times 250) Baht
         4th month: 750 + 250 + 250 + 250 \implies 750 + (3 \times 250) Baht
          nth month \Rightarrow 750 + [(n - 1) × 250]
          Amount of money at the end of the 6th month = 750 + [(6-1) \times 250]
                                                         = 750 + (5 \times 250)
                                                         = 750 + 1,250
                                                         = 2,000 Baht
          There would be 2,000 Baht in the fund at the end of the 6th month.
      (b) Amount of money at the end of the 14th month = 750 + [(14 - 1) \times 250]
                                                          = 750 + (13 \times 250)
                                                          = 750 + 3.250
                                                          = 4,000 Baht
          There would be 4,000 Baht in the fund at the end of the 14th month.
          Percentage = \frac{1,200}{4,000} \times 100
                    = 30%
          Jenny used 30% of the money in the fund.
102 | Mathematics Prathomsuksa 6
```

- 10. For the first part of the problem, ask the students to list the amount of money accumulated in the first 5 months. What is the initial amount? How much is added every month?
- 11. Guide them to derive a formula to find the amount of money accumulated at the end of a month. Guide them to find the amount of money accumulated by the end of the 6th month.
- 12. For the second part of the problem, tell them that there are a few steps to solve it.

What do they need to find at the end?

The percentage of the money used •

What do they need to find first?

- The amount of money accumulated at the end of the 14th month
- 13. Guide the students to refer to Starting Point on page 100. Ask them to answer the question. Have a discussion to conclude the lesson.



Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 99 to 104 in Go Get Maths Workbook P6.

To find out if the students have mastered the first half of the year's content, ask them to complete the **Revision 1** on pages 105 to 114 in Go Get Maths Workbook P6.





Chapter 7 Triangles

The big idea

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) Is a triangle a 2D shape or a 3D shape?
- b) What are the properties of a triangle?
- c) What are the things around us that have a shape of a triangle?
- d) How do we find the perimeter of a triangle?
- e) How do we find the area of a triangle?

Strand 2: Measurement and geometry

Standard M.2.1

Indicators:

M 2.1 Gr6/2 Show mathematical methods of finding the answers of word problems involving perimeters and areas of polygons.

Standard M.2.2

M 2.2 Gr6/1	Classify triangles based on properties.
M 2.2 Gr6/2	Construct triangles using given length of sides and angles.

Lesson 1 Triangles

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Categorize triangles based on their angles and length of the sides.
- 2. List the properties of the different types of triangles.
- Realize that the sum of interior angles of a triangle is 360°.
- 4. Find the unknown angle in a triangle.

Suggested teaching time

5 periods (5 x 50 minutes)

Vocabulary

Right triangle, acute triangle, obtuse triangle, equilateral triangle, isosceles triangle, scalene triangle

Materials needed

Paper

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Ask a student to draw a triangle on the board. Ask the rest if there is a right angle or an obtuse angle in it, or if all the angles are acute angles. Tell them that we can categorize a triangle based on its angles.
- Introduce right triangles, acute triangles and obtuse triangles. Help the students to identify the properties of these triangles.









Extra notes

We can also categorize triangles based on both their sides and angles. Here are some examples.



Scalene right triangle - one of the angles is a right angle and all the 3 sides are unequal



Isosceles acute triangle – all the angles are acute angles and 2 sides are equal



Scalene obtuse triangle – one of the angles is an obtuse angle and all the 3 sides are unequal

Teaching ideas

- Ask a student to draw a triangle on the board. Ask the rest if the sides are of equal length. Tell them we can categorize the triangles based on the length of the sides.
- Introduce equilateral triangles, isosceles triangles and scalene triangles. Discuss their properties.
- Tell them the similar markings on the sides indicate the lines are of same length.

Fun with Maths!

Materials required: Paper

Objective of the activity: Identify the types of triangles and their properties

The students should be able to identify the different types of triangles and their properties.

Ask them if a triangle can be categorized based on both their angles and sides.

Fun with Maths!

Materials required: Paper Objective of the activity: Finding the sum of interior angles of a triangle

The students will remember that the sum of all the interior angles of a triangle is 180° by doing this activity.

- Draw a triangle on the board. Introduce to the students the interior angles of the triangle.
- Ask them to draw any types of triangles on a piece of paper. Ask them to measure all the interior angles and add them up.
- 3. Tell them that the sum of the interior angles of a triangle is 180°.
- 4. Using the examples, guide them to find the unknown angles.




- 5. Ask the students to draw a right triangle on a piece of paper and measure and add up the other 2 angles. Ask them why the sum of the other 2 angles is 90°. Relate it with the fact that the sum of the interior angles of a triangle is 180°.
- Tell them that when an angle in a triangle is 90°, the sum of the other 2 angles is 90° too.
- 7. Using the examples, guide them to find the unknown angles.
- 8. Ask the students to draw an isosceles triangle on a piece of paper and measure the 2 angles opposite to the equal sides. Are they the same?
- 9. Tell them that in an isosceles triangle, the angles opposite the similar sides are equal.
- 10. Using the example, guide them to find the unknown angles.

- 11. Using the example, guide them to find the unknown angles.
- 12. Ask the students to draw an equilateral triangle on a piece of paper and measure all the angles. Ask them why each of the angles measures 60°. Relate it with the fact that the sum of the interior angles of a triangle is 180°.
- Tell them that the angles in an equilateral triangle are the same, that is 60°.
- 14. Using the example, guide them to find the unknown angles.





Activity for Reinforcement

Draw these angles on the board. Get some students to find the unknown angles.



105°

- 15. Help the students to recall that
 - a) the sum of the angles on a straight line is 180°.
 - b) the sum of angles at a point is 360°.
 - c) the vertically opposite angles are the same.
- 16. For the first and second examples, tell them that they need to use their understanding of angles on a straight line and vertically opposite angles.
- 17. Guide them to find the unknown angles.
- For the third and fourth examples, tell them to realize that there are 2 triangles in each diagram.
- 19. Guide them to find the unknown angles.

- 20. For the first example, there are 2 triangles in the big triangle. Ask the students to take note of the similar sides, and that the angles opposite the similar sides are similar.
- 21. Guide them to find the unknown angle.
- 22. For the second example, there are 2 triangles in the diagram. Remind the students that the angles in an equilateral triangle are 60° each, and the angles opposite the similar sides of an isosceles are the same.
- 23. Guide them to find the unknown angle.
- 24. Guide the students to refer to **Starting Point** on page 105. Ask them to answer the question. Have a discussion to conclude the lesson.





Try This!

Get 12 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 115 to 120 in Go Get Maths Workbook P6.

Lesson 2 Drawing triangles

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Draw triangles with given 2 sides and 1 angle.
- 2. Draw triangles with given 1 side and 2 angles.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

_

Materials needed

Protractor, ruler

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- 1. Ask the students to read the instruction carefully and sketch the triangle.
- 2. Guide them step by step on how to draw it.
- 3. Ask them to use the protractor to get the angle.





- 4. Ask the students to read the instruction carefully and sketch the triangle.
- 5. Guide them step by step on how to draw it.
- 6. Ask them to use the protractor to get the angle.

- 1. Ask the students to read the instruction carefully and sketch the triangle.
- 2. Guide them step by step on how to draw it.
- 3. Ask them to use the protractor to get the angles.
- Guide the students to refer to Starting Point on page 113. Ask them to answer the questions. Have a discussion to conclude the lesson.

