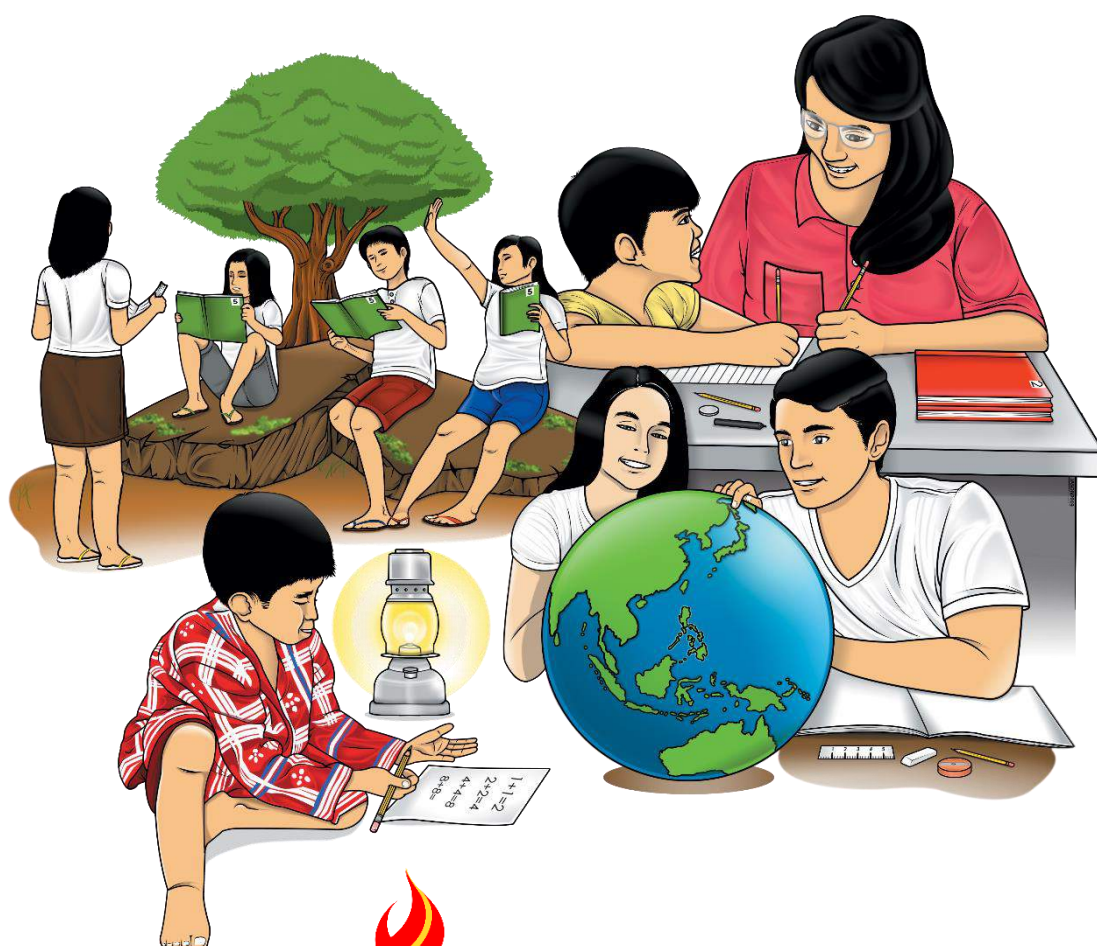


# Mathematics

## Quarter 4 – Module 1: Finding the Areas of Irregular Figures



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**Mathematics – Grade 4**  
**Alternative Delivery Mode**  
**Quarter 4 – Module 1: Finding the Areas of Irregular Figures**  
**First Edition, 2020**

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Published by the Department of Education  
Secretary: Leonor Magtolis Briones  
Undersecretary: Diosdado M. San Antonio

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**Department of Education – Region V**

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# **Mathematics**

## **Quarter 4 – Module 1: Finding the Areas of Irregular Figures**

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

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If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

It may seem easy to find the area of a plane figure like a rectangle or a square, but what if the figure has more than four sides or if it is irregular?

In this module, you will understand how to partition an irregular figure into squares and/or rectangles to find the area of the irregular figure.

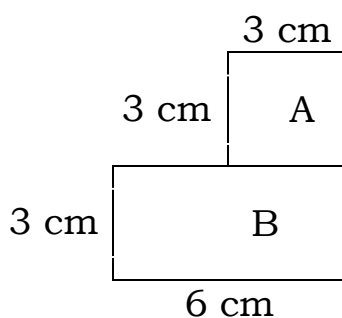
After going through this module, you are expected to find the area of irregular figures made up of squares and rectangles using sq. cm and sq. m.



## ***What I Know***

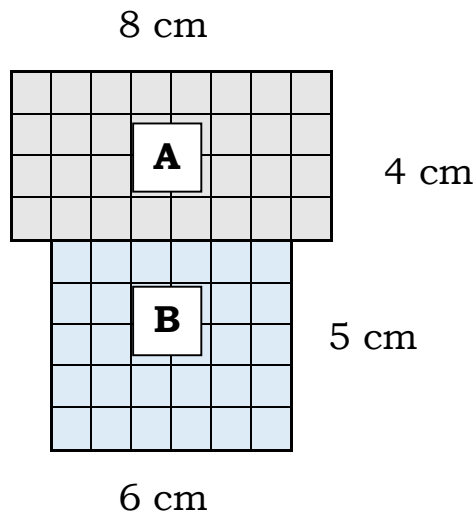
Analyze each diagram below and answer the questions that follow.

For questions 1 to 3, consider the figure below.



1. What is the area of square A?
2. What is the area of rectangle B?
3. What is the total area of figures A and B?

For questions 4 to 6, consider the figure below. Rectangle A is 8 cm long and 4 cm wide. Rectangle B is 6 cm long and 5 cm wide.

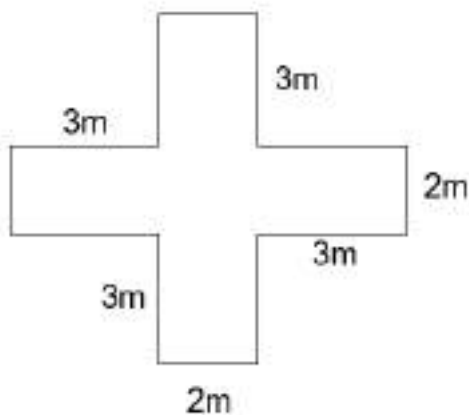


4. What is the area of rectangle A?
5. What is the area of rectangle B?
6. What is the total area of rectangles A and B?

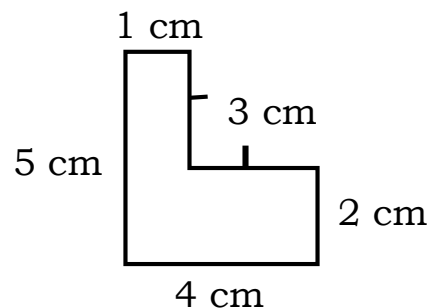
Find the area of each irregular figure.

In each figure, identical markings are used to show that the sides are of equal length (congruent). Sides with the same number of markings are equal in length.

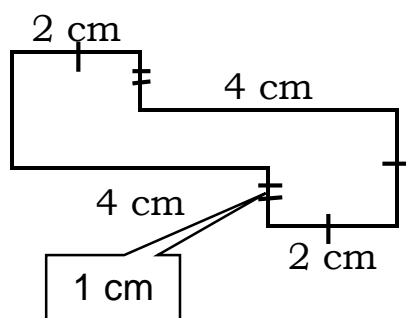
7)



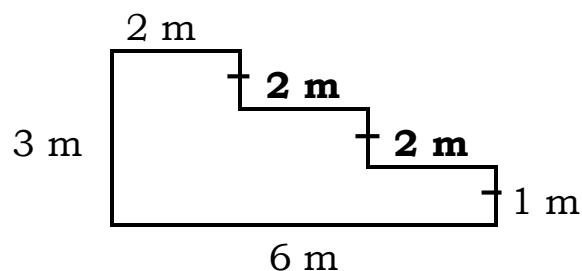
8)



9.



10.



Are you done answering?

If yes, time to check. Please go to page 14 for the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

**Lesson****1****Finding the Areas of Irregular Figures*****What's In***

Let's do this activity for a quick recall of finding the area of a square or a rectangle.

Match the square or rectangle in Column A to its area in Column B. Write the letter of the correct answer on your answer sheet.

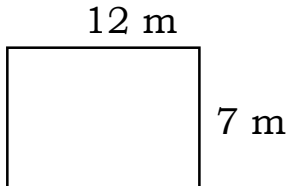
**Column A**

1.

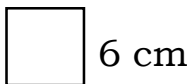


10 cm

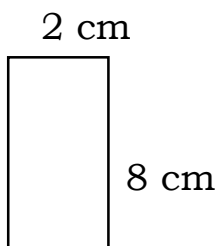
2.



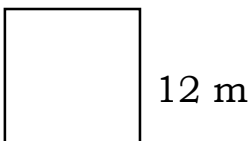
3.



4.



5.

**Column B**a.  $16 \text{ cm}^2$ b.  $36 \text{ cm}^2$ c.  $84 \text{ m}^2$ d.  $100 \text{ cm}^2$ e.  $120 \text{ cm}^2$ f.  $144 \text{ m}^2$ 

To find the area of a square, we use the formula:

$$A = s \times s$$

For the rectangle, we use the formula:  $A = l \times w$

Are you done answering?

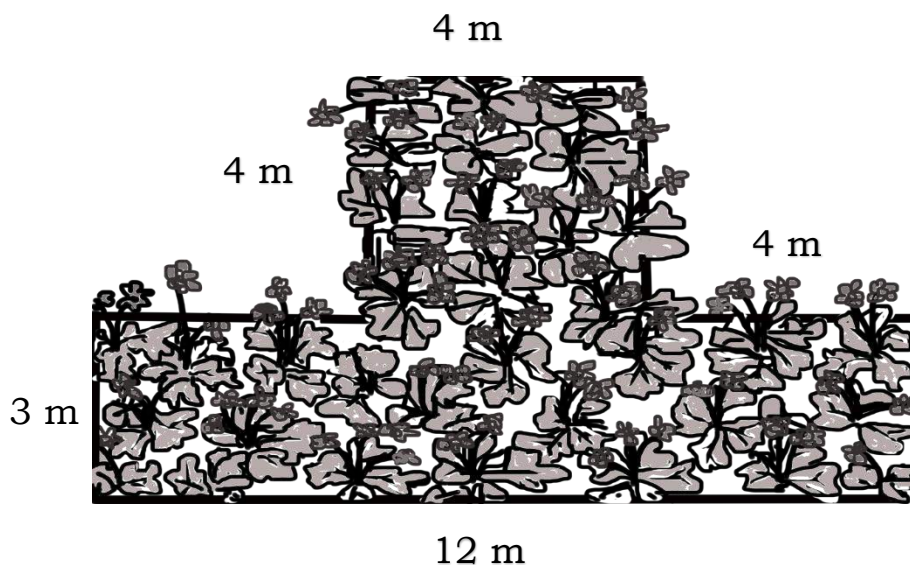
If yes, time to check. Please go to page 14 for the **Answer Key**.





## What's New

Neo and his younger sister Narlyn made a flower garden as shown below. They planted it with roses of different colors. Find the area of their garden.



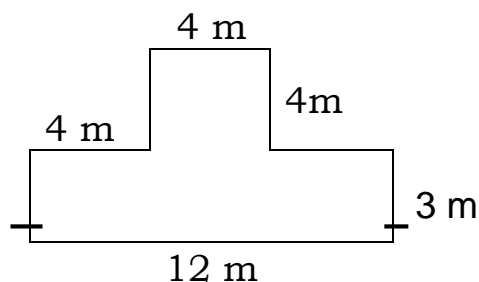
What can you say about the shape of their garden?

How will you find its area? In how many ways can you find its area?



## What is It

Let's take a look at the shape of their garden. How can you break it up into rectangles and/or squares?



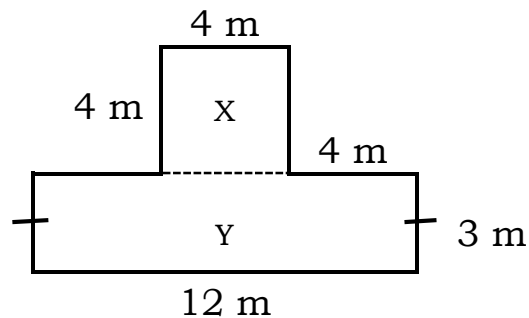
Let's find the area of the irregular figure following these steps.

**Solution A. Using a Horizontal Cut**

- a. Draw a horizontal line to form a rectangle and a square.

The illustration below shows how it is done.

Two figures are formed: square **X** and rectangle **Y**.



- b. Find the areas of the square and the rectangle.

Area of the square **X**

$$\begin{aligned} A &= s \times s \\ &= 4 \text{ m} \times 4 \text{ m} \\ &= 16 \text{ m}^2 \end{aligned}$$

Area of the rectangle **Y**

$$\begin{aligned} A &= L \times W \\ &= 12 \text{ m} \times 3 \text{ m} \\ &= 36 \text{ m}^2 \end{aligned}$$

- c. Get the area of the irregular figure by adding the areas of the square and the rectangle.

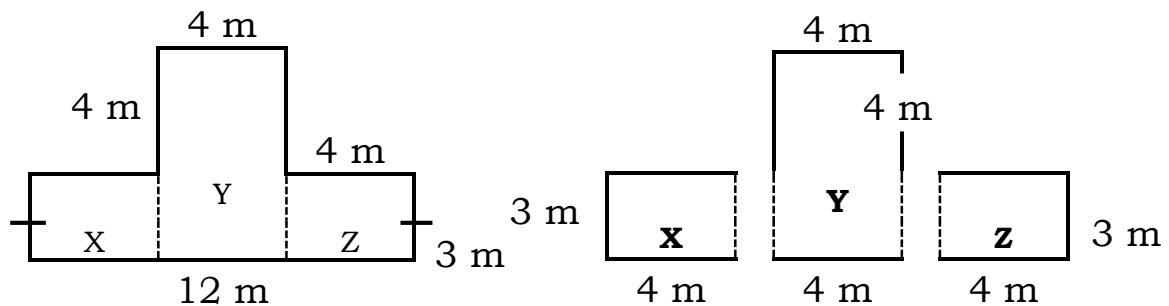
$$\begin{aligned} \text{Total area of the irregular figure} &= \text{area of } \mathbf{X} + \text{area of } \mathbf{Y} \\ &= 16 \text{ m}^2 + 36 \text{ m}^2 \\ &= 52 \text{ m}^2 \end{aligned}$$

**Therefore, the total area of their garden is 52 m<sup>2</sup>.**

### Solution B: Using Vertical Cuts

a. Let's cut up the figure into three rectangles using vertical lines.

We have rectangle X, rectangle Y and rectangle Z.



b. Find the lengths and widths of the rectangles and solve for the area of each.

#### Area of rectangle X

**X**

$$\begin{aligned} A &= L \times W \\ &= 4 \text{ m} \times 3 \text{ m} \\ &= 12 \text{ m}^2 \end{aligned}$$

#### Area of rectangle Z

$$\begin{aligned} A &= L \times W \\ &= 4 \text{ m} \times 3 \text{ m} \\ &= 12 \text{ m}^2 \end{aligned}$$

#### Area of rectangle Y

$A = L \times W$

$$\begin{aligned} &= 7 \text{ m} \times 4 \text{ m} \\ &= 28 \text{ m}^2 \end{aligned}$$

**How did we  
get 7 m?**

We added **4  
m and 3 m.**

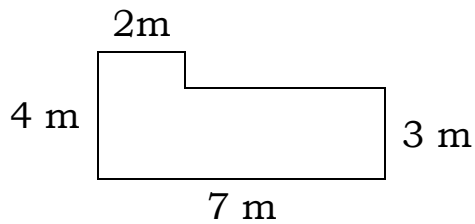
c. Then, add the areas of the three rectangles to get the area of the irregular figure.

$$\begin{aligned} \text{Area of the irregular figure} &= \mathbf{X + Y + Z} \\ &= 12 \text{ m}^2 + 28 \text{ m}^2 + 12 \text{ m}^2 \\ &= 52 \text{ m}^2 \end{aligned}$$

**Therefore, the total area of their garden is 52 m<sup>2</sup>.**

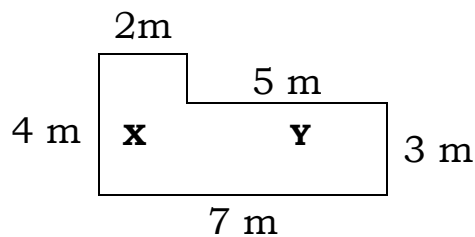
Let's try other examples.

1.



For the irregular figure above, how do you cut up the figure into rectangles and/or squares?

Consider this.



Two rectangles are formed: rectangle **X** and rectangle **Y**.

Area of rectangle **X**

$$\begin{aligned} A &= l \times w \\ &= 2 \text{ m} \times 4 \text{ m} \\ &= \mathbf{8 \text{ m}^2} \end{aligned}$$

Area of rectangle **Y**

$$\begin{aligned} A &= l \times w \\ &= 5 \text{ m} \times 3 \text{ m} \\ &= \mathbf{15 \text{ m}^2} \end{aligned}$$

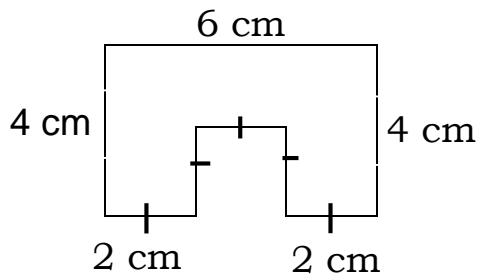
**How did we  
get 5 m?**  
We subtracted  
**2 m** from **7 m**.

The sum of the areas of rectangles **X** and **Y** gives the area of the irregular figure.

$$\begin{aligned} \text{Area} &= \mathbf{X + Y} \\ &= 8 \text{ m}^2 + 15 \text{ m}^2 \\ &= \mathbf{23 \text{ m}^2} \end{aligned}$$

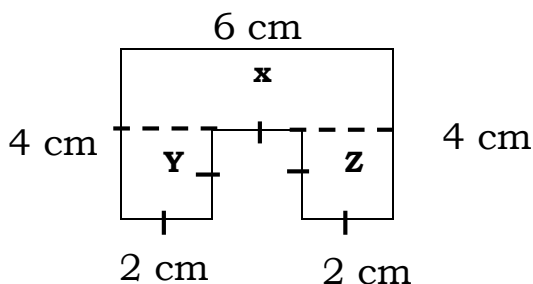
**The area of the given irregular figure is 23 m<sup>2</sup>.**

2.



How can you break it up into rectangles and/or squares?

The rectangle formed is labelled X and the two squares formed are labelled Y and Z.



#### Area of square Y

$$\begin{aligned} A &= s \times s \\ &= 2 \text{ cm} \times 2 \text{ cm} \\ &= 4 \text{ cm}^2 \end{aligned}$$

#### Area of square Z

$$\begin{aligned} A &= s \times s \\ &= 2 \text{ cm} \times 2 \text{ cm} \\ &= 4 \text{ cm}^2 \end{aligned}$$

#### Area of rectangle X

$$\begin{aligned} A &= l \times w \\ &= 6 \text{ cm} \times 2 \text{ cm} \\ &= 12 \text{ cm}^2 \end{aligned}$$

#### How did we get 2 cm?

We subtracted 2 cm from 4 cm which is the original length.

#### Area of the irregular figure

$$\begin{aligned} &= \text{area of X} + \text{area of Y} + \text{area of Z} \\ &= 12 \text{ cm}^2 + 4 \text{ cm}^2 + 4 \text{ cm}^2 \\ &= 20 \text{ cm}^2 \end{aligned}$$

**The area of the given irregular figure is 20 cm<sup>2</sup>.**

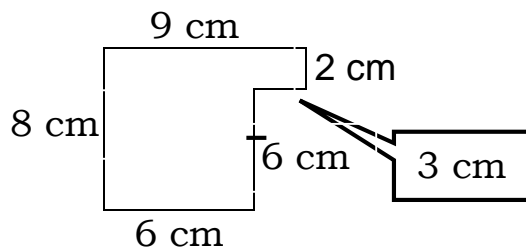


## ***What's More***

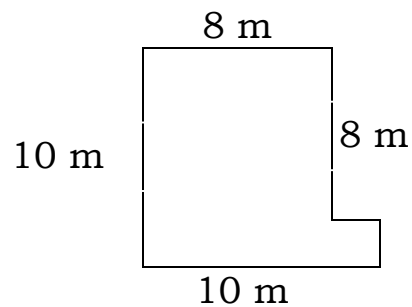
Let's have some practice.

Find the area of each irregular figure.

1



2.



Are you done answering?

If yes, time to check. Please go to page 14 for the ***Answer Key***.



## ***What I Have Learned***

Let us summarize what you have learned:

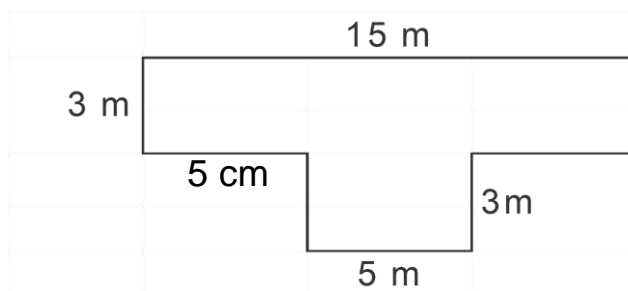
To find the area of an irregular figure that is made up of squares and rectangles:

- First, break or cut the figure into squares and/or rectangles.
- Next, find the area of each square and/or rectangle.
- Then, add the areas of the squares and/or rectangles.



## What I Can Do

Mr. Delgado is going to plant frog grass in their front yard as shown in the diagram. What is the area of the front yard that will be planted with frog grass?



Are you done answering?

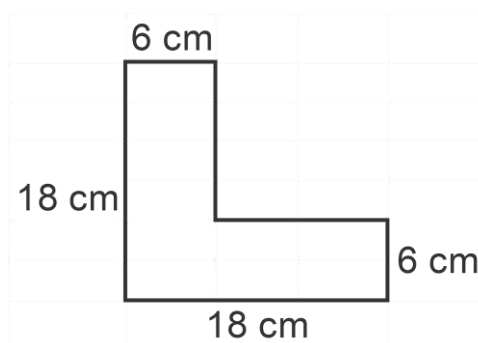
If yes, time to check. Please go to page 14 for the **Answer Key**.



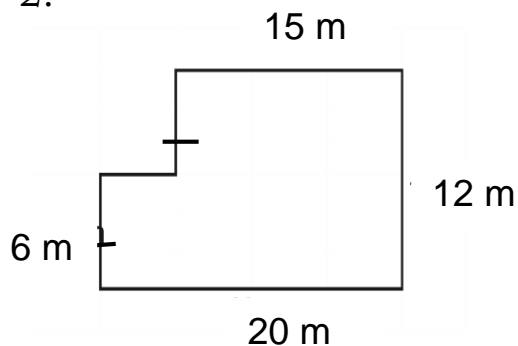
## Assessment

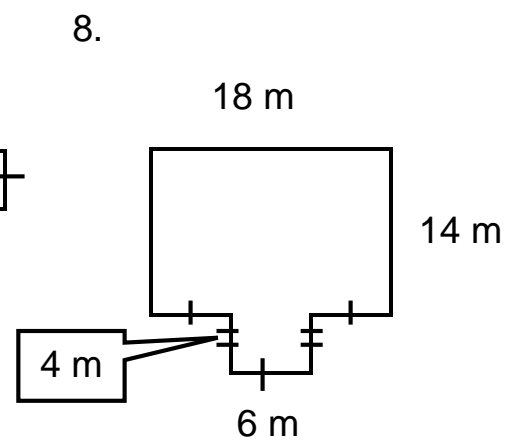
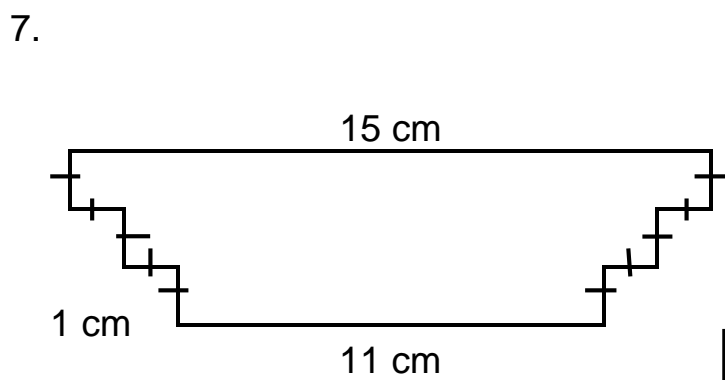
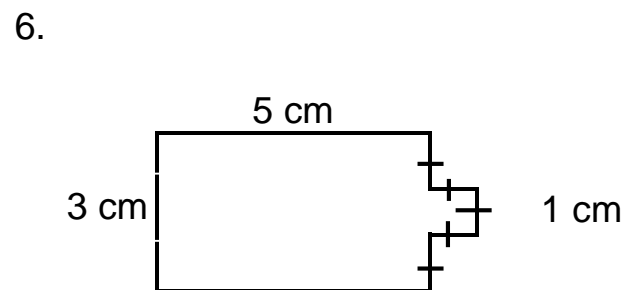
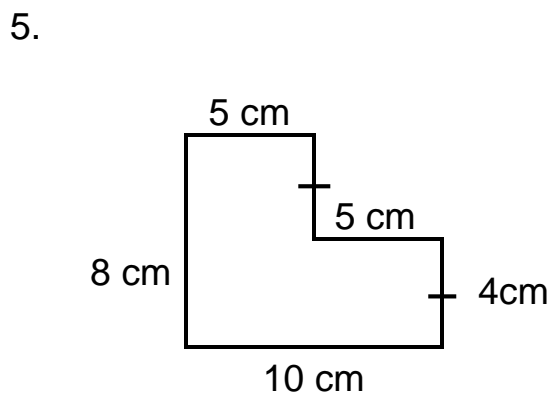
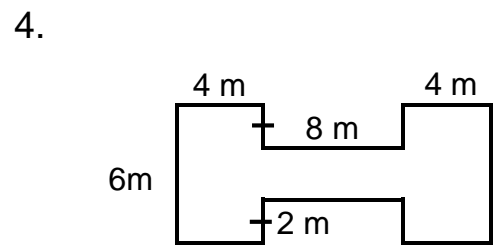
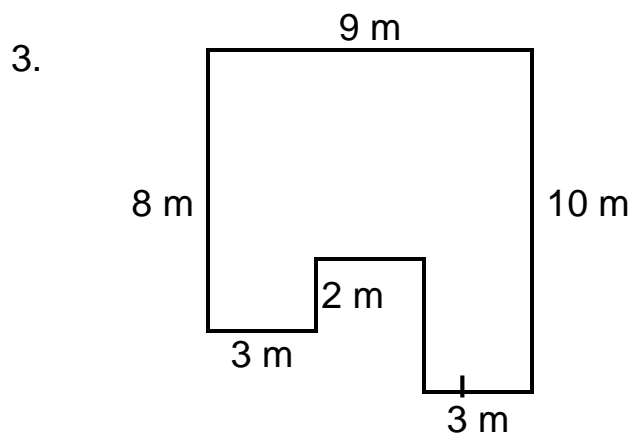
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1.



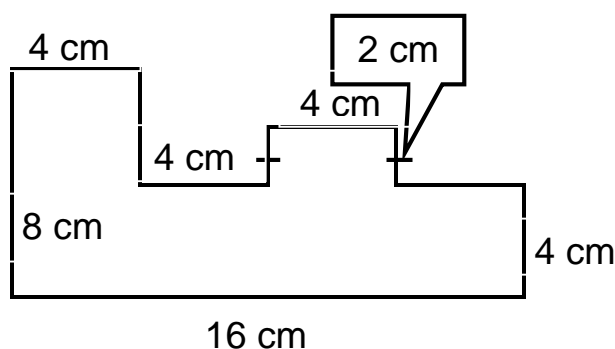
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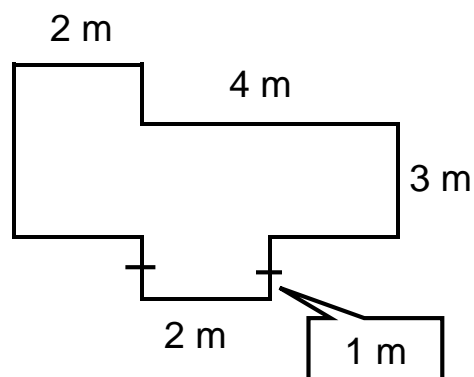




9.



10.



Are you done answering?

If yes, time to check. Please go to page 14 for the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.



## Additional Activities

Mr. De la Cruz constructed an infinity pool which measures 15 meters long and 6 meters wide. He decided to attach to its shorter side, a square pool with a side of 4 meters. Find the area occupied by the entire pool.

Are you done answering?

If yes, time to check. Please go to page 14 for the **Answer Key**.



## Answer Key

<p><b>What I Know</b></p> <p>1. 9 cm<sup>2</sup>  2. 18 cm<sup>2</sup>  3. 27 cm<sup>2</sup>  4. 32 cm<sup>2</sup>  5. 30 cm<sup>2</sup>  6. 62 cm<sup>2</sup>  7. 28 m<sup>2</sup>  8. 11 cm<sup>2</sup>  9. 10 cm<sup>2</sup>  10. 12 m<sup>2</sup></p>	<p><b>What's In</b></p> <p>1. d  2. c  3. b  4. a  5. f</p>	<p><b>What's More</b></p> <p>1. 54 cm<sup>2</sup>  2. 84 m<sup>2</sup></p>
<p><b>What I Can Do</b></p> <p>The area of the front yard is 60 m<sup>2</sup>.</p>	<p><b>Assessment</b></p> <p>1. 180 cm<sup>2</sup>  2. 210 m<sup>2</sup>  3. 72 m<sup>2</sup>  4. 64 m<sup>2</sup>  5. 60 cm<sup>2</sup>  6. 16 cm<sup>2</sup>  7. 39 cm<sup>2</sup>  8. 276 m<sup>2</sup>  9. 88 cm<sup>2</sup>  10. 16 m<sup>2</sup></p>	<p><b>Additional Activities</b></p> <p>The area occupied by the entire pool is 106 m<sup>2</sup>.</p>

## **References**

DepEd Order No. 12, s. 2020. Adoption of the Basic Education Learning Continuity Plan for SY 2020-2021 In Light of the Covid-19 Public Health Emergency. June 19, 2020. p. 342.

Tabilang, Alma R., Arce, Ian Jay B., Pascua, Rodrigo V., Calayag, Nelma P., Dacubo, Lolita p., Borais, Diolata B., Buemia, Rafael B., collao, Myra T., Morandante, Larry G., Danao, Amado B., Gonzaga, Laura N., Briones, Isagani A., Daganta, John Antonio D., 2015, **Mathematics 4 Learner's Material**, Department of Education

Tabilang, Alma R., Arce, Ian Jay B., Pascua, Rodrigo V., Calayag, Nelma P., Dacubo, Lolita p., Borais, Diolata B., Buemia, Rafael B., collao, Myra T., Morandante, Larry G., Danao, Amado B., Gonzaga, Laura N., Briones, Isagani A., Daganta, John Antonio D., 2015, **Mathematics 4 Teacher's Guide**, Department of Education.

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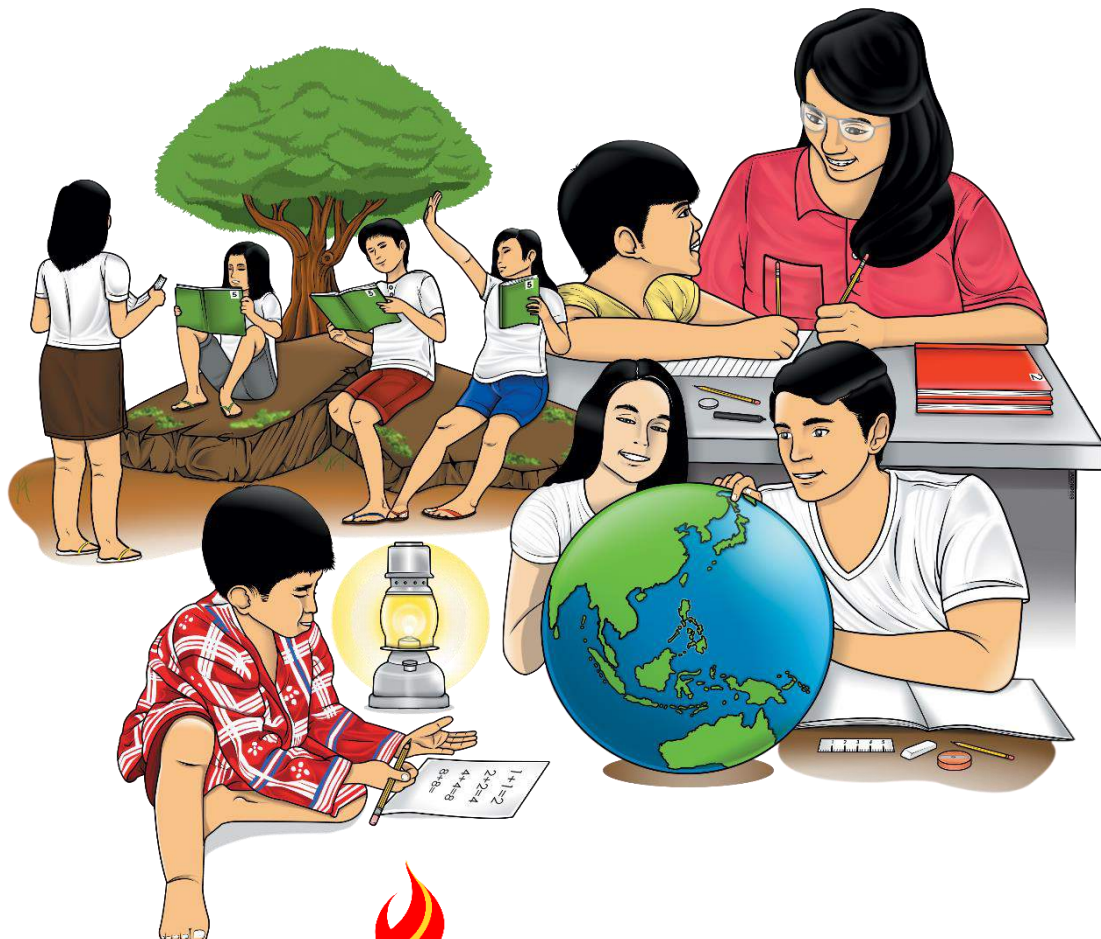
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# Mathematics

## Quarter 4 – Module 2: Finding the Area of Triangles, Parallelograms and Trapezoids



**Mathematics – Grade 4**

**Alternative Delivery Mode**

**Quarter 4 – Module 2: Finding the Area of Triangles, Parallelograms and Trapezoids**  
**First Edition, 2020**

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Published by the Department of Education

Secretary: Leonor Magtolis Briones

Undersecretary: Diosdado M. San Antonio

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Thank you.





## ***What I Need to Know***

When we see a plane figure, we consider not only its perimeter but also its area, which is the amount of surface occupied by the figure.

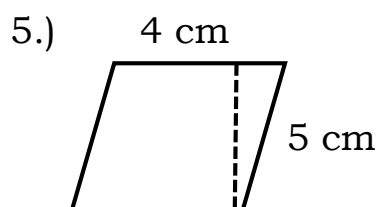
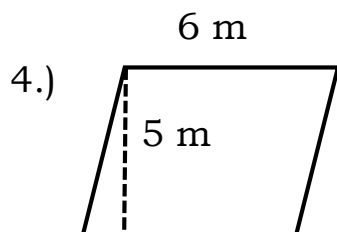
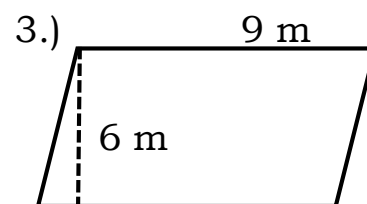
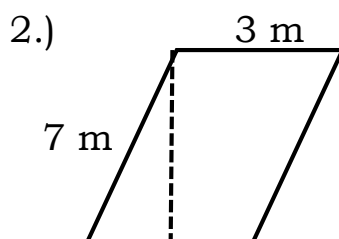
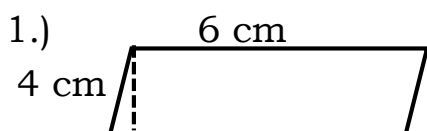
In this module, you will explore the area of a parallelogram and derive a formula for finding its area given its base and height.

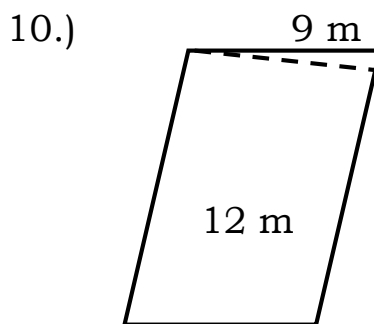
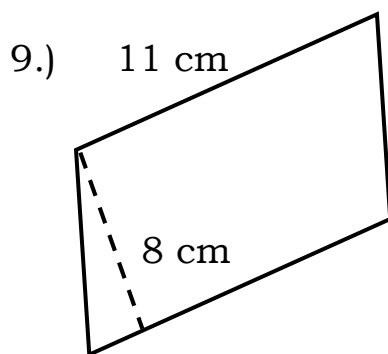
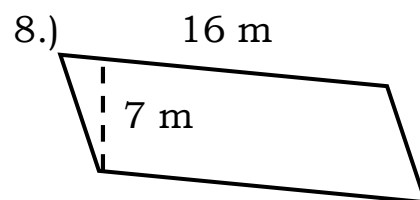
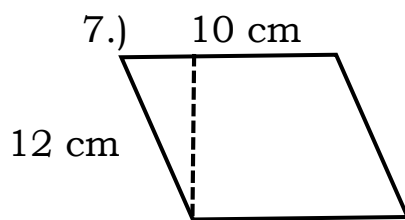
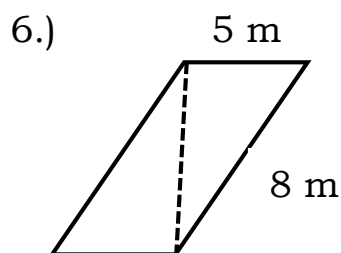
At the end of this module, you should be able to find the area of a parallelogram using sq. cm and sq. m.



## ***What I Know***

Find the area of each parallelogram given the measures of its base and height. Choose the letter corresponding to the correct answer from the given choices in the box.





a.  $30 \text{ m}^2$

b.  $22 \text{ m}^2$

c.  $20 \text{ cm}^2$

d.  $54 \text{ m}^2$

e.  $24 \text{ cm}^2$

f.  $40 \text{ m}^2$

g.  $88 \text{ cm}^2$

h.  $120 \text{ cm}^2$

i.  $112 \text{ m}^2$

j.  $108 \text{ m}^2$

k.  $21 \text{ m}^2$

l.  $55 \text{ m}^2$

Are you done answering?

If yes, time to check. Please go to page 34 for the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

## Lesson

# 1

## Finding the Area of a Parallelogram



### What's In

Write TRUE if the statement is a property of a parallelogram and FALSE if it is not.

1. It has 2 pairs of parallel sides.
2. It has no right angles.
3. Opposite angles are congruent.
4. Adjacent angles are supplementary.
5. It has 4 angles.

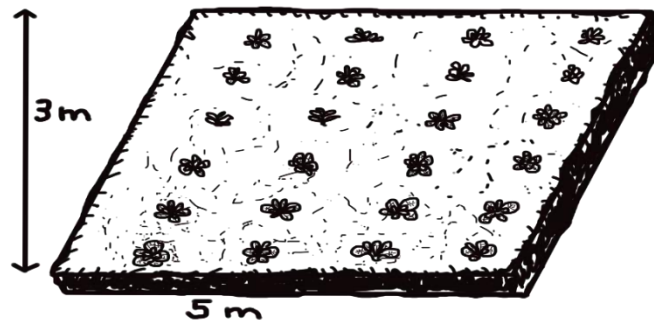
Are you done answering?