Draw triangle XYZ with $\overline{XY} = 4 \text{ cm}, \angle YXZ = 70^{\circ} \text{ and } \angle XYZ = 60^{\circ}.$ Step 1: Sketch triangle XYZ. Step 2: Draw $\overline{XY} 4 \text{ cm}$ long. $\sqrt[4]{2}$ Step 3: Place a protractor along \overline{XY} with its center mark at X. Mark at 70°. Then, draw a line from point X to this mark. $\sqrt[4]{2}$ Step 4: Place a protractor along \overline{XY} with its center mark at Y. Mark at 60°. Then, draw at 2. Mark at 60°.	Learning to know Dra	wing triangles with 1 sid	de and 2 angles
Step 1: Sketch triangle XYZ. Step 2: Draw \overline{XY} 4 cm long. Step 3: Place a protractor along \overline{XY} with its center mark at X. Mark at 70°. Then, draw a line from point X to this mark. Step 4: Place a protractor along \overline{XY} with its center mark at Y. Mark at 60°. Then, draw a line from point X to this mark.	Draw triangle XYZ with \overline{XY}	$= 4 \text{ cm}, \angle YXZ = 70^{\circ} \text{ and}$	$d \angle XYZ = 60^{\circ}.$
Step 4: Place a protractor along \overline{XY} with its center mark at X. Mark at 70°. Then, draw a line from point X to this mark. Step 4: Place a protractor along \overline{XY} with its center mark at Y. Mark at 60°. Then,	Step 1: Sketch triangle XYZ	Step 2:	Draw \overline{XY} 4 cm long.
Step 3: Place a protractor along XY with its center mark at X. Mark at 70°. Then, draw a line from point X to this mark.	x 4 cm	у x	4 cm Y
$ \begin{array}{c} $	Step 3: Place a protractor ald draw a line from point	ong \overline{XY} with its center m at X to this mark.	ark at X. Mark at 70°. Then,
draw a line from point Y passing through this mark and intersecting the	Step 4: Place a protractor al	+ $\frac{1}{4 \text{ cm}}$ y $\frac{1}{2}$ with its center m int Y passing through th	$x \frac{70^{\circ}}{4 \text{ cm}} y$ ark at Y. Mark at 60°. Then,
	x 70°	•	x 4 cm y
x 70° 4 cm y			Chapter 7 115

TRY THIS!

1. Draw triangle JKL with $\overline{\text{JK}} = 8 \text{ cm}$, $\overline{\text{JL}} = 5 \text{ cm}$ and $\angle \text{KJL} = 55^{\circ}$.

2. Draw triangle STU with $\overline{ST} = 9$ cm, $\angle TSU = 40^{\circ}$ and $\angle STU = 60^{\circ}$.

Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 121 and 122 in Go Get Maths Workbook P6.

3. Draw right triangle ABC with $\overline{AB} = 7$ cm, $\overline{AC} = 6$ cm and $\angle BAC = 90^\circ$.

116 Mathematics Prathomsuksa 6

Lesson 3 Perimeter of a triangle

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the perimeter of a triangle.
- 2. Find the unknown side of a triangle.

Suggested teaching time

3 periods (4 x 50 minutes)

Vocabulary

Perimeter

Materials needed

-

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- 1. Help the students to recall what perimeter of a shape is.
- 2. Draw a rectangle on the board with its length and width. Ask a volunteer to show how to find its perimeter.
- Tell the students that the perimeter of a shape is the length around it. This applies to triangles too.
- 4. Use the examples to explain further.
- 5. Guide them to understand the similar marks on the diagrams that indicate the similar lengths.





6. Use the example to explain further.

- 1. Guide the students to find the length of the unknown sides of the triangles.
- 2. Ask them to recall the properties of an equilateral triangle.

- 3. Guide the students to find the length of the unknown side of the triangle.
- 4. Ask them to recall the properties of an isosceles triangle.
- Guide the students to refer to Starting Point on page 117. Ask them to answer the questions. Have a discussion to conclude the lesson.



Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 123 and 124 in Go Get Maths Workbook P6.



Extra notes

For any triangle, it has 3 sets of base and height. The base and the height are perpendicular to each other.



Lesson 4 Area of a triangle

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Identify the base and height of a triangle.
- 2. Find the area of a triangle.
- 3. Find the length of the base or height of a triangle.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary Base, height, area

Materials needed Cut-outs of triangles, set square, paper

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Introduce the base and height of a triangle. Tell them that these 2 lines must be perpendicular to each other.
- Show the students a big cut-out of an acute triangle. Take a side as the base. Guide them to identify its height. The height is the line from the base perpendicular to the opposite vertex. Repeat with other sides. Tell them that for a triangle, there are 3 sets of base and height.
- Ask the students to draw an acute triangle and identify the 3 sets of base and height. Ask them to use the set square to draw the height.

Go Get Maths Teacher's Guide P6 | 120

- 4. Show the students a big cut-out of an obtuse triangle. Take a side as the base. Guide them to identify its height. The height is the line from the base perpendicular to the opposite vertex. Repeat with other sides. Tell them that for a triangle, there are 3 sets of base and height.
- Tell them for some triangles, the height is drawn from the extended base. Reiterate that the height must be perpendicular from the base to the opposite vertex.
- Ask the students to draw an obtuse triangle and identify the 3 sets of base and height. Ask them to use the set square to draw the height.
- 7. Repeat with a right triangle.
- 8. Use the example to explain further.





- 8. Get another 2 pieces of paper and place them on top of each other.
- 9. Draw an obtuse triangle on the paper and cut the triangles out.



10. Arrange the triangles as shown above. What will you get?11. What can you say about the area of one of the similar triangles and the area of the quadrilateral that is formed by them?



Fun with Maths!

Materials required: Paper

Objective of the activity: Arranging triangles into quadrilaterals

The students will realize that we can rearrange 2 similar triangles into a square or a parallelogram.

- 1. Use the diagrams in the book to show to the students that we can rearrange
 - a) 2 similar right triangles into a rectangle
 - b) 2 similar acute or obtuse triangles into a parallelogram.

Ask them to take note of the base and height of the triangles with the base and height of the quadrilateral formed.

 From there, guide them to realize that the area of a triangle is half of a quadrilateral with the same base and height.

Area of a triangle = $\frac{1}{2}$ x base x height

3. Use the examples to guide them to find the area of the triangles.





123 | Go Get Maths Teacher's Guide P6





4. Using the diagrams, guide them to identify the bases and heights of the triangles before calculating their area.

 Using the formula of the area of triangle, guide them to devise a formula to find the base or height of a triangle with the given area.

Area =
$$\frac{1}{2}$$
 x base x height
2 x area = 2 x $\frac{1}{2}$ x base x height
= base x height
 $\frac{1}{base}$ x 2 x area = $\frac{1}{base}$ x base x height
 $\frac{2 x area}{base}$ = height
or height = $\frac{2 x area}{base}$
and base = $\frac{2 x area}{height}$

- 2. Using the examples, guide them to find the length of the base or height of the triangles.
- Guide the students to refer to Starting Point on page 120. Ask them to answer the questions. Have a discussion to conclude the lesson.





Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 125 to 128 in Go Get Maths Workbook P6.

Lesson 5 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving perimeter and area of a triangle.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- 4. Reiterate the 3 simple steps to solve a word problem.
 Step 1: Understand the problem
 Step 2: Plan and execute
 Step 3: Check the answer
- 5. Work with them the 3 steps in solving the word problems. Ask them to always check their answers.



The area of the remaining cloth is 14 m².



- 6. Work with them the 3 steps in solving the word problems. Ask them to always check their answers.
- Guide the students to refer to Starting Point on page 127. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 129 to 131 in Go Get Maths Workbook P6.





Chapter 8 Polygons

The big idea

- 1. Ask the students these questions to start a discussion:
 - a) Have you seen a house plan before?
 - b) Where do we see it often?
 - c) What does it do?
 - d) What information do we get from a house plan?
- 2. Ask the students to look at the picture carefully. Ask them these questions:
 - a) How many rooms are there?
 - b) How many bedrooms are there?
 - c) Can you find the perimeter of house? How?
 - d) Can you find the area of the house? How?

Strand 2: Measurement and geometry

Standard M.2.1

Indicators:

M 2.1 Gr6/2 Show mathematical methods of finding the answers of word problems involving perimeters and areas of polygons.

Lesson 1 Angles in polygons

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. List the sum of interior angles in polygons.
- 2. Find the unknown angle in a polygon.

Suggested teaching time

5 periods (5 x 50 minutes)

Vocabulary Interior angle, exterior angle

Materials needed

Cut-outs of triangles

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Guide the students to understand that the interior angle of a polygon is the angle in the polygon. Draw a polygon and ask the students to identify its interior angles.
- 2. Ask the students for the sum of the interior angles of a triangle. Use the examples to help them to recall.

Thinking Corner!

Ask the students to make a quadrilateral and a pentagon using cut-outs of triangles. Guide them to realize the sum of the interior angles of a quadrilateral equals to the sum of the interior angles of 2 triangles, and the sum of the interior angles of a pentagon equals to the sum of interior angles of 3 triangles.







- Ask the students for the sum of the interior angles of a quadrilateral. Use the examples to help them to recall.
- Ask the students what a pentagon is. Get them to draw a pentagon and measure the interior angles. Ask them to add up the interior angles.
- Ask the students what a hexagon is. Get them to draw a hexagon and measure the interior angles. Ask them to add up the interior angles.
- 6. Tell them that
 - a) the sum of the interior angles of a triangle = 180°
 - b) the sum of the interior angles of a quadrilateral = 360°
 - c) the sum of the interior angles of a pentagon = 540°
 - d) the sum of the interior angles of a hexagon = 720°

7. Tell them that the sum of the interior angles of a polygon depends on the number of the sides of the polygon.

Sum of interior angle = $180^{\circ} \times (n - 2)$ n = number of sides

 Using the formula, ask the students to find the sum of interior angles of a triangle, a quadrilateral, a pentagon, a hexagon, a heptagon and an octagon.

Fun with Maths!

Materials required: -

Objective of the activity: Finding the size of interior angles of regular polygons

The students will realize that a polygon with similar sides have interior angles with similar size. The sum of the interior angles of a polygon is a constant, depending on the number of sides.

Sum of interior angles = 180° × (n – 2) where n = number of sides						
Number of angles	Number of sides	Sum of interior angles				
3	3	$180^{\circ} \times (3-2) = 180^{\circ}$				
4	4	$180^{\circ} \times (4-2) = 360^{\circ}$				
5	5	$180^{\circ} \times (5-2) = 540^{\circ}$				
6	6	$180^{\circ} \times (6-2) = 720^{\circ}$				
7	7	$180^{\circ} \times (7-2) = 900^{\circ}$				
	Sum of interior where n = Number of angles 3 4 5 6 7	Sum of interior angles = 180° × where n = number of sidesNumber of anglesNumber of sides3344556677				

Fun.... Maths!



 Measure the length of each side of each polygon above. Are the sides of each polygon equal?

2. Measure each of the interior angles in each polygon. Are the sizes of the angles in each polygon equal?

3. Fill in the table below.

Polygon	Size of interior angle	Sum of interior angles
Triangle		
Quadrilateral		
Pentagon		
Hexagon		



or visit https://qr.pelangibooks.com/ ?u=oJPMWt74



- Tell the students that a regular polygon has equal sides and equal interior angles.
- 10. Use the examples to explain further.
- 11. Guide them how to find the size of an interior angle of a regular polygon. Ask them to find the sum of the interior angles first using the formula below before dividing the sum by the number of angles.

Sum of interior angle = $180^{\circ} x (n - 2)$ n = number of sides

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 132 to 135 in Go Get Maths Workbook P6.

 For this example, it is an acute triangle. To find the acute ∠BAC, ask the students to recall that the sum of angles at a point is 360°.



Then, they need to recall that the sum of the interior angles in a triangle is 180°.

- In the second example, the diagram is made up of a rectangle and a rhombus. Ask them to recall that
 - a rectangle has 4 right angles,
 - a rhombus has sides of equal length,
 - the opposite angles of a rhombus are equal,
 - the sum of the interior angles in a triangle is 180°.

Guide them to find the unknown angles.





- 3. For this example, there is a triangle in the rectangle. However, guide them to realize there is a trapezium in it with 2 right angles. Ask them to recall that a trapezium is a quadrilateral and the sum of its interior angles is 360°. Guide them to find the unknown angles.
- 4. In the second example, the diagram is made up of 2 similar hexagons. Ask them to recall
 - a) how to find the size of an interior angle of a regular hexagon
 - b) that the sum of angles at a point is 360°.

Guide them to find the unknown angles.

- 5. In the first example, there is an isosceles triangle in a trapezium. Ask them to recall that
 - a) a trapezium has 2 parallel sides
 - b) an isosceles triangle has 2 equal sides
 - an isosceles triangle has 2 similar angles on the opposite of the equal sides
 - d) that the alternate interior angles are equal

Guide them to find the unknown angle.

- In the second example, the shape is made up of a parallelogram and an equilateral triangle. Ask them to recall that
 - a) the sum of the adjacent angles of a parallelogram is 180°.
 - an equilateral triangle has angles of 60° each
 - c) the sum of angles at a point is 360°.

Guide them to find the unknown angle.

LQO is an isosceles tria	ngle in trapezium KMNP. Find ∠q.	
	P O N	
∠LON = 108° - Alte	ernate interior angles	
$\angle LOQ = 108^{\circ} - 52^{\circ}$ $= 56^{\circ}$		
$\angle QLO = \angle LOQ = 56^{\circ}$		
$ \begin{array}{c} \angle q + \angle QLO + \angle LOQ \\ \angle q + 56^\circ + 56^\circ \\ \angle q + 112^\circ \\ \angle q \end{array} $	$= 180^{\circ}$ = 180^{\circ} = 180^{\circ} = 180^{\circ} - 112^{\circ} = 68^{\circ}	
KLMO is a parallelogra	m. MON is an equilateral triangle. Find $\angle x$.	
	K 52° O N M	
	Sum of adjacent angles	
$\angle KOM + 52^\circ = 180^\circ$	in a parallelogram	
$\angle KOM = 180^{\circ} - 128^{\circ}$	- 52*	
$\angle NOM = \angle OMN = \angle N$	$MNO = 60^{\circ}$ Regular triangle	
/x + /KOM + /NOP	$M = 360^{\circ}$	
$\angle x + 128^\circ + 60$	$0^{\circ} = 360^{\circ}$	
/	$x = 360^{\circ} - 188^{\circ}$	
~		
	= 172°	



- In the first example, the shape is made up of a rhombus and an isosceles triangle. Ask them to recall that
 - a) the alternate interior angles are equal
 - b) 4 right angles are made by the intersection of the diagonals of a rhombus
 - c) the sum of interior angles of a right triangle is 180°
 - d) the sum of angles on a straight line is 180°

Guide them to find the unknown angle.

- In the second example, the shape is made up of a kite and an isosceles triangle. Ask them to recall that
 - a) only 1 pair of opposite angles in a kite is equal
 - b) the sum of angles on a straight line is 180°
 - c) the sum of interior angles of a kite is 360°
 - an isosceles triangle has 2 similar angles on the opposite of the equal sides
 - e) the sum of interior angles of a triangle is 180°.

Guide them to find the unknown angles.

 Guide the students to refer to Starting Point on page 130. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 136 and 137 in Go Get Maths Workbook P6.





Lesson 2 Perimeter of a polygon

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the perimeter of a polygon.
- 2. Find the length of the unknown side of a polygon.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary Perimeter

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- 1. Help the students to recall what the perimeter of a shape is.
- 2. Draw a rectangle on the board with its length and width. Ask a volunteer to show how to find its perimeter.
- 3. Tell the students that the perimeter of a shape is the length around it.
- 4. Use the examples to explain further.
- Guide them to realize the marks on the diagrams that indicate the similar lengths.

- Tell the students that a shape might be made up of a few shapes which are placed side by side.
- 7. Use the example to guide the students to find the perimeter.