If yes, time to check. Please go to page 34 for the **Answer Key**.



### What's New

Diane and her groupmates have a parallelogram-shaped vegetable garden. It has a base of 5 meters and a height of 3 meters. They planted it with *pechay*. She is interested in finding the area of the vegetable garden but she does not know how to do it.



What did the problem ask for?

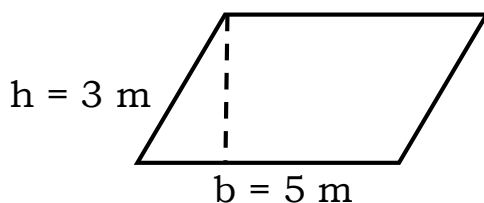
How can we help Diane?



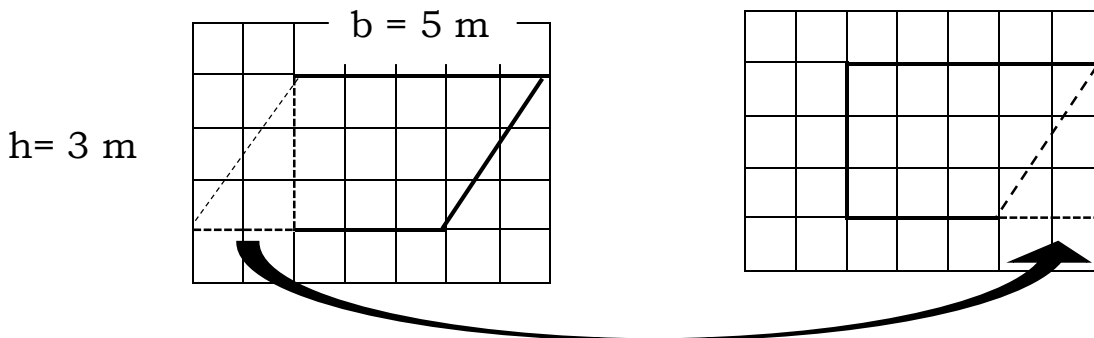
## What is It

Let us help Diane find the area of the parallelogram-shaped vegetable garden.

The vegetable garden has the shape of a parallelogram. Its base ( $b$ ) is 5 m and its height ( $h$ ) is 3 m.



The illustration below shows how the parallelogram may be transformed into a rectangle.



Will the change in shape result to a change in the figure's area? No.

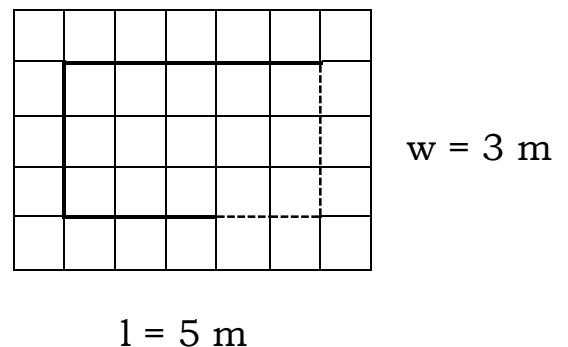
Will the parallelogram and the resulting rectangle have the same area? Yes.

So, what is the length and width of the rectangle?

length = 5 m ; width = 3 m

How are the base ( $b$ ) and the height ( $h$ ) related to the length ( $l$ ) and width ( $w$ ) of the rectangle formed?

$b = l$  ;  $h = w$



By counting the number of squares covered by the rectangle, where each square unit is equal to 1 sq. m, we say that the area of the rectangle is 15 sq. m.

$$\begin{aligned} A &= l \times w \\ &= 5 \text{ m} \times 3 \text{ m} \\ &= 15 \text{ sq. m or} \\ &15 \text{ m}^2 \end{aligned}$$

Using the formula, the area of the rectangle is the product of its length ( $l$ ) and width ( $w$ ).

Since the area of a rectangle can be found by multiplying its length by its width, you can find the area of the parallelogram by multiplying the base ( $b$ ) by its height ( $h$ ).

Therefore, the area of a parallelogram is the product of its base and height.

$$\begin{aligned} \text{Area of a Parallelogram} &= \text{base } (b) \times \text{height } (h) \quad \text{or} \\ A &= b \times h \end{aligned}$$

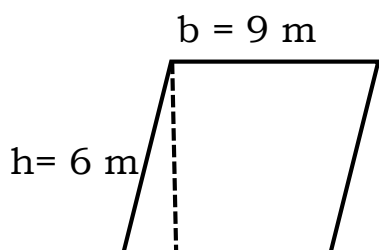
Let us find the area of the parallelogram-shaped vegetable garden using the formula.

$$\begin{aligned} A &= b \times h \\ &= 5 \text{ m} \times 3 \text{ m} \\ &= 15 \text{ m}^2 \end{aligned}$$

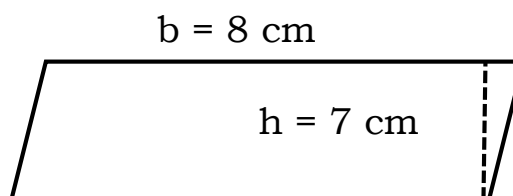
- Substitute the length of the base for  $b$  and height for  $h$ .
- Multiply.

**Thus, the area of their vegetable garden is 15 m<sup>2</sup>.**

Let's try another example. Let us find the area of each parallelogram using the formula ( $A = b \times h$ ). Express your answer in square units.



$$\begin{aligned} A &= b \times h \\ &= 9 \text{ m} \times 6 \text{ m} \\ &= 54 \text{ m}^2 \end{aligned}$$



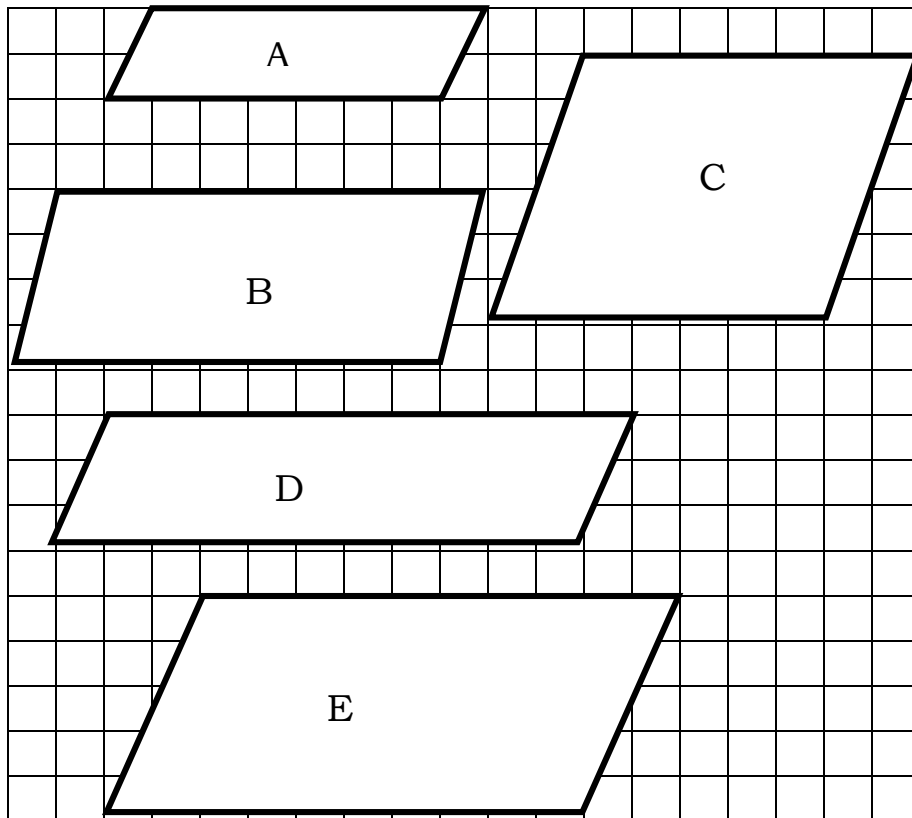
$$\begin{aligned} A &= b \times h \\ &= 8 \text{ cm} \times 7 \text{ cm} \\ &= 56 \text{ cm}^2 \end{aligned}$$



## What's More

Complete the table.

Give the base and height of each parallelogram. Then, find its area using the formula  $A = b \times h$ . (1 unit = 1 cm)



Parallelogram	Base	Height	Area
A			
B			
C			
D			
E			

Are you done answering?

If yes, time to check. Please go to page 34 for the **Answer Key**.



## ***What I Have Learned***

Let us summarize what you have learned:

Area is the measurement of the space contained within a plane figure. To find the area of a parallelogram:

- multiply the base and height.



## ***What I Can Do***

Find the area of the parallelogram with the following dimensions.

1.  $b = 4 \text{ m}$   
 $h = 10 \text{ m}$   
 $A = \underline{\hspace{2cm}}$

2.  $b = 5 \text{ cm}$   
 $h = 13 \text{ cm}$   
 $A = \underline{\hspace{2cm}}$

3.  $b = 9 \text{ m}$   
 $h = 10 \text{ m}$   
 $A = \underline{\hspace{2cm}}$

4.  $b = 21 \text{ cm}$   
 $h = 2 \text{ cm}$   
 $A = \underline{\hspace{2cm}}$

5.  $b = 6 \text{ m}$   
 $h = 11 \text{ m}$   
 $A = \underline{\hspace{2cm}}$

Are you done answering?

If yes, time to check. Please go to page 34 for the ***Answer Key***.

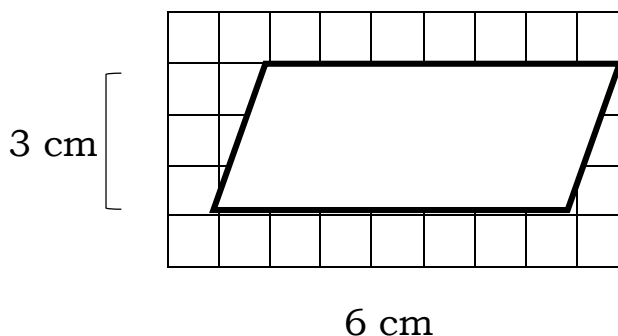


## Assessment

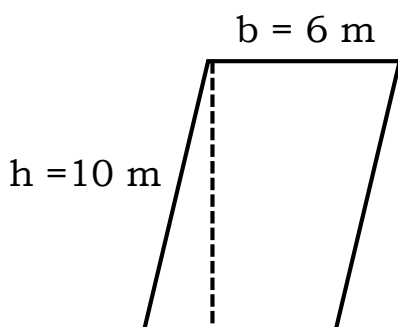
A. Multiple Choice. Choose the letter of the best answer.

1. What is the area of the parallelogram?

- A. 10 sq. cm
- B. 12 sq. cm
- C. 18 sq. cm
- D. 22 sq. cm

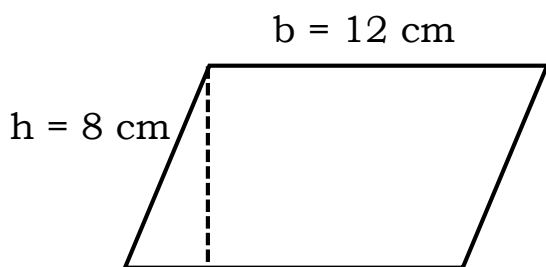


2. The base of a parallelogram is 6 m and its height is 10 meters. What is the area of the parallelogram?



- A.  $50\text{ m}^2$
- B.  $55\text{ m}^2$
- C.  $60\text{ m}^2$
- D.  $65\text{ m}^2$

3. The base of a parallelogram is 12 cm and its height is 8 cm. What is the area of the parallelogram?

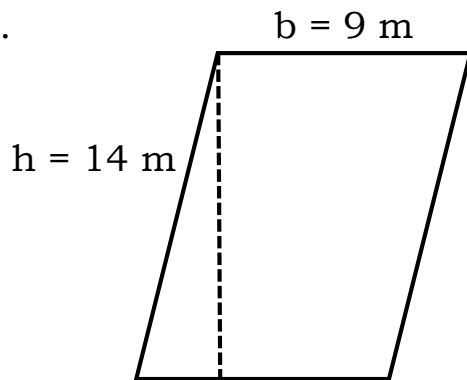


- A.  $98\text{ cm}^2$
- B.  $96\text{ cm}^2$
- C.  $95\text{ cm}^2$
- D.  $94\text{ cm}^2$

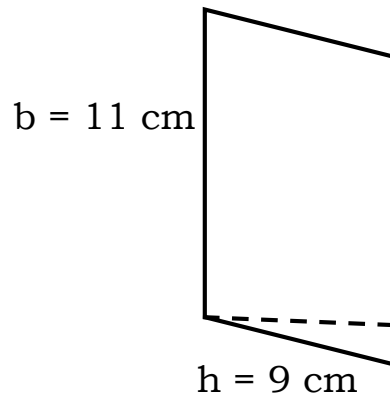


B. Find the area of each parallelogram using the formula.

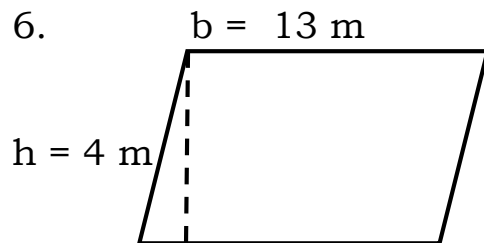
4.



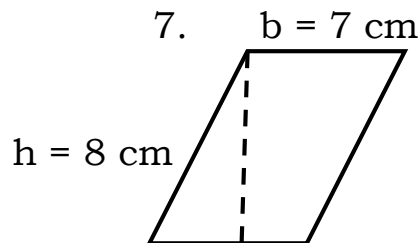
5.



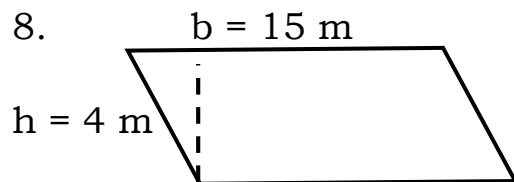
6.



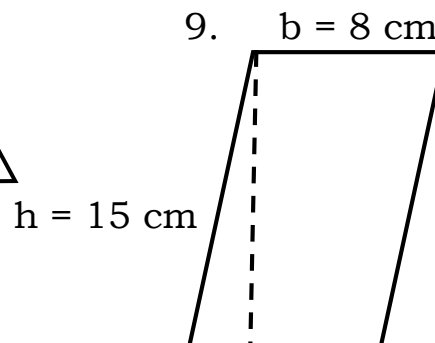
7.



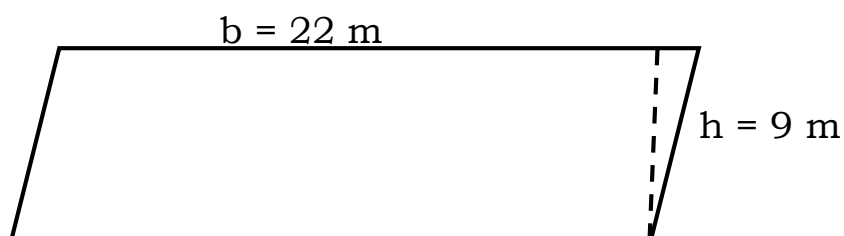
8.



9.



10.



Are you done answering?

If yes, time to check. Please go to page 34 for the **Answer Key**.



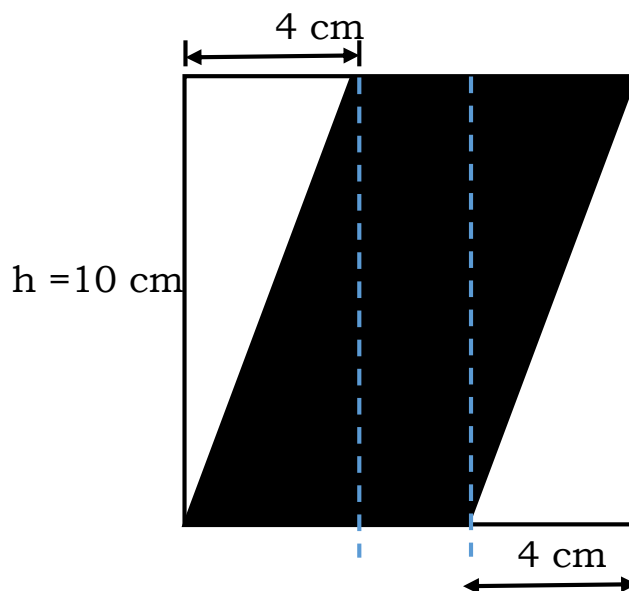
Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next lesson.

If your score is below 8, kindly study again the lesson and the activities.



### ***Additional Activities***

Find the area of the shaded region of the square.



Are you done answering?

If yes, time to check. Please go to page 34 for the ***Answer Key***.



## ***What I Need to Know***

How did you find the activities in the previous lesson?

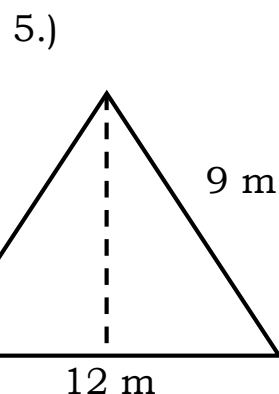
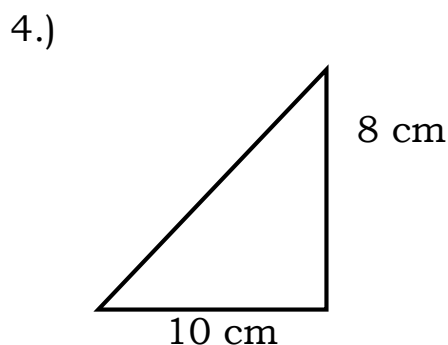
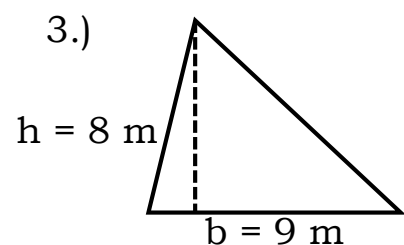
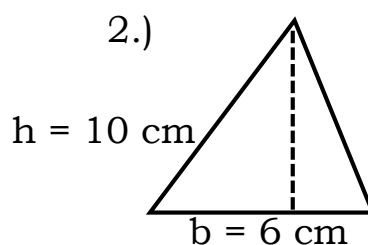
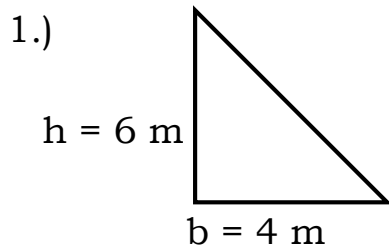
In this module, you will explore and derive the formula for finding the area of a three-sided polygon.

At the end of this module, you should be able to find the area of a triangle using sq. cm and sq. m.



## ***What I Know***

Solve for the area of each triangle.



6.  $b = 12\text{ m}$   
 $h = 4\text{ m}$   
 $A = \underline{\hspace{2cm}}$

7.  $b = 20\text{ cm}$   
 $h = 10\text{ cm}$   
 $A = \underline{\hspace{2cm}}$

8.  $b = 15\text{ cm}$   
 $h = 8\text{ cm}$   
 $A = \underline{\hspace{2cm}}$

9.  $b = 14 \text{ m}$   
 $h = 6 \text{ m}$   
 $A = \underline{\hspace{2cm}}$

10.  $b = 15 \text{ cm}$   
 $h = 16 \text{ cm}$   
 $A = \underline{\hspace{2cm}}$

Are you done answering?

If yes, time to check. Please go to page 35 for the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

## Lesson 2

# Finding the Area of a Triangle



### *What's In*

Solve.

1.  $\frac{10 \times 8}{4} = \bigcirc$

2.  $\frac{1}{2} (5 \times 6) = \bigcirc$

3.  $7 \times 6 \div 2 = \bigcirc$

4.  $\frac{9 \times 6}{2} = \bigcirc$

5.  $30 \times 2 \div 5 = \bigcirc$

Are you done answering?

If yes, time to check. Please go to page 35 for the **Answer Key**.

In performing a series of operations, we must follow the MDAS Rule. MDAS stands for the 4 basic operations – Multiplication, Division, Addition and Subtraction.

The rule says that:

- Multiply or divide first in the order they come, from left to right.
- Add or subtract in the order they come, from left to right.

Let's have the following examples.

$$\begin{aligned} 1. \quad & 4 \times 50 \div 5 = n \\ & 200 \div 5 = n \\ & 40 = n \end{aligned}$$

$$\begin{aligned} 2. \quad & 20 \div 4 \times 3 = n \\ & 5 \times 3 = n \\ & 15 = n \end{aligned}$$

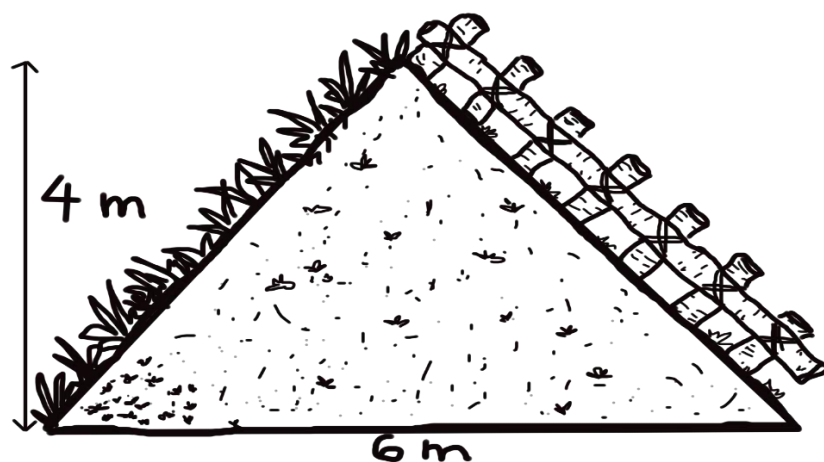
Both equations involved multiplication and division. We applied rule No. 1, that is, multiply or divide first in the order they come, from left to right.



### ***What's New***

Let us study the situational problem.

Karen has a botanical garden. The garden is triangular in shape. The length of the base is 6 meters and the height is 4 meters. She would like to cover the whole area of the garden with carabao grass. How many square meters of carabao grass are needed?



What is the shape of the botanical garden?

What is asked in the problem?

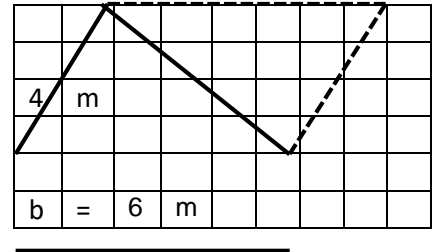
How can we find the area of the triangular botanical garden?



## What is It

The illustration below will help us find the area of the garden. The botanical garden has the shape of a triangle. The length of its base is 6 m and its height is 4 m.

If we draw another triangle that is exactly the same as the given triangle and arrange these 2 triangles as shown in the figure, a parallelogram is formed.



From the illustration, we see that the base of the parallelogram is 6 m and its height is 4 m. Thus, the area of the parallelogram is 24 sq. m or  $24 \text{ m}^2$ . Since the triangle is  $\frac{1}{2}$  of the parallelogram, the area of the triangle is  $\frac{1}{2}$  of the area of the parallelogram. That is,  $24 \text{ m}^2 \div 2 = 12 \text{ m}^2$ .

Try the activity using another pair of congruent triangles. You will find that any pair of congruent triangles will always form a parallelogram. Likewise, you will see that the area of the triangle is half the area of a parallelogram ( $A = bh$ ).

So, the formula in finding the area of a triangle is:

$$\text{Area of a triangle} = \frac{1}{2} (b \times h) \quad \text{or} \quad A = \frac{b \times h}{2}$$

where  $b$  = base of the triangle

$h$  = height of the triangle

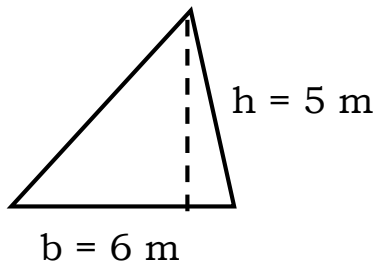
Let's find the area of the triangular botanical garden using the formula.

$$\begin{aligned}
 A &= \frac{b \times h}{2} \\
 &= \frac{6 \text{ m} \times 4 \text{ m}}{2} \\
 &= \frac{24 \text{ sq. m}}{2} \\
 &= 12 \text{ sq. m}
 \end{aligned}$$

**Therefore, the area of the botanical garden is 12 m<sup>2</sup>.**

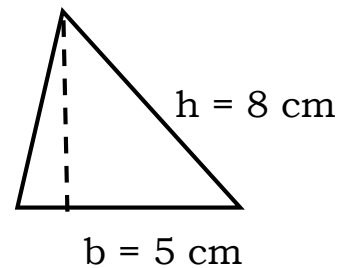
Let us solve for the area of the following triangles using the formula.

1.



$$\begin{aligned}
 A &= \frac{1}{2} (b \times h) \\
 &= \frac{1}{2} (6 \text{ m} \times 5 \text{ m}) \\
 &= \frac{1}{2} (30 \text{ m}^2) \\
 &= 15 \text{ m}^2
 \end{aligned}$$

2.



$$\begin{aligned}
 A &= \frac{b \times h}{2} \\
 &= \frac{5 \text{ cm} \times 8 \text{ cm}}{2} \\
 &= \frac{40 \text{ sq cm}}{2} \\
 &= 20 \text{ sq. cm}
 \end{aligned}$$



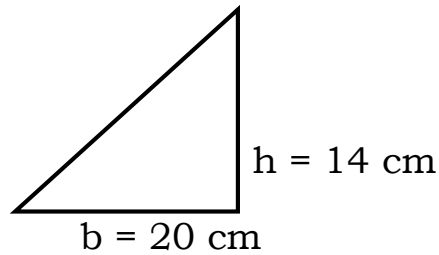


## What's More

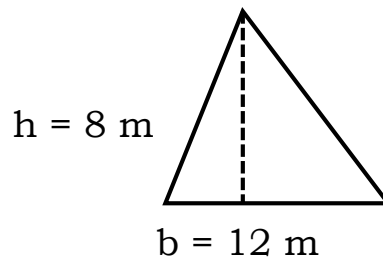
Find the area of each triangle.

Given the height and the base, fill in the blank to complete the solution.

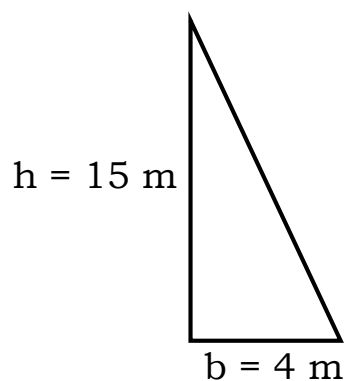
$$\begin{aligned} 1. A &= \frac{b \times h}{2} \\ &= \frac{20 \text{ cm} \times 14 \text{ cm}}{2} \\ &= \frac{280 \text{ sq. cm}}{2} \\ A &= \underline{\hspace{2cm}} \text{ sq. cm} \end{aligned}$$



$$\begin{aligned} 2. A &= \frac{b \times h}{2} \\ &= \frac{12 \text{ m} \times 8 \text{ m}}{2} \\ &= \frac{\underline{\hspace{2cm}} \text{ sq. m}}{2} \\ A &= \underline{\hspace{2cm}} \text{ sq. m} \end{aligned}$$



$$\begin{aligned} 3. A &= \frac{b \times h}{2} \\ &= \frac{4 \text{ m} \times 15 \text{ m}}{2} \\ &= \frac{\underline{\hspace{2cm}} \text{ sq. m}}{2} \\ A &= \underline{\hspace{2cm}} \text{ sq. m} \end{aligned}$$



Are you done answering?

If yes, time to check. Please go to page 35 for the **Answer Key**.



## ***What I Have Learned***

Let us summarize what you have learned:

The area of a triangle with a given base (b) and height (h) can be solved by the formula:

- Area of a triangle (A) =  $\frac{1}{2} (b \times h)$  or  $A = \frac{b \times h}{2}$ .

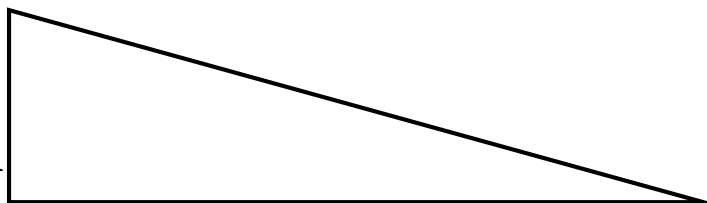


## ***What I Can Do***

Find the area of each triangle using the formula,  $A = \frac{b \times h}{2}$  **or**  $\frac{1}{2} (b \times h)$

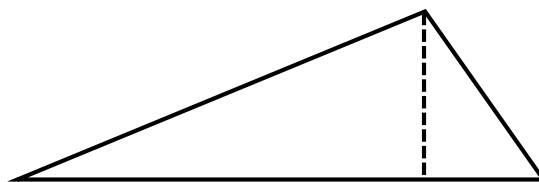
1.

$h = 8 \text{ m}$



$b = 10 \text{ m}$

2.

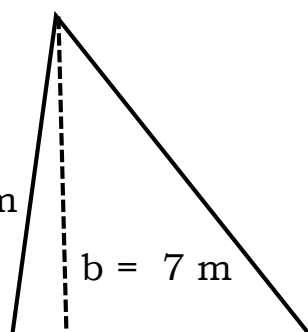


$h = 6 \text{ cm}$

$b = 9 \text{ cm}$

3.

$h = 10 \text{ m}$



$b = 7 \text{ m}$

Are you done answering?  
If yes, time to check. Please go to  
page 35 for the **Answer Key**.

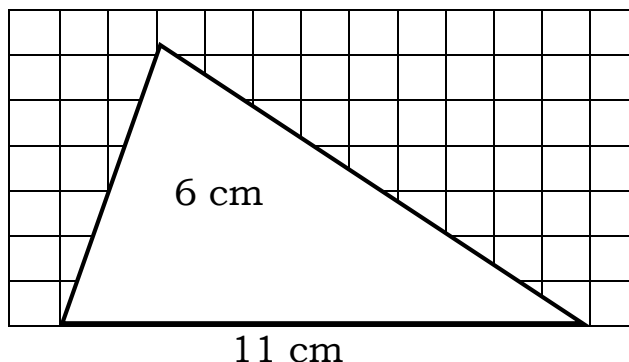


## Assessment

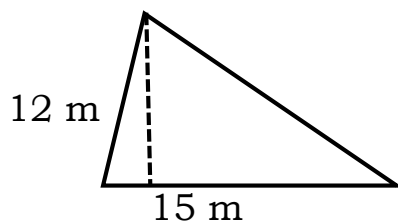
A. Multiple Choice. Read and understand each item carefully. Choose the letter of the correct answer.

1. What is the area of the triangle?

A. 36 sq. cm  
B. 33 sq. cm  
C. 22 sq. cm  
D. 17 sq. cm



2. A triangular landscape has a base of 15 m and a height of 12 m. Find its area.



A.  $80 \text{ m}^2$       B.  $85 \text{ m}^2$       C.  $90 \text{ m}^2$       D.  $100 \text{ m}^2$

3. Find the area of George's lantern, which is a triangle with a base of 30 cm and a height of 20 cm.

A. 300 sq. cm    B. 310 sq. cm    C. 320 sq. cm    D. 330 sq. cm

4. A triangular garden is 7 m wide and 16 m long. What is its area?

A.  $58 \text{ m}^2$       B.  $56 \text{ m}^2$       C.  $55 \text{ m}^2$       D.  $54 \text{ m}^2$

5. Manny's flaglet is 26 cm long and 14 cm wide. Find the area of such triangle.

A. 183 sq. cm    B. 182 sq. cm    C. 181 sq. cm    D. 180 sq. cm

B. Complete the table. Use the formula for the area of a triangle.

Triangle	Base (b)	Height (h)	Area (A)
6	18 cm	12 cm	
7	24 cm	10 cm	
8	30 m	6 m	
9	21 m	8 m	
10	18 cm	26 cm	

Are you done answering?

If yes, time to check. Please go to page 35 for the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next lesson.

If your score is below 8, kindly study again the lesson and the activities.

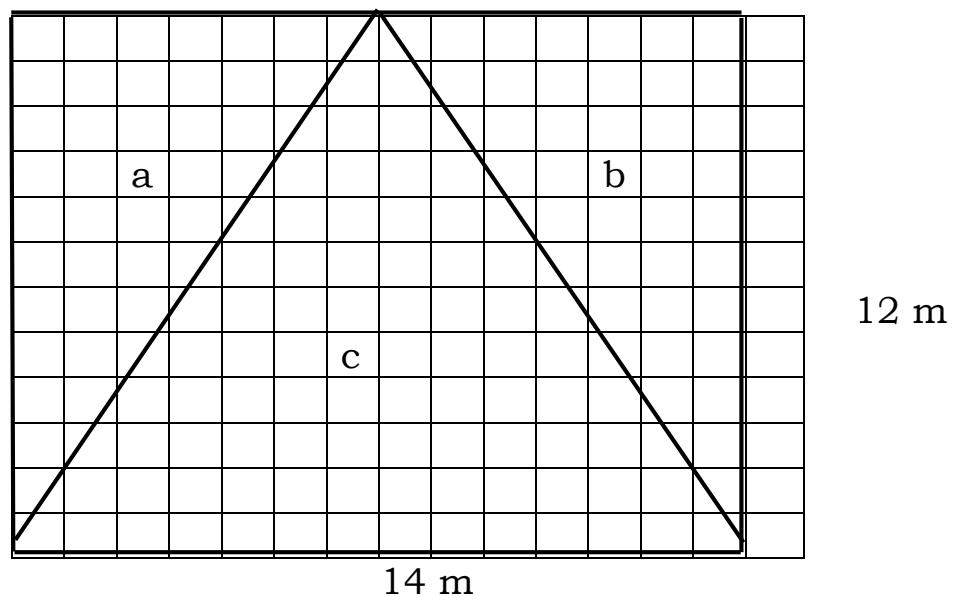




## Additional Activities

A quilt is designed using two congruent right triangles and an isosceles triangle as shown below.

- Find the area of the three pieces using the formula.
- Compare the area of the right triangle to the area of the isosceles triangle. Each square unit is 1 sq. m.



Are you done answering?

If yes, time to check. Please go to page 35 for the **Answer Key**.



## ***What I Need to Know***

In the previous modules, we learned how to solve for the areas of parallelograms and triangles.

Now, we will explore and derive the formula for finding the area of another 4-sided polygon - the trapezoid.

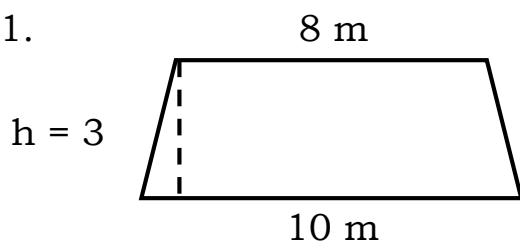
At the end of this module, you should be able to find the area of a trapezoid using sq. cm and sq. m.



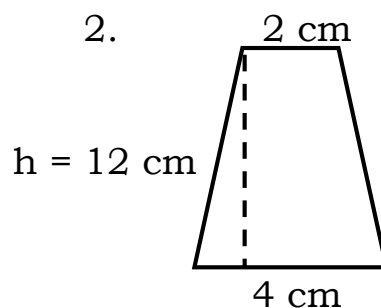
## ***What I Know***

Find the area of each trapezoid.

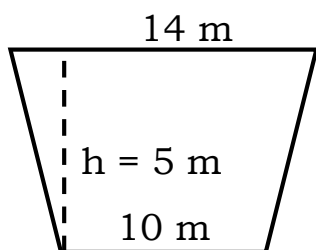
1.



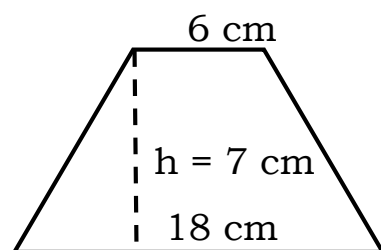
2.



3.



4.



5.  $b_1 = 4 \text{ m}$

$b_2 = 6 \text{ m}$

$h = 8 \text{ m}$

$A = \underline{\hspace{2cm}} \text{ m}^2$

6.  $b_1 = 10 \text{ cm}$

$b_2 = 4 \text{ cm}$

$h = 5 \text{ cm}$

$A = \underline{\hspace{2cm}} \text{ cm}^2$

7.  $b_1 = 5 \text{ m}$

$b_2 = 7 \text{ m}$

$h = 4 \text{ m}$

$A = \underline{\hspace{2cm}} \text{ m}^2$

$$8. b_1 = 8 \text{ cm}$$

$$b_2 = 9 \text{ cm}$$

$$h = 6 \text{ cm}$$

$$A = \underline{\hspace{2cm}} \text{ cm}^2$$

$$9. b_1 = 10 \text{ m}$$

$$b_2 = 13 \text{ m}$$

$$h = 8 \text{ m}$$

$$A = \underline{\hspace{2cm}} \text{ m}^2$$

$$10. b_1 = 12 \text{ cm}$$

$$b_2 = 15 \text{ cm}$$

$$h = 6 \text{ cm}$$

$$A = \underline{\hspace{2cm}} \text{ cm}^2$$

Are you done answering?

If yes, time to check. Please go to page 36 for the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

# Lesson 3

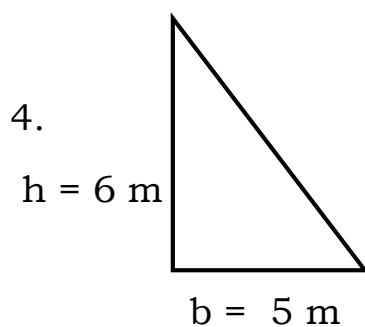
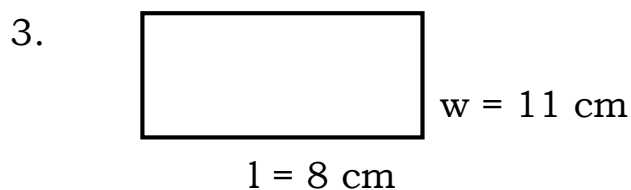
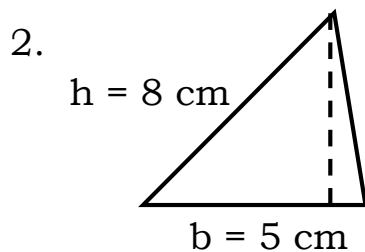
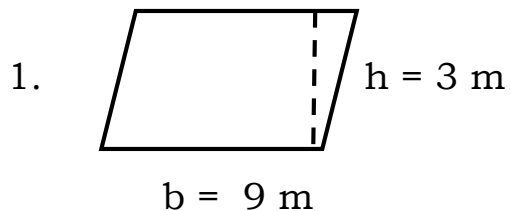
## Finding the Area of a Trapezoid



### What's In

Match the figures in Column A with their corresponding areas in Column B. Choose the letter of the correct answer.

#### A



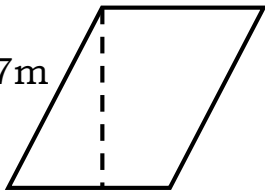
#### B

- a.  $15 \text{ m}^2$
- b.  $20 \text{ cm}^2$
- c.  $27 \text{ m}^2$
- d.  $28 \text{ m}^2$
- e.  $40 \text{ cm}^2$
- f.  $88 \text{ cm}^2$



5.

$$h = 7\text{m}$$



$$b = 4\text{m}$$

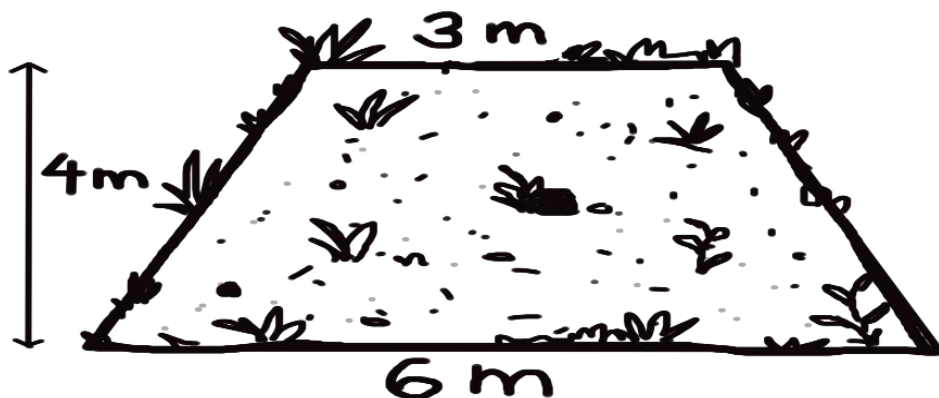
Are you done answering?

If yes, time to check. Please go to page 36 for the **Answer Key**.



### **What's New**

Mr. Cruz cultivated a small garden lot in the shape of a trapezoid. The bases are 3 meters and 6 meters, while the distance between the two bases is 4 meters. What is the area of the lot?



What is the shape of the garden lot?

What is asked in the problem?

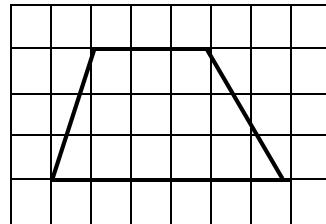
How are we going to find the area of the garden lot?



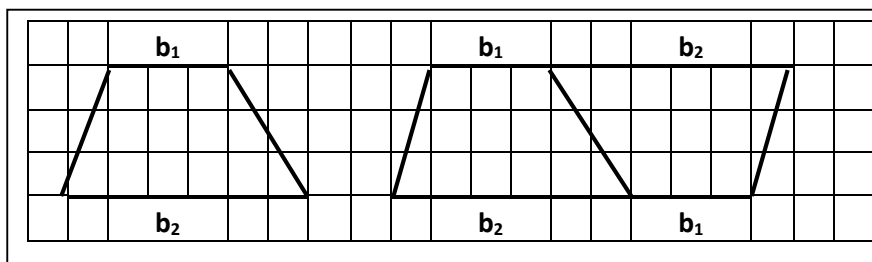
## What is It

To find the area of the garden lot, we need to find the area of the trapezoid.

The lot has an upper base of 3 meters and a lower base of 6 meters. Its height is 4 meters.



If we take another trapezoid that is exactly the same as the first, we can form a parallelogram as shown below.



We can say that the base of the parallelogram is the sum of  $b_1$  and  $b_2$  of the trapezoid. We can also say that the area of the given trapezoid is  $\frac{1}{2}$  that of the parallelogram.

The area of the parallelogram can be solved using the formula:

$$A = b \times h$$

$$A = (3 \text{ m} + 6 \text{ m}) \times 4 \text{ m}$$

$$A = 9 \text{ m} \times 4 \text{ m}$$

$$A = 36 \text{ m}^2$$

3 m is the upper base ( $b_1$ )  
and 6 m is the lower base ( $b_2$ )

Since it takes two congruent trapezoids to form the parallelogram, then we can say that the area of the trapezoid is  $\frac{1}{2}$  the area of the parallelogram.

Thus, the area of the farm lot is:

$$\begin{aligned} A &= \frac{1}{2} (3 \text{ m} + 6 \text{ m}) \times 4 \text{ m} \\ &= \frac{1}{2} (9 \text{ m}) \times 4 \text{ m} \\ &= \frac{1}{2} (36 \text{ m}^2) \\ &= 18 \text{ m}^2 \end{aligned}$$

**Therefore, the area of the trapezoidal garden lot is 18 m<sup>2</sup>.**

To solve for the area of a trapezoid, we use this formula:

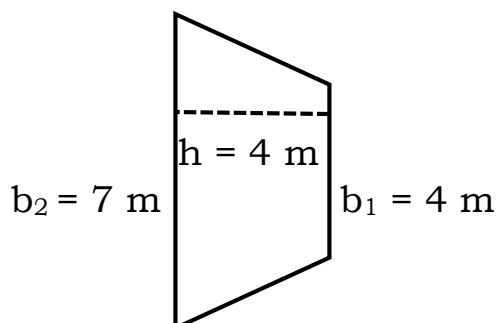
$$\text{Area of a trapezoid (A)} = \frac{1}{2} (b_1 + b_2) \times h \quad \text{or} \quad A = \frac{(b_1 + b_2) \times h}{2}$$

where:

$b_1$  and  $b_2$  are the bases; and  
 $h$  is the height of the trapezoid

Let us take a look at another example.

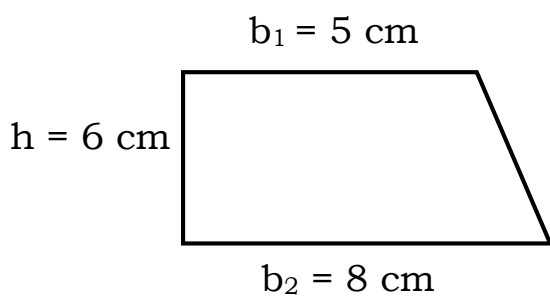
A. Let us find the area of this trapezoid.



$$\begin{aligned}
 A &= \frac{1}{2} (b_1 + b_2) \times h \\
 &= \frac{1}{2} (4 \text{ m} + 7 \text{ m}) \times 4 \text{ m} \\
 &= \frac{1}{2} (11 \text{ m}) \times 4 \text{ m} \\
 &= \frac{1}{2} (44 \text{ sq. m}) \\
 &= 22 \text{ sq. m or } 22 \text{ m}^2
 \end{aligned}$$

**Therefore, the area of the trapezoid is 22 m<sup>2</sup>.**

B. Let us try another one.



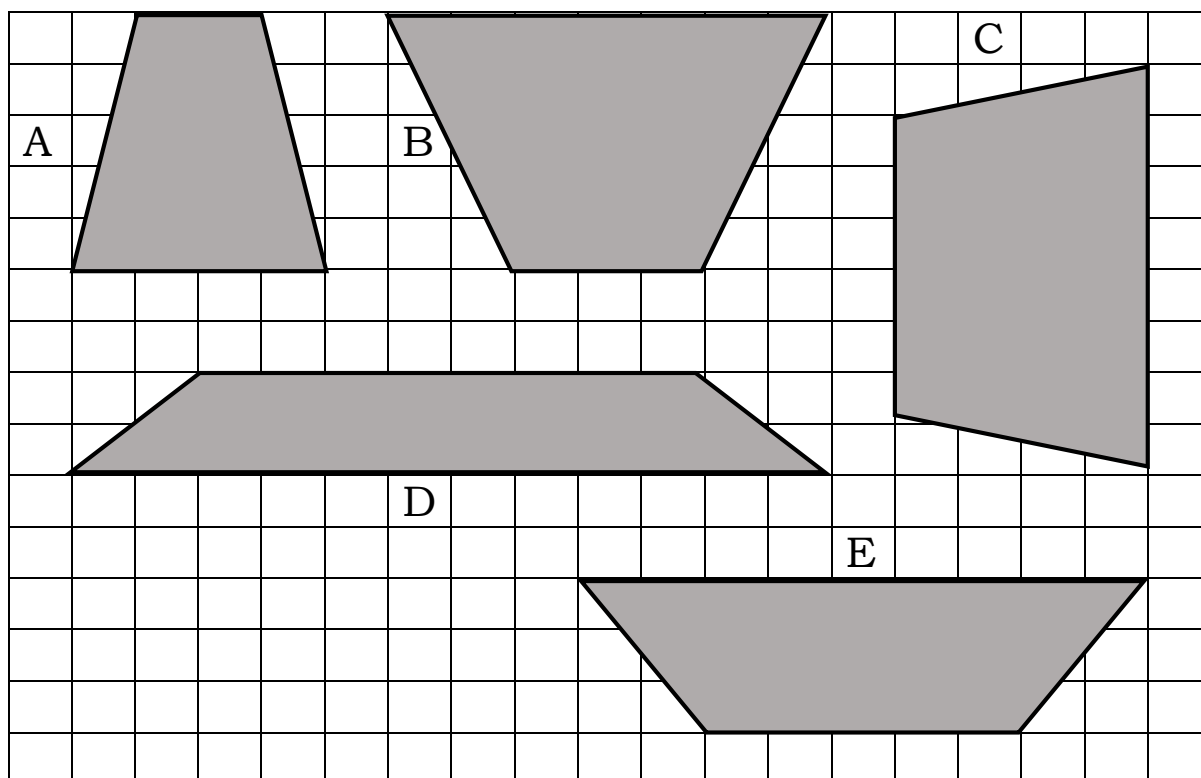
$$\begin{aligned}
 A &= \frac{(b_1 + b_2) \times h}{2} \\
 &= \frac{(5 \text{ cm} + 8 \text{ cm}) \times 6 \text{ cm}}{2} \\
 &= \frac{(13 \text{ cm}) \times 6 \text{ cm}}{2} \\
 &= \frac{78 \text{ sq. cm}}{2}
 \end{aligned}$$

$$A = 39 \text{ sq. cm or } 39 \text{ cm}^2$$



## What's More

Complete the table below by giving the base and height of each trapezoid in cm, then find the corresponding area by using the formula. Each square of the grid is 1 cm by 1 cm.



Trapezoid	$b_1$	$b_2$	$h$	Area (A)
A	2 cm	_____	5 cm	_____
B	7 cm	3 cm	_____	_____
C	_____	8 cm	4 cm	_____
D	8 cm	_____	2cm	_____
E	9 cm	5 cm	_____	_____

Are you done answering?

If yes, time to check. Please go to page 36 for the **Answer Key**.



## What I Have Learned

Let us summarize what you have learned:

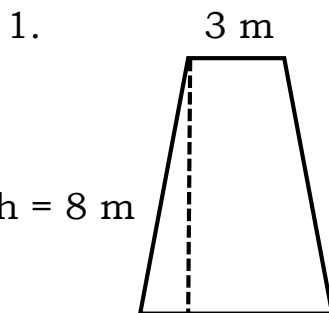
- The area of a **trapezoid** is half its height multiplied by the sum of the lengths of its two bases.
- The formula to obtain the area of a trapezoid is:

$$A = \frac{1}{2} (b_1 + b_2) \times h \quad \text{or} \quad A = \frac{(b_1 + b_2) \times h}{2}$$

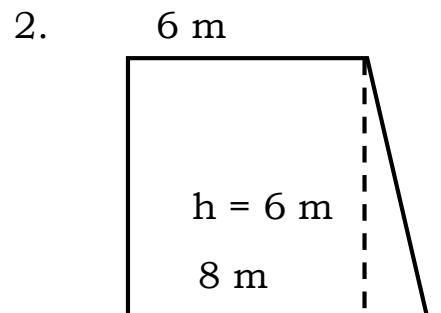


## What I Can Do

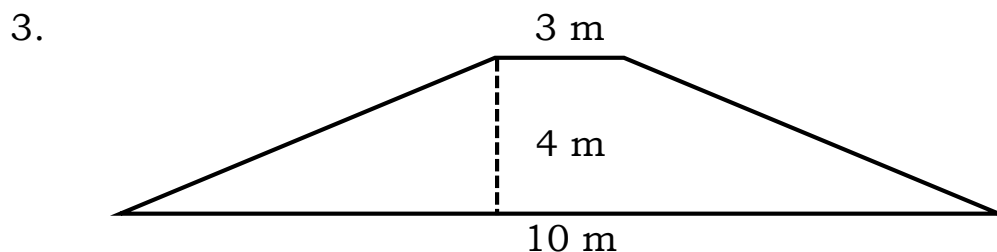
Find the area of each trapezoid using the formula.



$A = \underline{\hspace{2cm}} \text{ m}^2$



$A = \underline{\hspace{2cm}} \text{ m}^2$



$A = \underline{\hspace{2cm}} \text{ m}^2$

Are you done answering?

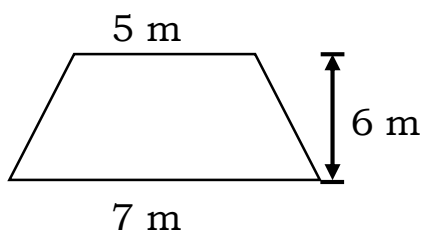
If yes, time to check. Please go to page 36 for the **Answer Key**.



## Assessment

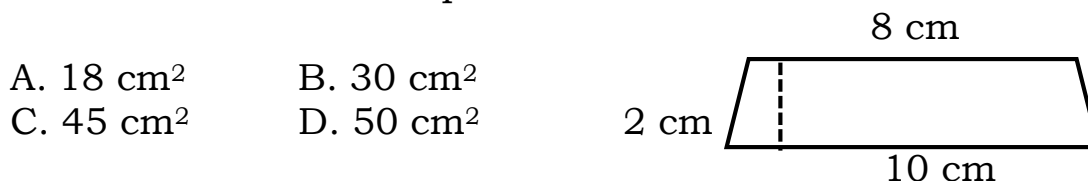
A. Multiple Choice. Choose the letter of the correct answer.

1. Find the area of a trapezoid whose bases are 5 m and 7 m and with a height of 6 m.



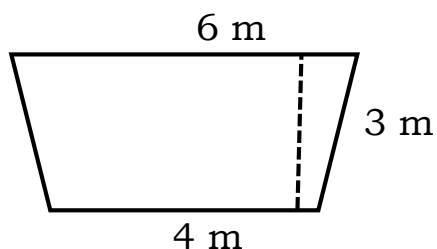
- A.  $36 \text{ m}^2$       B.  $35 \text{ m}^2$       C.  $34 \text{ m}^2$       D.  $33 \text{ m}^2$

2. The bases of a trapezoid are 8 cm and 10 cm. Its height is 2 cm. What is the area of the trapezoid?



- A.  $18 \text{ cm}^2$       B.  $30 \text{ cm}^2$   
C.  $45 \text{ cm}^2$       D.  $50 \text{ cm}^2$

3. The bases of a trapezoid are 6 m and 4 m. Its height is 3 m. What is the area of the trapezoid?



- A.  $10 \text{ m}^2$       B.  $15 \text{ m}^2$   
C.  $16 \text{ m}^2$       D.  $17 \text{ m}^2$

4. The height of a trapezoid is 9 cm. Its bases are 10 cm and 12 cm. What is the area of the trapezoid?

- A.  $88 \text{ cm}^2$       B.  $99 \text{ cm}^2$       C.  $100 \text{ cm}^2$       D.  $102 \text{ cm}^2$

5. What is the area of a trapezoid whose bases are 13 m and 16 m, and whose height is 4 m?

- A.  $56 \text{ m}^2$       B.  $58 \text{ m}^2$       C.  $60 \text{ m}^2$       D.  $62 \text{ m}^2$

B. Find the area of each trapezoid with the given dimensions.

6.  $b_1 = 4$  cm

$b_2 = 9$  cm

$h = 6$  cm

$A = \underline{\hspace{2cm}}$  sq. cm

7.  $b_1 = 7$  m

$b_2 = 8$  m

$h = 4$  m

$A = \underline{\hspace{2cm}}$  sq. m

8.  $b_1 = 14$  cm

$b_2 = 20$  cm

$h = 5$  cm

$A = \underline{\hspace{2cm}}$  sq. cm

9.  $b_1 = 8$  m

$b_2 = 18$  m

$h = 10$  m

$A = \underline{\hspace{2cm}}$  sq. m

10.  $b_1 = 15$  cm

$b_2 = 22$  cm

$h = 8$  cm

$A = \underline{\hspace{2cm}}$  sq. cm

Are you done answering?

If yes, time to check. Please go to page 36 for the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.

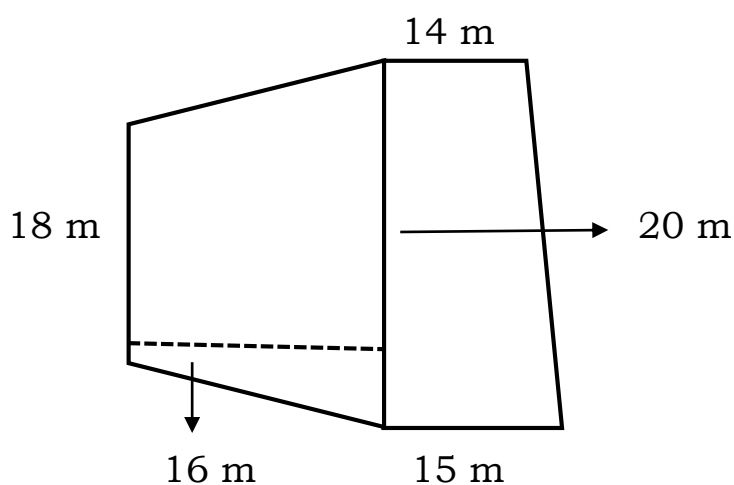






## ***Additional Activities***

Consider the figure formed by two adjoining trapezoidal residential lots. Find the area of each lot and the total area of the two lots using the formula.



Lot 1: bases  $\rightarrow$  18 m and 20 m ;  $h = 16$  m

Lot 2: bases  $\rightarrow$  14 m and 15 m ;  $h = 20$  m

Are you done answering?

If yes, time to check. Please go to page 36 for the ***Answer Key***.



## Answer Key

<p><b>What I Can Do</b></p> <ol style="list-style-type: none"> <li>1. 40 m<sup>2</sup></li> <li>2. 65 cm<sup>2</sup></li> <li>3. 90 m<sup>2</sup></li> <li>4. 42 cm<sup>2</sup></li> <li>5. 66 m<sup>2</sup></li> </ol>	<p><b>Assessment</b></p> <ol style="list-style-type: none"> <li>1. C</li> <li>2. C</li> <li>3. B</li> <li>4. 126 m<sup>2</sup></li> <li>5. 99 cm<sup>2</sup></li> <li>6. 52 m<sup>2</sup></li> <li>7. 56 cm<sup>2</sup></li> <li>8. 60 m<sup>2</sup></li> <li>9. 120 cm<sup>2</sup></li> <li>10. 198 m<sup>2</sup></li> </ol>	<p><b>Additional Activities</b></p> <p>The base = 6 cm Height = 10 cm Area = 60 cm<sup>2</sup></p>
---	---	--

<b>What's More</b>			
Parallelogram	Base	Height	Area
A	7 cm	2 cm	14 cm <sup>2</sup>
B	9 cm	4 cm	36 cm <sup>2</sup>
C	7 cm	6 cm	42 cm <sup>2</sup>
D	11 cm	3 cm	33 cm <sup>2</sup>
E	10 cm	5 cm	50 cm <sup>2</sup>

<p><b>What I Know</b></p> <ol style="list-style-type: none"> <li>1. e</li> <li>2. k</li> <li>3. d</li> <li>4. a</li> <li>5. c</li> <li>6. f</li> <li>7. h</li> <li>8. i</li> <li>9. g</li> <li>10. j</li> </ol>	<p><b>What's In</b></p> <ol style="list-style-type: none"> <li>1. TRUE</li> <li>2. FALSE</li> <li>3. TRUE</li> <li>4. TRUE</li> <li>5. TRUE</li> </ol>
---	--

## LESSON 1

## LESSON 2

### What I Know

1. 12 m<sup>2</sup>
2. 30 cm<sup>2</sup>
3. 36 m<sup>2</sup>
4. 40 cm<sup>2</sup>
5. 54 m<sup>2</sup>
6. 24 m<sup>2</sup>
7. 100 cm<sup>2</sup>
8. 60 cm<sup>2</sup>
9. 42 m<sup>2</sup>
10. 120 cm<sup>2</sup>

### What's In

1. 20
2. 15
3. 21
4. 27
5. 12

### What's More

$$3. A = \frac{b \times h}{2} = \frac{4 \text{ m} \times 14 \text{ m}}{2} = \frac{60 \text{ sq.m}}{2} = A = 30 \text{ sq. m}$$

$$2. A = \frac{b \times h}{2} = \frac{12 \text{ m} \times 8 \text{ m}}{2} = \frac{96 \text{ sq.m}}{2} = A = 48 \text{ sq. m}$$

$$1. A = \frac{b \times h}{2} = \frac{20 \text{ cm} \times 14 \text{ cm}}{2} = \frac{280 \text{ sq. cm}}{2} = A = 140 \text{ sq. cm}$$

### What I Can Do

1. 40 m<sup>2</sup>
2. 27 cm<sup>2</sup>
3. 35 m<sup>2</sup>

### Assessment

1. B
2. C
3. A
4. B
5. B
6. 108 cm<sup>2</sup>
7. 120 cm<sup>2</sup>
8. 90 m<sup>2</sup>
9. 84 m<sup>2</sup>
10. 234 cm<sup>2</sup>

### Additional Activities

Areas:  
 piece a (Right triangle) = 42 m<sup>2</sup>  
 piece b (Right triangle) = 42 m<sup>2</sup>  
 piece c (Isosceles triangle) = 84 m<sup>2</sup>  
 c. The area of the right triangle is half the area of the isosceles triangle.

### LESSON 3

#### What I Know

1. 27 m<sup>2</sup>
2. 36 cm<sup>2</sup>
3. 60 m<sup>2</sup>
4. 84 cm<sup>2</sup>
5. 40 m<sup>2</sup>
6. 35 cm<sup>2</sup>
7. 24 m<sup>2</sup>
8. 51 cm<sup>2</sup>
9. 92 m<sup>2</sup>
10. 81 cm<sup>2</sup>

#### What's In

1. c
2. b
3. f
4. a
5. d

#### What's More

Trapezoid	b <sub>1</sub>	b <sub>2</sub>	h	Area (A)
A	2 cm	<u>4 cm</u>	5 cm	<u>15 cm<sup>2</sup></u>
B	7 cm	3 cm	<u>5 cm</u>	<u>25 cm<sup>2</sup></u>
C	<u>6 cm</u>	8 cm	4 cm	<u>28 cm<sup>2</sup></u>
D	8 cm	<u>12 cm</u>	2 cm	<u>20 cm<sup>2</sup></u>
E	9 cm	5 cm	<u>3 cm</u>	<u>21 cm<sup>2</sup></u>

#### What I Can Do

1. 28 m<sup>2</sup>
2. 42 m<sup>2</sup>
3. 26 m<sup>2</sup>

#### Assessment

1. A
2. A
3. B
4. B
5. B
6. 39 sq cm
7. 30 sq m
8. 85 sq cm
9. 130 sq m
10. 148 sq cm

#### Additional Activities

Lot 1 = 304 m<sup>2</sup>  
 Lot 2 = 290 m<sup>2</sup>  
 Total Area of two lots =  
 594 m<sup>2</sup>

## ***References***

K to 12 Mathematics Curriculum Guide, August 2016

Tabilang, A., Arce, I., Pascua, R., Calayag, N., Dacubo, L., Borais, D., Buemia, R., Collao, M., Morandante, L., Danao, A., Gonzaga, L., Briones, I., Daganta, J. 2015. **Mathematics 4 Learner's Material**. Department of Education.

Tabilang, A., Arce, I., Pascua, R., Calayag, N., Dacubo, L., Borais, D., Buemia, R., Collao, M., Morandante, L., Danao, A., Gonzaga, L., Briones, I., Daganta, J. 2015. **Mathematics 4 Teacher's Guide**. Department of Education

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# Mathematics

## Quarter 4 – Module 3: Solving Routine and Non-routine Problems Involving Areas of Plane Figures



**Mathematics – Grade 4**  
**Alternative Delivery Mode**  
**Quarter 4 – Module 3: Solving Routine and Non-routine Problems Involving Areas**  
**of Plane Figures**  
**First Edition, 2020**

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Published by the Department of Education  
Secretary: Leonor Magtolis Briones  
Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by** \_\_\_\_\_

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# **Mathematics**

## **Quarter 4 – Module 3: Solving Routine and Non-routine Problems Involving Areas of Plane Figures**

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

In previous modules, we learned how to obtain the perimeter and area of plane figures. Now we will apply our knowledge and skills on finding the areas of plane figures to solve problems in real-world situations.

After going through this module, you are expected to solve routine and non-routine problems involving finding the areas of squares, rectangles, triangles, parallelograms, and trapezoids.



## ***What I Know***

- A.** Read the problem carefully, then answer the questions that follow. Choose the letter of your answer from the given choices inside the box.

A rose garden inside a park has the shape of a trapezoid. Its bases are 30 meters and 24 meters. The perpendicular distance between these bases is 16 meters. What is the area of the garden?

1. What is asked in the problem?
2. What facts are given?
3. What possible equation may help solve the problem?
4. How is the solution done?
5. What is the complete/final answer?

- |  |                         |
|--|-------------------------|
| a. bases: 30 meters and 24 meters, height: 16 meters |                         |
| b. 342 sq. m   |                         |
| c. $A = \frac{(b_1 + b_2) \times h}{2}$              | g. Add the 2 bases,     |
| d. The perimeter of the garden                       | multiply the sum by     |
| e. 432 sq. m   | its height, then divide |
| f. The area of the garden                            | the product by 2.       |

**B. Analyze the problems, then solve.**

A rectangular swimming pool measures 18 m by 9 m. A 2-meter-wide path around the pool is paved with concrete.

6. What is the area of the path?
7. What is the area of the swimming pool?

A rectangular grass lawn is 24 m long and 18 m wide. At each corner of the lawn are square flower boxes whose side is 3 m each.

8. What area of the lawn is covered by grass?
9. What is the total area of the four flower boxes?

10. Five small squares are put together to form a cross without overlap.

If a side of each square is 9 cm, what is the area of the cross?

Are you done answering?

If yes, time to check. Please go to page 15 for the **Answer Key**.



**CONGRATULATIONS!** If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.



## What's In

Match each question card in column A with its corresponding answer in column B.

### A

1. What is the formula for finding the area of a trapezoid?

2. What is the formula for finding the area of a parallelogram?

3. What is the area of a square whose side is 9 m long?

4. What is the formula for finding the area of a triangle?

5. What is the area of the rectangle whose length ( $l$ ) = 15 cm and width ( $w$ ) = 8 cm?

### B

a.  $81 \text{ m}^2$

b.  $A = \frac{b \times h}{2}$

c.  $120 \text{ cm}^2$

d.  $A = \frac{(b_1 + b_2) \times h}{2}$

e.  $A = b \times h$

Are you done answering?

If yes, time to check. Please go to page 15 for the **Answer Key**.



## ***What's New***

Read and analyze the problem.

Carlos wants to cover their backyard with Bermuda grass to prevent soil erosion and preserve the topsoil. The backyard is in the shape of a parallelogram with a base of 11 meters and a height of 9 meters.

How many square meters of Bermuda grass are needed to cover the backyard?

How are we going to solve this problem?



## ***What is It***

The problem given is an example of a routine problem.

To solve it, we use the 4-step plan.

1. Understand the problem.

a. Know what facts are given.

A backyard in the shape of a parallelogram with the following dimensions: base = 11 meters; height = 9 meters.

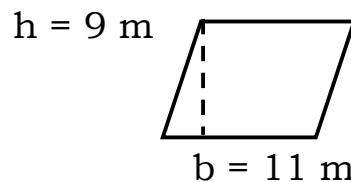
b. Know what is asked in the problem.

How many square meters of Bermuda grass is needed to cover the backyard?

## 2. Plan

What strategy can we use to solve the problem?

c. Draw a diagram to visualize the problem. (only if necessary)



Compute for the area of the backyard.

d. We use the formula:

$$\text{Area} = b \times h$$

## 3. Solve to carry out the plan.

$$\begin{aligned} A &= b \times h \\ &= 11 \text{ m} \times 9 \text{ m} \\ A &= 99 \text{ m}^2 \end{aligned}$$

The backyard has an area of  $99 \text{ m}^2$ . So, Carlos needs  $99 \text{ m}^2$  of Bermuda grass to cover the yard.

## 4. Check and Look back.

Ask yourself;

Did you use the correct formula?

Does the answer make sense?

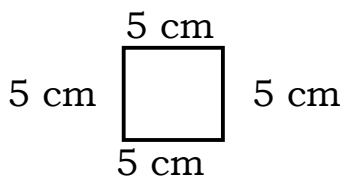
Did you label the answer correctly?

If all your answers to these questions are yes, you have solved the problem correctly.

This time we are going to solve a non-routine problem.

A rectangle is formed by three identical squares lying side by side. The perimeter of the square is 20 cm. What is the area of the rectangle?

- We can solve this problem by making an illustration.



The perimeter of the square is 20 cm. To find the measurement of each side (s), divide the perimeter by 4.

$$\text{Perimeter} = 4 \times s$$

$$20 = 4 \times s \quad \text{Divide both sides by 4}$$

$$20 \div 4 = 4 \div 4 \times s$$

$$5 = s$$

The side measures 5 cm.

- Let's put the three identical squares side by side.

Length:  $5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} = 15 \text{ cm}$



The dimensions of the rectangle formed is:

$$\text{length} = 15 \text{ cm}; \text{width} = 5 \text{ cm}$$

Then, find the area of the rectangle using the formula.

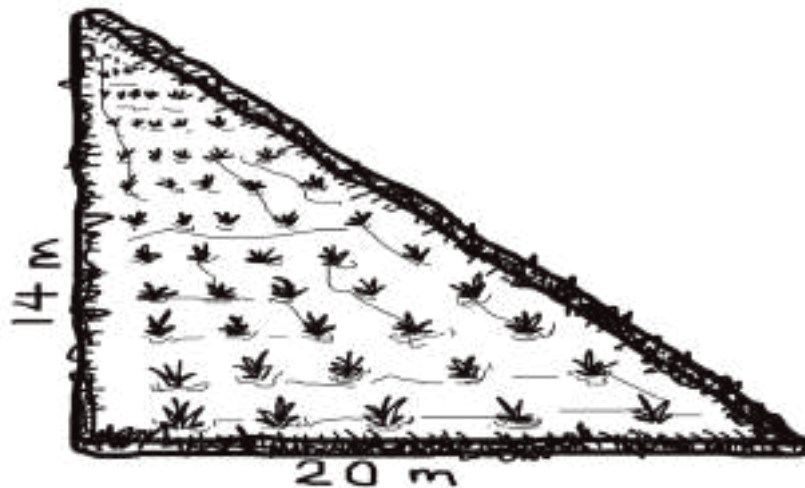
$$\begin{aligned} A &= l \times w \\ &= 15 \text{ cm} \times 5 \text{ cm} \\ &= 75 \text{ cm}^2 \end{aligned}$$

**Therefore, the area of the rectangle is 75 cm<sup>2</sup>.**



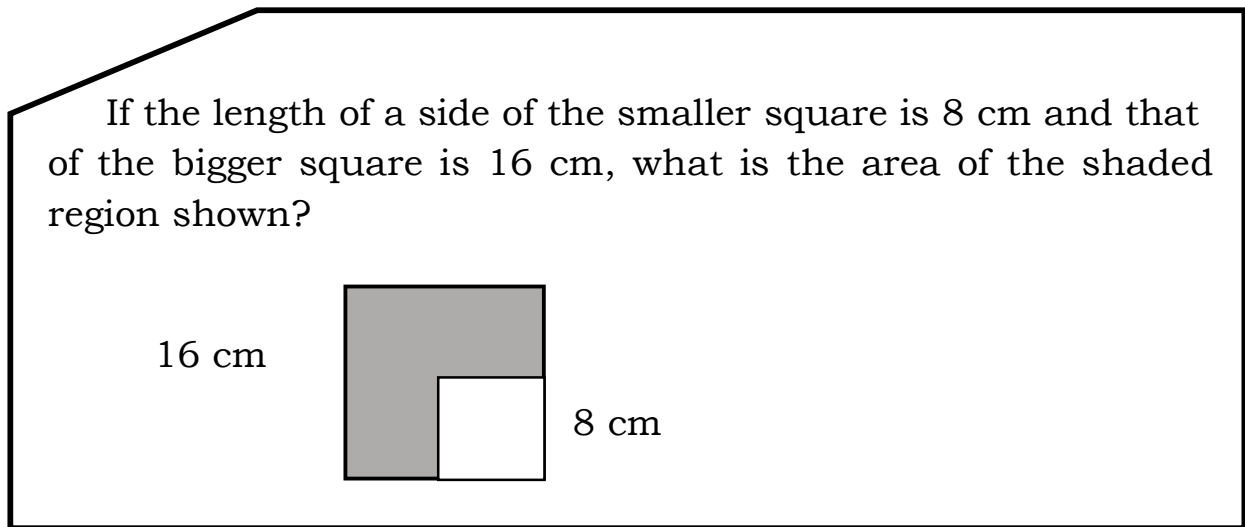
Let us analyze another word problem.

A rice field is in the shape of a right triangle with a base of 20 m and a height of 14 m. What is its area?



Steps	Questions	Answer
Understand	What is asked in the problem?	The area of the rice field.
	What are given?	$b = 20 \text{ m}$ , $h = 14 \text{ m}$
Plan	What formula will be used?	$A = \frac{b \times h}{2}$
Solve	What is the solution?	$A = \frac{b \times h}{2}$ $= \frac{20 \text{ m} \times 14 \text{ m}}{2}$ $= \frac{280 \text{ sq m}}{2}$ $A = 140 \text{ m}^2$
Check your answer	What is the final/complete answer?	The area of the rice field is $140 \text{ m}^2$ .

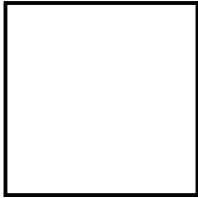
Now, let us solve another non-routine problem.



To get the area of the shaded region;

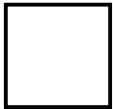
First, let's find the area of the two squares.

Area of the bigger square =  $s \times s$

$s = 16 \text{ cm}$  

$$= 16 \text{ cm} \times 16 \text{ cm}$$
$$= 256 \text{ cm}^2$$

Area of the smaller square =  $s \times s$

$s = 8 \text{ cm}$  

$$= 8 \text{ cm} \times 8 \text{ cm}$$
$$= 64 \text{ cm}^2$$

Then, subtract the area of the smaller square from the area of the bigger square.

$$\begin{aligned}\text{Area of the shaded region} &= 256 \text{ cm}^2 - 64 \text{ cm}^2 \\ &= 192 \text{ cm}^2\end{aligned}$$

**Therefore, the area of the shaded region is  $192 \text{ cm}^2$ .**



## What's More

Solve the word problems and complete the statement.

1. Leilani and Elaine made a trapezoidal doormat. The bases measures 14 cm and 12 cm, respectively. If its height is 8 cm, what is its area?

- The problem is asking for \_\_\_\_\_.
- The given facts are \_\_\_\_\_
- The formula to solve the problem is \_\_\_\_\_
- The solution is \_\_\_\_\_
- The complete answer is \_\_\_\_\_

2. A section of a stained-glass window has the shape of a parallelogram. Its base is 16 cm and its height is 14 cm. How much glass is needed to cover that section completely?

- The problem is asking for \_\_\_\_\_.
- The given facts are \_\_\_\_\_
- The formula to solve the problem is \_\_\_\_\_
- The solution is \_\_\_\_\_
- The complete answer is \_\_\_\_\_

Illustrate/draw on a paper and solve.

3. The square is formed by three identical rectangles. The perimeter of each rectangle 32 cm. What is the area of the square?

Are you done answering?

If yes, time to check. Please go to page 15 for the **Answer Key**.



## ***What I Have Learned***

### **Let us remember:**

To solve routine word problems involving areas of plane figures, we can follow the 4-step plan:

1. Understand the problem.
  - a. Know what is asked.
  - b. Know what the given facts/data are.
2. Plan
  - a. Draw or illustrate the diagram to visualize the problem, if necessary.
  - b. Use the formula.
3. Solve
  - a. Write the complete solution.
  - b. Label your answer.
4. Check and Look back
  - a. Review and check your answer.

Non-routine problems may be solved by drawing a picture or making an illustration, using a number line, making a table, or some other problem-solving strategies.



## ***What I Can Do***

Shapes make our lives meaningful. We are surrounded with objects which are shaped like squares, rectangles, triangles, parallelograms and trapezoids or a combination of these shapes.

Show which of the two figures in the situations below has a greater area.

- a. A triangle with a base of 12 m and a height of 6 m
- b. A trapezoid with bases of 12 m and 6 m, and a height of 4 m

Illustrate the figures, indicate the given dimensions and show your solution.

Are you done answering?

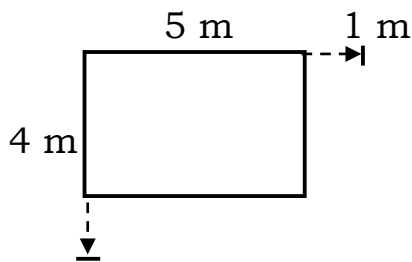
If yes, time to check. Please go to page 16 for the ***Answer Key***.



## **Assessment**

Solve the following word problems. Choose the letter of the correct answer.

1. Nestor prepared a rectangular seedbed measuring 6 m long and 4 m wide. What is the area of the seedbed?  
a.  $28 \text{ m}^2$                       b.  $24 \text{ m}^2$                       c.  $25 \text{ m}^2$                       d.  $30 \text{ m}^2$
2. Rosemarie is making a table cloth for her square table. If one side of the table is 4 m long, what is the area of the top of the table?  
a.  $16 \text{ m}^2$                       b.  $18 \text{ m}^2$                       c.  $15 \text{ m}^2$                       d.  $17 \text{ m}^2$
3. Aunt Susan placed a study table with a triangular top in her library. The top of the table has the following dimensions: its base is 60 cm and its height is 20 cm. What is the area of the top of the table?  
a.  $650 \text{ cm}^2$                       b.  $600 \text{ cm}^2$                       c.  $700 \text{ cm}^2$                       d.  $610 \text{ cm}^2$
4. A decorative pillow is in the shape of a trapezoid. Its upper and lower bases measure 28 cm and 20 cm, respectively. Its height is 10 cm. What is the area of the front surface of the pillow?  
a.  $220 \text{ cm}^2$                       b.  $230 \text{ cm}^2$                       c.  $240 \text{ cm}^2$                       d.  $250 \text{ cm}^2$
5. The playground is parallelogram in shape. It has a base of 10 m and a height of 17 m. What is its area?  
a.  $190 \text{ m}^2$                       b.  $180 \text{ m}^2$                       c.  $175 \text{ m}^2$                       d.  $170 \text{ m}^2$
6. Mrs. Garcia has a flower garden 5 m long and 4 m wide. She wanted to widen it by adding 1 m to both its length and width.



Which is the correct equation to find the area of the bigger garden?

- a.  $A = (5 \text{ m} \times 4 \text{ m}) + 1 \text{ m}$       c.  $A = (5 \text{ m} + 1 \text{ m}) + (4 \text{ m} + 1 \text{ m})$   
 b.  $A = 5 \text{ m} \times 4 \text{ m} \times 1 \text{ m}$       d.  $A = (5 \text{ m} + 1 \text{ m}) \times (4 \text{ m} + 1 \text{ m})$

7. What is the area of the bigger garden? (Please refer to problem #6).

- a.  $11 \text{ m}^2$       b.  $20 \text{ m}^2$       c.  $21 \text{ m}^2$       d.  $30 \text{ m}^2$

For each of the following problems, draw the figure and indicate the given dimensions on a piece of paper. Then, solve the problem.

8. A rectangular grass lawn is 80 m long and 60 m wide. Four rectangular flower box each 15 m by 10 m are found within the lawn. What is the area covered by the grass?
9. Five identical squares are placed side by side to form a rectangle. The area of the rectangle is  $45 \text{ cm}^2$ . Squares are then removed from one end so that the resulting rectangle has a perimeter of 24 cm. What is the area of the new rectangle?
10. A rectangular mini park is 75 m long and 40 m wide. There is a concrete walk 3 m wide around it. Find the area of the concrete walk.

Are you done answering?

If yes, time to check. Please go to page 16-17 for the **Answer Key**.

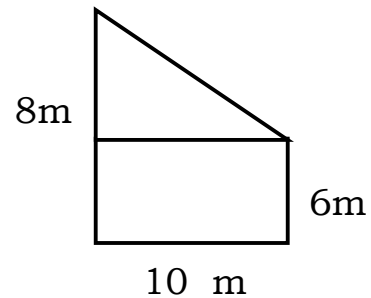
Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.



### ***Additional Activities***

1. A lemon orchard is shaped like the figure on the right. Find the area of the orchard.



2. Which of these two gardens has a larger area?

- a) a trapezoid-shaped garden with parallel sides 34 m and 20 m long, and a 12-m perpendicular distance between these sides
- b) a square garden that is 18 m on a side

Are you done answering?

If yes, time to check. Please go to page 17 for the ***Answer Key***.