- Guide the students to find the length of the unknown side of the irregular pentagon.
- In the second example, ask the students to take note of the marks on the sides of the shape. Guide them to identify the sides with similar length. Finally guide them to find the length of the said side.







- In the example, ask the students to take note of the marks on the sides of the shape. Guide them to identify the sides with similar length. Finally guide them to find the length of the said side.
- Guide the students to refer to Starting Point on page 140. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 5 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 138 and 139 in Go Get Maths Workbook P6.

Lesson 3 Area of a polygon

Lesson objectives

By the end of the lesson, the students should be able to:

- Recall formulas for areas of triangles, rectangles, squares, rhombuses and parallelograms.
- 2. Find the area of polygons.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Area

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Ask a few students to draw a triangle, a rectangle, a square, a rhombus and a parallelogram on the board. Ask them for the distinct properties of each shape.
- 2. Then, get other students to write the formula of area for each shape.
- 3. Tell them that they need to know these formulas by heart.




- In the first example, the trapezium is made up of a square and a right triangle.
- 5. We can find the areas of the square and the right triangle separately first. Ask them to take note of the marks on the sides to realize the sides with equal length.
- 6. In the second example, the kite can be separated into 2 triangles. Guide them to find the area of the kite.
- For the same kite, ask the students to separate the kite into 2 similar triangles with PR as the base. Ask them to calculate the area of each triangle before add them up to find the area of the kite.

- 8. In the first example, the hexagon is made up of an isosceles triangle, a rectangle and a right triangle.
- 9. Guide them to find the area of the hexagon.
- In the second example, the kite can be separated into 2 triangles and 2 parallelograms. Guide them to find the area of the shape.

Find the area of the hexagon below 4 cm 10 cr $\overline{\mathrm{BC}} = \overline{\mathrm{CF}} = 6 \div 2$ Area of rectangle CDGF = 6×3 $= 18 \text{ cm}^2$ = 3 cmArea of triangle ABF = $\frac{1}{2} \times 6 \times 4$ Area of triangle DGE = $\frac{1}{2} \times (10 - 6) \times 3$ $= 12 \text{ cm}^2$ $= 6 \text{ cm}^2$ Area of hexagon = 12 + 18 + 6 $= 36 \text{ cm}^2$ The area of the hexagon is 36 cm². Find the area of the shape below. Area of triangle STY Area of triangle SYX $=\frac{1}{2} \times (3+2) \times 2$ $=\frac{1}{2} \times (3+2) \times 2$ $= 5 \text{ m}^2$ $= 5 \text{ m}^2$ Area of parallelogram TUVY Area of parallelogram YVWX $= 3 \times 2$ $= 3 \times 2$ $= 6 \text{ m}^2$ $= 6 \text{ m}^2$ Area of whole shape = 5 + 5 + 6 + 6 $= 22 \text{ m}^2$ The area of the shape is 22 m^2 .



- Tell the students that some shapes might originate from a simple rectangle with some missing parts. Therefore, for such shape, we can find the area of the original shape before subtracting the area of the missing parts.
- 12. In the first example, the shape originates from a rectangle with a missing triangle at a corner.
- 13. Guide them to find the area of the shape.
- 14. In the second example, the shape originates from a rectangle with a smaller rectangle missing from its center.
- 15. Guide them to find the area of the shape.
- Guide the students to refer to Starting Point on page 143. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 9 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 140 to 141 in Go Get Maths Workbook P6.





Lesson 4 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving perimeter and area of a polygon.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Reiterate the 3 simple steps to solve a word problem.
 Step 1: Understand the problem
 Step 2: Plan and execute
 Step 3: Check the answer
- 2. Work with them the 3 steps in solving the word problems. Ask them to always check their answers.

3. Work with them the 3 steps in solving the word problems. Ask them to always check their answers.

Annie combined 4 pieces of similar right-triangle shaped cardboard as shown below to make a pinwheel. What is the perimeter of the pinwheel?



The perimeter of the pinwheel is 24 cm.

This shape is made of 5 identical squares. If the perimeter of this shape is 192 cm, find its area.





- 4. Work with them the 3 steps in solving the word problems. Ask them to always check their answers.
- Guide the students to refer to Starting Point on page 148. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.





Further practices

Get the students to complete the practices on pages 142 to 144 in Go Get Maths Workbook P6.

Chapter 9 Circles

The big idea

- 1. Ask the students to look at the picture carefully.
- 2. Ask them these questions to start a discussion:
 - Do you know how to ride a bicycle?
 - Is it easy to balance on a bicycle?
 - What is the shape of a bicycle wheel?
 - Does a bicycle with big wheels move a longer distance when the wheels make a complete turn compared to a bicycle with smaller wheels? Why?
 - Can we calculate how far a bicycle move when the wheels make a complete turn? What other information do we need?



Strand 2: Measurement and geometry

Standard M.2.1

Indicators:

M 2.1 Gr6/3 Show mathematical methods of finding the answers of word problems involving circumference and area of a circle.



Lesson 1 Parts of a circle

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Identify parts of a circle.
- 2. Differentiate the diameter and radius of a circle.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Radius, chord, diameter, circumference, center

Materials needed

Round items such as a lid or bottle

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Fun with Maths!

Materials required: Round items such as a lid or bottle

Objective of the activity: Understanding that diameters intersect at center

The students will be able to identify a diameter of a circle, and realize that a diameter passes through the center of the circle.

- Draw a big circle on the board. Introduce the terms circumference, chord, diameter and center of a circle to the students.
- 2. Tell them that the circumference of a circle is the perimeter of the circle. Ask them to draw a circle and measure its circumference.
- Tell them that a diameter is the longest cord that passes through the center of the circle. Inform that the lines they drew in the previous activity are diameters. A circle has countless diameters.
- 4. Ask them these questions for a discussion:
 - a) Is a diameter a chord?
 - b) When do we call a chord a diameter?





- Draw a big circle on the board. Introduce the term radius by drawing some radii on it. A radius is the length from the center of the circle to its circumference.
- Draw a circle on the board. Ask a student to draw its radius. Then, extend the radius from the center to the circumference. Ask them these questions:
 - a) Has the radius become a diameter?
 - b) What can you say about the length of the diameter and the radius?
- Tell them that the diameter of a circle is 2 times its radius.
- 8. Use the examples to explain further.
- Guide the students to refer to Starting Point on page 154. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 16 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 145 and 146 in Go Get Maths Workbook P6.





Extra notes

When drawing a circle with a compass,

- a) hold the compass firmly from the top part of the compass, not at the pencil,
- b) place the needle of the compass on the paper where you wish to draw the circle,
- c) slowly rotate the compass around so that the pencil begins drawing the circle,
- d) do not apply any pressure to the pencil or the width of your circle will change.



Lesson 2 Drawing circles

Lesson objectives

By the end of the lesson, the students should be able to:

1. Draw circles with a compass.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Materials needed Compass

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Ask the students to bring a compass. Guide them to set the distance between the needle and the pencil lead to 1.5 cm.
- 2. Then, guide them to draw a circle with a radius of 1.5 cm with the compass.
- 3. Ask them to draw a circle with a radius of 4 cm.

Go Get Maths Teacher's Guide P6 | 158

- 4. Always ask the students to identify how big the circle would be. Take note if the instruction mentions diameter or radius.
- Using the example, explain to them how to draw a circle with a diameter of 4 cm.
- 6. Ask them to draw a circle with a diameter of 6 cm.
- Guide the students to refer to Starting Point on page 158. Ask them to answer the question. Have a discussion to conclude the lesson.

<text><text><text><text><image><image>





Try This!

Get 3 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 147 to 149 in Go Get Maths Workbook P6.

160 Mathematics Prathomsuksa 6

Lesson 3 Circumference of a circle

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the circumference of a circle with given radius or diameter.
- 2. Find the perimeter of a $\frac{1}{4}$ of a circle, a semicircle, and a $\frac{3}{4}$ of a circle with given the radius or diameter.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Circumference, π

Materials needed

Round items such as a CD, meter rule, marker pen

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Fun with Maths!

Materials required: Round items such as a CD, meter rule, marker pen

Objective of the activity: Finding the relation between the diameter of a circle and its circumference

The students will notice that the ratios of the circumference of a circle to its diameter are quite similar.





- 1. Tell the students that the ratio of the circumference to the diameter of each circle is fixed and it is a 3.14159..., but we usually take it as 3.14.
- Introduce this number as π (read as pi). Regardless to the size of the circle, the value of π remains the same.
- Introduce the formula to find the circumference of a circle using its diameter.

Circumference = π x diameter

 Ask the students to derive the formula to find the circumference of a circle using its radius. Ask them to relate the circumference to its radius.

Circumference = $2 \times \pi \times radius$

5. Use the examples to explain further.

- Draw a semicircle on the board. Ask them to identify the perimeter of the semicircle. Tell them that to find its perimeter, we need to find the length of the arc before adding it with its diameter.
- 7. Use the example to explain further.
- Draw a quarter circle on the board. Ask them to identify the perimeter of the quarter circle. Tell them that to find its perimeter, we need to find the length of the arc before adding it with 2 times its radius.
- 9. Use the example to explain further.
- 10. Draw $\frac{3}{4}$ of a circle on the board. Ask them to identify the perimeter of the $\frac{3}{4}$ of a circle. Tell them that to find its perimeter, we need to find the length of the arc before adding it with 2 times its radius.
- 11. Use the example to explain further.
- 12. Guide the students to refer to **Starting Point** on page 161. Ask them to answer the question. Have a discussion to conclude the lesson.







Try This!

Get 7 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 150 to 153 in Go Get Maths Workbook P6.

Lesson 4 Area of a circle

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the area of a circle with given radius or diameter.
- 2. Find the area of a $\frac{1}{4}$ of a circle, a semicircle and a $\frac{3}{4}$ of a circle with given radius or diameter.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Area, π

Materials needed

Circular cards, color pencils, scissors

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Fun with Maths!

Materials required: Circular cards, color pencils, scissors

Objective of the activity: Deriving the formula of area of a circle

After this activity, the students will understand how the formula of area of a circle is derived.





or visit https://qr.pelangibooks.com/ ?u=cxndoo0r



1. Introduce the formula to find the area of a circle using its radius.

Area = π x radius x radius

- Ask the students to take note that here the formula involves radius, not diameter.
- 3. Use the examples to explain further.
- 4. Draw a semicircle on the board. Ask them to identify the area of the semicircle. Tell them that since a semicircle is half of a circle with similar radius, thus its area is half the area of the circle with similar radius.
- 5. So, guide the students to realize that to find the area of a quarter circle, they need to compare it with a complete circle with the similar radius.
- 6. A quarter circle is $\frac{1}{4}$ of a circle with the similar radius. Thus, its area is $\frac{1}{4}$ of the area of a circle with the similar radius.
- 7. Use the examples to explain further.

- 8. Draw a $\frac{3}{4}$ of a circle on the board. Ask a student to compare it to a circle with the same radius. Get another to write the formula to find its area.
- 9. A $\frac{3}{4}$ of a circle is $\frac{3}{4}$ of a circle with the similar radius. Thus, its area is $\frac{3}{4}$ of the area of a circle with the similar radius.
- 10. Use the example to explain further.
- Guide the students to refer to Starting Point on page 165. Ask them to answer the question. Have a discussion to conclude the lesson.



Try This!

Get 5 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 154 to 157 in Go Get Maths Workbook P6.



Lesson 5 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving circumference and area of a circle.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

 Reiterate the 3 simple steps to solve a word problem.

Step 1: Understand the problem Step 2: Plan and execute Step 3: Check the answer

- 2. In this problem, the shape is made up of a semicircle and a right triangle. To find its perimeter we need to find the length of the arch before adding it with the length of the 2 sides of the triangle.
- To find the area of the shape, we need to find the area of the semicircle and the area of the triangle separately before adding them up.

Go Get Maths Teacher's Guide P6 | 168

- 4. In the first problem, the shape is made from a quarter circle with a semicircle cut out from it. To find its perimeter, we need to find the length of the 2 arches, before adding them with the radius of the quarter circle.
- 5. For the area of the shape, we should find the area of the quarter circle and the area of the semicircle. Then, we subtract the area of the semicircle from the area of the quarter circle.
- 6. For the second problem, the shape is made from a semicircle with an isosceles triangle cut out from it. To find the area of the shape, we need to find the area of the semicircle and the area of the isosceles triangle. Then, we subtract the area of the isosceles triangle from the area of the semicircle.

```
Sakda cuts out a semicircle from a quarter-circle shaped card
and obtains a shape as shown. Find the perimeter and area of
the shape. (Take \pi = \frac{22}{7}.)
Perimeter of shape
=(\frac{1}{2} \times \frac{22}{7} \times 7) + (\frac{1}{4} \times 2 \times \frac{22}{7} \times 7) + 7
= 11 + 11 + 7
= 29 cm
Area of quarter circle = \frac{1}{4} \times \frac{22}{7} \times 7 \times 7
                               = 38.5 \text{ cm}^2
Area of semicircle = \frac{1}{2} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}
                         = 19.25 \text{ cm}^2
Area of shape = 38.5 - 19.25
                   = 19.25 \text{ cm}^2
The perimeter of the shape is 29 cm. The area of the shape is 19.25 cm<sup>2</sup>.
An isosceles triangle is cut out from a semicircle
as shown. The base of the triangle is the diameter
of semicircle which is 35 cm long. Find the area of
the shaded part. (Take \pi = \frac{22}{7}.)
                                                                                             35 cm
Area of semicircle = \frac{1}{2} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2}
                         = 481.25 cm
                                                                               The height of the isosceles triangle is the radius of the
Area of triangle = \frac{1}{2} \times 35 \times \frac{35}{2}
                                                                                semicircle.
                      = 306.25 \text{ cm}^2
Area of shaded part = 481.25 - 306.25
                            = 175 \text{ cm}^{2}
The area of the shaded part is 175 cm<sup>2</sup>.
```



- In this problem, guide the students to realize that the shaded part is made up of 2 quarters of a circle that have an isosceles triangle cut out from each of them.
- 8. To find its perimeter, we multiply 2 by the length of the arch of the quarter circle.
- 9. To find the area of the shaded part, we need to find the area of a quarter circle first and the area of the isosceles triangle. We subtract the area of the isosceles triangle from the area of the quarter circle. Then, we multiply it by 2 as the shaded part is made up of 2 quarters of a circle that have an isosceles triangle cut out from each of them.
- Guide the students to refer to Starting Point on page 168. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 158 to 163 in Go Get Maths Workbook P6.

2. A wheel has a diameter of 63 cm. It made a few complete turns and traveled 49.5 m. How many complete turns did it make? (Take $\pi = \frac{22}{7}$.)
49.5 m
It made complete turns.
3. Kwang cut a small semicircle from a large semicircle. The shape she obtained is shown. What are the perimeter and area of the shape? (Take $\pi = 3.14$.)
The perimeter of the shape is The area of the shape is
4. Kiet drew 4 identical quarter circles on a square. He shaded a part of it as shown. Find the area of the shaded part. (Take $\pi = \frac{22}{7}$.)
The area of the shaded part is



Chapter 10 Volume and capacity

The big idea

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) Do you know how to swim?
- b) How often do you go swimming?
- c) Where do you swim usually?
- d) What is the shape of the swimming pool in the book?
- e) How do you find the surface area of the swimming pool? What information do you need?
- f) How do you find the volume of water in the swimming pool? What information do you need?
- g) If the pool is 10 m long and 5 m wide, and contains 60 m³ of water, can you find the depth of the water? How?