## Answer Key

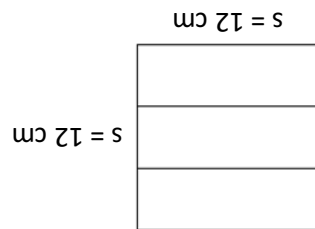
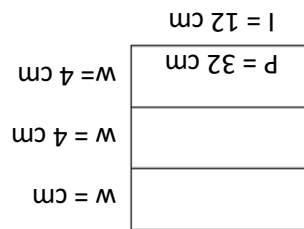
### What's In

1. d
2. e
3. a
4. b
5. c

### What I Know

1. f
2. a
3. c
4. g
5. e
6.  $124 \text{ m}^2$
7.  $162 \text{ m}^2$
8.  $396 \text{ m}^2$
9.  $36 \text{ m}^2$
10.  $405 \text{ m}^2$

3.



2. a) The area of the glass needed to cover the stained-glass window  
 b) base =  $16 \text{ cm}$ , height =  $14 \text{ cm}$   
 c)  $A = b \times h$   
 d)  $A = 16 \text{ cm} \times 14 \text{ cm}$   
 $= 224 \text{ cm}^2$   
 e) The area of the glass needed is  $224 \text{ cm}^2$ .
1. a) The area of a trapezoidal door mat.  
 b) bases:  $14 \text{ cm}$  and  $12 \text{ cm}$ , height =  $8 \text{ cm}$   
 c)  $A = \frac{(b_1 + b_2) \times h}{2}$   
 d)  $A = \frac{(14 \text{ cm} + 12 \text{ cm}) \times 8 \text{ cm}}{2}$   
 $= \frac{(26 \text{ cm}) \times 8 \text{ cm}}{2}$   
 $= \frac{208 \text{ cm}^2}{2}$   
 $= 104 \text{ cm}^2$   
 e) The area of the trapezoidal mat is  $104 \text{ cm}^2$ .

### What's More

The area of the square formed is  $144 \text{ cm}^2$ .

$$A = s \times s$$

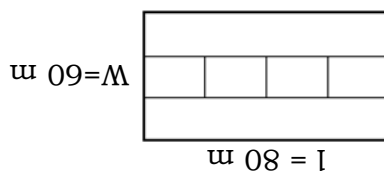
$$= 12 \text{ cm} \times 12 \text{ cm}$$

$$= 144 \text{ cm}^2$$

**Assessment**

1. B 2. A 3. B 4. C 5. D 6. D 7. D

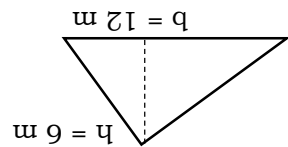
8.



Area of grass rectangular lawn  
 $A = l \times w$   
 $= 80 \times 60\text{ m}$   
 $= 4\,800\text{ m}^2$

Area of rectangular flower box,  
 $A = l \times w$   
 $= 15\text{ m} \times 10\text{ m}$   
 $= 150\text{ m}^2$   
 To get the total area of 4 rectangular flower boxes,  
 $150\text{ m}^2 \times 4 = 600\text{ m}^2$   
 Area covered by grass = Area of rectangular grass lawn – area of 4 rectangular flower boxes  
 $= 4\,800\text{ m}^2 - 600\text{ m}^2$   
 $= 4\,200\text{ m}^2$

**What I Can Do**



$$A = \frac{b \times h}{2}$$

$$= \frac{12\text{ m} \times 6\text{ m}}{2}$$

$$= \frac{72\text{ m}^2}{2}$$

$$= 36\text{ m}^2$$

A diagram of a trapezoid with a top base  $b_1 = 6\text{ m}$ , a bottom base  $b_2 = 12\text{ m}$ , and a height  $h = 4\text{ m}$ . A dashed vertical line between the bases indicates the height.

$$A = \frac{(b_1 + b_2) \times h}{2}$$

$$= \frac{(6\text{ m} + 12\text{ m}) \times 4\text{ m}}{2}$$

$$= \frac{(18\text{ m}) \times 4\text{ m}}{2}$$

$$= \frac{72\text{ m}^2}{2}$$

$$= 36\text{ m}^2$$

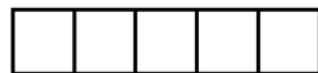
The area of the triangle and the trapezoid are equal.

**Additional Activities**

1. 100 m<sup>2</sup>
2. The area of the square garden and the trapezoidal garden are equal.

9.

Five identical squares placed side by side formed a rectangle with an area of 45 cm<sup>2</sup>.



To find the area of each square, we have to divide 45 cm<sup>2</sup> by 5.

$$45 \text{ cm}^2 \div 5 = 9 \text{ cm}^2.$$

The area of each square is 9 cm<sup>2</sup>.

To find the measurement of one side, take the square root of the

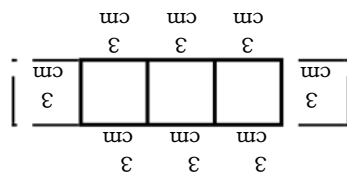
area of a square.

$$s = \sqrt{9}$$

$$= 3$$



$$s = 3 \text{ cm}$$



The dimension of the rectangle formed:

$$l = 9 \text{ cm}; w = 3 \text{ cm}$$

The area of the new rectangle:

$$A = l \times w$$

$$= 9 \text{ cm} \times 3 \text{ cm}$$

$$= 27 \text{ cm}^2.$$

10.

(A and B)  
Concrete walk:  $l = 81 \text{ m}; w = 3 \text{ m}$   
 $A = l \times w$   
 $= 81 \text{ m} \times 3 \text{ m}$   
 $= 243 \text{ m}^2 \times 2 = 486$

m<sup>2</sup>.

(C and D) Concrete walk:  $l = 40 \text{ m}; w = 3 \text{ m}$

$$A = l \times w$$

$$= 40 \text{ m} \times 3 \text{ m}$$

$$= 120 \text{ m}^2 \times 2 = 240 \text{ m}^2$$

Area of the concrete walk =  $(A + B) + (C + D)$

$$= 486 \text{ m}^2 + 240 \text{ m}^2$$

$$= 726 \text{ m}^2$$

## ***References***

K to 12 Mathematics Curriculum Guide. 2016. Department of Education.

Tabilang, A., Arce, I., Pascua, R., Calayag, N., Dacubo, L., Borais, D., Buemia, R., Collao, M., Morandante, L., Danao, A., Gonzaga, L., Briones, I., & Daganta, J. 2015. **Mathematics 4 Learner's Material**. Department of Education.

Tabilang, A., Arce, I., Pascua, R., Calayag, N., Dacubo, L., Borais, D., Buemia, R., Collao, M., Morandante, L., Danao, A., Gonzaga, L., Briones, I., & Daganta, J. 2015. **Mathematics 4 Teacher's Guide**. Department of Education

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# Mathematics

## Quarter 4 – Module 4: Volume of Rectangular Prism



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**Alternative Delivery Mode**  
**Quarter 4 – Module 4: Volume of Rectangular Prism**  
**First Edition, 2020**

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Published by the Department of Education  
Secretary: Leonor Magtolis Briones  
Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by** \_\_\_\_\_

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# **Mathematics**

## **Quarter 4 – Module 4: Volume of Rectangular Prism**



## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

Do you enjoy making different kinds of artworks? If you do, you will have fun doing this module.

As you explore the lesson, you will learn about the volume of rectangular prisms. You will also learn about the applications of mathematics in the fields of art and architecture. Read on and explore how your knowledge in measurement could help you become a good artist or an architect.

At the end of this module, you should be able to:

- visualize the volume of solid figures using unit cubes;
- derive the formula for finding the volume of rectangular prisms; and
- find the volume of a rectangular prism using cubic centimeter and cubic meter.



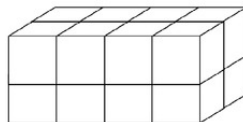
## What I Know

**A.** Find the volume of each rectangular prism using cubic units.

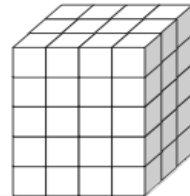
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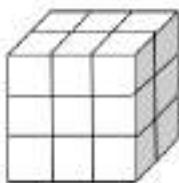
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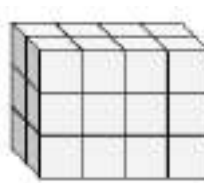
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4.

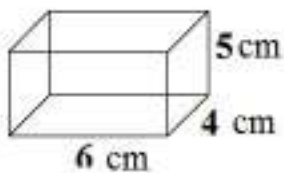


5.

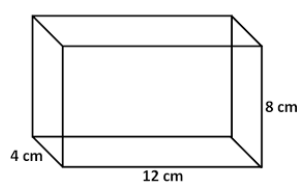


**B.** Find the volume of each rectangular prism using the formula.

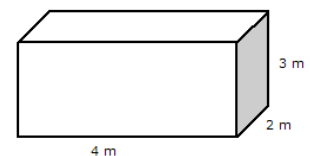
1.



2.



3.



**CONGRATULATIONS!** If you got a score of 7 or 8, you should not have any difficulty studying the lesson in this module.

If you got a score of 6 or below, you may need to study the lesson more carefully and do all the given activities.

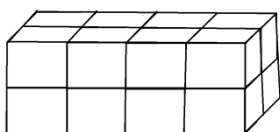


## ***What's In***

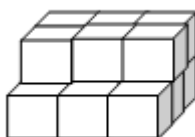
Find the volume of the following figures by counting the cubes and express your answers in cubic units.

 = 1 cubic unit or cu.

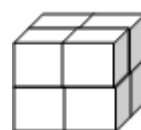
1.



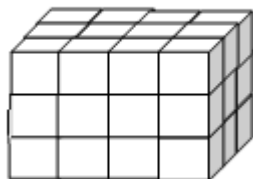
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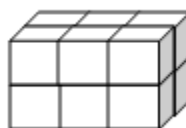
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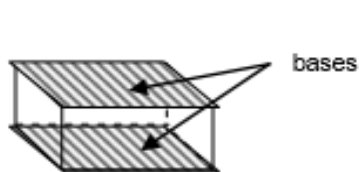
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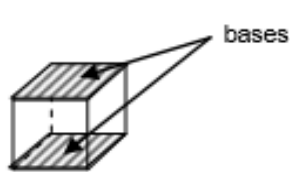
## ***What's New***

Before we explore the volume of a rectangular prism, let us recall what a prism is. A **prism** is a solid figure with two bases that are parallel and identical polygons. Other faces are parallelograms. Prisms may be named by the type of polygon at its bases. A square prism is a prism whose bases are squares. It is more commonly known as a cube. A rectangular prism has bases which are rectangles.

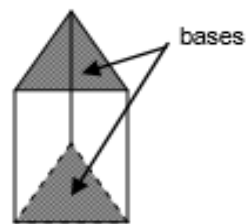
These are examples of prisms.



rectangular prism



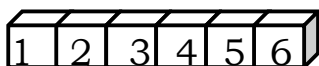
square prism or cube



triangular prism

**Volume** is the space a three-dimensional figure occupies. It is expressed in cubic units. The number of unit cubes that is enclosed or contained in a figure is the measure of the volume of the figure.

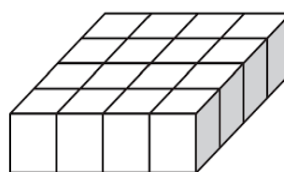
Let us visualize the volume of solid figures using unit cubes. Just count the number of unit cubes that form the figure to find its volume. The volume of a unit cube whose length, width and height are 1 unit each is 1 **cubic unit or cu.**



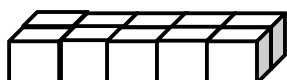
This figure is formed by 6 unit cubes.  
Its volume is **6 cubic units.**



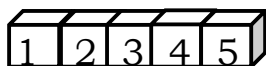
**V = 10 cubic units**



**V = 16 cubic units**

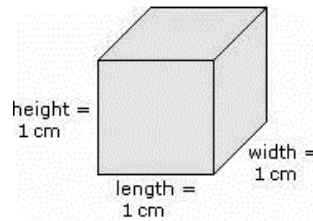


We can also break them apart in order to get the volume.



**V = 10 cubic units**

A cube has 3 dimensions: length, width, and height. The volume of a cube whose length, width and height are 1 cm is **1 cubic centimeter or 1 cm<sup>3</sup>**. It is called a centimeter cube.



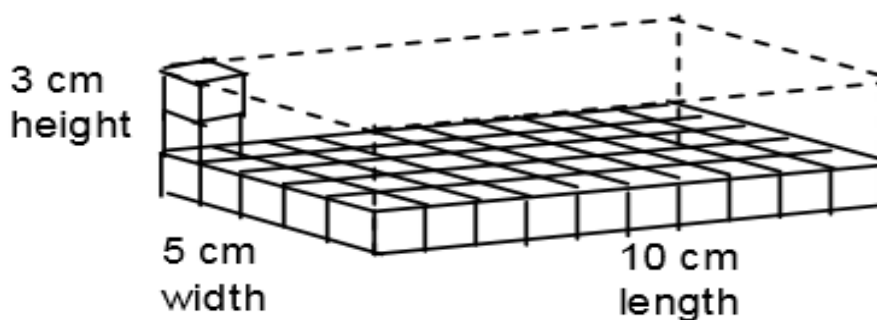
$$V = 1 \text{ cm}^3$$

Let us work on a problem involving the volume of a rectangular prism.

A box is 10 cm long, 5 cm wide and 3 cm tall. What is its volume?



Let us visualize the box using centimeter cubes.



The figure above is a box which is 10 cm long, 5 cm wide and 3 cm high. To find its volume, we need to know the number of centimeter cubes in the whole figure.

We know that the bottom of the prism is 10 cm long and 5 cm wide and that the figure is **3** cm high.

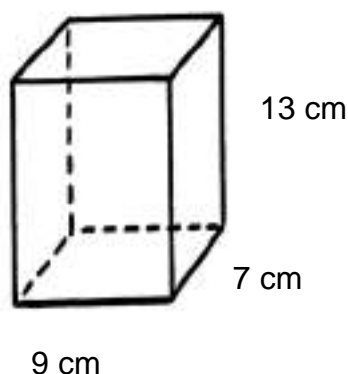
To find the total number of **centimeter cubes**, we have to multiply the number of cubes in the bottom layer by the number of layers.

We multiply 10 by 5 by 3.

$$\begin{array}{ccccccc}
 10 & \times & 5 & \times & 3 & = & 150 \text{ centimeter cubes} \\
 \text{length} & & \text{width} & & \text{height} & & \\
 \underbrace{\hspace{2cm}} & & & & \downarrow & & \\
 \text{number of cubes} & & & & \text{number of} & & \\
 \text{at the bottom layer} & & & & \text{layers} & & 
 \end{array}$$

**The volume of the box is 150 cm<sup>3</sup>.**

Consider the next example. Find the volume of the prism below:



The general formula for finding the volume of a prism is  **$V = B \times h$** , where  **$B$**  is the area of the base and  **$h$**  is the height.

The base of the given prism is a rectangle that is 9 cm long and 7 cm wide. So, the base area is  $9 \times 7$  or  $63 \text{ cm}^2$ . Its height is 13 cm.

Substitute 63 for  $B$  and 13 for  $h$  in the formula. Thus,

$$\begin{aligned}
 V &= B \times h \\
 &= 63 \text{ cm}^2 \times 13 \text{ cm} \\
 &= 819 \text{ cm}^3
 \end{aligned}$$

The volume of the prism is  $819 \text{ cm}^3$ .

Remember: The volume of a rectangular prism can be computed using either of these formulas:  **$V = l \times w \times h$**  or  **$V = B \times h$** .

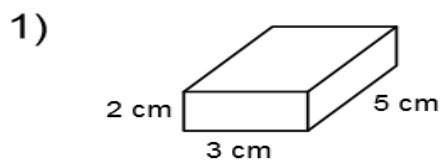


## ***What is It***

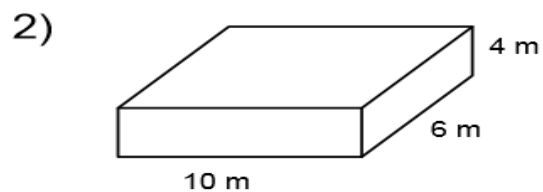
### **READ AND LEARN MORE**

Let us take a look at some more examples.

Study the figure below.



$$\begin{aligned} V &= l \times w \times h \\ &= 5 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm} \\ &= 30 \text{ cm}^3 \end{aligned}$$



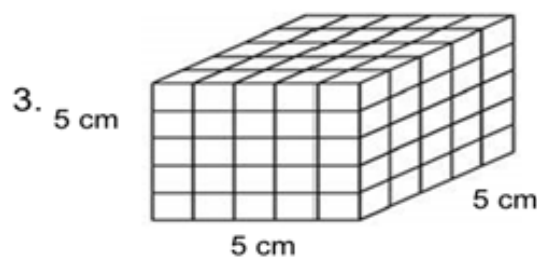
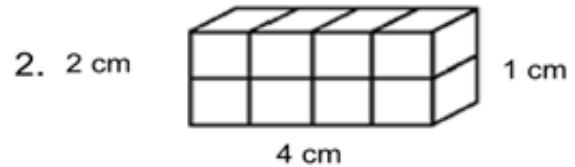
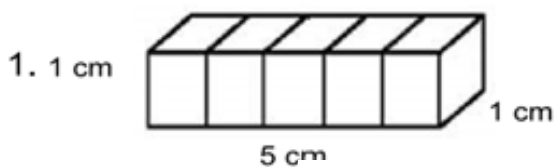
$$\begin{aligned} V &= B \times h \\ &= (10 \text{ m} \times 6 \text{ m}) \times 4 \text{ m} \\ &= 240 \text{ m}^3 \end{aligned}$$

The solid figure in numbers 1 and 2 are both rectangular prisms. Hence, we use the formula:  $V = l \times w \times h$  or  $V = B \times h$ .

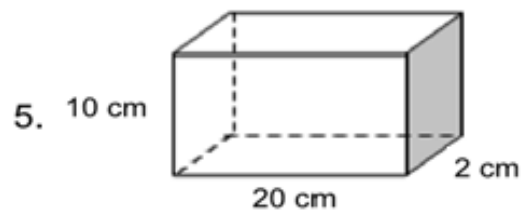
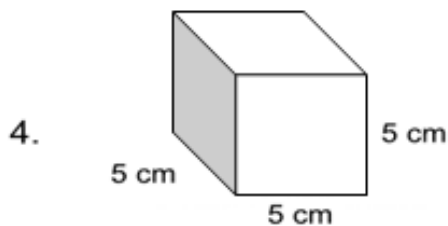


## ***What's More***

Find the volume.







## ***What I Have Learned***

**Prism** – a solid figure with two bases that are parallel and identical polygons. Its sides are parallelograms.

**Cubic unit** – the unit used to find the volume of a solid

**Volume** - is the space a three-dimensional figure occupies. It is the number of cubic units needed to make or fill a solid figure.

The formula for finding the volume of a rectangular prism is:

$$V = l \times w \times h$$

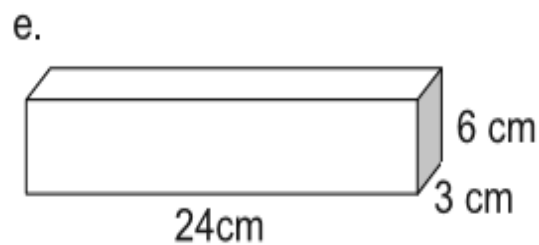
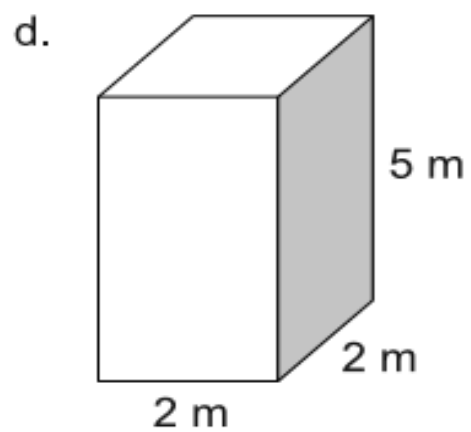
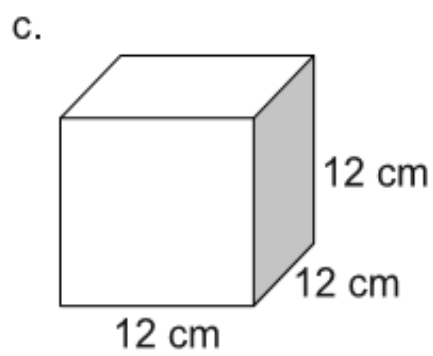
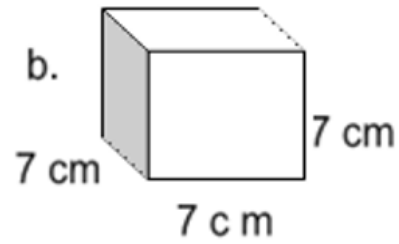
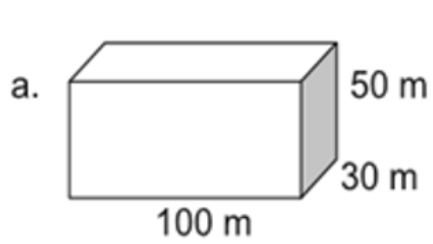
where  $l$  = length,  $w$  = width, and  $h$  = height

The General Volume Formula for any prism is:  
 $V = B \times h$ , where  $B$  stands for the area of the base and  $h$  stands for the height.



## ***What I Can Do***

Find the volume of the following prisms.

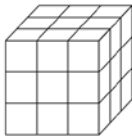




## Assessment

A. Find the volume of each figure using cubic units.

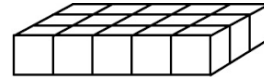
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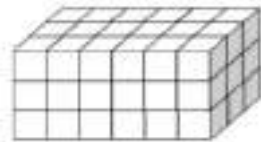
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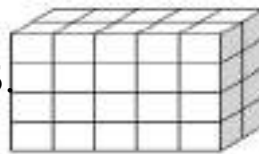
3.



4.

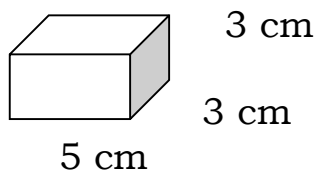


5.

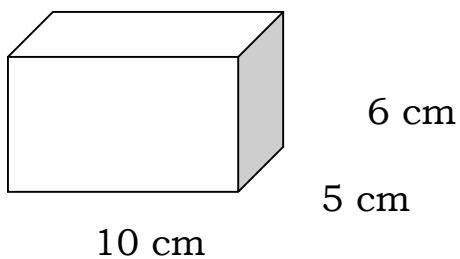


B. Find the volume of each rectangular prism.

1)

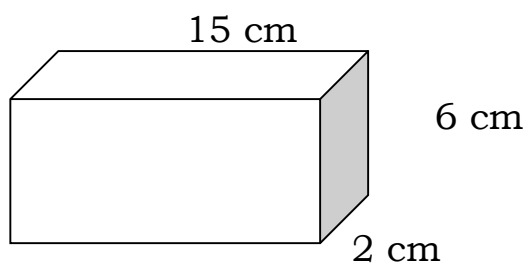


2)



$$\begin{aligned} 4) \quad l &= 9 \text{ m} \\ w &= 3 \text{ m} \\ h &= 2 \text{ m} \end{aligned}$$

3)



$$\begin{aligned} 5) \quad l &= 6 \text{ m} \\ w &= 10 \text{ m} \\ h &= 4 \text{ m} \end{aligned}$$

Got a score of 8-10? CONGRATULATIONS! Job well done. See you in the next module. If below 8, you may have to go over the lessons and the exercises again.



## ***Additional Activities***

**A.** Draw a figure with the given dimensions and find its volume.

1. Length = 12 cm  
Width = 4 cm  
Height = 6 cm

2. Length = 5 cm  
Width = 3 cm  
Height = 3 cm

**B.** Solve the following word problems.

1. A container is 15 m tall, 3 m wide and 4 m long. What is the volume of the container?
2. The toy cabinet has a dimension of 4 cm x 6 cm x 8 cm. What is the volume of the cabinet?



## Answer Key

1.  $45 \text{ cm}^3$
2.  $300 \text{ cm}^3$
3.  $180 \text{ cm}^3$

4.  $54 \text{ m}^3$
5.  $240 \text{ m}^3$

B.

- A. 1. 27 cubic units
2. 10 cubic units
3. 15 cubic units
4. 54 cubic units
5. 40 cubic units

### Assessment

1.  $5 \text{ cm}^3$
2.  $8 \text{ cm}^3$
3.  $125 \text{ cm}^3$

4.  $125 \text{ cm}^3$
5.  $400 \text{ cm}^3$

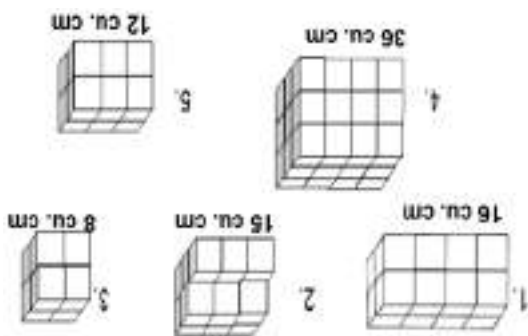
### What's More

- B. 1.  $120 \text{ cm}^3$
2.  $384 \text{ cm}^3$
3.  $24 \text{ m}^3$

### What I Know

- A. 1. 10 cubic units
2. 16 cubic units
3. 60 cubic units
4. 18 cubic units
5. 24 cubic units

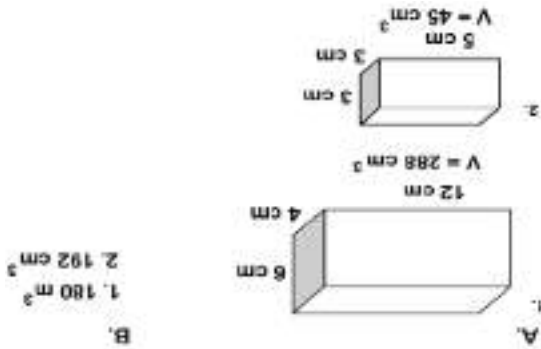
### What's In



### What I Can Do!

- A.  $150,000 \text{ m}^3$
- B.  $343 \text{ cm}^3$
- C.  $1,728 \text{ cm}^3$
- D.  $20 \text{ m}^3$
- E.  $432 \text{ cm}^3$

### Additional Activity



## ***References***

Tabilang, A., Arce, I., Pascua, R., Calayag, N., Dacubo, L., Borais, D., Buemia, R., Collao, M., Morandante, L., Danao, A., Gonzaga, L., Briones, I., & Daganta, J. 2015. **Mathematics 4 Teacher's Guide**. Department of Education

**Distance Education for Elementary Schools: Self-Instructional Materials**. Department of Education

<https://www.youtube.com/watch?v=YECQ5JGNKIc>

<https://www.youtube.com/watch?v=qJwecTgce6c>

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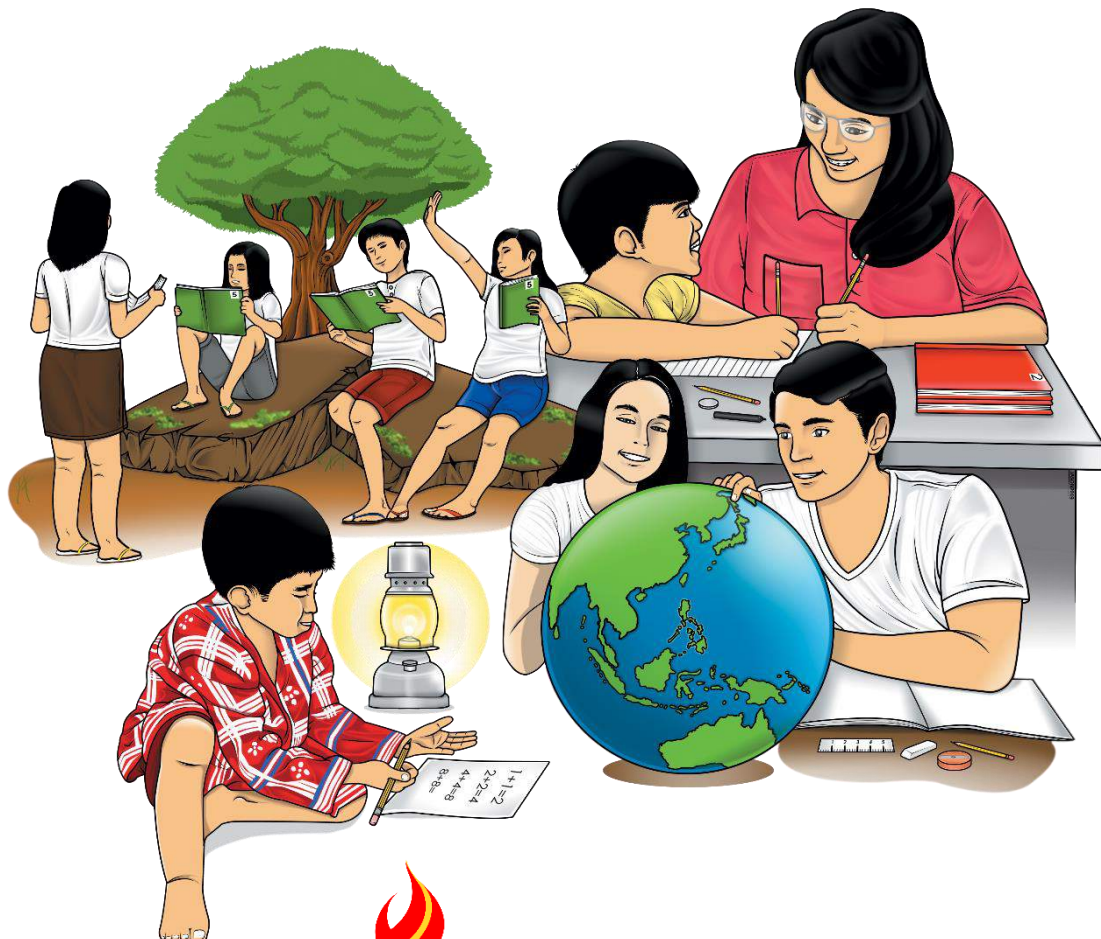
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# Mathematics

## Quarter 4 – Module 5: Problems Involving the Volume of a Rectangular Prism





**Mathematics – Grade 4**

**Alternative Delivery Mode**

**Quarter 4 – Module 5: Problems Involving the Volume of a Rectangular Prism**

**First Edition, 2020**

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Published by the Department of Education

Secretary: Leonor Magtolis Briones

Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by** \_\_\_\_\_

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# Mathematics

## Quarter 4 – Module 5: Problems Involving the Volume of a Rectangular Prism

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

Good day to you! From the previous module, you learned how to find the volume of a rectangular prism.

This time you will learn how to solve problems involving the volume of a rectangular prism in real life. Have fun!

After going through this module, you are expected to be able to solve routine and non-routine problems involving the volume of a rectangular prism.



## ***What I Know***

- A. Solve each problem by answering the following questions.  
Choose the letter of the correct answer.

Elvira wants to fill a rectangular container with chocolate. What is the volume of the rectangular container if it is 70 cm long, 40 cm wide and 10 cm tall?

1. What is asked in the problem?
  - a. The height of the container
  - b. The volume of each chocolate bar
  - c. The volume of the rectangular container
  - d. The number of chocolate bars needed to fill the container

2. What are the given facts in the problem?

- |  |  |
|--|--|
| a. Length = 70 cm<br>Width = 40 cm<br>Height = 10 cm | c. Length = 40 cm<br>Width = 70 cm<br>Height = 10 cm |
| b. Length = 10 cm<br>Width = 40 cm<br>Height = 70 cm | d. Length = 70 m<br>Width = 40 m<br>Height = 10 m    |

3. What is the formula to be used?

- a. Volume = Length  $\times$  Width  $\div$  Height
- b. Volume = Length + Width  $\times$  Height
- c. Volume = Length  $\times$  Width  $\times$  Height
- d. Volume = Length  $\times$  Width - Height

4. What is the number sentence?

- a. Volume = 70 m  $\times$  40 m  $\times$  10 m
- b. Volume = 70 cm  $\times$  40 cm  $\times$  10 cm
- c. Volume = 70 cm  $\times$  40 cm + 10 cm
- d. Volume = 70 cm + 40 cm  $\div$  10 cm

5. What is the final answer?

- a. The volume of the rectangular container is 2 800 cm<sup>3</sup>.
- b. The volume of each chocolate bar is 28 000 m<sup>3</sup>.
- c. The volume of the rectangular container is 28 000 cm<sup>3</sup>.
- d. The rectangular container needs 28 000 chocolate bars.

A glass block 10 cm long, 6 cm wide and 3 cm high is placed inside a 2 cm-thick box. Find the volume of the box.

6. What are you going to find out in the problem?

- a. The volume of the box
- b. The dimensions of the box
- c. The volume of the glass block
- d. None of the above

7. What could be an appropriate strategy to solve the problem?
- Draw an illustration.
  - Follow the 4-step Plan.
  - Guess and Check
  - Make a pattern.

8. Which solution is correct?

- $V = (10 \text{ cm} \times 6 \text{ cm} \times 3 \text{ cm}) + 2 \text{ cm}$   
 $V = 180 \text{ cm}^3 + 2 \text{ cm}$   
 $V = 182 \text{ cm}^3$
- $V = (10 \text{ cm} \times 6 \text{ cm} \times 3 \text{ cm}) \times 2 \text{ cm}$   
 $V = 180 \text{ cm}^3 \times 2 \text{ cm}$   
 $V = 360 \text{ cm}^3$
- $V = (10 \text{ cm} + 4 \text{ cm}) \times (6 \text{ cm} + 4 \text{ cm}) \times (3 \text{ cm} + 4 \text{ cm})$   
 $V = 14 \text{ cm} \times 10 \text{ cm} \times 7 \text{ cm}$   
 $V = 980 \text{ cm}^3$
- $V = (10 \text{ cm} + 6 \text{ cm} + 3 \text{ cm}) \times 2 \text{ cm}$   
 $V = 19 \text{ cm} \times 2 \text{ cm}$   
 $V = 38 \text{ cm}^3$

A. Read and solve.

9. A rectangular box has a length of 45 cm, a width of 25 cm and a height of 10 cm. Find the volume of the box.
10. A wooden plank is 360 cm long, 40 cm wide and 2 cm thick. Find the volume of the plank if its length is reduced by 240 cm.

To check, go to the **Answer Key**. If you got a score of 8 – 10, VERY GOOD! The lesson will be easy for you. If you got a score of 7 or below, study carefully the discussion and examples in this module.



## What's In

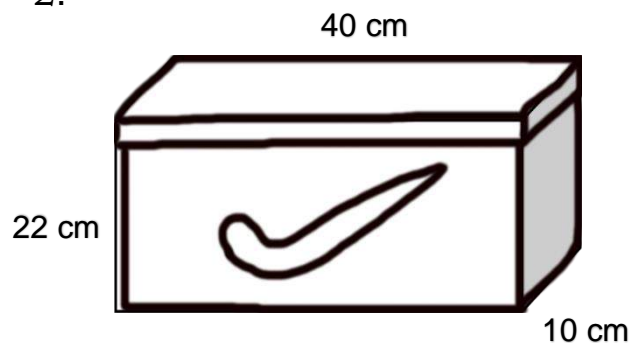
You can find the volume of a rectangular prism by using the formula  $V = L \times W \times H$ , where  $L$  = length,  $W$  = width, and  $H$  = height.

Find the volume of the following objects below.

1.



2.



Go to the **Answer Key**. If you got 2, Excellent!  
If you have any mistakes, it's OK, try to review your solutions.



## ***What's New***

*Do you bring snacks and lunch to school? Where do you put them? Are your snacks and lunch healthy?*

**Read the problem below.**



Chris helps his mother prepare his lunch for school. He puts them in a lunch box which is 20 cm long, 15 cm wide, and 10 cm tall. What is the volume of the lunch box?





## What Is It

The problem is an example of a routine problem. You encounter many situations of this kind in your daily life.

To solve the problem, use the 4-step Plan

### A. UNDERSTAND

1. Know **what is asked** in the problem.

*The volume of the lunch box*

2. Know the given facts.

*Length (L) = 20 cm   Width(W) = 15 cm   Height(H) = 10 cm*

### B. PLAN

1. Determine the **operation** or **formula** to be used.

*Multiplication:  $V = L \times W \times H$*

### C. SOLVE

Solve using the formula.

$$V = L \times W \times H$$

$$V = 20 \text{ cm} \times 15 \text{ cm} \times 10$$

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

Substitute 20 cm for L, 15 cm for W, and 10 cm for H then multiply.

$$20 \times 15 = 300$$

$$300 \times 10 = 3\,000$$

Don't forget to write the unit **cm<sup>3</sup>**.

### D. CHECK AND LOOK BACK

Check your answer.

State the final answer.

You can also use a calculator to check.

**The volume of the lunch box is 3 000 cm<sup>3</sup>**

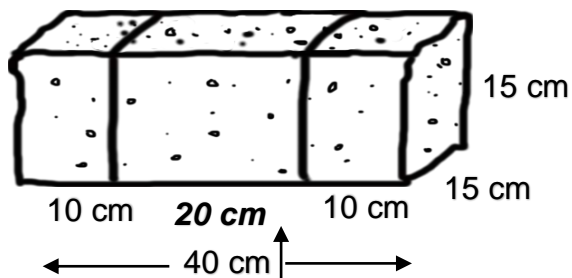
This is solving routine problems. How about solving non-routine problems? Let me show you an example.

Study this problem.

A loaf of banana bread 40 cm x 15 cm x 15 cm is cut into three slices, each in the shape of a rectangular prism. The end slices are each 10 cm x 15 cm x 15 cm. What is the volume of the middle slice?

An illustration would help solve this problem.

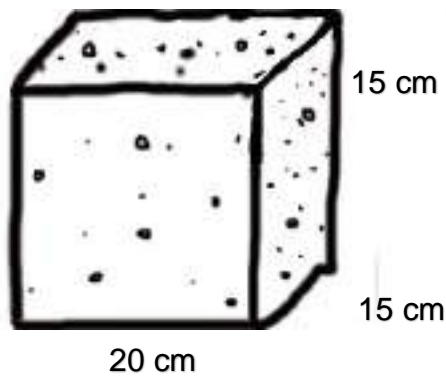
Find the dimensions of the middle slice.



Non-routine problem solving develops your reasoning power. You may use any of these strategies: Listing, Creating a Table, Guess and Check, Drawing, Making Diagrams, Finding Patterns, etc.

The length of the middle slice is 20 cm since  $(40 - (10 + 10)) = 20$ .  
The width and height are just the same.  
 $40 - (10 + 10) = 20$

Thus, the middle slice has these dimensions:



Solving for the volume of the middle slice,

$$\begin{aligned} V &= L \times W \times H \\ &= 20 \text{ cm} \times 15 \text{ cm} \times 15 \text{ cm} \\ &= 4\,500 \text{ cm}^3 \end{aligned}$$

**So, the volume of the middle slice is 4 500 cm<sup>3</sup>**

You just learned how to solve non-routine problems.  
You are now ready for the activities. LET'S GO!



## ***What's More***

### **Activity 1**

A rectangular swimming pool 8 m long, 5 m wide and 2 m deep is to be filled with water. How much water is needed to completely fill the swimming pool?

Fill in the blanks.

1. What is asked?

***The volume of water needed*** \_\_\_\_\_.

2. What are the given facts?

***L = 8 m, W = 5 m,*** \_\_\_\_\_

3. What is the operation or formula to be used?

***V =*** \_\_\_ ***x*** ***W*** ***x*** \_\_\_

4. Show your solutions.

***V = 8 m x 5 m x 2 m***

***V =*** \_\_\_\_\_ ***m***<sup>3</sup>

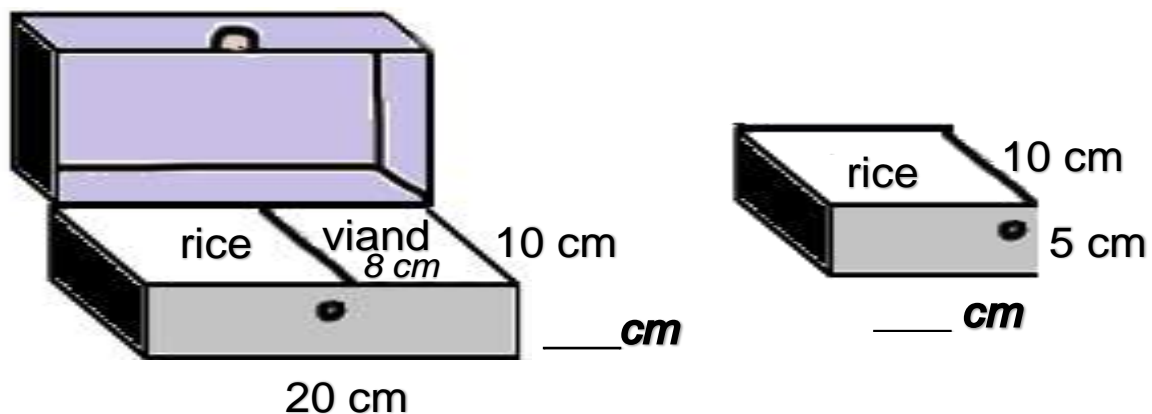
5. What is the final answer?

\_\_\_\_\_ ***is needed to completely fill the swimming pool.***

## Activity 2

Solve the problem. Complete the illustration and solutions by filling in the blanks.

A lunch box 20 cm long, 10 cm wide and 5 cm tall is divided into two parts: one part for viand and one part for rice. If the part for viand is 8 cm x 10 cm x 5 cm, what is the volume of the part for rice?



Solutions:

Length = 12 cm

Width = 10 cm

Height = \_\_\_\_

$V_{\text{part for rice}} = L \times W \times H$

$V = 12 \text{ cm} \times 10 \text{ cm} \times 5 \text{ cm}$

$V = 600$  \_\_\_\_

The total length of the lunch box is 20 cm. By taking away 8 cm (the length of the compartment for the viand), we get the length of the part for the rice, which is 12 cm.

Answer: The volume of the part for \_\_\_\_.

Illustration/Solutions:

### Activity 3

Read and understand each problem. Write the equation and the final answer on your answer sheet. The first one is done for you.

1. Victor made a rectangular prism out of used cardboards for his project. If the prism is 6 cm long, 25 cm tall, and 5 cm wide, find the volume of the rectangular prism.

Equation:  **$V = 6 \text{ cm} \times 5 \text{ cm} \times 25 \text{ cm}$**

Final answer: **The volume of the rectangular prism is 750  $\text{cm}^3$ .**

2. How much water would fill up a concrete fish pond which is 5 m long, 4 m wide and 2 m deep?

Equation: \_\_\_\_\_

Final Answer: \_\_\_\_\_

3. If a dictionary measures 20 cm long, 27 cm wide and 6 cm thick, what is its volume?

Equation: \_\_\_\_\_

Final Answer: \_\_\_\_\_

4. A rectangular pan measuring 31 cm x 25 cm x 6 cm is half-filled with chiffon cake mixture. How much chiffon cake mixture is in the pan?

Equation: \_\_\_\_\_

Final Answer: \_\_\_\_\_

Go to the **Answer Key**. If you got most of the answers, WOW! That's great! If not, go back and review the lesson before proceeding.



## ***What I Have Learned***

How do you solve routine and non-routine word problems involving the volume of a rectangular prism?

To solve routine problems involving the volume of a rectangular prism, you may follow these steps:

### **UNDERSTAND**

- Know what is asked.
- Know the given facts.

### **PLAN**

- Determine the operation or formula to use.

### **SOLVE**

- Substitute the correct values in the formula.

### **CHECK AND LOOK BACK**

- Write the correct answer.

Non-routine problems can be solved using different strategies such as drawing a picture, guess and check, making a pattern, using number line, and/or making a table.



## ***What I Can Do***

A. Solve each problem. Answer the following questions.

1. Mother and I prepared a fruit salad for a weekend family gathering. If the fruit salad completely filled a rectangular container that was 40 cm long, 25 cm wide and 10 cm high, how much fruit salad was there?

- a. What is asked? \_\_\_\_\_
- b. What are given? \_\_\_\_\_
- c. What is the formula to be used? \_\_\_\_\_
- d. What is the solution? \_\_\_\_\_
- e. State the final answer. \_\_\_\_\_

2. Steven helps his father in making a wooden cabinet with three identical drawers. Each drawer is 50 cm long, 30 cm wide and 15 cm high. What is the total volume of the three drawers?

- a. What is asked? \_\_\_\_\_
- b. What is the solution? \_\_\_\_\_
- c. State the final answer. \_\_\_\_\_



B. Read and solve each problem.  
Show your solutions/illustrations.

1. Jennifer bakes a three-layered rectangular cake. The first layer measures 50 cm long, 25 cm wide and 5 cm high. The second is 10 cm shorter than the first. The third is 10 cm shorter than the second. Each layer has the same width and height. What is the volume of the third layer of the cake?



2. The edge of a Rubik's cube is 5 cm long. What is the total volume of three of these Rubik's cubes placed side by side?



Go to the **Answer Key**. Check your answers before you proceed to the next activity.



## Assessment

Read, analyze, then solve each problem. Answer each question.

- A. A bowl of mango jelly was poured into a 14 cm x 8 cm x 3 cm rectangular container. If the mango jelly completely filled the container, how much mango jelly was there?

1. *What is asked in the problem?* \_\_\_\_\_

2. *Show your solutions.* \_\_\_\_\_

3. *State the final answer.* \_\_\_\_\_

- B. Ana is cleaning a box which is 6 dm long, 4 dm wide and 15 dm tall. What is the volume of the box?

4. *What is asked in the problem?* \_\_\_\_\_

5. *What are given?* \_\_\_\_\_

6. *State the final answer.* \_\_\_\_\_

- C. Wenalyn baked a cassava cake which measures 18 cm x 10 cm x 4 cm. She wants to share the cake with her two classmates so she cuts it into three parts all of the same sizes. How much cassava cake will each of her classmates receive?

7. *Show your solutions or illustration.*

8. *What is the final answer?* \_\_\_\_\_

- D. A ream of bond paper is 28 cm long, 22 cm wide and 4 cm thick. It contains 500 sheets. If 250 sheets were removed from the ream of bond paper, what is the volume of the remaining sheets?

9. *Write the equation.* \_\_\_\_\_

10. *What is the final answer?* \_\_\_\_\_

Please check your answers in the ANSWER KEY.



## ***Additional Activities***

Solve the following problems.

1. How much water is needed to completely fill a fish pond that is 10 m long, 8 m wide and 1 m deep?
2. Nenita found a 60 cm x 30 cm x 12 cm rectangular plastic container in her backyard. How much garden soil would she need if she wanted to fill it to the brim?
3. Find the volume of a container van that is 8 m long, 4 m wide and 3 m high.
4. Aling Choling sells bangus in the market. She stores them in an ice box. What is the volume of the ice box if it is 10 dm long, 8 dm wide and 7 dm deep?
5. An android tablet measures 20 cm long, 15 cm wide and 2 cm thick. It is placed inside a rectangular box that is 1 cm thick on all sides. What is the volume of the box?

To check, go to the ***Answer Key***. Congratulations for reaching this part of the module. You can always review the previous pages of this module if you need to.



## Answer Key

Answer: The total volume of the three Rubik's cube placed side by side is 375 cm<sup>3</sup>.

$$V = 15 \text{ cm} \times 5 \text{ cm} \times 5 \text{ cm OR}$$

$$V = (5 \text{ cm} \times 5 \text{ cm} \times 5 \text{ cm}) \times 3$$

$$V = 375 \text{ cm}^3$$

Solutions:

Length = 12 cm  
Width = 10 cm  
Height = 5 cm

$V_{\text{part for rice}} = L \times W \times H$   
 $V = 12 \text{ cm} \times 10 \text{ cm} \times 5 \text{ cm}$   
 $V = 600 \text{ cm}^3$

The total length of the lunch box is 20 cm. By taking away 8 cm (the length of the compartment for the viand), we get the length of the part for the rice, which is 12 cm.

Answer: The volume of the part for rice is 600 cm<sup>3</sup>.

2.

Activity 2:

1. The volume of water needed to completely fill the swimming pool.
2.  $L = 8 \text{ m}$     $W = 5 \text{ m}$     $H = 2 \text{ m}$
3.  $V = L \times W \times H$
4.  $V = 80 \text{ m}^3$
5. **80 m<sup>3</sup> of water** is needed to completely fill the swimming pool.

Activity 1:

### What's More

1. 7 200 cm<sup>3</sup>
2. 8 800 cm<sup>3</sup>

### What's In

1. c
2. a
3. c
4. b
5. c
6. c
7. a
8. c
9. 11 250 cm<sup>3</sup>
10. 9 600 cm<sup>3</sup> (The length is decreased by 240 cm.)

### What I Know

## Activity 3:

2. Equation:  $V = 5 \text{ m} \times 4 \text{ m} \times 2 \text{ m}$

Final Answer:  $40 \text{ m}^3$  of water can fill the

concrete fish pond.

3. Equation:  $V = 20 \text{ cm} \times 27 \text{ cm} \times 6 \text{ cm}$

Final Answer: The dictionary is  $3\,240 \text{ cm}^3$ .

4. Equation:  $V = 31 \text{ cm} \times 25 \text{ cm} \times 3 \text{ cm}$

(half-filled)

Final Answer: The pan was filled with  $2\,325$

$\text{cm}^3$  chiffon cake mixture.

## What I Can Do

A. 1. a. The volume of fruit salad.

b.  $L = 40 \text{ cm}$

$W = 25 \text{ cm}$

$H = 10 \text{ cm}$

c.  $V = L \times W \times H$

d.  $V = L \times W \times H$

$V = 40 \text{ cm} \times 25 \text{ cm} \times 10 \text{ cm}$

$V = 10\,000 \text{ cm}^3$

e. There was  $10\,000 \text{ cm}^3$  of fruit salad in

the container

2. a. The total volume of the three drawers.

b.  $V = (50 \text{ cm} \times 30 \text{ cm} \times 15 \text{ cm}) \times 3$

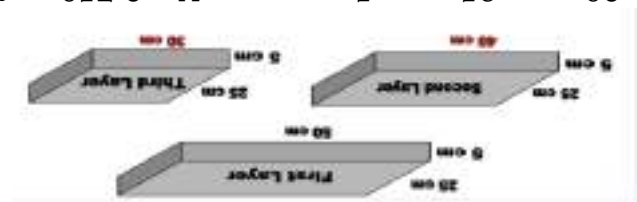
$V = 22\,500 \text{ cm}^3 \times 3$

$V = 67\,500 \text{ cm}^3$

c. The total volume of the three drawers is

$67\,500 \text{ cm}^3$ .

B. 1.



$V = 30 \text{ cm} \times 25 \text{ cm} \times 5 \text{ cm}$

$V = 3\,750 \text{ cm}^3$

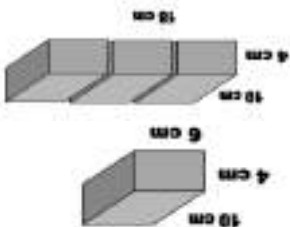
Answer: The volume of the third layer of the

cake is  $3\,750 \text{ cm}^3$ .



## Assessment

- The volume of the mango jelly.
- $V = L \times W \times H$
- $V = 14 \text{ cm} \times 8 \text{ cm} \times 3 \text{ cm}$
- $V = 336 \text{ cm}^3$
- There was  $336 \text{ cm}^3$  mango jelly.
- The volume of the box.
- $L = 6 \text{ dm}$   $W = 4 \text{ dm}$
- $H = 15 \text{ dm}$
- The volume of the box is  $360 \text{ dm}^3$ .



$V = L \times W \times H$

$V = 6 \text{ cm} \times 10 \text{ cm} \times 4 \text{ cm}$

$V = 240 \text{ cm}^3$

8. Each of her classmate

will receive  $240 \text{ cm}^3$

cassava cake.

9.  $V = 28 \text{ cm} \times 22 \text{ cm} \times 2$

$\text{cm}$  ( $250$  is  $\frac{1}{2}$  of  $500$ ,  $\frac{1}{2}$  of

$4 \text{ cm}$  is  $2 \text{ cm}$ )

10. The volume of the

remaining sheets is

$1232 \text{ cm}^3$ .

## Additional Activities

- $80 \text{ m}^3$
- $21\,600 \text{ cm}^3$
- $96 \text{ m}^3$
- $560 \text{ dm}^3$
- $1\,496 \text{ m}^3$  ( $2 \text{ cm}$  will be added to each dimension)

## ***References***

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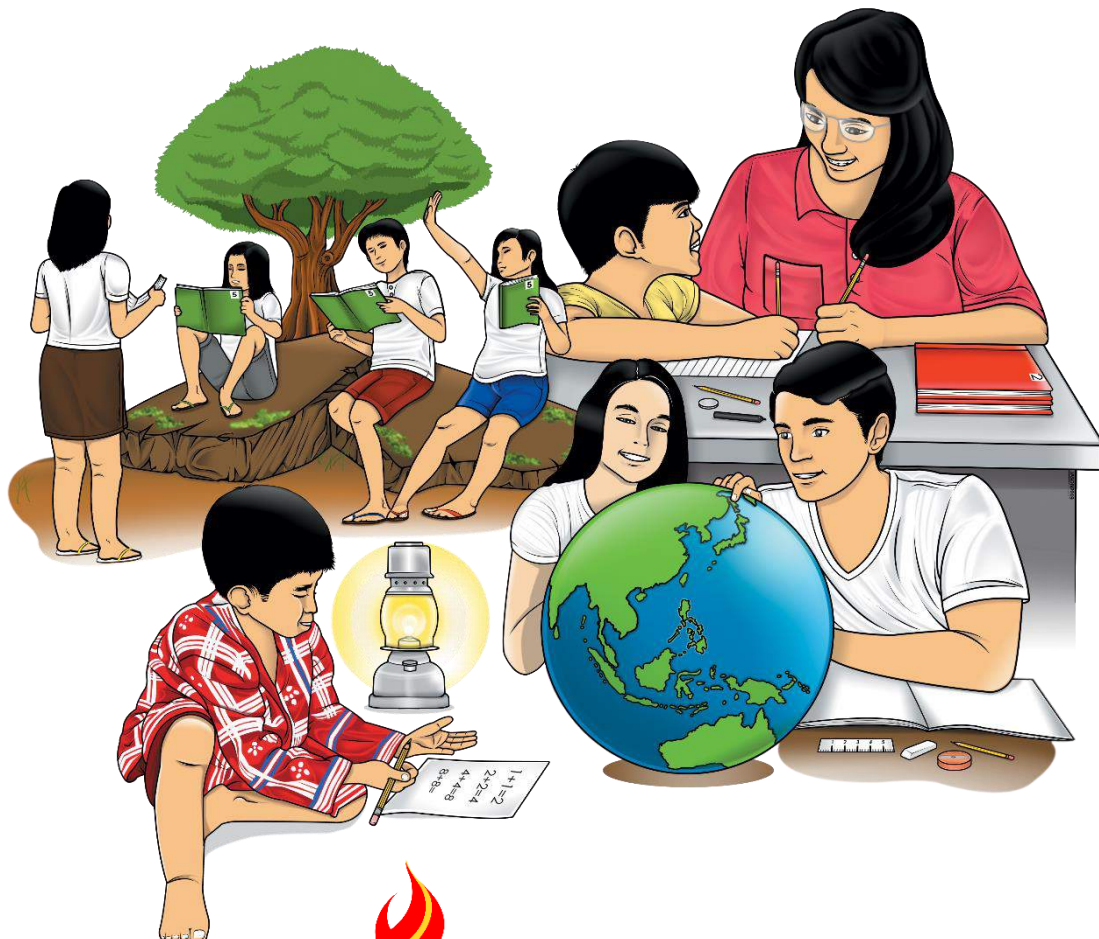
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# Mathematics

## Quarter 4 – Module 6: Collecting and Organizing Data using Tables and Bar Graphs





**Mathematics – Grade 4****Alternative Delivery Mode****Quarter 4 – Module 6: Collecting and Organizing Data using Tables and Bar Graphs**  
**First Edition, 2020**

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Published by the Department of Education

Secretary: Leonor Magtolis Briones

Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by** \_\_\_\_\_

**Department of Education – Region V**

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# Mathematics

## Quarter 4 – Module 6: Collecting and Organizing Data using Tables and Bar Graphs

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

There are different reasons why we collect data. Some possible reasons are to gather information, to capture evidence, to draw inferences, or to provide answers to relevant questions.

In this module, you will learn how data are collected. You will know some useful terms about data collection and organization.

At the end of this module, you should be able to collect data on two variables using any source.



## ***What I Know***

Use the following information to create a table. Place tally marks. Count the tally marks and place the counts as frequencies. Use the table to answer the questions that follow.

Ms. Catherine surveyed his Grade 4 class to see what their favorite subjects are. The results are as follows.

Math	Filipino	Math	Filipino	Math	Science
Filipino	Math	Filipino	Science	Filipino	Filipino
English	Filipino	Science	Filipino	Math	Filipino
Science	English	Filipino	English	Filipino	Araling Panlipunan
Others	Filipino	English	Filipino	Araling Panlipunan	Filipino

1 to 5: Complete the table.

Subjects	Tally marks	Frequency
Mathematics		
Science		
Filipino		
English		
Araling Panlipunan		

6. What is the table about?
7. What are the top 3 favorite subjects?
8. Which is the most favorite subject?
9. Which subject has the lowest frequency?
10. How many students were surveyed?

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

**Lesson****1****Collecting Data*****What's In***

The given data show the fourth quarterly test scores of 15 female students in Filipino.

21	18	23	25	19	26	13	18
23	22	19	16	18	27	17	

Arrange the test scores from greatest to least. Answer the following questions.

1. What is the highest score in the Filipino fourth quarterly test?
2. What is the lowest score?
3. Are there repeated scores? How many times?
4. What is the difference between the highest and the lowest scores?
5. What is the total score of the 15 female students in the Filipino fourth quarterly test?

Are you done answering?

If yes, time to check. Please go to the ***Answer Key***.

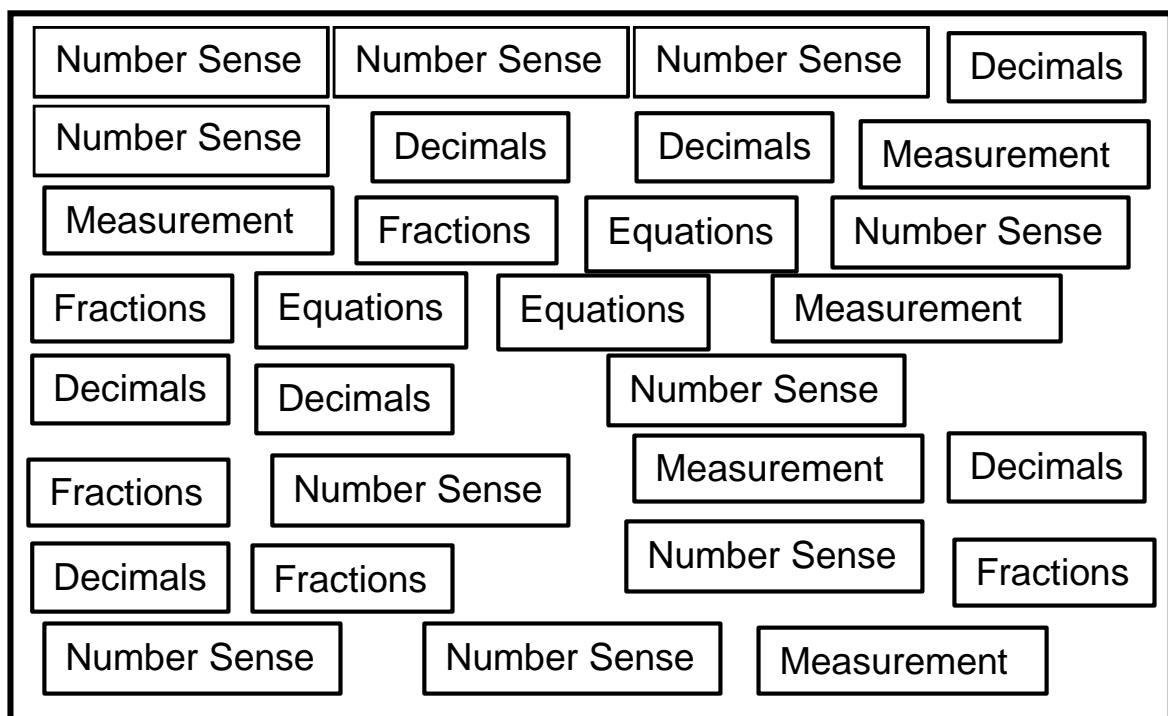


## What's New

Let's begin our lesson with the story problem below.

Mrs. Deramas surveyed 30 pupils to know their favorite concepts in Math. She let them choose among Number Sense, Fractions, Decimals, Measurement, and Equations. The students wrote their answers on pieces of papers and pasted them on the board.

Here are the results of her survey.



What data or information were collected in this survey?

How many students were surveyed?

What would be a good title for this survey?

What is the most favorite concept of Mrs. Deramas' learners in Mathematics?

How can we arrange the data to see the most favorite concept?



## ***What is It***

Data can be collected in many ways and for different reasons. A method to collect data is to make a survey or to conduct an interview.

**Data** can be defined as a collection of gathered information. They include characteristics that can be observed or measured. We call these characteristics or quantities **variables** or **data items**. A variable can have different categories or values. Favorite concept in Math is an example of a variable. The different categories are Number Sense, Fractions, Decimals, Measurements, and Equations.

A **survey** is a way of collecting data by asking people questions either through questionnaires or interviews.

An **interview** is a conversation between individuals to collect relevant information.

Data should be properly recorded.

We use **tally marks** and **frequency chart** to record the results of a survey.

These are the steps to record data on a frequency chart.

- Draw a table with three columns.
- Label the first column with the topic of your survey, the second column with tally marks, and the third column with frequency.
- Place tally marks and count them.

Write the total number of tally marks as the frequency for a category.



Here is the table for the collected data in the story problem. It is called frequency chart or frequency table.

Concept in Math 4	Tally Marks	Frequency
Number Sense		10
Fractions		5
Decimals		7
Measurement		5
Equations		3

- The total number of **tally marks** in each category represents the **frequency**. A frequency is how often a particular response occurred.

From this table, we can say the following:

- Mrs. Deramas was able to ask 30 pupils about their favorite concept in Mathematics.
- *Number Sense* is the most favorite concept of her pupils. The least liked concept in Mathematics of her pupils is Equations.
- *Fractions* and *Measurement* have the same frequency. The same number of pupils chose *Fractions* and *Measurement* as their favorite concepts in Mathematics.

Let's have another example.

Arnold recorded his 20 quiz scores in Math 4. The scores are as follows.

23	22	21	21	20	19	23	24	19	24
22	20	23	23	23	22	20	23	20	22

Let's make a table of tallies and frequencies for these data.

Arnold's 20 Quiz Scores in Math 4

Scores	Tally Marks	Frequency
24	II	2
23	I	6
22		4
21	II	2
20		4
19	II	2

What is Arnold's highest score in these 20 quizzes?

What is his lowest score?

What is the most repeated score?

Refer to the frequency chart.

- 24 is Arnold's highest score and 19 is his lowest score.
- 23 is the most repeated score.



### ***What's More***

Read and understand the problem.

Mark conducted a survey among his classmates to know how they get to school from home. The results are as follows:

walking	bicycle	tricycle
walking	tricycle	bicycle
bicycle	Jeepney	walking
tricycle	jeepney	tricycle
walking	jeepney	jeepney
walking	walking	walking

Make a tally of the responses in the survey. Complete the frequency chart below. Answer the questions that follow.

Means of going to school from home	Tally	Frequency
walking		
bicycle		
tricycle		
jeepney		

1. How many of his classmates answered the survey?
2. What is the most common means of going to school from home?
3. How many of his classmates go to school from home other than walking?

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



## ***What I Have Learned***

How do we collect data?

- Conducting a survey or an interview by asking questions.

How do we record data?

- Using tally marks and frequency table to record the results of a survey.



## ***What I Can Do***

Make a frequency table for the given data.

1. The initial letters of the surnames of 18 students.

B	J	A	D	B	D	D	F	E
A	C	H	C	D	A	B	D	F

2. The favorite colors of a Grade 4 class.

red	yellow	blue	pink	white	red	orange
orange	red	red	white	blue	yellow	pink
pink	yellow	green	green	blue	red	orange

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



## Assessment

Do the following.

A. The weights in kilograms of 25 pupils are as follows:

30	25	23	24	30
26	22	25	23	22
25	26	27	25	22
24	21	20	22	23
25	26	32	27	26

Prepare tally marks and make a frequency table for the given data. (5 points)

B. Karen conducted a survey among her friends about their favorite fruits.

Here are the results of her survey.

Fruit	Tally	Frequency
Avocado	IIII III	8
Banana	IIII IIII	10
Santol	IIII	5
Apple	IIII IIII	9
Pineapple	IIII I	6

6. What information did she survey?
7. How many of her friends answered the survey?
8. How many consider apple as their favorite? How about pineapples?
9. Which fruit is the most favorite? The least favorite?
10. How many of them did not indicate that banana is their favorite fruit?

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next lesson.

If your score is below 8, kindly study again the lesson and the activities.



### ***Additional Activities***

Conduct an interview among your family members about their favorite food. Organize the data using a frequency table. Create three questions based on the table.



## ***What I Need to Know***

Data are presented in different ways. You have learned about pictographs which present data using icons or pictures.

In this module, you will learn another way of organizing data. You will present frequencies of categories using vertical or horizontal bars. We call this a bar graph.

At the end of this module, you should be able to organize data in tabular form. You should be able to present data in a single horizontal or vertical bar graph.



## ***What I Know***

Read each situation carefully and do what is asked.

- A. The Grade 4 pupils were tasked to plant different vegetables in their garden for 5 days to promote the school's *Gulayan sa Paaralan* project. On the first day, they planted 15 eggplants, on the second day, they planted 17 *okras*, on the third day, they planted 25 string beans, on the fourth day, they planted 15 tomatoes, and on the last day, they planted 20 *pechay* seedlings.

Organize the data in a frequency table and make a vertical bar graph.

- B. Aling Martha is a certified *plantita*. She grows different kinds of ornamental plants in her yard. Here is the list of some ornamental plants in her yard.

Make a horizontal bar graph using the information in the table.

Ornamental Plants	Number of Ornamental Plants
Fortune plant	10
Red Palm	8
Snake plant	16
Caladium	8
Adenium	12

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

## Lesson 2

# Organizing Data using Single Bar Graphs



### *What's In*

Read and understand the situation carefully and do what is asked.

Mrs. Deramas conducted a survey in her class to know the favorite flowers of her pupils. She asked her 54 pupils and she made a tally to record the flowers they like.

Below are the results of her survey.

Flowers	Tallies
Rose	llll
Sampaguita	<del>lll</del> <del>llll</del> ll
Gumamela	<del>lll</del> lll
Santal	<del>lll</del> <del>llll</del> llll
Adelfa	<del>lll</del> l
Daisy	<del>lll</del> <del>llll</del>

Make a frequency chart. Answer the questions that follow.

1. How many pupils answered the survey?
2. Which is the most favorite flower?
3. Which flower is least liked by the pupils?

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.





## ***What's New***

Let us study this example.

The boxes below show the names and scores of the top six students in Grade IV - Unity in a 40-item Science 4<sup>th</sup> Quarterly Test. Mrs. Pura wants to organize their scores in a way that she can easily know who got the highest or the lowest score or what is the lowest or the highest score.

Name: Rizza Score: 30	Name: Edna Score: 28	Name: John Score: 25
Name: Robin Score: 40	Name: Jay-R Score: 20	Name: Andy Score: 35

How will she organize the given data?



## ***What is It***

Analyzing the data is easier if they are properly organized.

The given data can be organized using a table as shown below.

<b>Name of Student</b>	<b>Score</b>
Rizza	30
Robin	40
Edna	28
Jay-R	20
John	25
Andy	35

- A **table** is a systematic arrangement of data presented in rows and columns.

Another way of presenting data is by a bar graph. In this lesson, we focus on single bar graph.

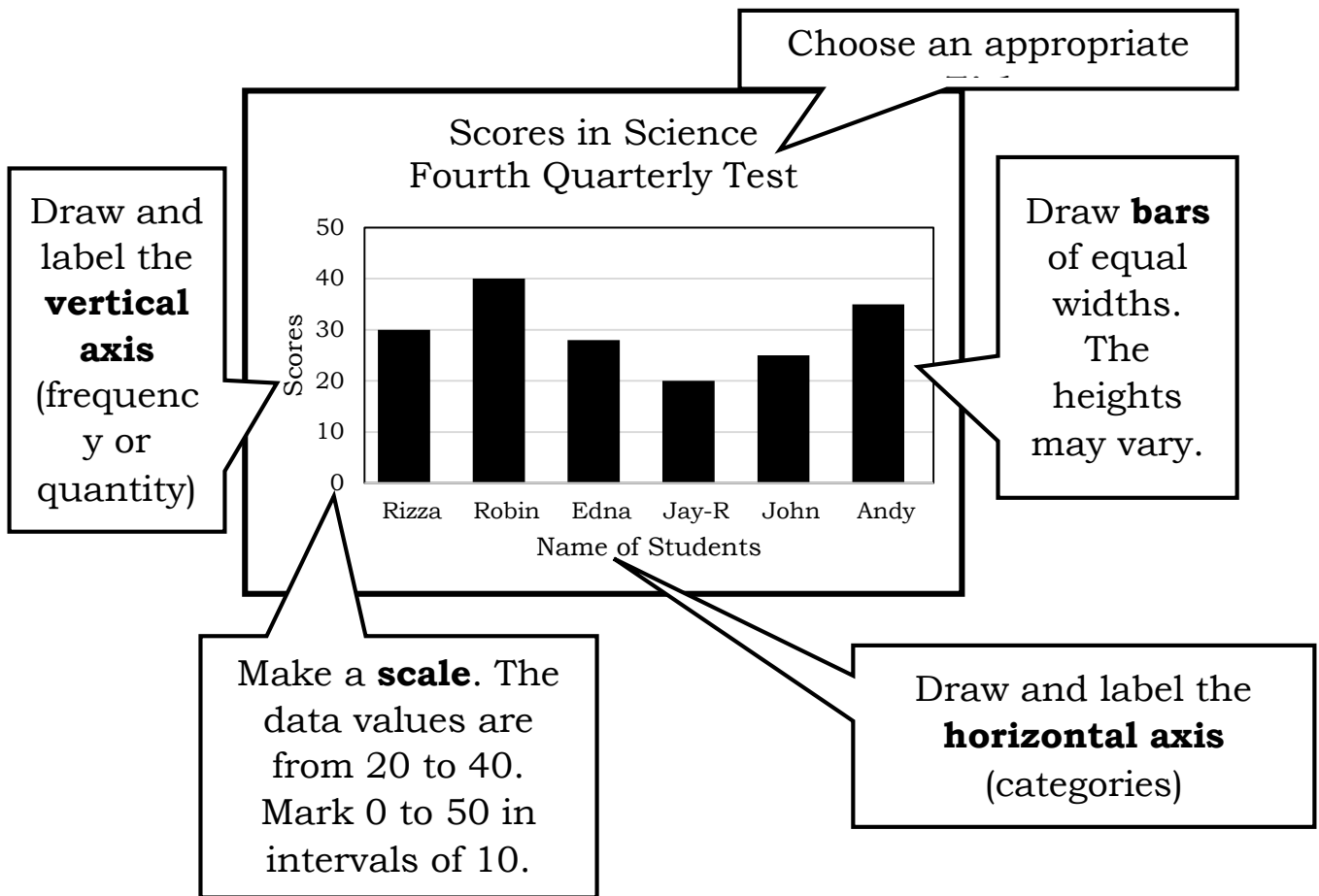
- A **bar graph** is also known as **bar chart** or **bar diagram**. This graph presents data using rectangular bars. The heights or lengths of the bars are proportional to the frequencies or quantities they represent. These bars are of equal width and are separated from one another.
- A bar graph can be plotted vertically or horizontally.
- A **single bar graph** is used to present data involving only one variable in several categories. It is used to compare frequencies or quantities of categories in one set of data.

How do we construct a bar graph?

### **Steps in making a bar graph.**

1. Draw and label the horizontal and vertical axes.
2. Identify the greatest number.
3. Make a scale from 0 to the greatest number.
4. Draw bars of equal width to represent categories of the data.  
The heights or lengths of the bars vary depending on the frequencies or quantities.
5. Write a title for the graph.

This is how we present the data in a **Vertical Bar Graph**.

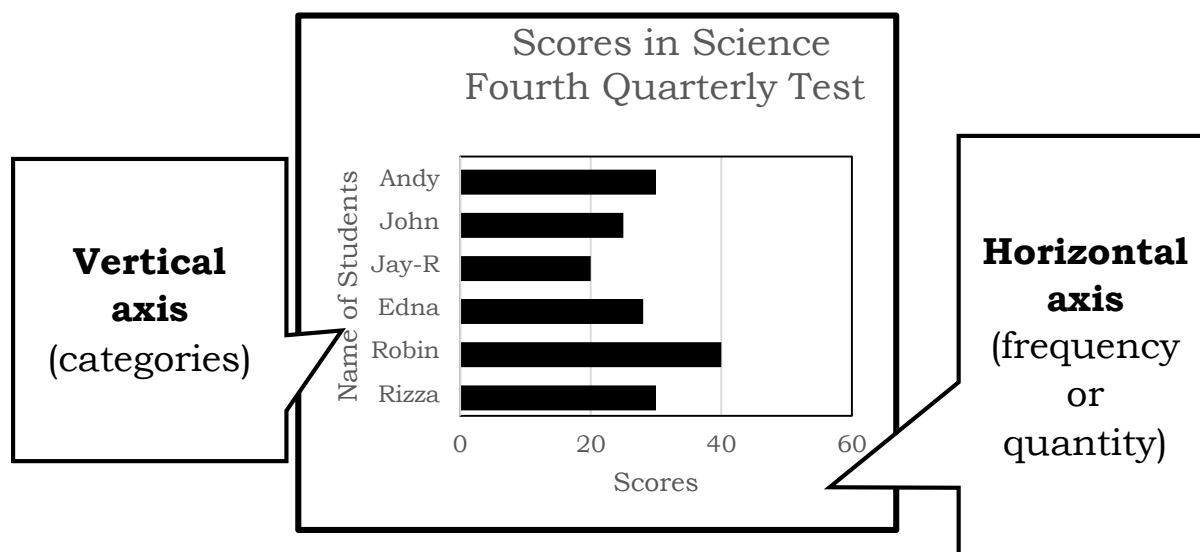


What information can you see in the vertical bar graph?

- The graph is about the 4<sup>th</sup> quarterly test scores in Science.
- The bar graph shows that Robin got a score of 40 which is the highest. Rizza scored 30, Andy scored 35, John scored 25, and Edna scored 28. Jay-R got a score of 20, which is the lowest among the six.
- The names of the students are listed in the horizontal axis while the scores are placed in the vertical axis.
- The range of scores is from 0 to 40. The scale used in the vertical axis is in intervals of 10.

Note that in a vertical bar graph, categories are listed in the **horizontal axis** while in the **vertical axis** are **frequencies or quantities**.

Bar graphs can also be constructed horizontally. We can also present data using the **horizontal bar graph**.

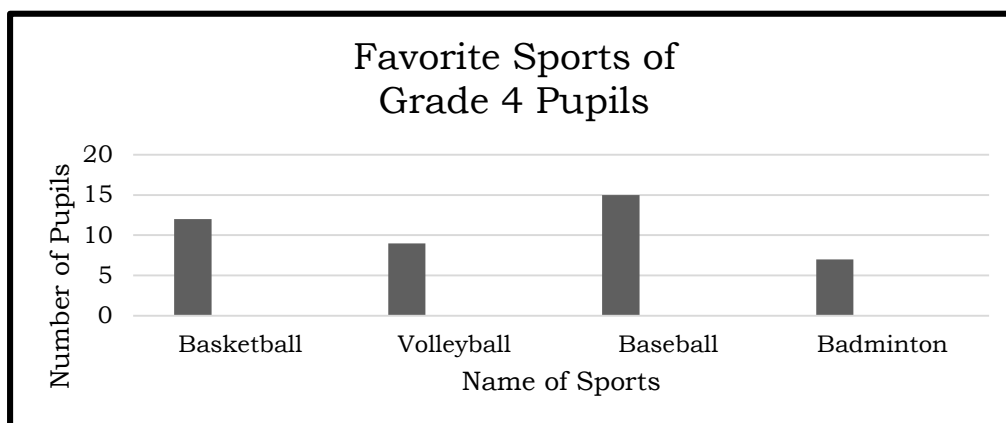


In a horizontal bar graph, categories are listed in the **vertical axis** while in the **horizontal axis** are **frequencies or quantities**.

Let's have another example:

Mr. Diaz, the Grade 4 MAPEH Teacher, conducted a survey among his pupils on their favorite sports. The table shows the results of the survey. Let's make a vertical bar graph for the given data.

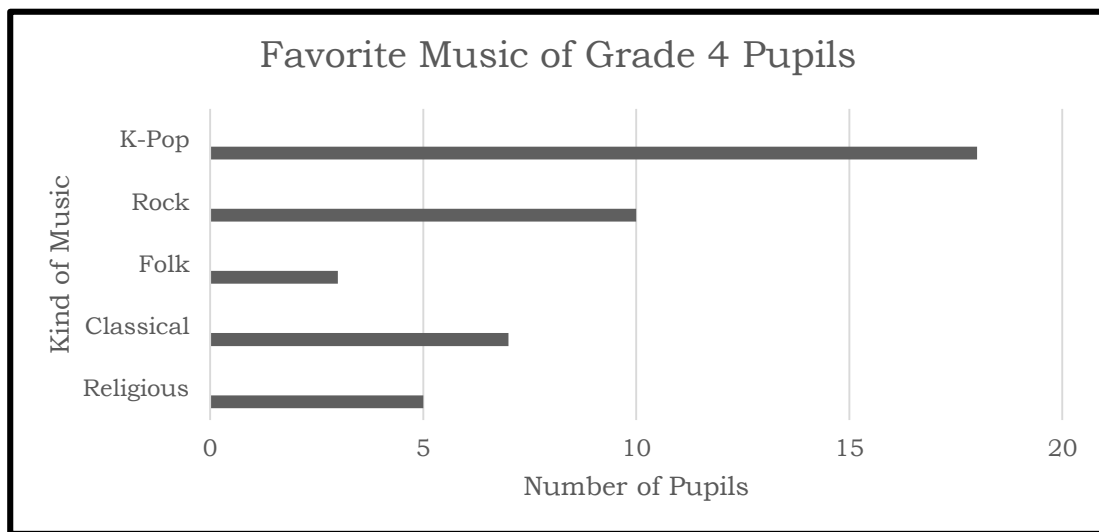
Sports	Number of Pupils
Basketball	12
Volleyball	9
Baseball	15
Badminton	7



- The vertical bar graph is about the Favorite Sports of Grade 4 pupils.
- There are 43 pupils who answered the survey.
- The most liked sport is baseball, and the least liked is badminton.

On the same class, he also asked the pupils of their favorite music. The table shows the results of his survey. Let's make a horizontal bar graph for the given data.

Favorite Music	Number of Pupils
Religious	5
Classical	7
Folk	3
Rock	10
K-Pop	18



- The horizontal bar graph is about the Favorite Music of Grade 4 pupils.
- There are 18 pupils who like K-Pop Music, 10 like Rock, 5 like Religious, 7 like Classical and 3 like Folk Music.

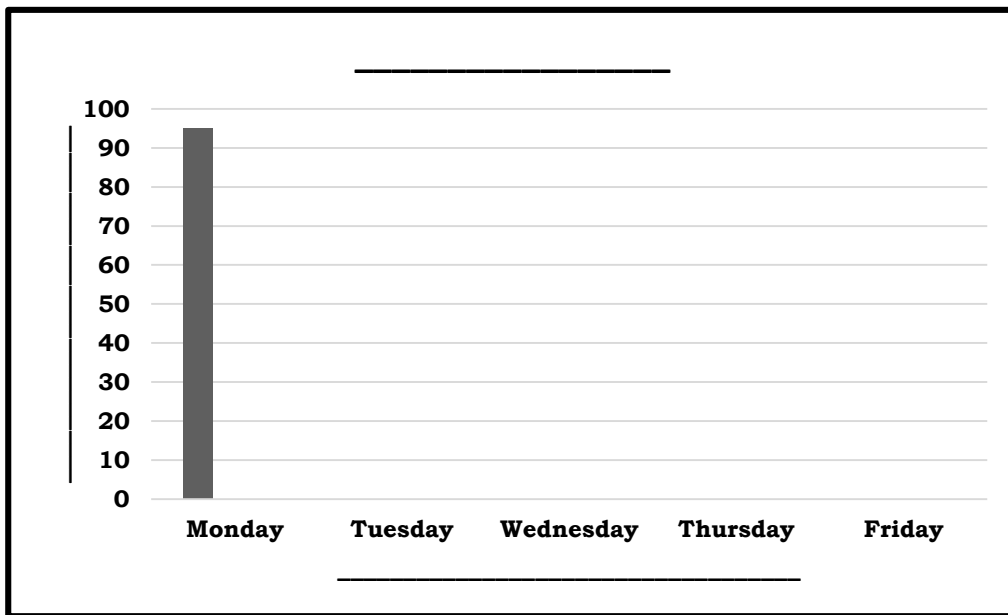


### ***What's More***

Use the given data to complete the vertical/horizontal bar graph.