Strand 2: Measurement and geometry

Standard M.2.1

Indicators:

M 2.1 Gr6/1 Show mathematical methods of finding the answers of word problems involving volume of three-dimensional geometric shapes that are made of cuboids.

Lesson 1 Volume and capacity of cuboids and cubes

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Find the volume and capacity of a cuboid.
- 2. Find the length, width or height of a cuboid.
- 3. Find the area of a face of a cuboid.
- 4. Find the length of an edge of a cube.
- 5. Find the length of a side of a square face of a cuboid.

Suggested teaching time

5 periods (5 x 50 minutes)

Vocabulary

Volume, capacity, cuboid,

Materials needed

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Draw a cuboid with its dimensions. Get a volunteer to give the formula of volume of a cuboid. Get another to find the volume of the cuboid.
- 2. From the formula of volume of a cuboid, guide the students to realize that the area of a face of the cuboid can be used to find the volume of the cuboid.
- 3. Use the examples to explain further.





Extra notes

A product of any two dimensions of a cuboid is the area of one of its faces.

Since volume of a cuboid = length x width x height, the product of the area of one of its faces by the third dimension also equals to its volume.



$$\frac{1}{\text{width}} \times \text{volume} = \text{length } \times \text{width } \times \text{height } \times \frac{1}{\text{width}}$$
$$\frac{\text{volume}}{\text{width}} = \text{length } \times \text{height}$$
$$\frac{1}{\text{height}} \times \frac{\text{volume}}{\text{width}} = \text{length } \times \text{height } \times \frac{1}{\text{height}}$$
$$\frac{\text{volume}}{\text{height } \times \text{width}} = \text{length } \text{or length} = \frac{\text{volume}}{\text{height } \times \text{width}}$$
With the same method, we can get

width =
$$\frac{\text{volume}}{\text{height x length}}$$
 and height = $\frac{\text{volume}}{\text{length x width}}$

- Guide the students to understand how to find length, width or height from the formula of volume of a cuboid.
- 2. Use the examples to explain further.

- 3. Use the example to explain further.
- Tell the students that we can find the length of the third dimension of a cuboid if given its volume and area of one of its surfaces.
- 5. Use the examples to explain.

A rectangular tank has a capacity of 6,000 mm³. If the length is 8 mm and the height is 25 mm, find the width of the tank.



 $Width = \frac{capacity}{length \times height}$ $= \frac{6,000}{8 \times 25}$ $= \frac{6,000}{200}$

= 30 mm

So, the width of the tank is 30 mm.

The volume of the cuboid is 240 $\rm cm^3.$ The area of the shaded face is 60 $\rm cm^2.$ Find its width.



Find the height of a rectangular tank if its capacity is 1.2 / and the area of its base is 120 cm².







6. Use the example to explain further.

- Tell the students that we can find the area of one of the surfaces of a cuboid if given its volume and length of the third dimension.
- 2. Use the examples to explain.

3. Use the example to explain further.

Teaching ideas

- Ask the students to describe the properties of a cube. Its edges are of similar length.
- 2. Tell them that we can find the length of its edges when given its volume.
- 3. Use the examples to explain.
- Ask them to try to multiply a number 3 times in order to find the length of an edge of a cube.

2 x 2 x 2 = 8
3 x 3 x 3 = 27
4 x 4 x 4 = 64
5 x 5 x 5 = 125

The rectangular tank is 40 cm long. Its capacity is 6 *l*. Find the area of the shaded face of the tank.



Area = $\frac{\text{capacity}}{\text{length}}$ = $\frac{6,000}{40}$ = 150 cm²

 $= 6,000 \text{ cm}^3$

Capacity = 6 l

So, the area of the shaded face of the tank is 150 cm².



To find the length of a cube, we can try to multiply a number 3 times. Length \times length \times length = volume $3 \times 3 \times 3 = 27$ So, the length of its edge is 3 cm.





- Tell the students that we can find the length of a side of a square face of a cuboid if given its volume and the length of the third dimension.
- 2. Ask them to try to multiply a number 2 times in order to find the length of side of a square.

2 x 2 = 4
3 x 3 = 9
4 x 4 =16
5 x 5 = 25

- 3. Use the examples to explain.
- Guide the students to refer to Starting Point on page 173. Ask them to answer the questions. Have a discussion to conclude the lesson.

Try This!

Get 8 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 164 to 168 in Go Get Maths Workbook P6.






Lesson 2 Volume and capacity of solids

Lesson objectives

By the end of the lesson, the students should be able to:

1. Find the volume and capacity of solids made of cuboids and cubes.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary Volume, capacity

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Tell the students that the solids are made of cuboids and cubes. We can divide them into a few cuboids or cubes when finding its volume.
- For this example, the solid is divided into 2 cuboids. We find the volumes of the 2 cuboids first. Then, we add them up to find the volume of the solid.

- 3. Tell the students that for some solids, there are some than 1 way to divide them into cuboids and cubes.
- This example shows another way to divide the solid. Ask the students to take note that whichever way they divide the solid, the results are always the same.
- In the second example, the solid is a cuboid with a smaller cuboid removed from it. Guide the students to find its volume by subtracting the volume of the smaller cuboid from the larger cuboid.





- 6. In the first example, guide the students to find the volume of the solid.
- Then, ask them to divide the solid in other ways and find its volume. The students should be able to find the same answer.
- 8. Ask the students what the capacity of a tank means. How does it differ from the volume of water in a tank?
- 9. In the second example, the tank contains some water. We need to find the volume of water in the tank. Here we can divide the tank into a few cuboids, and then find the volume of water in each cuboid. Lastly, we add up the volume of water in each cuboid to find the volume of water in the tank.
- Guide the students to refer to Starting Point on page 180. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 169 to 173 in Go Get Maths Workbook P6.





Lesson 3 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving volume and capacity of solids.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Reiterate the 3 simple steps to solve a word problem.
 Step 1: Understand the problem
 Step 2: Plan and execute
 Step 3: Check the answer
- 2. In the problem, the water from the first tank is poured into the second tank. We need to find the height of water in the second tank.
- Explain to students that we need to find the volume of water first. Then, with that volume, we can find the height of water in the second tank as the dimensions of the base of the second tank is given.

- In the first problem, we need to find the volume of concrete cement to build the hollow cuboid. The cuboid is hollow without a base.
- 5. Discuss with the students using these questions:
 - a) How do you find the volume of the cuboid if it is not hollow?
 - b) How do you find the volume of the hollow cuboid without a base?
 - c) How do you find the length, width and height of the empty space in the cuboid?
 - d) How do you find the volume of the empty space in the cuboid?
- In the second problem, 8 cubical metals measuring 5 cm are placed in a tank of water. We need to find the new level of water in the tank.
- 7. Ask the students these questions to start a discussion:
 - a) What happens to the level of water when we put the cubes into the water? Why?
 - b) What does the increment of the level of water equal to?
 - c) How do we find the increment of the level of water?
 - d) How do we find the new level of water in the tank?

A construction factory wants to make a hollow cuboid without a base using concrete cement as shown. The thickness of the hollow cuboid is 0.2 m. Find the volume of concrete cement needed to make the hollow cuboid. Volume of solid cuboid = length x width x height



Volume of solid cuboid = length × width × height = $2 \times 2 \times 3$ = 12 m^3

Volume of empty space in cuboid = length × width × height

 $= (2 - 0.2 - 0.2) \times (2 - 0.2 - 0.2) \times 3$ $= 1.6 \times 1.6 \times 3$

 $= 7.68 \text{ m}^3$

Volume of hollow cuboid = 12 - 7.68= 4.32 m^3

So, the volume of concrete cement needed to make the hollow cuboid is 4.32 m³.

A rectangular tank measuring 20 cm by 10 cm by 30 cm is filled with water to the height of 12 cm. Pheng puts 8 cubical metals of length 5 cm into the tank. Find the height of water in the tank now.