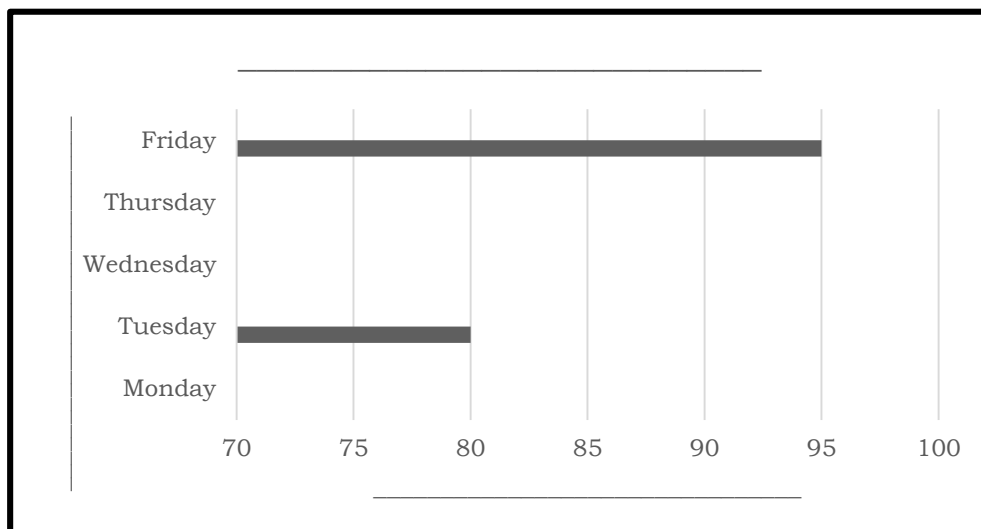
**Pupils Buying Lunch in the Canteen**

Day	Number of Pupils
Monday	95
Tuesday	80
Wednesday	105
Thursday	90
Friday	65



Pupils Bringing Packed Lunch

Day	Number of Pupils
Monday	65
Tuesday	80
Wednesday	55
Thursday	70
Friday	95



Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



## ***What I Have Learned***

How do we organize or present data//information?

- To organize data or information, we make use of table and bar graph.

A **table** is a systematic arrangement of data presented in rows and columns.

A **bar graph**, also known as bar chart or bar diagram, presents data using rectangular bars. The heights or lengths of the bars are proportional to the frequencies or quantities they represent. It can be plotted vertically or horizontally.

A **single bar graph** is used to present data involving only one variable in several categories.

A **horizontal or vertical bar graph** includes two axes, the horizontal axis and the vertical axis with labels, title, and scale.

- In a **horizontal bar graph**, categories are listed in the **vertical axis** while the **horizontal axis** shows the frequencies or quantities.
- In a **vertical bar graph**, the **vertical axis** shows the frequencies-or quantities while the categories are listed in the **horizontal axis**.



## ***What I Can Do***

Use the given data in the table.

Make a vertical bar graph to present the weekly planned budget.

Construct a horizontal bar graph for the weekly actual budget.



### Weekly Budget

Items	Planned	Actual
Food	Php 800	Php 750
Transportation	Php 400	Php 350
Housing/Utilities	Php 800	Php 750
Entertainment	Php 200	Php 200
Savings	Php 100	Php 250

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



### **Assessment**

- A. There are 100 kid - respondents in a survey about the activities they commonly do at home. The table shows the results of the survey. Construct a vertical bar graph using the given information.

#### Kids' Activity at Home

Activities	Number of Kids
Play Indoor	25
Read Books	15
Play board games	23
Do household chores	17
Watch TV	20

- B. The table below shows Kids' Toys. Construct a horizontal bar graph using the data.

Toys	Number of Kids
Art supplies	25
Puzzles	18
Stuffed animals	27
Musical Instruments	9
Balls	14

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next lesson.

If your score is below 8, kindly study again the lesson and the activities.



### ***Additional Activities***

Study the table below then construct a single horizontal or vertical graph. Make at least two or three questions about the graph.

Kids' Favorite Food

Foods	Number of Kids
Spaghetti	19
French Fries	15
Pizza	21
Burger	23
Ice cream	20
Cheese	16

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



## ***What I Need to Know***

In the previous module, data were presented in a single bar graph. We use a single bar graph to present categories and frequencies of only one variable or data item. In this lesson, we will present data with more than one variable using double bar graphs.

At the end of this module, you should be able to organize data in tabular form and present them in a double horizontal or vertical bar graph.



## ***What I Know***

Read and understand the given situation. Do what is asked.

A School Nurse conducted a survey to know the kind of masks the teachers are using. The table shows the results of the survey. Construct a double vertical or a horizontal bar graph using the given data.

<b>Masks Used by Teachers</b>				
Teachers/Masks	Surgical	N95	Copper mask	Cloth
Male	23	15	6	9
Female	20	17	4	5

Are you done answering?

If yes, time to check. Please go for the ***Answer Key***.

## Lesson 3

# Presenting Data using Double Bar Graphs



### *What's In*

Study the table below.

Barangay Health Workers conducted a survey on their respective areas about the commonly used hygiene kits at home. In one area, 30 households answered the questionnaires. The table shows the results of the survey.

Construct a single vertical or horizontal bar graph using the given data.

Commonly Used Hygiene Kit at Home

Hygiene Kit	Number
Alcohol/Sanitizer	18
Soap/water	28
Toothbrush/toothpaste	30
Shampoo	26
Conditioner	15

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



## ***What's New***

Let us study the story problem.

Cristine is a newly hired nurse. She was assigned in a Government Quarantine Facility for Locally Stranded Individuals (LSI). To plan for some activities, she asked from two adjacent facilities which physical activities they prefer to do in the morning.

The table shows the results.

Quarantine Facility	Gardening	Zumba Dance	Jog/Walk	Others
A	16	12	12	3
B	18	14	8	1

How can she easily compare and describe LSIs' physical activity preferences?



## ***What is It***

We will use a double bar graph to present and compare the preferences of LSIs in the two quarantine facilities, using the same category.

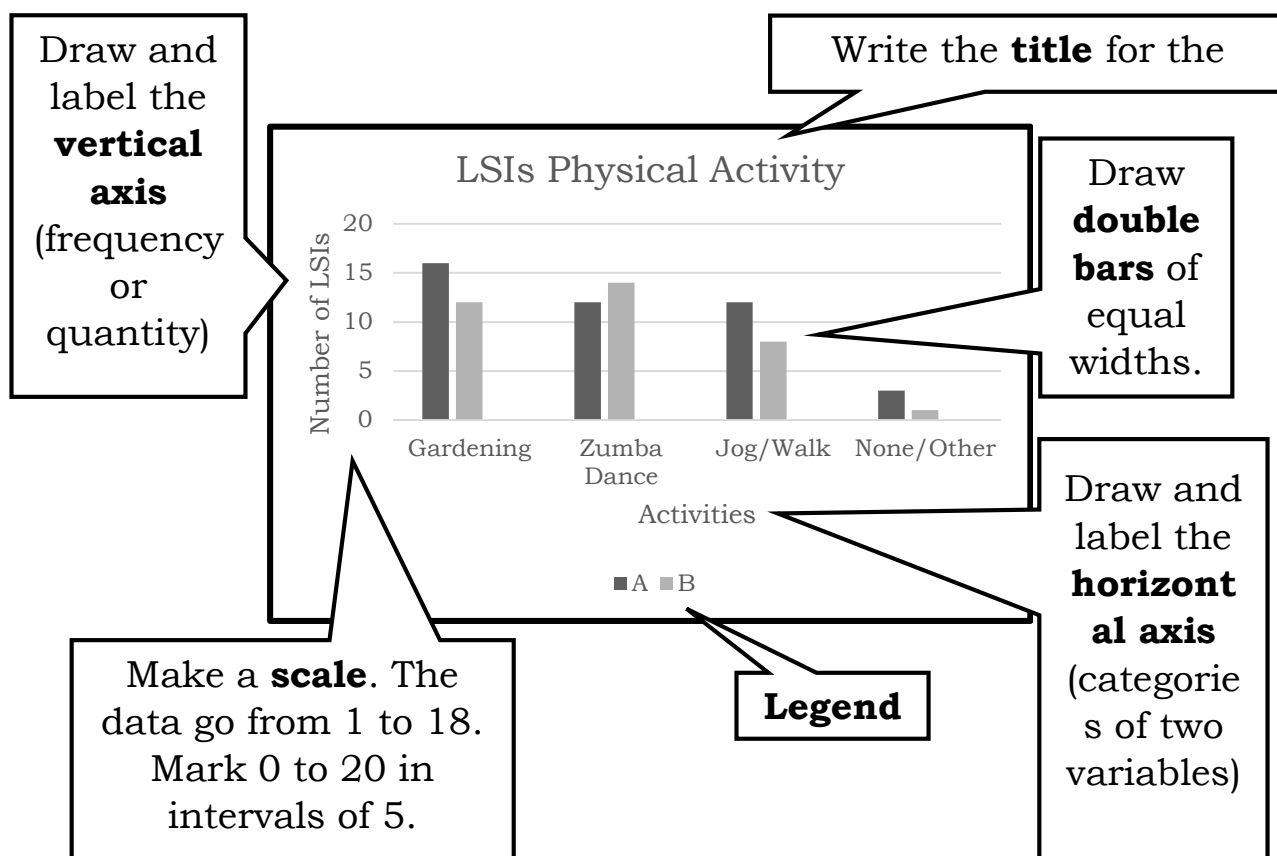
- A **double bar graph**, also called a **double bar chart**, presents data with two variables. Each variable has categories. The frequencies of the categories of the two variables are represented by double bars. The bars can be arranged vertically or horizontally.

How do we construct a double bar graph?

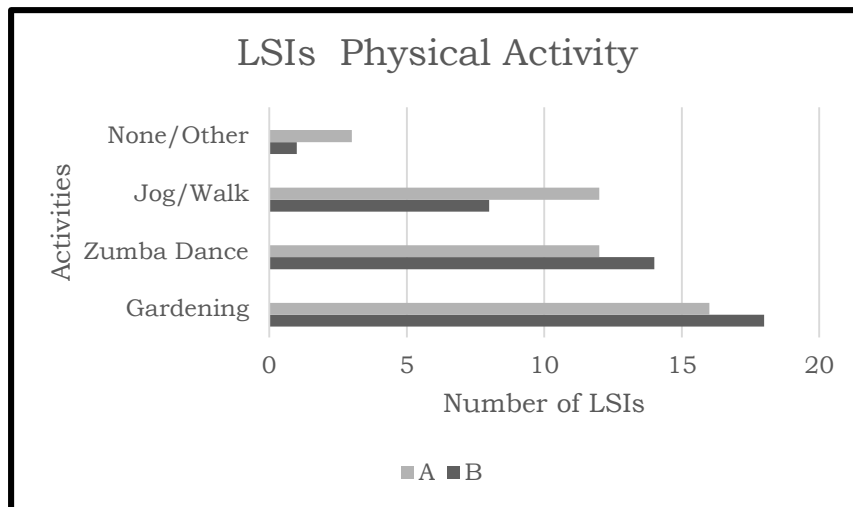
Steps in constructing the double bar graph.

1. Draw and label the horizontal and vertical axes.
2. Identify the greatest number.
3. Make a scale from 0 to the greatest number.
4. Draw the double vertical (or horizontal) bars to represent the frequencies of categories of the variables. Make the frequencies accurate and the double bars of the same width.
5. Indicate the legend.
6. Write a title for the graph.

Let's take a look at the presentation of the given data using **double vertical bar graph**.



## Double Horizontal Bar Graph



What does the graph tell about the LSIs' physical activity preferences?

- The Locally Stranded Individuals of both quarantine facilities preferred gardening as their morning physical activity with a total of 34 individuals, 26 for Zumba Dance, 20 for Jog/Walk and 4 for Others which has the lowest.

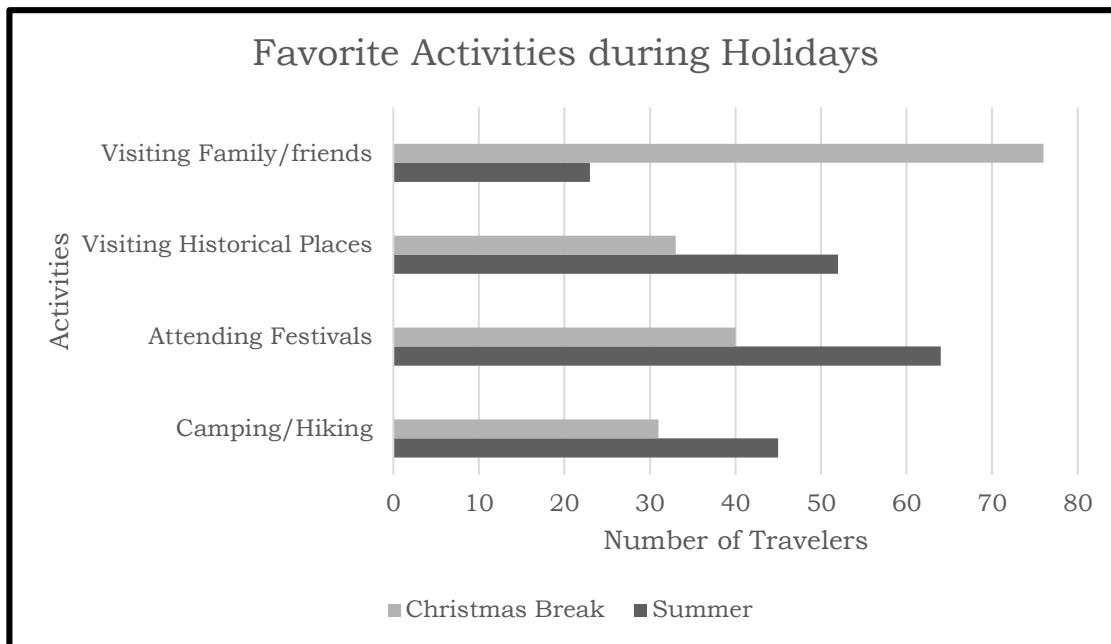
Let's have another example.

A travel company surveyed its customers about the favorite activities they would take if they could travel during summer or during Christmas break once the pandemic is over. The table below shows the results of their survey.

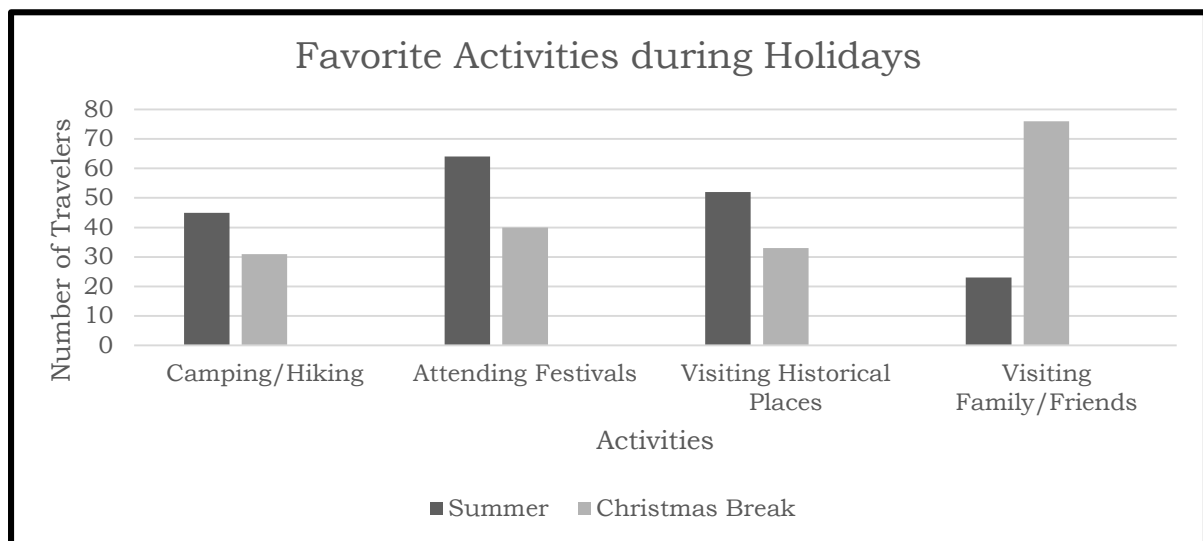
Favorite Activities during Holidays

Holidays	Camping/ Hiking	Attending Festivals	Visiting Historical Places	Visiting family/friends
Summer	45	64	52	23
Christmas Break	31	40	33	76

Let's present the given data in a double horizontal bar graph.



The double vertical bar graph below presents the same data.



It can be seen in the double bar graphs that the travelers preferred visiting family/friends during Christmas break and attending festivals during Summer.





## ***What's More***

Study the table below. Present the data in a double vertical/horizontal bar graph.

### **Relief Goods Distributed in Two Barangays**

Barangay	Box of Canned Goods	Box of Noodles	Sacks of Rice	Bottled water (6L)
San Ramon	23	26	46	53
San Isidro	32	30	40	45

Are you done answering?

If yes, time to check. Please go to the ***Answer Key***.



## ***What I Have Learned***

How do we organize or present data?

- To organize data, we can make use of tables and bar graphs.

**A double bar graph**, also called double bar chart, presents two variables instead of just one by using bars. The double bars can be arranged vertically or horizontally.

How do we construct a double bar graph?

- Draw and label the horizontal and vertical axes.
- Identify the greatest number.
- Make a scale from 0 to the greatest number.

- Draw the double vertical (or horizontal) bars to represent the frequencies of categories of the variables. Make the frequencies accurate and the double bars of the same width.
- Place the legend.
- Write a title for the graph.



## ***What I Can Do***

A group of students conducted a survey. They asked the question—“How many hours per week do you read?” to pupils who entered the library. The results are shown below. Present the given data in a double vertical or horizontal bar graph.

Reading Hours in a Week

<b>Hours</b>	<b>0-3</b>	<b>4-7</b>	<b>8-11</b>	<b>12-15</b>
Boys	32	30	21	18
Girls	36	27	37	40

Are you done answering?

If yes, time to check. Please go to the ***Answer Key***.



## ***Assessment***

Study the table below. Present the given data using double bar graphs.

A. Construct a double vertical bar graph.

Time Spent on Modules Each Day

<b>Grade Level / Time in Minutes</b>	<b>60</b>	<b>100</b>	<b>150</b>
Grade 4	14	17	12
Grade 5	12	19	10

B. Construct a double horizontal bar graph.

Time Spent on Modules Each Day

Grade Level / Time in Minutes	40	80	120
Grade 1	14	17	12
Grade 2	12	19	10

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.



## Additional Activities

Use the given data to make a double horizontal or vertical bar graph.

Mode of Transport during Pandemic

	Front liners	Office Workers	Vendors	Factory Workers
Motorcycle	34	24	56	30
Bicycle	36	30	43	24

Are you done answering?

If yes, time to check. Please go to the **Answer Key**.



# Answer Key

## LESSON 1

<b>What I Know</b>		
Subject	Tally marks	Frequency
Math	+++	5
Science		4
Filipino	++++ +++++	14
English		4
Araling Panlipunan		3
6. The favorite subjects of Grade Four Pupils		
7. Filipino, Math, Science		
8. Filipino		
9. Araling Panlipunan		
10. 30 students		

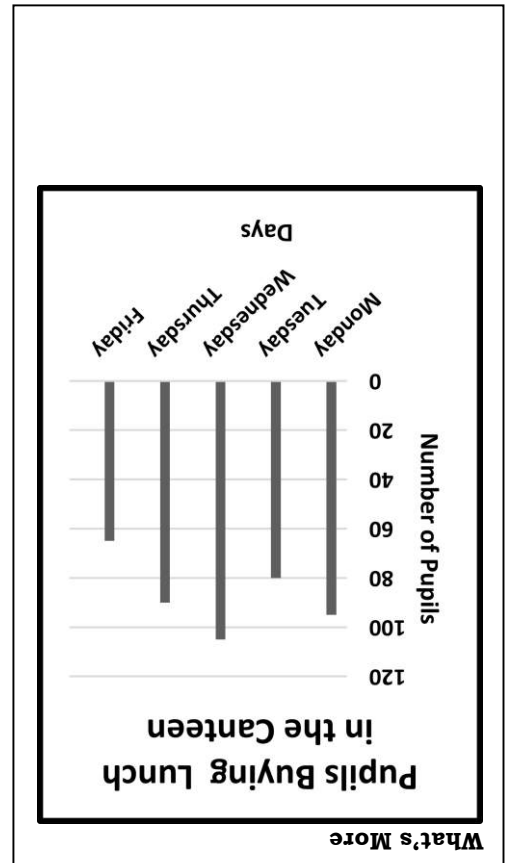
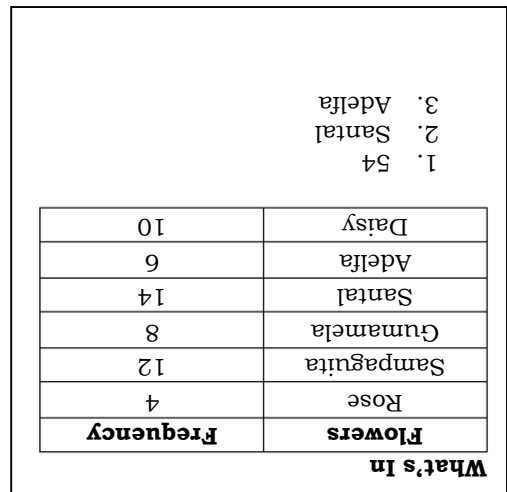
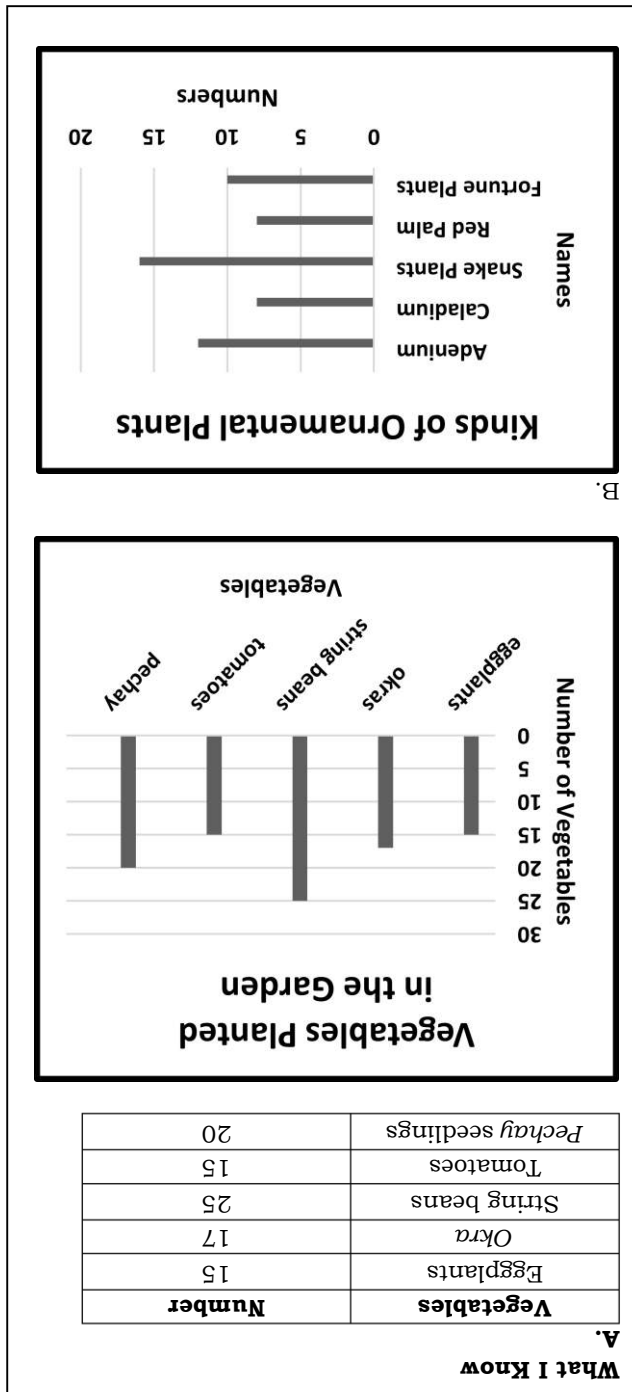
<b>What's More</b>		
Means of going to school from home	Tally	Frequency
walking	++++	7
bicycle		3
tricycle		4
jeepney		4
1. 18		
2. By walking		
3. 11		

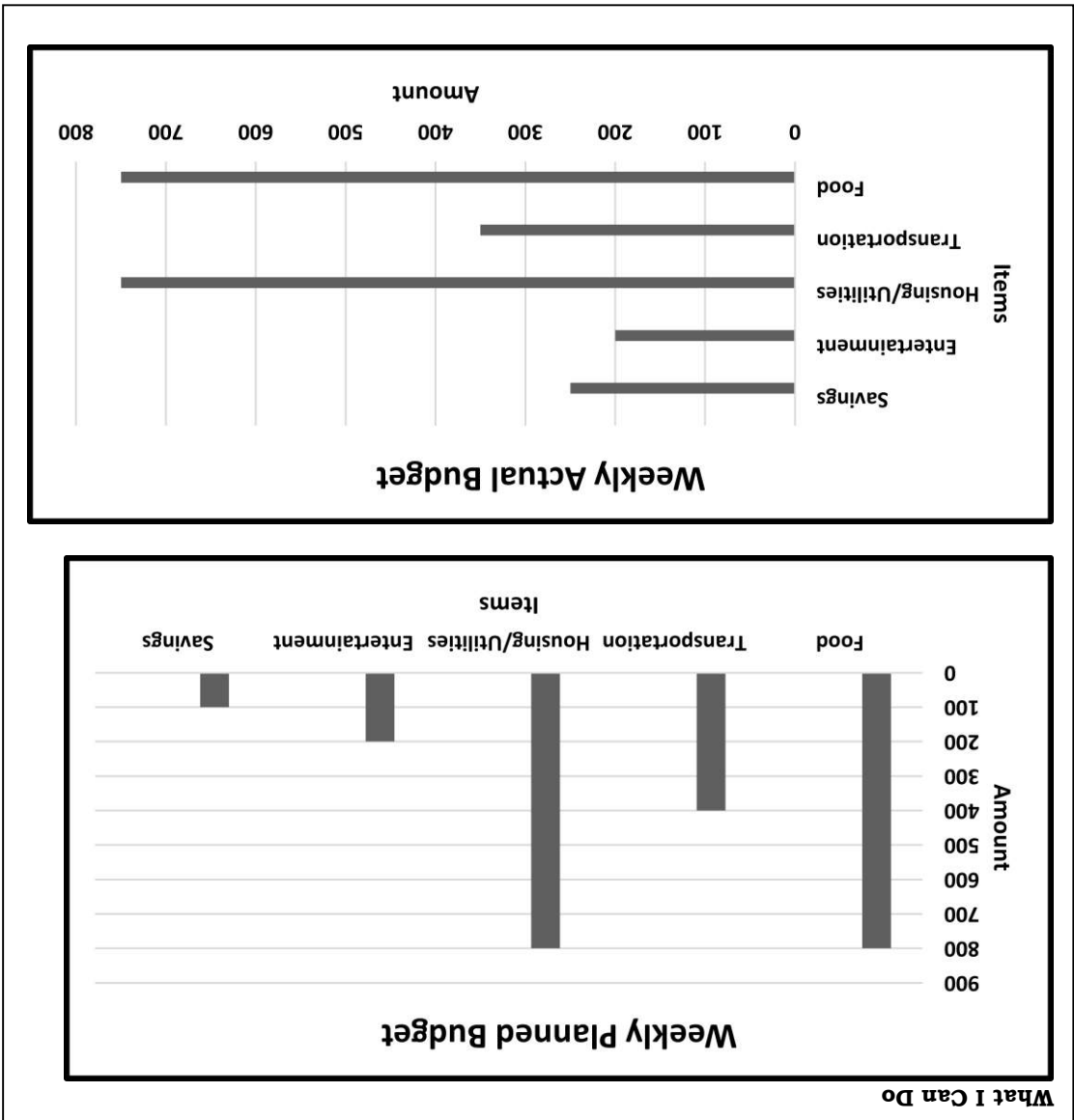
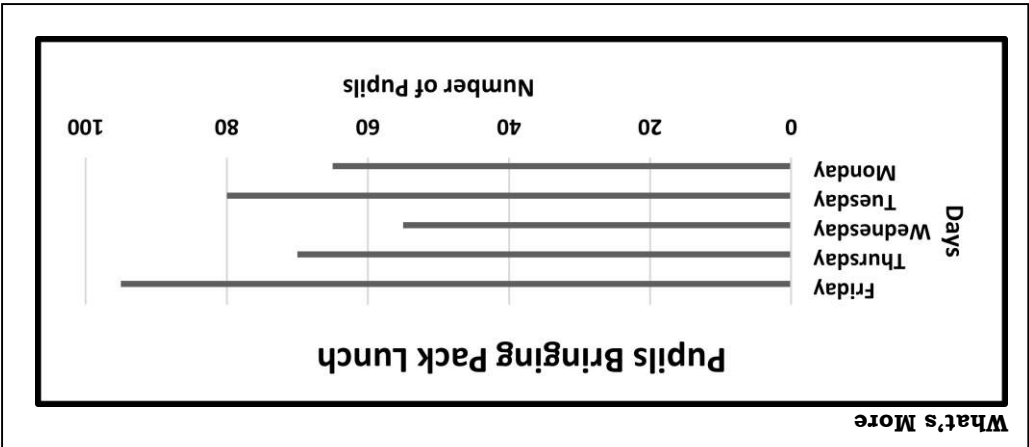
<b>What's In</b>		
1. 27 is the highest score	27	26
2. 13 is the lowest score	25	23
3. Yes, scores of 23 and 19 appeared twice while 18 appeared thrice	23	22
4. 14	22	21
5. 305	21	19

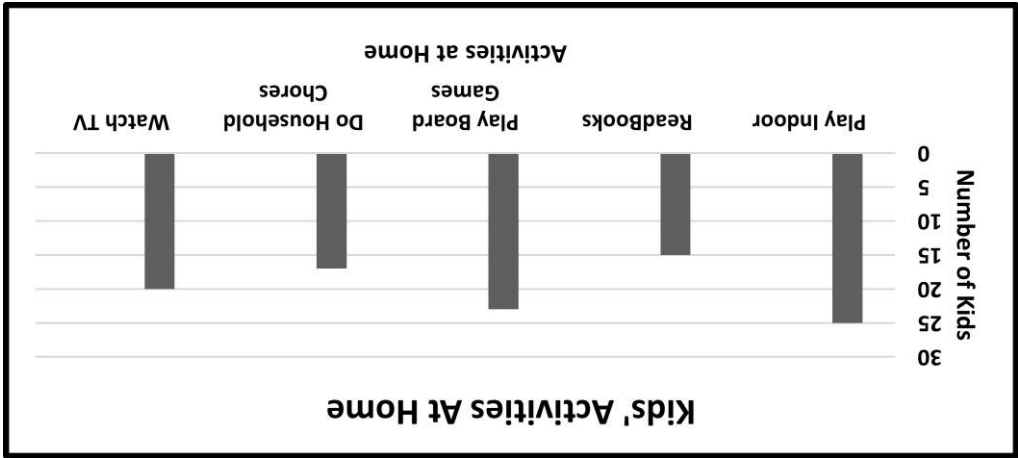
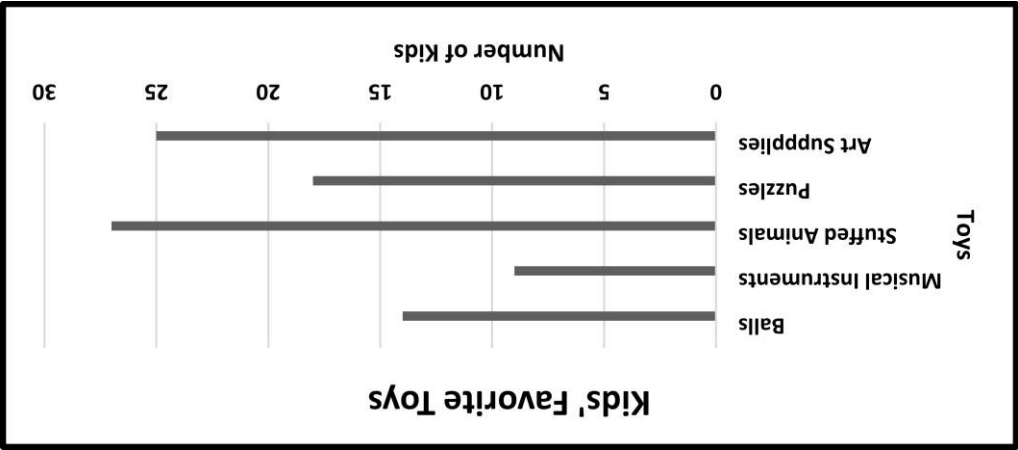
<b>What I Can Do</b>		
Initials	Tallies	Frequency
A		3
B		3
C		2
D	++++	5
E		1
F		2
J		1
H		1

<b>Assessment</b>		
A	Weights (kg)	Tallies
	Frequency	
32		1
30		2
27		2
26		4
25	++++	5
24		2
23		3
22		4
21		1
20		1
<b>B</b>		
6. Favorite fruits of her friends		
7. 38		
8. 9 for apples, 6 for pineapples		
9. banana, santol		
10. 28		

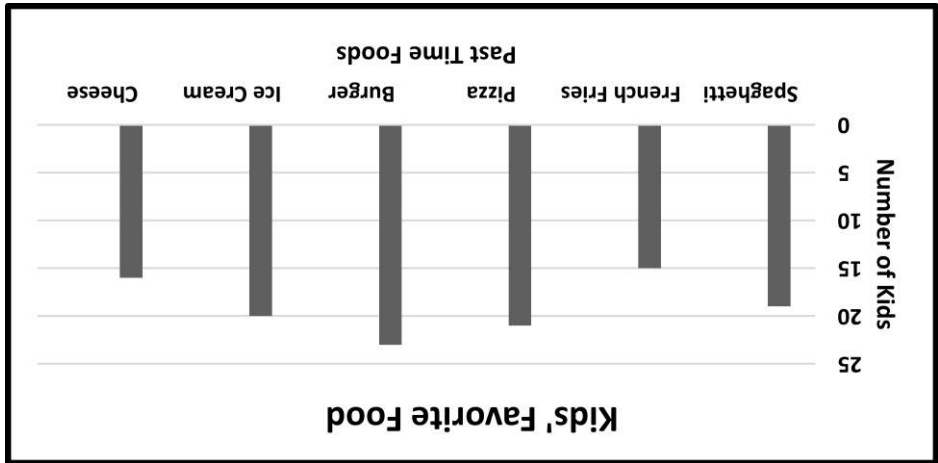
## LESSON 2



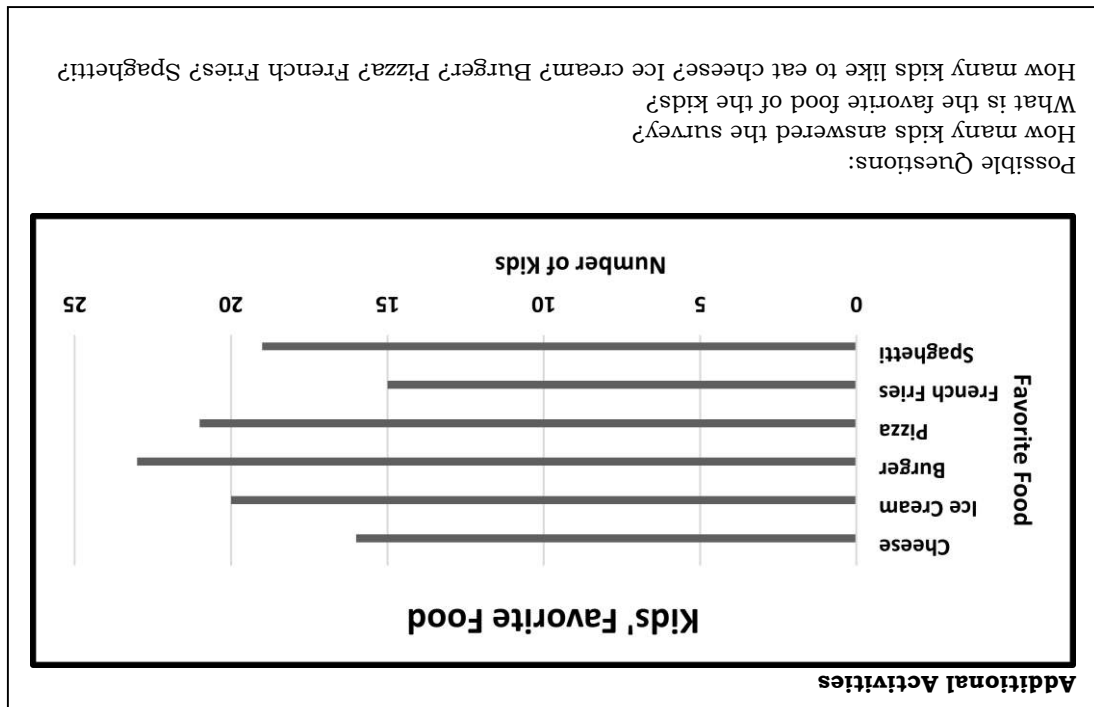




Assessment

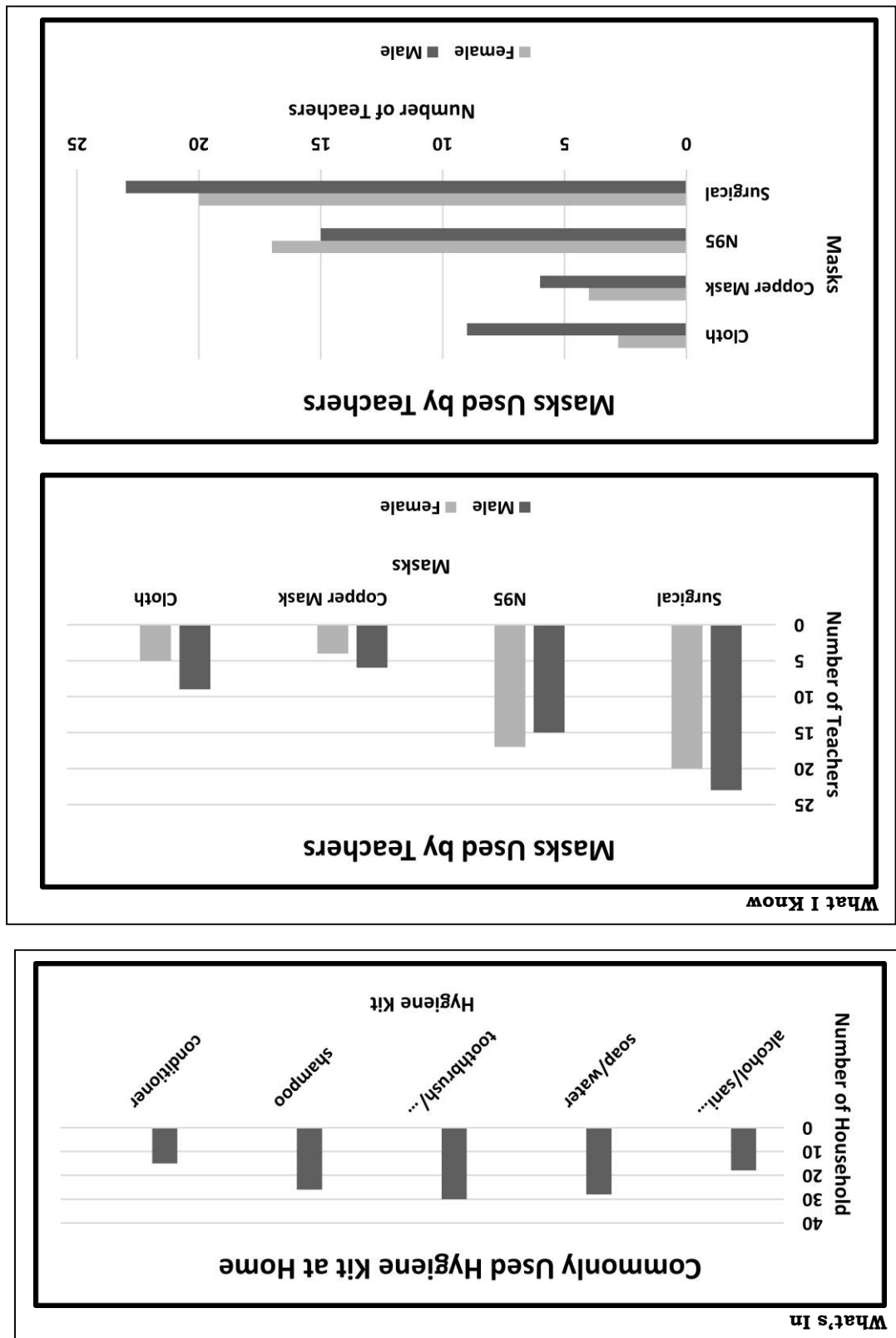


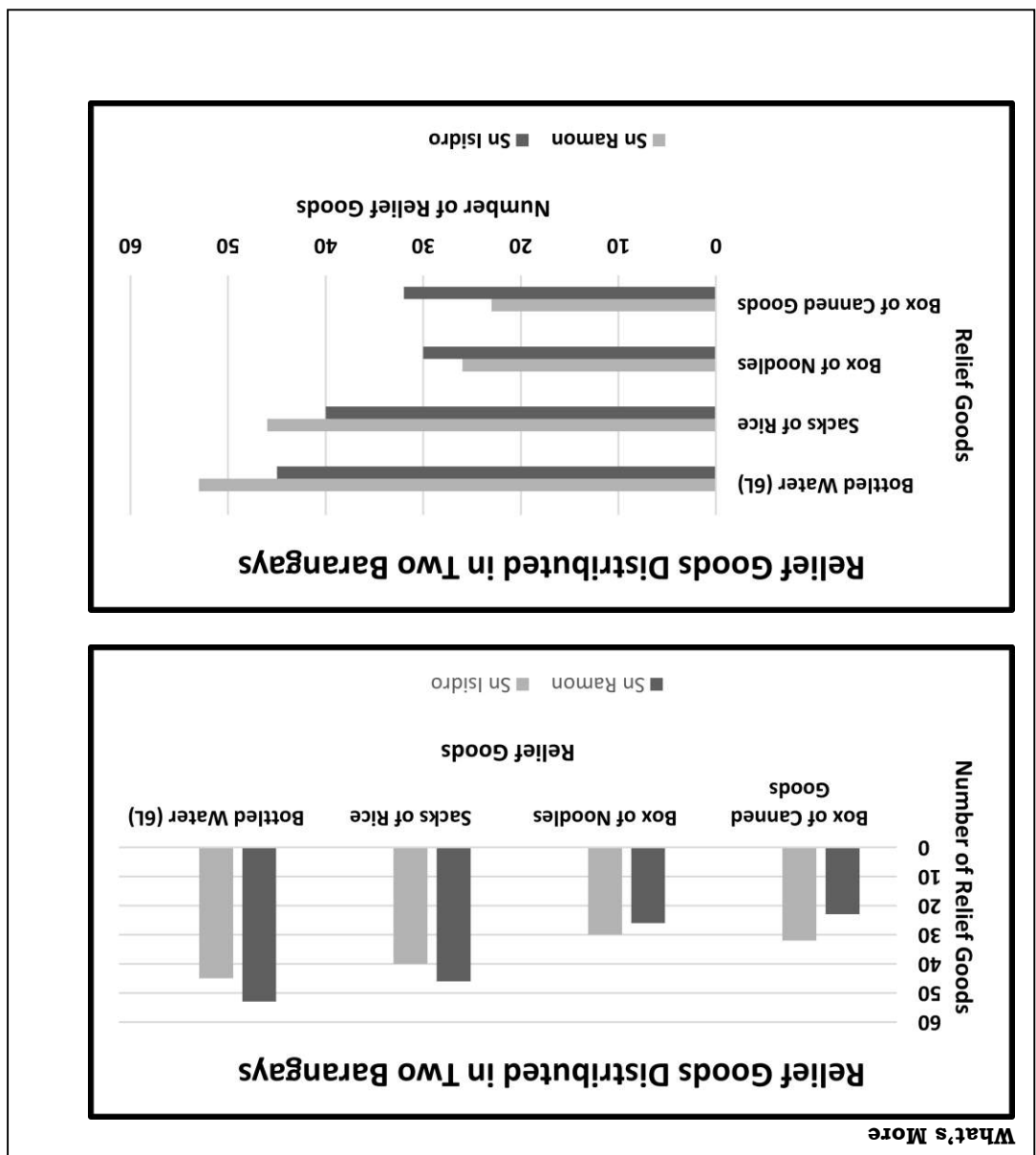
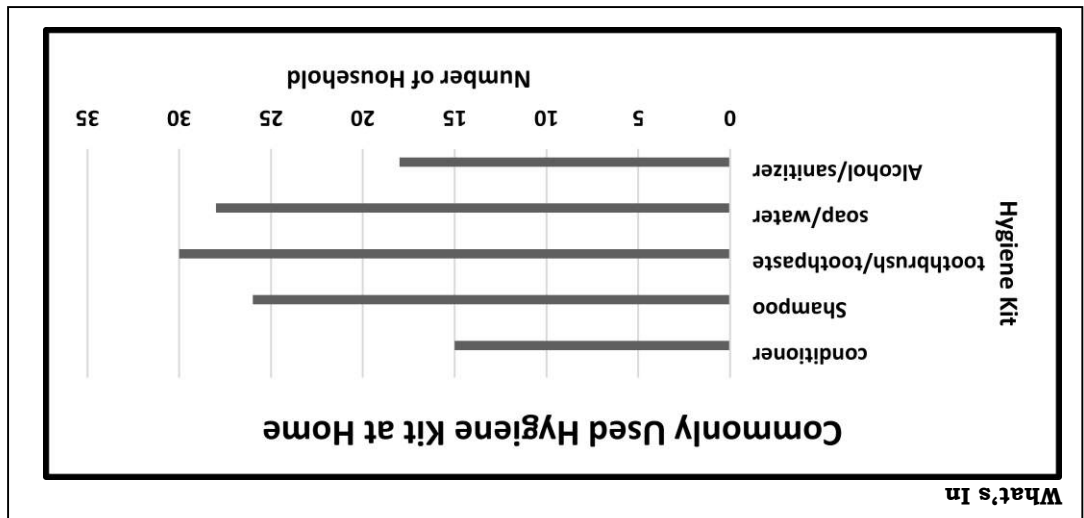
Additional Activities

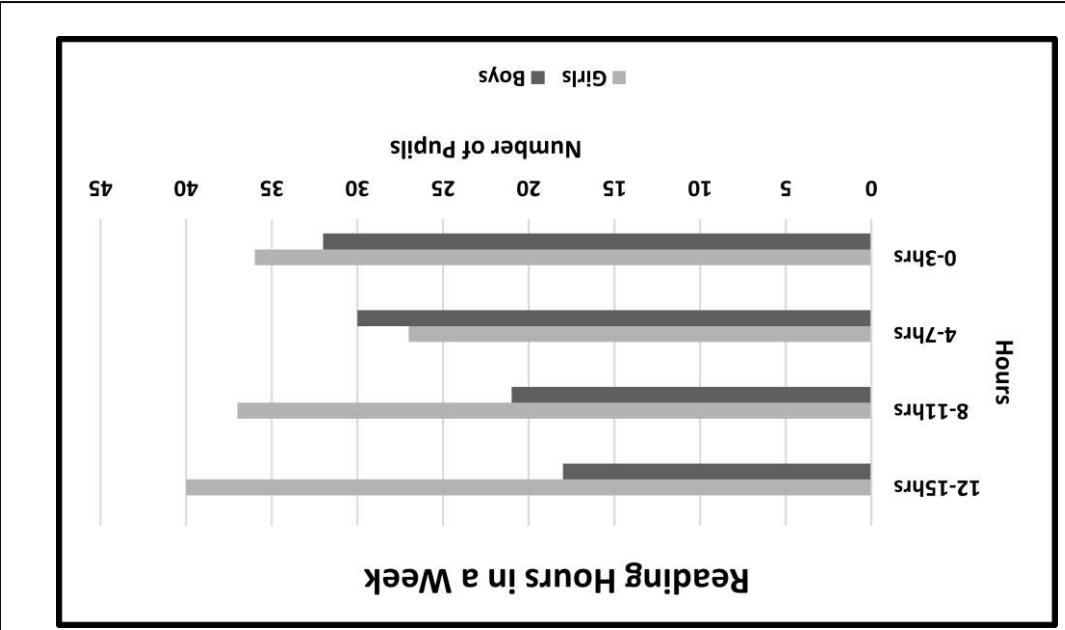
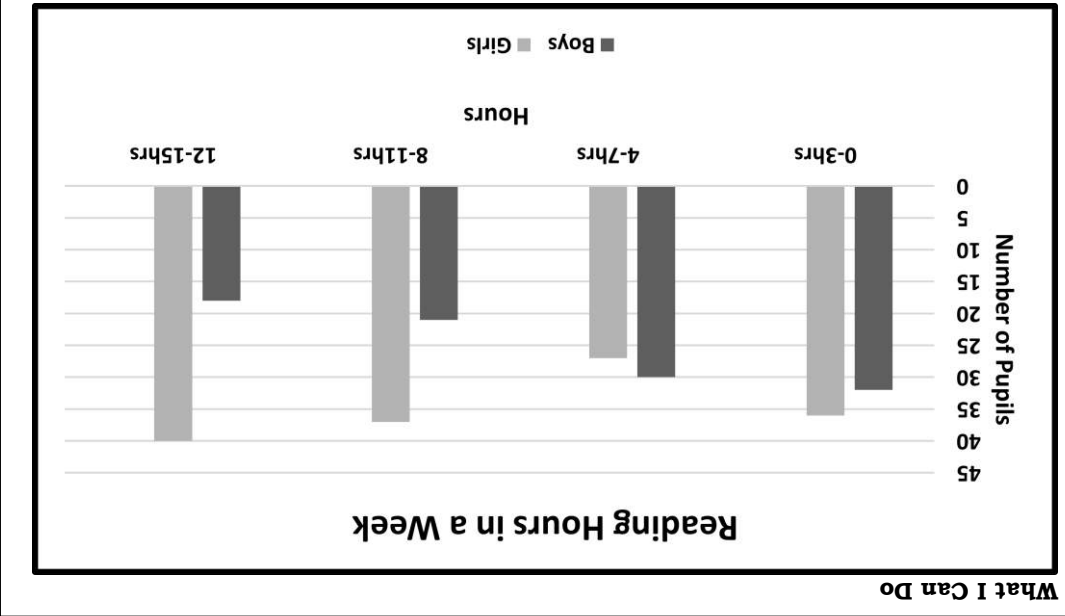
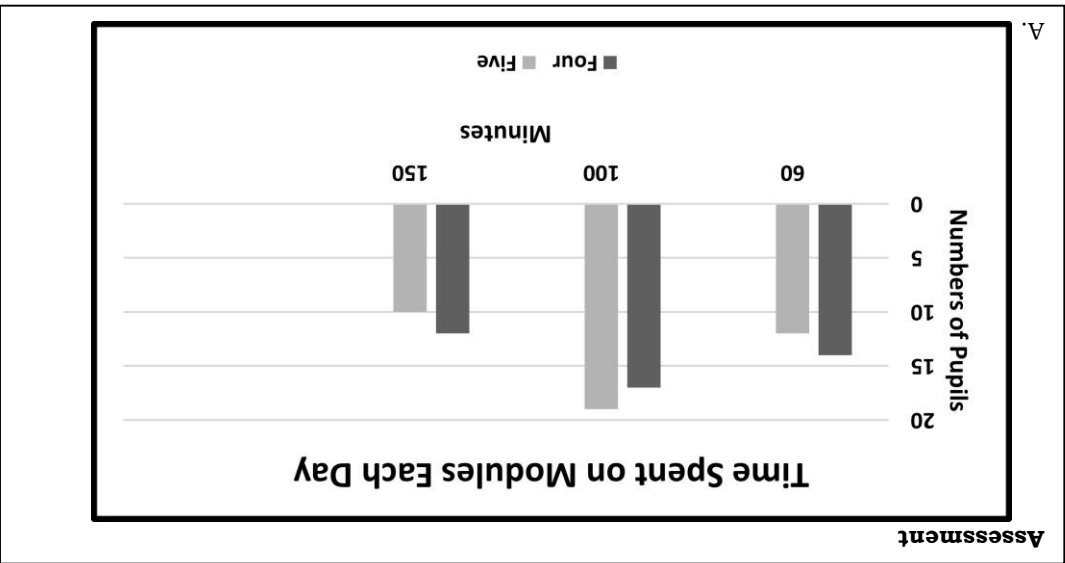


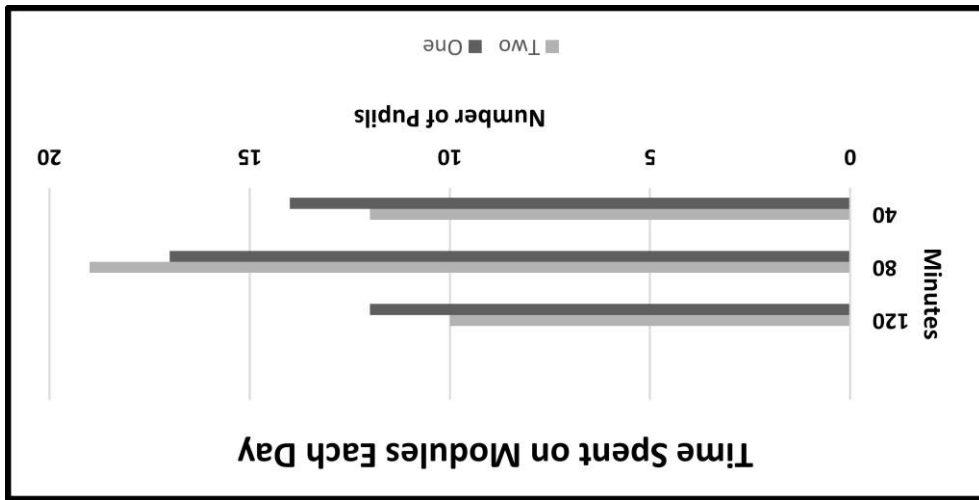


## LESSON 3

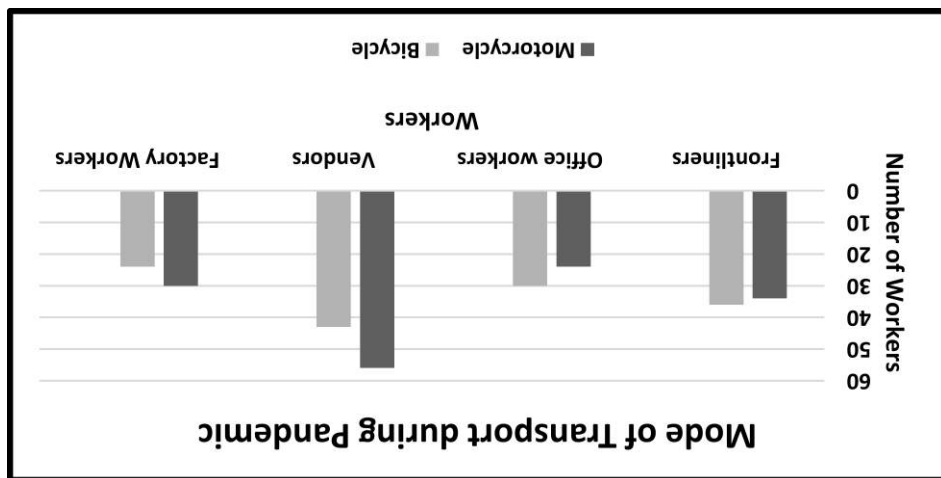
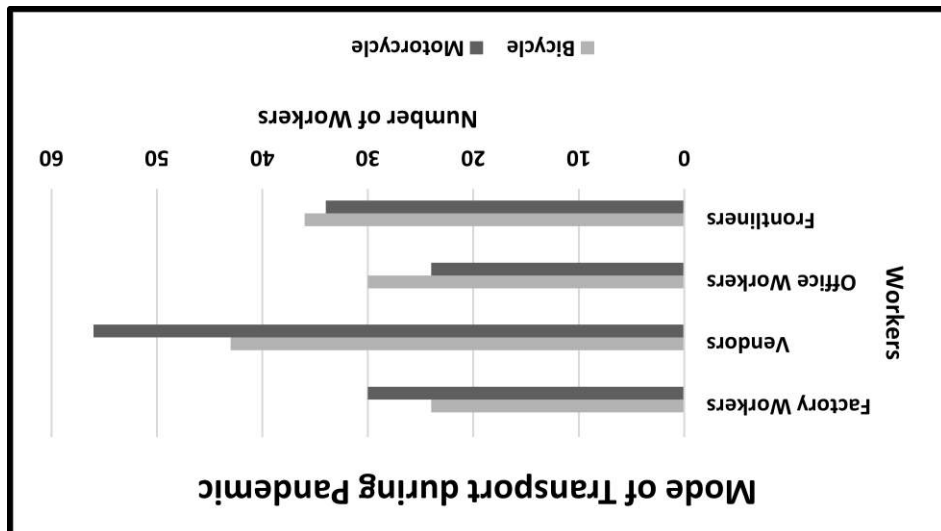








B.



Additional Activities

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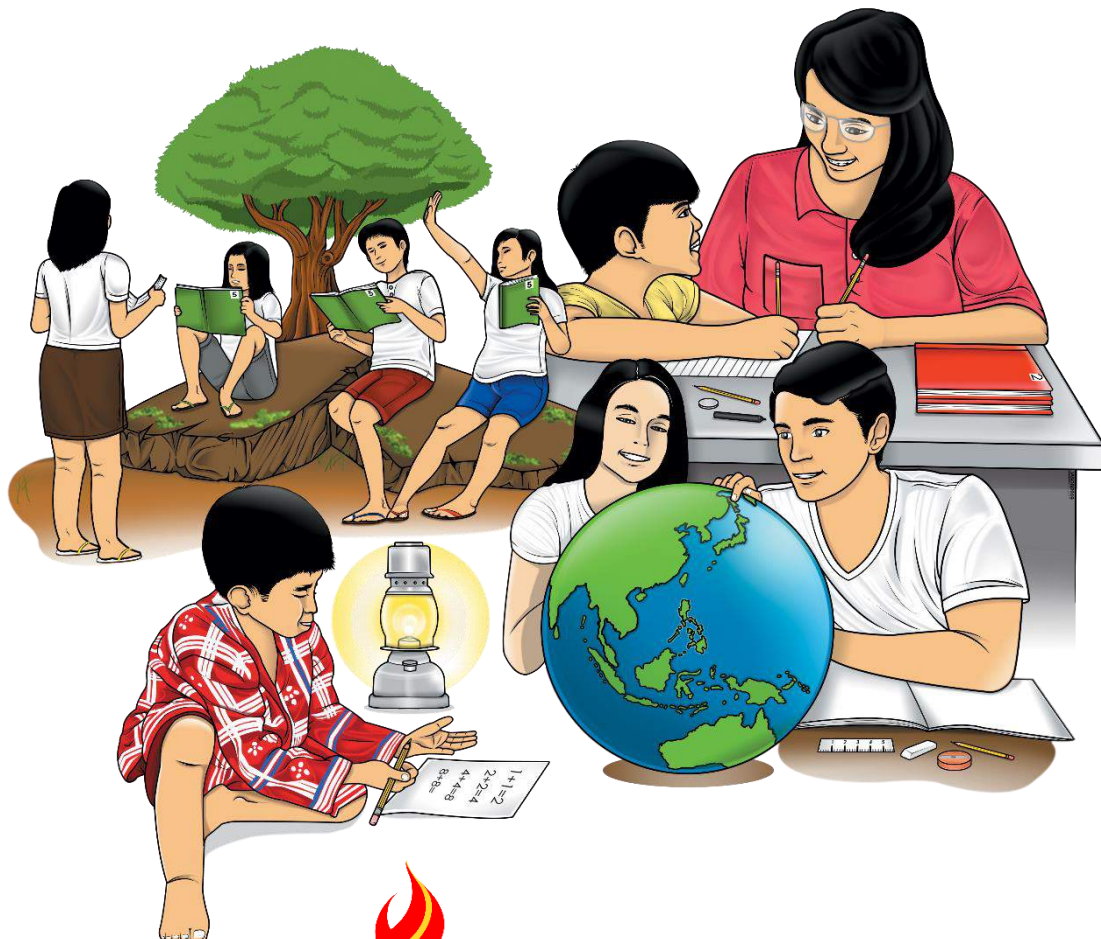
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# Mathematics

## Quarter 4 – Module 7:

### Interpreting and Solving Routine and Non-Routine Problems Using Data Presented in Bar Graphs



**Mathematics – Grade 4**

**Alternative Delivery Mode**

**Quarter 4 – Module 7: Interpreting and Solving Routine and Non-Routine Problems  
Using Data Presented in Bar Graphs**

**First Edition, 2020**

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Published by the Department of Education

Secretary: Leonor Magtolis Briones

Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by \_\_\_\_\_**

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# Mathematics

## Quarter 4 – Module 5: Interpreting and Solving Routine and Non-Routine Problems Using Data Presented in Bar Graphs

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

Bar graphs appear in many documents or reports. These graphs can be seen in newspapers, magazines, and internet. A good presentation of graphs can convey varied meaning or information.

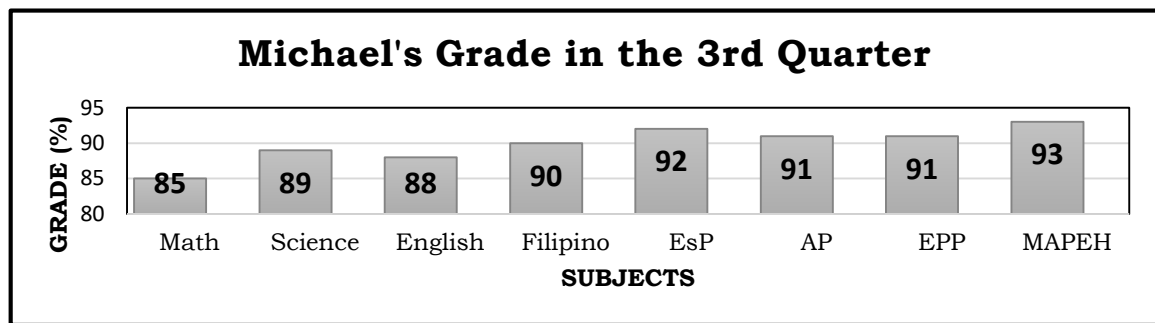
In this module, we will focus on reviewing and processing the content of the data presented in a bar graph in order to solve problems and come up with well-defined decisions.

At the end of this module, you should be able to interpret data presented in different kinds of bar graphs.

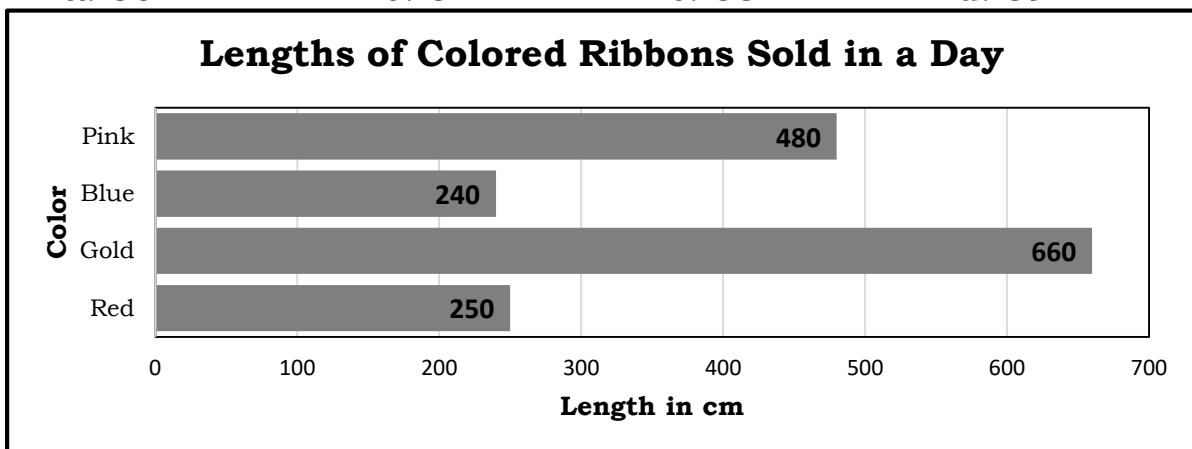


## ***What I Know***

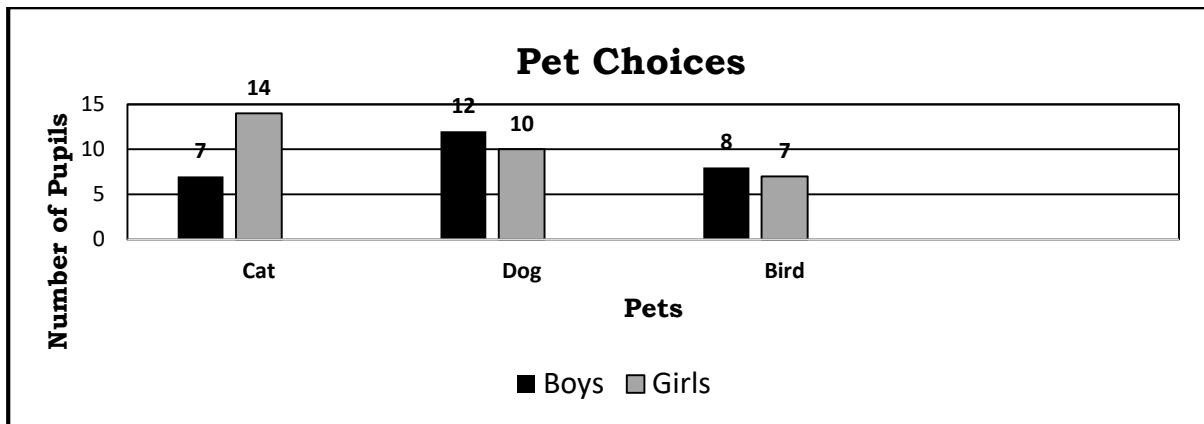
Study the graphs, and then answer the questions that follow.



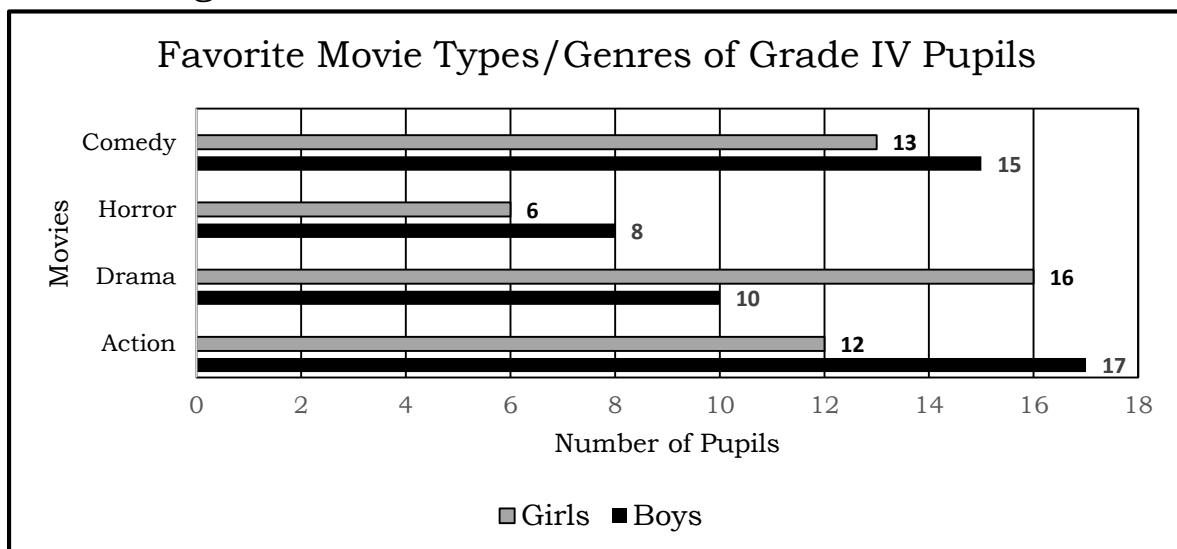
1. In which subject did Michael get the highest grade?  
a. AP                      b. EPP                      c. EsP                      d. MAPEH
2. What is the lowest grade attained by Michael in the 3<sup>rd</sup> quarter?  
a. 85                      b. 87                      c. 88                      d. 89



3. How many gold ribbons were sold?  
a. 480                      b. 500                      c. 600                      d. 660
4. How many more gold ribbons were sold than red ribbons?  
a. 250                      b. 410                      c. 660                      d. 810
5. What was the total length of all the ribbons sold in a day?  
a. 1 630                      b. 1 620                      c. 660                      d. 810



6. How many pupils chose dog as their pet?  
 a. 21                      b. 22                      c. 25                      d. 29
7. What pet is preferred by most of the pupils?  
 a. dog                      b. cat                      c. bird                      d. none



8. What is the most favorite movie type or genre of the pupils?  
 a. Action                      b. Comedy                      c. Drama                      d. Horror
9. How many boys like Comedy, Horror, Drama and Action?  
 a. 40                      b. 50                      c. 55                      d. 60
10. How many more pupils like comedy than horror movie?  
 a. 12                      b. 13                      c. 14                      d. 15

Are you done answering?

If yes, time to check.

Please go to page 32 for the **Answer Key**.

**Lesson****1****Interpreting Data Presented in Bar Graphs*****What's In***

Read and understand the problem. Do what is asked.

The School Principal wants to know, what day of the week has the highest number of borrowers of books in the library.

He also wants to know which Grade level borrowed the most number of books for 2 weeks. He asked Ms. Pilapil, the school librarian, to give him the information he needed.

The data given by Ms. Pilapil are shown in the table below.

- A. Using the given data below, make a single horizontal bar graph.

Day	Number of Borrowers
Monday	14
Tuesday	23
Wednesday	34
Thursday	21
Friday	40

- B. Present the given data below using a double vertical bar graph.

Number of Borrowers in All Grade Level for Two Weeks						
Grade Level	I	II	III	IV	V	VI
Week 1	23	32	26	21	36	31
Week 2	17	24	30	31	25	33

Are you done answering? If yes, time to check.  
Please go to page 32 for the **Answer Key**.

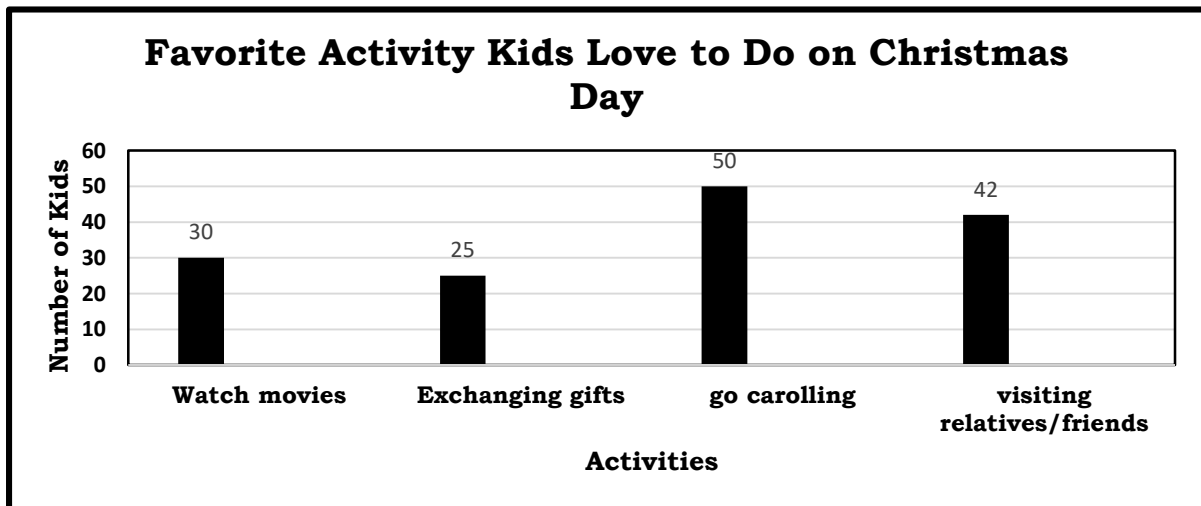


## ***What's New***

In a survey conducted, the following are the most favourite activities kids love to do on Christmas Day.

- Watch movies – 30
- Exchanging gifts – 25
- Go caroling – 50
- Visiting relatives/friends – 42

We can present the same information in a bar graph as shown below.

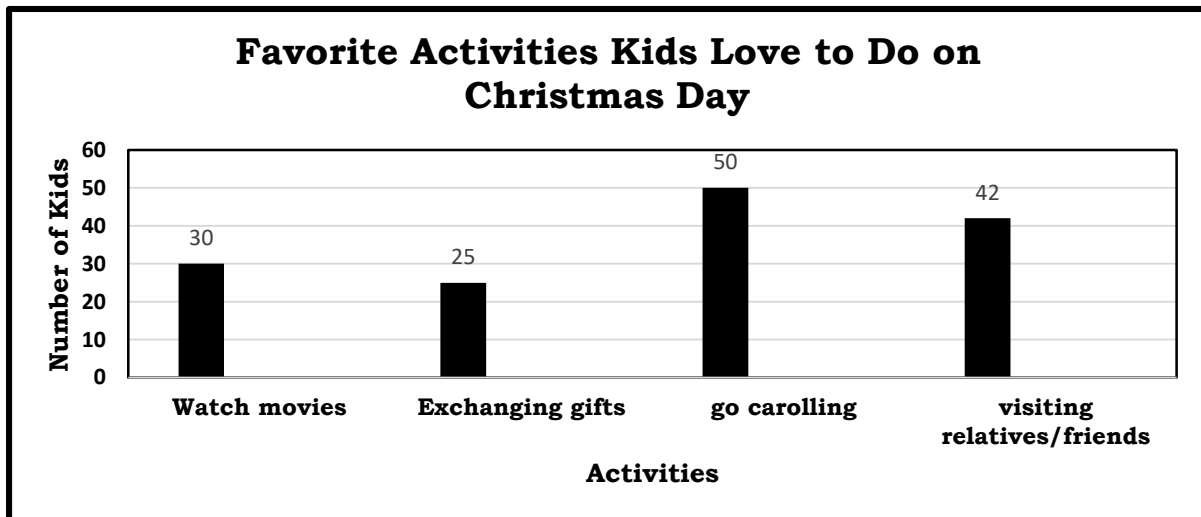


Look at the bar graph. What information does it tell us?



## ***What Is It***

Let us find out what information a bar graph tells us. Let us read and interpret the bar graph.



1. What does the vertical axis represent?  
(It shows the number of kids.)
2. What does the horizontal axis represent?  
(It shows the different activities.)
3. What is the title of the bar graph?  
(Favorite Activities Kids Love to Do on Christmas Day)
4. What are being compared on the graph?  
(The number of kids and the activities they love to do on Christmas Day.)
5. Which activity did 25 kids choose?  
(Exchanging gifts)
6. Which activities were chosen by more than 30 kids?  
(Go caroling and visiting relatives/friends)
7. How many kids chose visiting relatives/friends as their favorite activity? (42)
8. What activity is preferred by most kids? (Go caroling)
9. How many kids were surveyed? (147)

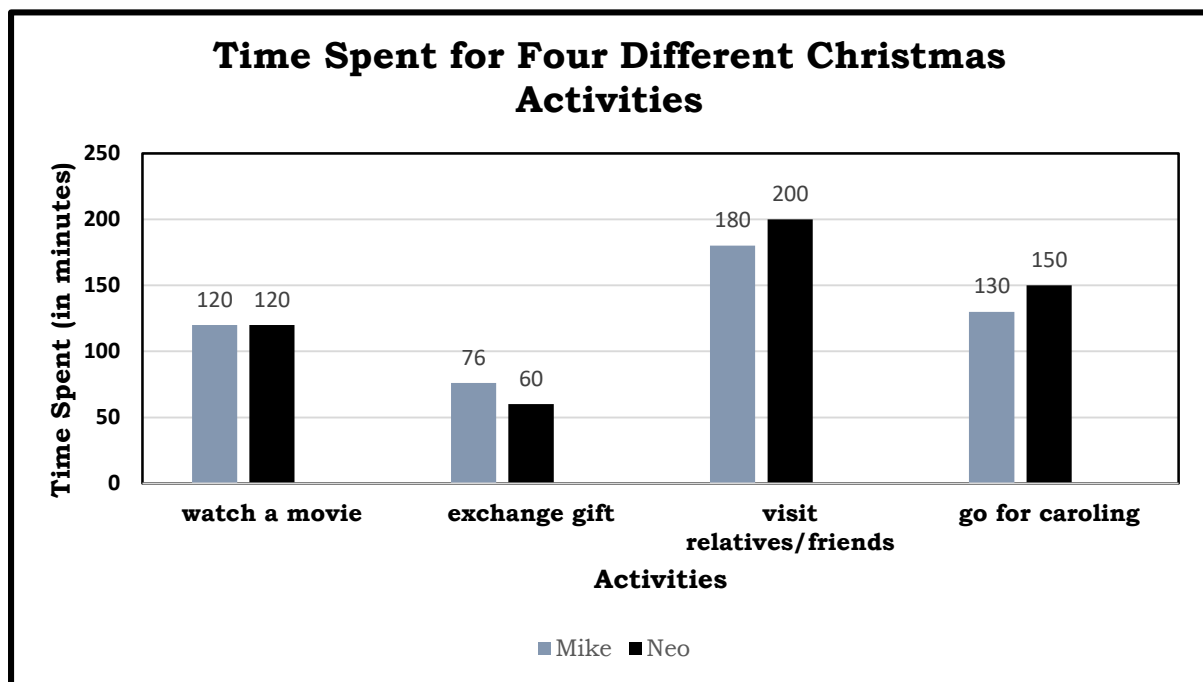


Based on the single vertical bar graph,

- Go caroling is the most favorite activity kids love to do on Christmas Day. Visiting relative/friends is the second. Watching movies is the third, and the last is exchanging gifts.
- 147 kids were surveyed.

Let's try another example. Let us study and interpret a double bar graph.

Mike and Neo spent their whole day enjoying Christmas Festivities. They kept track on how much time (in minutes) did they spend for four different activities. When they got home, they made a bar graph to show the time they spent for each.