- In the first problem, we need to find the extra volume of water to fill up the tank.
- 9. Discuss with the students using these questions:
 - a) How do you find the extra volume of water to fill up the tank?
 - b) How do you find the capacity of the tank?
 - c) How do you find the volume of existing water in the tank?
- 10. In the second problem, the water from the first tank is poured into the second tank. We need to find the length of the square base of the second tank.
- 11. Ask the students these questions to start a discussion:
 - a) How much water is there in the first tank?
 - b) When the water is poured into the second tank, we are given the height of the water in it. Can we find the length of the square base directly? Why?
 - c) How do you find the area of the square base of the tank?
 - d) How do you find the length of the square base of the tank?
- Guide the students to refer to Starting Point on page 184. Ask them to answer the question. Have a discussion to conclude the lesson.

Try This!

Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 174 to 178 in Go Get Maths Workbook P6.





Chapter 11 Solids

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) Have you seen these structures?
- b) Where did you see them?
- c) What are they known as?
- d) Do you know where they are usually found?
- e) Who built them?
- f) What are the shapes of the surfaces of the structures in the diagram?
- g) What do you think the shape of its base is?

Strand 2: Measurement and geometry

Standard M.2.2

Indicators:

M 2.2 Gr6/3 Describe the characteristics of different types of three-dimensional geometric shapes.

M 2.2 Gr6/4 Identify three dimensional geometric shapes that made up from unfolded pictures and identify unfolded pictures of three-dimensional geometric shapes.

Lesson 1 Cones, cylinders, spheres and pyramids

Lesson objectives

By the end of the lesson, the students should be able to:

1. List the properties of cones, cylinders, spheres and pyramids.

Suggested teaching time

3 periods (3 x 50 minutes)

Vocabulary

Cones, cylinders, spheres and pyramids

Materials needed

Cones, cylinders, spheres and pyramids

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

- Show the students a cone. Ask them to give examples of things that are shaped like a cone.
- 2. Guide them to identify the parts and list its properties.
- 3. Repeat with a cylinder.







- Show the students a sphere. Ask them to give examples of things that are shaped like a sphere
- 5. Guide them to identify the parts and list its properties.
- Show them a pyramid. Tell them that it has a vertex and a polygon as the base. It has triangular faces that join at the vertex.
- 7. Guide them to identify the types of pyramids based on the types of bases.
- 8. Guide them to identify the parts and list their properties.

- 9. Ask them to give examples of thing that are shaped like a pyramid.
- Guide the students to refer to Starting Point on page 189. Ask them to answer the questions. Have a discussion to conclude the lesson.

Thinking Corner!

Show the students a cone and a pyramid. Ask them to compare and contrast the two solids.

Both have a vertex. A cone has a curved face and a circular base. A pyramid has triangular faces and a polygonal base.

Promine Promine

A pentagonal pyramid has a pentagonal

base. It has 5 triangular faces. It has 6 faces

altogether.

lanta

Try This!

Get 12 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 179 and 180 in Go Get Maths Workbook P6.



Lesson 2 Nets of solids

Lesson objectives

By the end of the lesson, the students should be able to:

- 1. Visualize and describe nets from solids.
- 2. Visualize and describe solids from nets.

Suggested teaching time

2 periods (2 x 50 minutes)

Vocabulary

Net

Materials needed

Nets of different shapes, boxes, scissors, cubes, paper

Starting point

Help the students to understand the questions. Ask them if they know the answers and what they will learn today.

Teaching ideas

- Ask the students to bring a cuboidal box and a pair of scissors. Then, ask them to cut along the edges of the boxes, and open them up and lay them flat
- 2. Introduce the term net to the students.
- 3. Ask them these questions:
 - a) When the box is cut and opened up, is the new shape a 2D or a 3D shape?
 - b) Can you fold the net into its 3D shape?
 - c) Do some solids have more than 1 net?
- 4. Guide them to draw the net of the box they cut. Ask them to use dotted lines for the folding lines of the net.

Go Get Maths Teacher's Guide P6 | 192

5. Give the students a cube each. Ask them to use their imagination to draw all its possible nets.

Thinking Corner!

Ask the students to visualize the correct nets using a cube.

6. Using the examples, show the students the nets of some solids.





Go Get Maths Teacher's Guide P6 | 194

Thinking Corner!

Ask the students to analyze the 2 nets of the pentagonal prism in the book. Start a discussion using these questions:

- a) What are the shapes that make the net?
- b) Are the shapes that make the 2 nets the same?
- c) Are the numbers of the shapes the same for both nets?
- d) What is the difference between both nets?

Repeat with the nets of the cylinder. Ask them to conclude.







Fun with Maths!

Materials required: Paper Objective of the activity: Visualizing and drawing nets

The students are much better at visualizing 3D shapes when they have plenty of handson experience with them.

7. Using the examples, guide them to visualize the solids of the nets shown.

- 8. Tell the students that it is important to understand how a 3D shape is made up of 2D faces. It is not only a useful skill if you need to construct a box, but also is vitally important in any aspect of 3D designing.
- The important spatial skills that you build from the basic understanding of shapes and their nets can therefore develop further into other more challenging design applications.
- Guide the students to refer to Starting Point on page 192. Ask them to answer the questions. Have a discussion to conclude the lesson.





Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 181 to 188 in Go Get Maths Workbook P6.

Chapter 12 Pie charts

The big idea

Ask the students to look at the picture carefully. Ask them these questions to start a discussion:

- a) What are bar charts?
- b) What do they do?
- c) Can the information be presented in circular charts?
- d) What are these circular charts known as?



Strand 3: Statistics and probability

Standard M.3.1

Indicators:

M 3.1 Gr6/1 Use data from pie charts to find the answers of word problems.



Extra notes

A pie chart is a circle that is divided into areas, or slices. Each slice represents the data of that particular part out of the whole part.



Pie charts, also commonly known as pie graphs help in interpreting and representing the data more clearly. It is also used to compare the given data and is often used in business.

Lesson 1 Reading a pie chart

Lesson objectives

By the end of the lesson, the students should be able to:

1. Read a pie chart.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

Pie chart

Materials needed Computers

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

Teaching ideas

- Ask the students to analyze the picture graph in the book. Ask them these questions to start a discussion:
 - a) How many types of buttons are there?
 - b) How many yellow buttons are there?
 - c) How many blue buttons are there?
 - d) How many red buttons are there?
 - e) How many buttons are there altogether?
- 2. Repeat with the bar graph.
- 3. Tell the students that the picture graph, bar chart and the circular chart or pie chart give the same information.
- 4. Introduce the term pie chart to the students. It is another way to represent information.

Go Get Maths Teacher's Guide P6 | 200

- 5. Ask the students to analyze the first pie chart. It shows the number of fruits in the refrigerator. Ask them these questions:
 - a) How many types of fruits are there?
 - b) Which fruit is the greatest in number?
 - c) Which fruit is the smallest in number?
 - d) What is the number of each type of fruits?
 - e) Compare the numbers of pears and apples.
 - f) Compare the numbers of oranges and pears.
 - g) What is the number of apples and apples together?
 - h) How many fruits are there altogether?
- Ask the students to analyze the second pie chart. It shows the types of sports participated by 30 students. Ask them these questions:
 - a) How many types of sports are there?
 - b) How many students take part in soccer?
 - c) How many students take part in swimming?
 - d) How many students take part in badminton?
 - e) How do you find the number of students taking part in basketball?
 - f) Compare the numbers of students taking part in badminton and soccer.
 - g) Compare the numbers of students taking part in swimming and basketball.
- 201 | Go Get Maths Teacher's Guide P6

The pie chart below shows the number of each fruit in the refrigerator. Based on the pie chart, we know that in the refrigerator, there are



The pie chart below shows the types of sports participated by a group of 30 children.





- Ask the students to analyze the pie chart. It represents the types of tarts baked.
- 8. Guide the students to find the number of each type of tarts baked.
- 9. It is given that half of the 80 tarts are chocolate tarts. Guide them to find the number of chocolate tarts.
- Help the students to realize the existence of the right-angle mark on the slice of strawberry tarts. Help the students to realize that the sum of angles at a point is 360°.

$$\frac{90^o}{180^0} = \frac{1}{4}$$

- 11. Therefore, $\frac{1}{4}$ of the 80 tarts are strawberry tarts. Guide them to find the number of strawberry tarts.
- 12. There are as many pineapple tarts as apple tarts. Now, we know the number of chocolate tarts and strawberry tarts. Guide them to find the number of pineapple tarts and apple tarts together. Ask them how to find the number of pineapple tarts and apple tarts, respectively.
- 13. Guide them to find the percentage of pineapple tarts since we have the number of pineapple tarts and the number of tarts altogether.

- 14. Ask the students to analyze the pie chart. It represents how Pheng spent his 500 Baht.
- Guide the students to find amount of money he saved given its percentage. Use the rule of three.
- 16. From the pie chart, we can notice that $\frac{1}{8}$ of the money is used for transportation. Guide them to find the amount of money spent on transportation.
- 17. From the pie chart, there is a rightangle mark on the slice of food. As 90° is $\frac{1}{4}$ of the chart, guide them to find the amount of money spent on food.
- As we know all the amounts of money spent on savings, food and transportation respectively, guide them to find the amount of money spent on books.
- Guide them to find the fraction and percentage of the money spent on transportation too.
- 20. Guide the students to refer to **Starting Point** on page 200. Ask them to answer the question. Have a discussion to conclude the lesson.





or visit https://qr.pelangibooks.com /?u=IEVuPCEU

fun 🛶 Maths!

- 1. Work in groups of four.
- Prepare some information in a table such as the types of books you have or the number of hours spent on different activities on a weekend.
- 3. Then, record the information in a spreadsheet as shown below.



- 4. Use the tools in the spreadsheet to create a pie chart.
- 5. Prepare some questions to ask your classmates.
- 6. Present your pie chart and get your classmates to answer your questions.

Fish 30%

Birds / Cats

15

Dogs 40%

TRY THIS!

The pie chart shows the different types of pets owned by a group of children. Fill in the blanks.

- 1. % of the children have dogs.
- 2. of the children have cats.
- 3. are the most popular pet among the children.
- 4. are the least popular pet among the children.
- 5. 20% of the children have
- 6. If there are 20 children altogether, of them have fish as pets.

204 Mathematics Prathomsuksa

Fun with Maths!

Materials required: Computers

Objective of the activity: Using a spreadsheet application to represent information in a pie chart

The students may need help to use the spreadsheet. However, they will find it to be very friendly and useful.

Try This!

Get 6 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 189 to 191 in Go Get Maths Workbook P6.

Lesson 2 Word problems

Lesson objectives

By the end of the lesson, the students should be able to:

1. Solve word problems involving pie charts.

Suggested teaching time

4 periods (4 x 50 minutes)

Vocabulary

-

Materials needed

-

Starting point

Help the students to understand the question. Ask them if they know the answer and what they will learn today.

- Reiterate the 3 simple steps to solve a word problem.
 Step 1: Understand the problem
 Step 2: Plan and execute
 Step 3: Check the answer
- 2. Work with them the 3 steps in solving the word problem. Ask them to always check their answer.

L@	330h 2 Word problems
St	arting point Based on the pie chart, if there are 240 cats and dogs, how do we find the number of dogs?
Le	arning to know Solving word problems
A g pie tool	roup of students took part in a competition. The chart shows the number of boys and girls who k part.
(a)	What fraction of the students were boys? $1 - \frac{1}{4} = \frac{3}{4}$
	So, $\frac{3}{4}$ of the students were boys.
(b)	How many boys took part in the competition? $\frac{1}{2}$ \longrightarrow 12 students
	$\frac{3}{4} \longrightarrow 12 \times 3 = 36 \text{ students}$ So, 36 boys took part in the competition.
(c)	How many students took part in the competition altogether?
	$\frac{1}{4}$ \longrightarrow 12 students or $12 + 36 = 48$ students $\frac{4}{7}$ \longrightarrow $12 \times 4 = 48$ students
	So, 48 students took part in the competition.



3. Work with them the 3 steps in solving the word problem. Ask them to always check their answer.

4. Work with them the 3 steps in solving the word problem. Ask them to always check their answer.

A group of students chose their favorite shapes. The pie chart shows their preferences. The same number of students chose triangle and square. There are twice as many students who chose circle as students who chose rectangle. 10 students chose rectangle.







Get 4 students to answer it. Ask the rest to verify the answers.

Further practices

Get the students to complete the practices on pages 192 to 197 in Go Get Maths Workbook P6.

To find out if the students have mastered the second half of the year's content, ask them to complete the **Revision 2** on pages 198 to 206 in Go Get Maths Workbook P6.

 A survey is done to find out the favorite flowers among a group of people. The pie chart shows its result. (a) Which is the most preferred flower? 	Rose Jasmine
(b) What fraction of the group of people did not choose jasmine or carnation?	Orchid Sunflower Carnation
of the group of people did not choose jasmin (c) If 8 people chose carnation, how many people were	ne or carnation. there altogether?
There were people altogether. 4. The pie chart shows the number of cups of beverages sold in the morning. Half of the beverages sold were coffee. There were 4 times as many cups of fruit juice sold as cups of milk sold. (a) How many cups of tea were sold?	Fruit juice Milk Tec
(b) How many cups of milk were sold?	
cups of milk were sold.	Chapter 12 209



Computational Thinking

The big idea

- Tell the students that computational thinking is a way to solve a problem through a set of systematic approaches.
- 2. Explain briefly the 4 skills in computational thinking.
- 3. Give examples of how each skill is used.
- Decomposition: For example, to tidy up your room, you need break this task into smaller tasks like making your bed, tidying your table, organizing your clothes, sweeping the floor and more.
- Pattern recognition: For example, to tidy up your table, you may realize you need to sort out your books according their genres.
- Algorithms: For example, to tidy up your room, you need to plan which task to do first and which task follows.
 Should you mop the floor first and then sweep the floor?
- Abstraction: For example, when you are tasked to tidy up your room, you should ignore what online games your siblings are playing.

Example

- 1. Guide the students to read and understand the question.
- In this example, all the 4 skills are used abstraction, decomposition, pattern recognition and algorithms.
- 3. Not every problem requires all the 4 skills. Some may require 1 or 2 skills.

EXAMPLE

Anong cuts out a rectangle from a cardboard. She finds that the sum of the lengths of the rectangle is 80% of its perimeter. The perimeter of the rectangle is 90 cm. Find the length of the rectangle.

Abstraction:

Irrelevant information – Anong cuts out a rectangle from a cardboard. Relevant information – the sum of the lengths of the rectangle is 80% of its perimeter, the perimeter of the rectangle is 90 cm

Decomposition:

Part 1: What is the sum of the lengths of the rectangle?

The sum of the lengths of the rectangle is 80% of the perimeter. The perimeter is 90 cm.

Part 2: What is the length of the rectangle?

Pattern recognition:

We can simplify the first part into

$100\% \longrightarrow 90 \text{ cm}$ $1\% \longrightarrow ?$ $80\% \longrightarrow ?$

Algorithms:

Part 1: Find the sum of the lengths of the rectangle.

	100%		90 cm
	1%	\longrightarrow	$\frac{90}{100}$ cm
	80%	\longrightarrow	$\frac{90}{100} \times 80 = 72 \text{ cm}$
The sum of the length	s of the	rectangle i	s 72 cm.

Part 2: Find the length of the rectangle.



The length of the rectangle is 36 cm.

211 | Go Get Maths Teacher's Guide P6