1. What is the title of the bar graph?  
(Time Spent for Four Different Christmas Activities)
2. What are being compared?  
(The time spent by Mike and Neo for the different activities)
3. What is found in the vertical axis?  
(The time they spent in minutes)  
In the horizontal axis?  
(The different Christmas activities)

4. Which activity did they spend the same number of minutes?  
(Watch a movie)
5. Which activity did they spend the shortest time?  
(Go caroling and visiting relatives/friends)
6. What activity did they spend the longest time?  
(Visit relatives/friends)
7. What is the total number of minutes they spent together for caroling?  
(290 minutes)
8. Which of the two boys spent more in visiting their relatives/friends? By how many more minutes?  
(Neo, by 20 minutes)

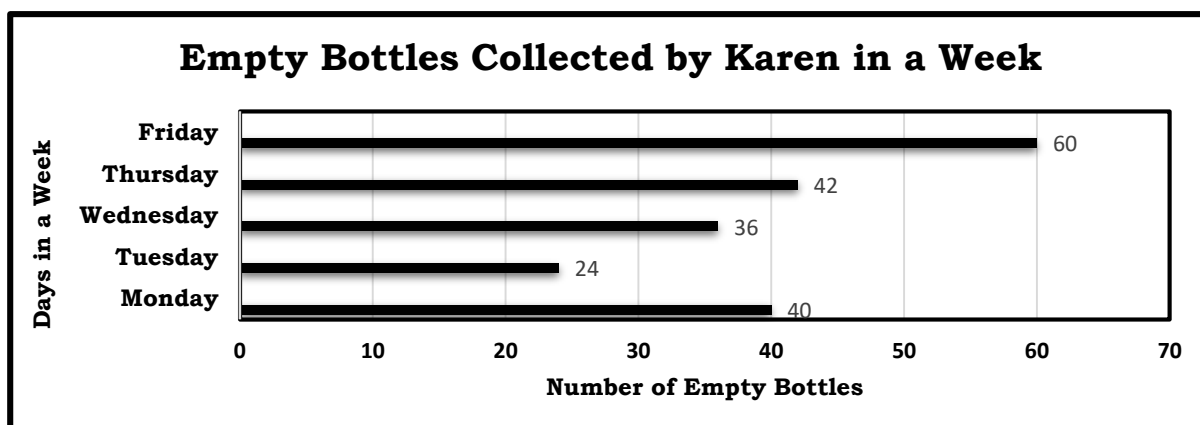
Based on the double vertical bar graph,

- Both boys spent the longest time in visiting relatives/friends. The shortest time they spent is in exchanging gift. They consumed the same time in watching a movie.



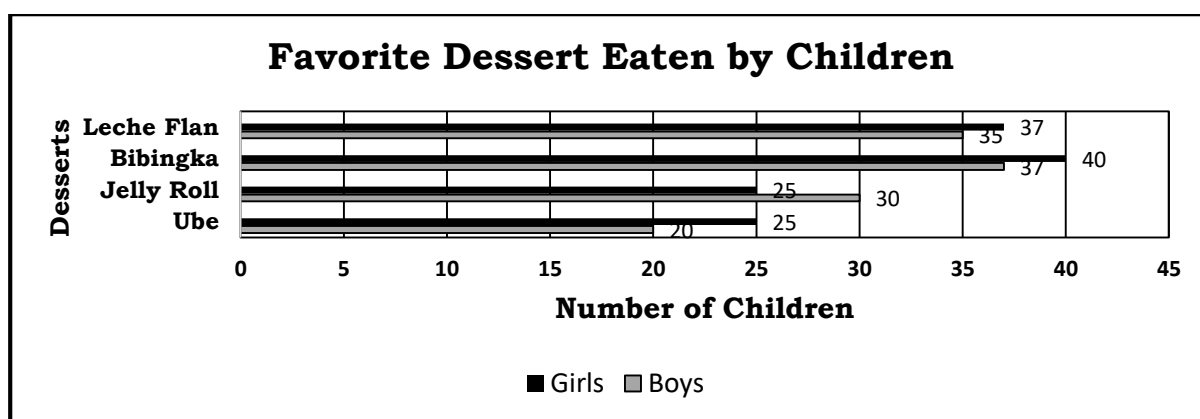
### ***What's More***

Study the graph carefully, then fill in the blank to complete the statements below.



### A

- \_\_\_\_\_ is found in the horizontal axis, while \_\_\_\_\_ is found in the vertical axis.
- The horizontal bar graph compares \_\_\_\_\_ and \_\_\_\_\_.
- On \_\_\_\_\_, Karen collected the most number of empty bottles. She collected \_\_\_\_\_ empty bottles.
- On \_\_\_\_\_, she collected the least number of empty bottles? She collected \_\_\_\_\_ empty bottles.
- She collected \_\_\_\_\_ empty bottles in a week.



### B

- The two variables or data items being compared in the double horizontal bar graph are \_\_\_\_\_ and \_\_\_\_\_.
- \_\_\_\_\_ is the information placed along the horizontal axis.  
\_\_\_\_\_ is the information placed along the vertical axis.
- Most of the children preferred to eat \_\_\_\_\_ than any other dessert while the least preferred dessert is \_\_\_\_\_.
- There are \_\_\_\_\_ children who chose leche flan as their favorite dessert.
- There are \_\_\_\_\_ more girls preferred to eat Ube than boys.

Are you done answering?

If yes, time to check. Please go to page 32 for the **Answer Key**.



## ***What I Have Learned***

How do we interpret the data in different bar graphs?

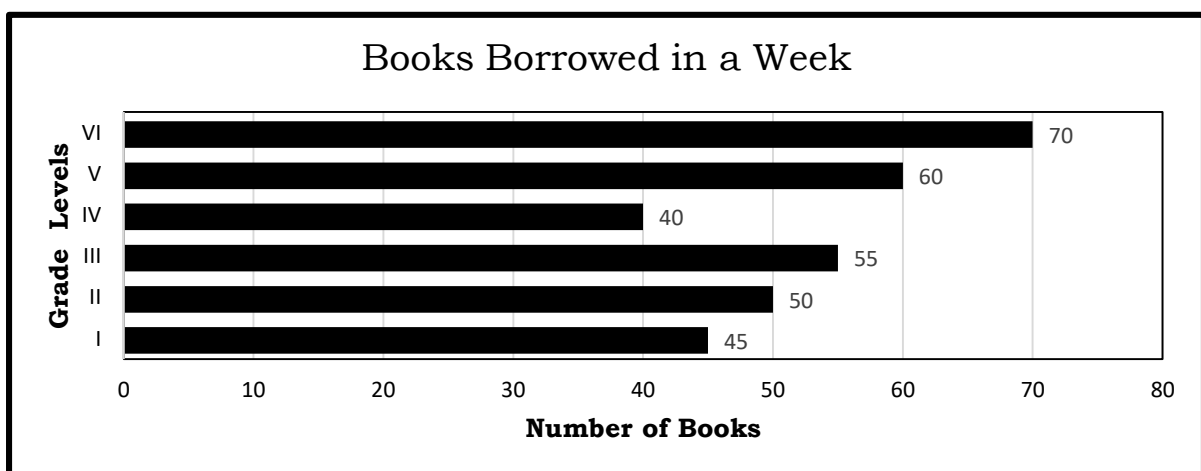
To interpret different bar graphs, we have to:

- look into the parts
- find the information in the vertical and horizontal axes
- look into labels, scales and legends
- compare heights or lengths of bars across groups or categories and look for differences.
- compare categories within groups



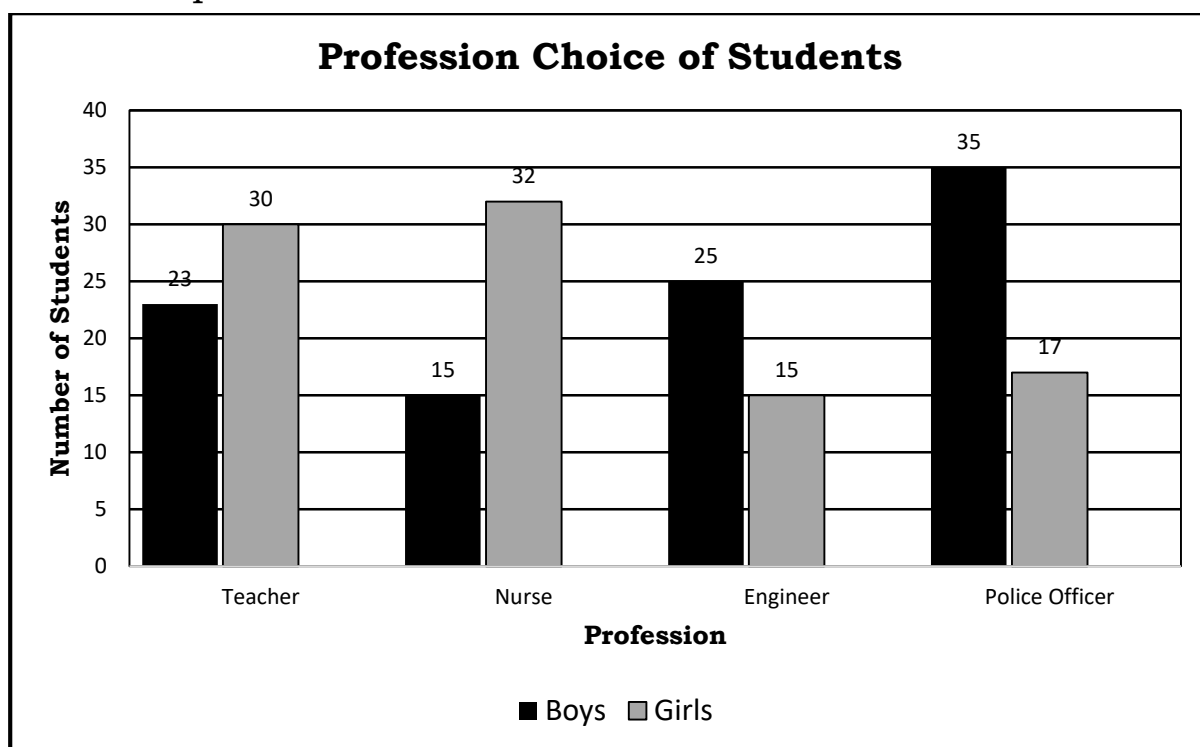
## ***What I Can Do***

A. Read and interpret the data presented in the bar graph.  
Use the guide questions below.



1. What grade level borrowed the most number of books?
2. What grade level borrowed the least number of books?
3. What is the total number of books borrowed in a week?

B. Study the double vertical bar graph below. Choose the letter corresponding to the statement that correctly describes or interprets the data.



- Most of the girls preferred to be a nurse or a teacher rather than to be a police officer or an engineer.
- Most of the students chose to be teachers.
- There are 35 boys who want to be a police officer someday.
- Among the four professions, to be an engineer is the least preferred by the students.
- There are 53 students who want to be in the field of teaching profession.

Are you done answering?

If yes, time to check.

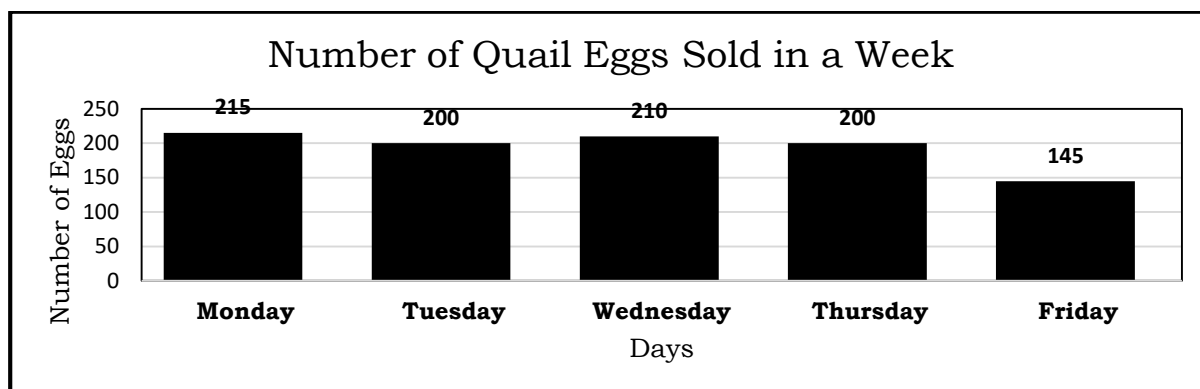
Please go to page 33 for the **Answer Key**.



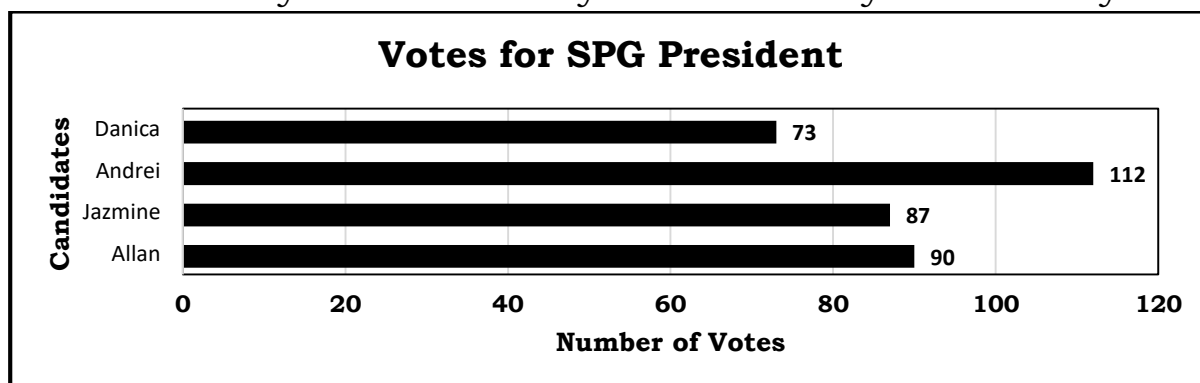
## Assessment

Study the graphs and then answer the questions that follow.

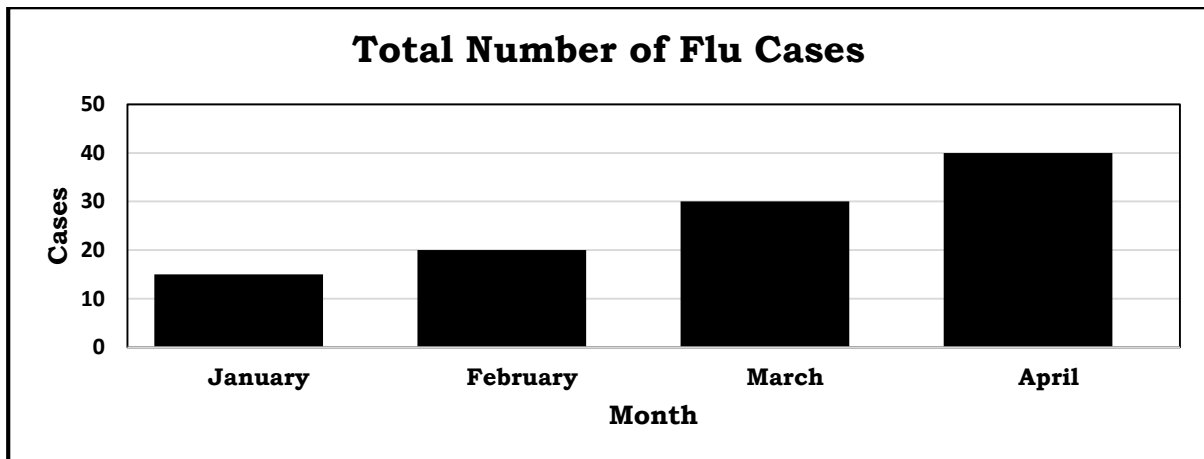
Choose the letter of the correct answer.



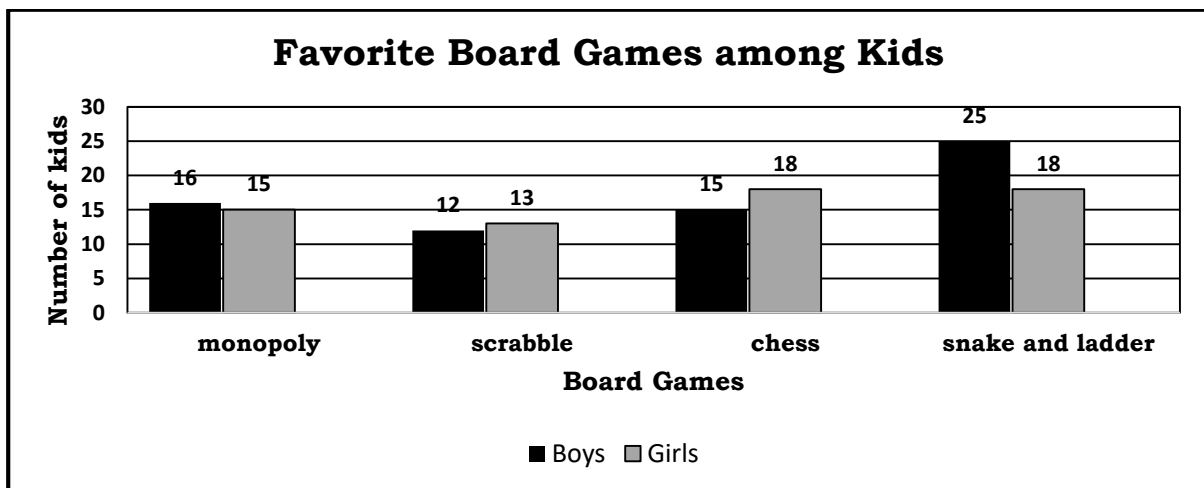
1. On which day was the sale of quail eggs the greatest?  
a. Friday  
b. Monday  
c. Thursday  
d. Tuesday
2. On which two days were the number of quail eggs sold the same?  
a. Thursday and Friday  
b. Monday and Wednesday  
c. Tuesday and Thursday  
d. Tuesday and Monday



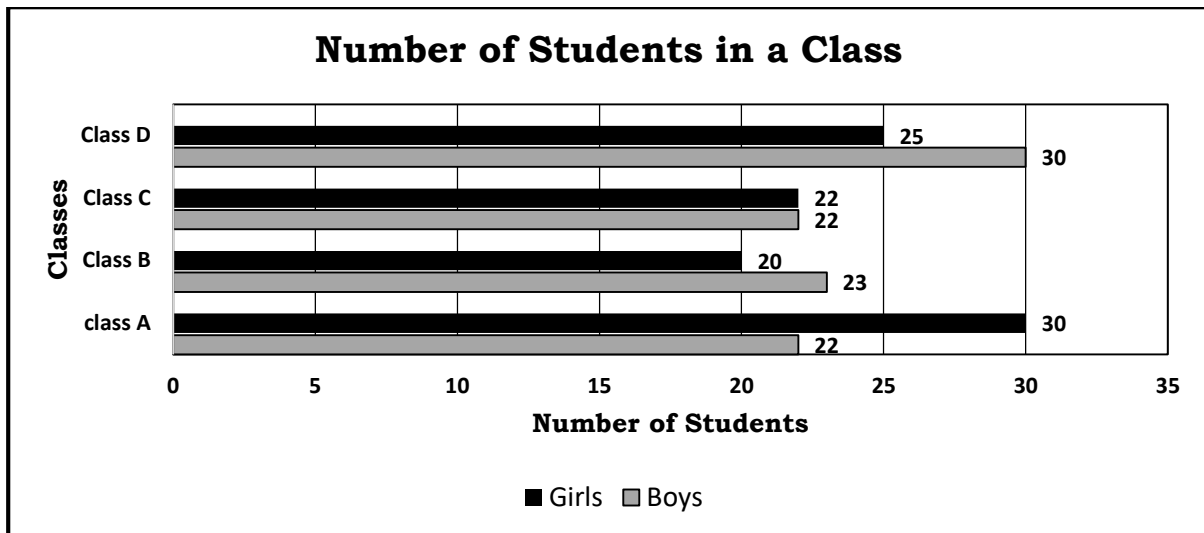
3. How many more votes did Andrei get than Allan?  
a. 20  
b. 22  
c. 23  
d. 24
4. What is the total number of students who voted in the election?  
a. 365  
b. 363  
c. 362  
d. 361



5. Which of the following statements best interpret the given bar graph?
- There was a slight decrease in the number of flu cases.
  - The number of flu cases increased from January to April.
  - The lowest number of flu cases was in February.
  - The highest number of flu cases was in March.



6. Which board game is least popular among the boys?
- chess
  - monopoly
  - scrabble
  - snake and ladder
7. Which board games are equally popular with the girls?
- snake and ladder & scrabble
  - monopoly and chess
  - snake and ladder & chess
  - scrabble and chess



8. In which class is the number of boys greater than girls?
- a. B & D      b. C & D      c. B & A      d. C & A
9. What is the total number of students in Class B?
- a. 43      b. 44      c. 52      d. 55
10. How many girls are there in all 4 classes?
- a. 110      b. 100      c. 99      d. 97

Are you done answering?

If yes, time to check.

Please go to page 33 for the **Answer Key**.

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next lesson.

If your score is below 8, kindly study again the lesson and the activities.

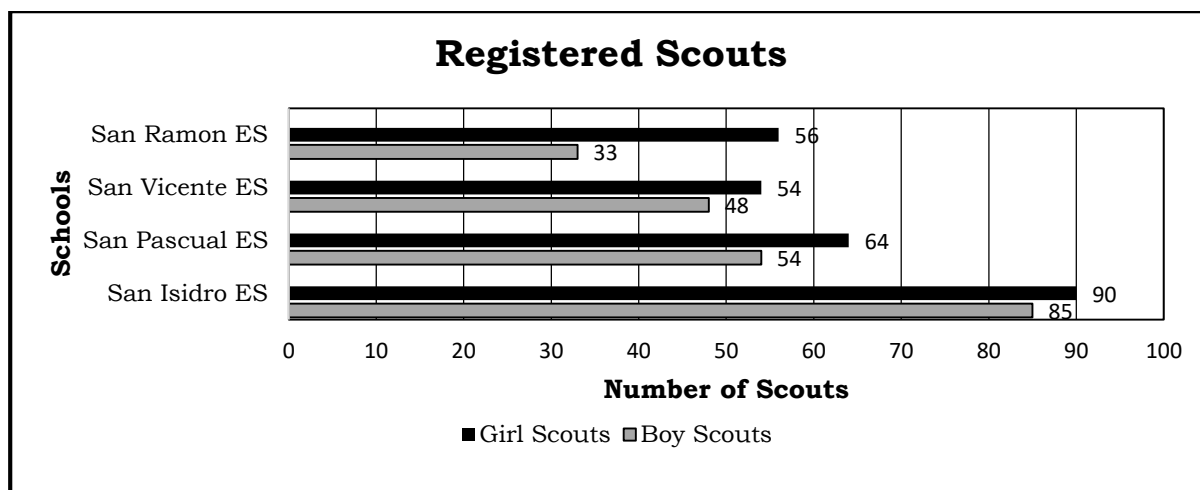






## Additional Activities

Interpret the data of the double bar graph below. Answer the guide questions that follow.



1. What is the title of the graph?
2. How many girl scouts are registered?
3. How many boy scouts are registered?
4. Which school has the highest number of registered scouts?
5. Which school has the lowest registered scouts?

Are you done answering?

If yes, time to check. Please go to page 33 for the **Answer Key**.



## ***What I Need to Know***

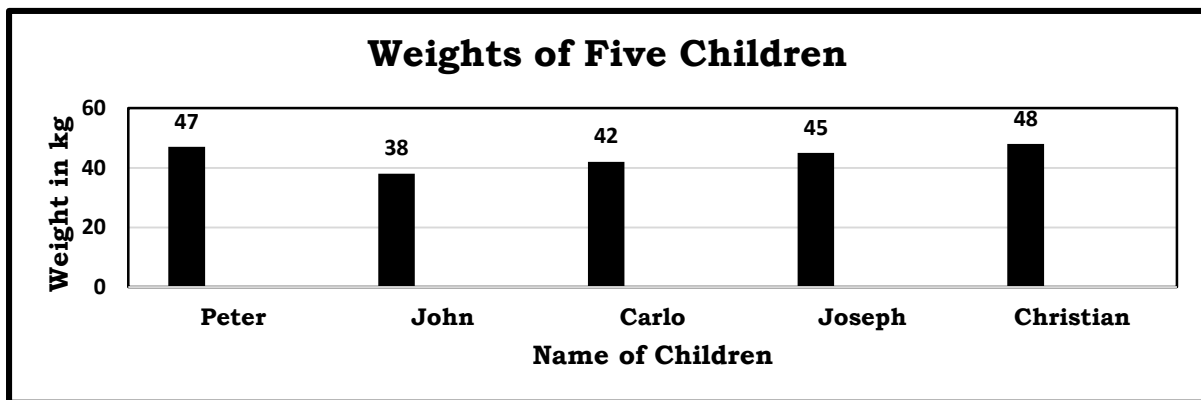
In this lesson, you will apply your knowledge on bar graphs in solving word problems. Understanding the problem, planning strategies, executing solutions, and writing the correct answer are positive attitudes towards problem solving.

After going through this module, you are expected to solve routine and non-routine problems using data presented in a single or double bar graph.



## ***What I Know***

The bar graph below shows the weights of five children.



Use the data in the bar graph to answer the following questions. Choose the letter of the correct answer.

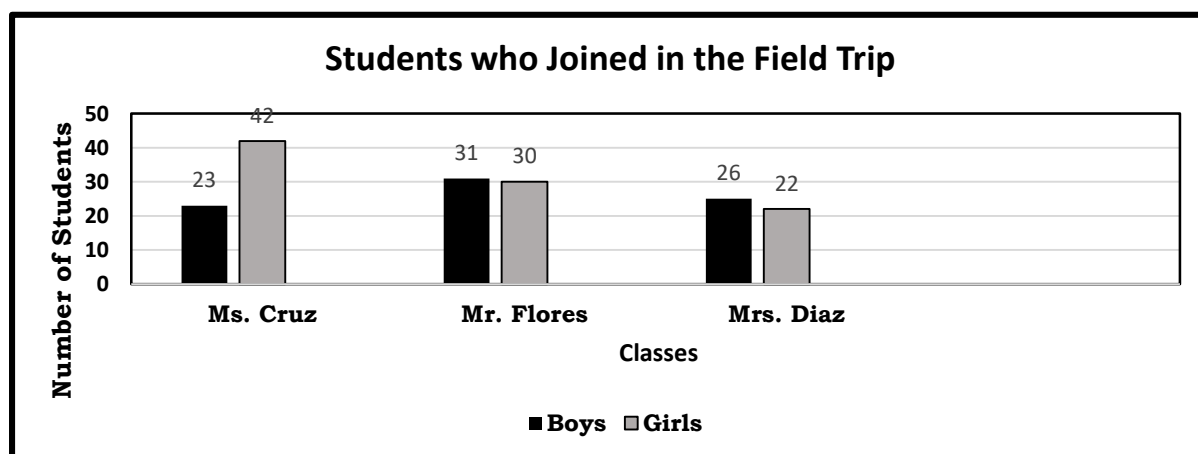
1. What is the combined weight of John and Joseph?  
a. 80kg                      b. 82 kg                      c. 83 kg                      d. 84 kg
2. What is the total weight of the five children?  
a. 230 kg                      b. 225 kg                      c. 220kg                      d. 215 kg

3. How much more is the combined weight of Peter and Joseph than the combined weight of John and Christian?
- a. 6 kg                      b. 8 kg                      c. 10 kg                      d. 12 kg

Answer the following questions for problems 4 and 5.

- a. What is the number sentence?  
b. What is the complete answer?
4. What is the average weight of five children?
5. What must be the weight of the sixth child to get an average weight of 42 kg?

The classes of Ms. Cruz, Mrs. Diaz, and Mr. Flores went on a field trip. The number of students in each class is shown in the bar graph below.



Use the data presented in the double bar graph to answer the questions. Choose the letter of the correct answer.

6. What is the total number of students who joined the field trip?
- a. 172                      b. 173                      c. 174                      d. 175
7. What is the difference between the total number of girls and the total number of boys who joined the field trip?
- a. 13                      b. 14                      c. 15                      d. 16

8. What is the average number of students of the three classes?  
 a. 31                      b. 38                      c. 48                      d. 58
9. How much is the total cost for all students if the cost to join the field trip is Php 450 for each student?  
 a. What is the number sentence?  
 b. What is the solution and the final answer?
10. The cafeteria where Mrs. Diaz' class ate lunch has 10 rectangular tables with 8 seats each. If they rearranged the 10 tables into two lines with equal number of tables and placed the shorter sides of the table's end-to-end, how many seats will not be occupied? Hint: The shorter side can only have one seat.

Table 1	Table 2	Table 3	Table 4	Table 5
---------	---------	---------	---------	---------

Table 6	Table 7	Table 8	Table 9	Table 10
---------	---------	---------	---------	----------

- a. 14                      b. 16                      c. 18                      d. 20

Are you done answering?

If yes, time to check. Please go to page 33 for the **Answer Key**.



CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

## Lesson 2

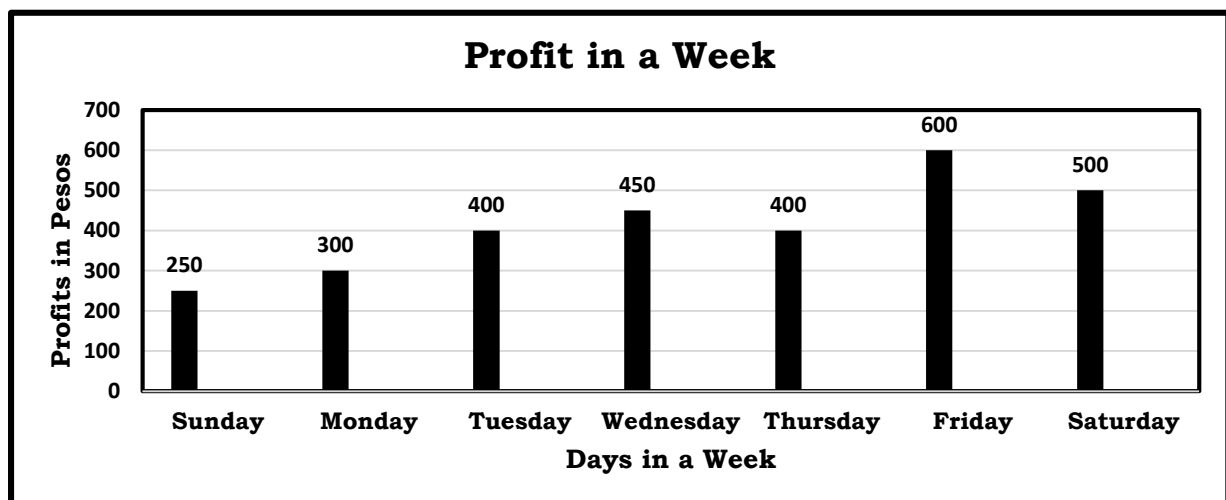
# Solving Routine and Non-routine Problems Using Data in a Bar Graph



### *What's In*

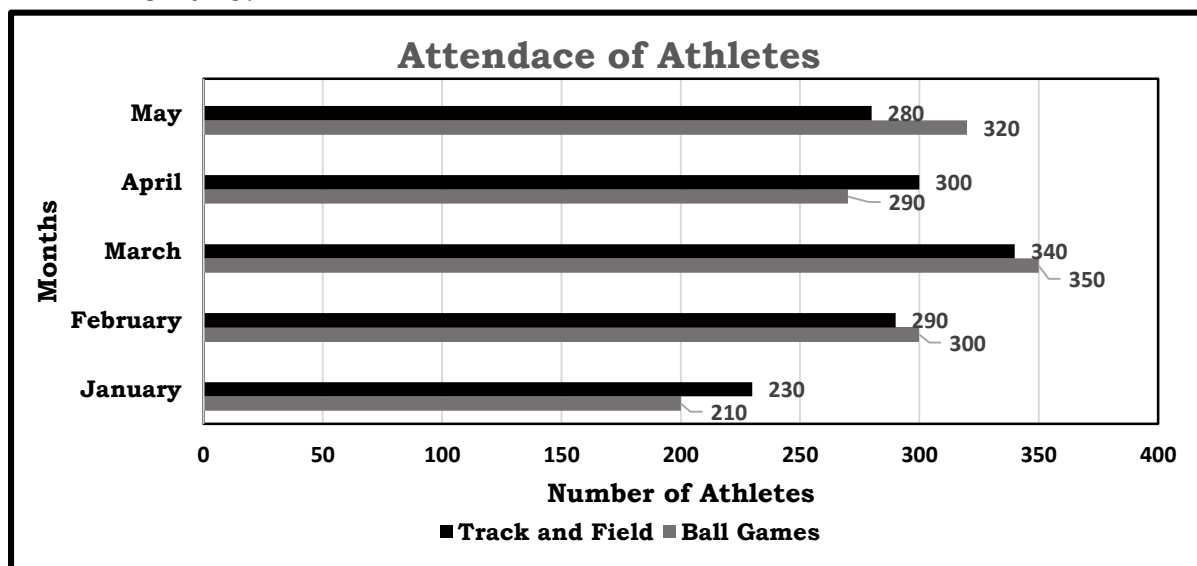
Study the graph and answer the questions that follow.

- A. Mang Kanor sells dried fish in the market. The bar graph shows the profit he had for a week.



1. On which day did Mang Kanor earn the highest profit?  
Has the lowest profit?
2. On which days did he earn the same profit?
3. What was the increase in profits from Tuesday to Wednesday?
4. What was the decrease in profits from Friday to Saturday?  
What is the total profit for the week?
5. What is the total profit for the week?

B. The double bar graph shows the attendance of the Ball Games and Track and Field Athletes in a training for 5 months.



6. Which month has the highest attendance?
7. Which month has the highest attendance?
8. What is the total attendance of the Ball games athletes?
9. What is the total attendance of the Track and Field athletes?
10. What was the difference in attendance of the Ball games athletes and the Track and Field athletes?

Are you done answering?

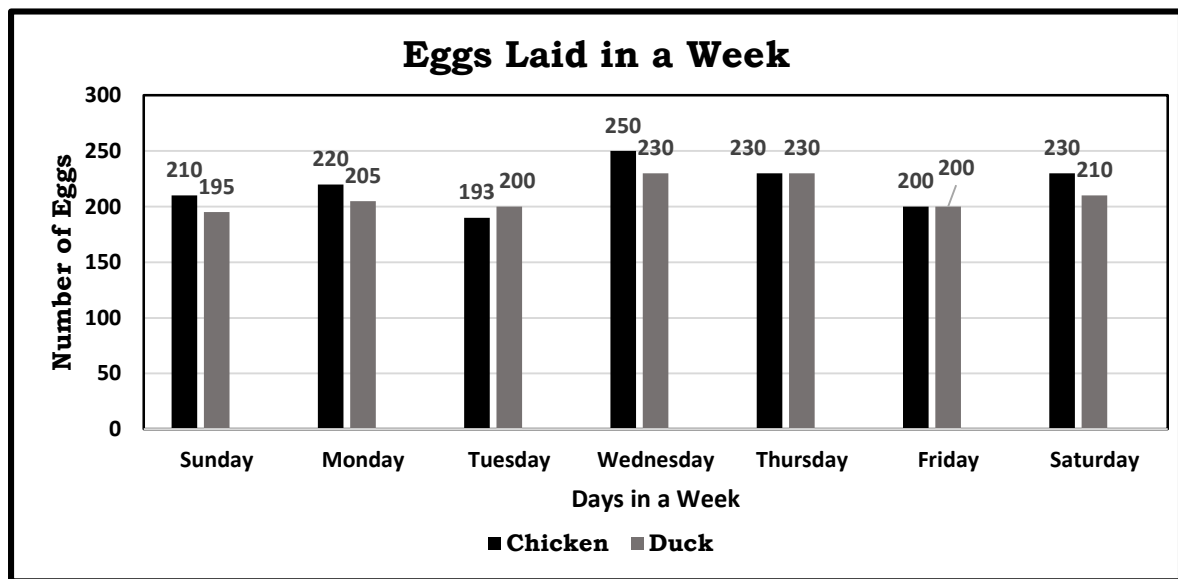
If yes, time to check.

Please go to page 34 for the **Answer Key**.



## What's New

Mang Berto has a poultry farm. He has the same number of chickens and ducks that laid eggs every day. His caretaker kept track on the number of eggs laid every day. The bar graph shows the number of eggs laid in a week.



Use the data presented in the bar graph to solve the problems below:

1. What is the difference between the total number of chicken eggs and the total number of duck eggs laid in a week?
2. What is the average number of chicken eggs laid in a week?  
What is the average number of duck eggs laid in a week?



## What is It

The problem given is an example of a routine problem. **Routine problems** need to use a certain process in order to be solved easily.

Let us solve problem number 1.

- What is the difference between the total number of chicken eggs and the total number of duck eggs laid in a week?

To solve the problem, we can make use of the 4-step plan.

STEPS	ANSWER																										
A. Understand																											
1. Read and understand the problem																											
2. Know what is asked for in the problem	The difference between the total number of chicken eggs and the total number of duck eggs laid in a week.																										
3. Know the hidden information.	The total number of chicken eggs and total number of duck eggs laid in a week.																										
4. Find the necessary information.	The given facts are: <table><tr><td>Days/Eggs</td><td>Chicken</td><td>Ducks</td></tr><tr><td>Sunday</td><td>210</td><td>195</td></tr><tr><td>Monday</td><td>220</td><td>205</td></tr><tr><td>Tuesday</td><td>193</td><td>200</td></tr><tr><td>Wednesday</td><td>250</td><td>230</td></tr><tr><td>Thursday</td><td>230</td><td>230</td></tr><tr><td>Friday</td><td>200</td><td>200</td></tr><tr><td>Saturday</td><td>230</td><td>210</td></tr></table>			Days/Eggs	Chicken	Ducks	Sunday	210	195	Monday	220	205	Tuesday	193	200	Wednesday	250	230	Thursday	230	230	Friday	200	200	Saturday	230	210
Days/Eggs	Chicken	Ducks																									
Sunday	210	195																									
Monday	220	205																									
Tuesday	193	200																									
Wednesday	250	230																									
Thursday	230	230																									
Friday	200	200																									
Saturday	230	210																									
B. Plan																											
1. Determine the operations to be used.	Addition and Subtraction																										



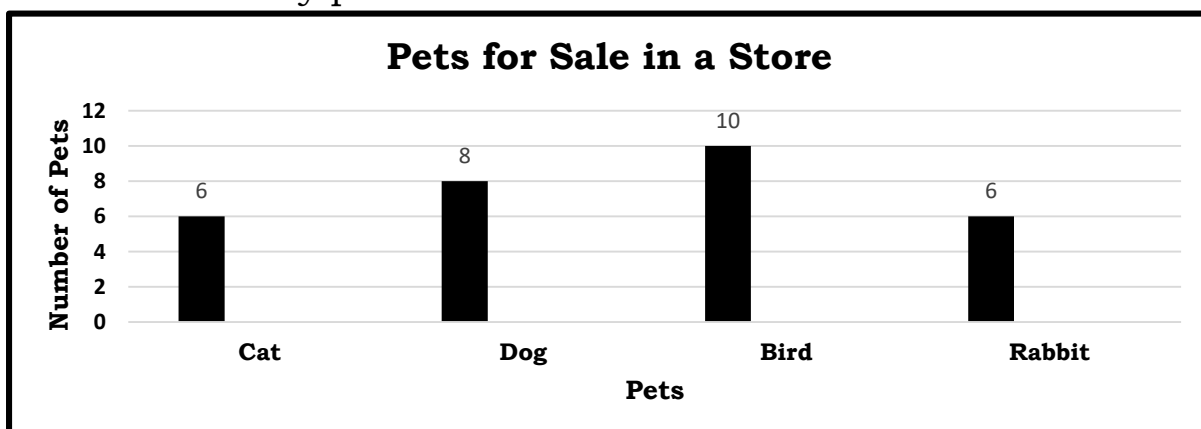
2. Write the number sentence.	$(210+220+193+250+230+200+230) - (195+205+200+230+230+200+210) = N$
C. Solve using the operations.	$(210+220+190+250+230+200+230) - (195+205+200+230+230+200+210) = N$ $1533 - 1470 = N$ $63 = N$
D. Check, look back and give the final answer	The difference between the total number of chicken eggs and the total number of duck eggs laid in a week is 63 eggs.

Let's have problem number 2.

- What is the average number of chicken eggs laid in a week and the average number of duck eggs laid in a week?
  - What is asked for in the problem?
    - The average number of chicken eggs laid in a week
    - The average number of duck eggs laid in a week.
  - Know the hidden information.
    - The total number of chicken eggs laid in a week.
    - The total number of duck eggs laid in a week.
  - Find the necessary information.
    - 210, 220, 193, 250, 230, 200 and 230 chicken eggs.
    - 195, 205, 200, 230, 230, 200 and 210 duck eggs.
  - Determine the operations to be used.
    - Addition and division
  - Write the number sentence.
    - $(210+220+193+250+230+200+230) \div 7 = N$
    - $(195+205+200+230+230+200+210) \div 7 = N$

- Solve using the operations.
  - $(210+220+193+250+230+200+230) \div 7 = N$   
 $1\ 533 \div 7 = N$   
 $219 = N$
  - $(195+205+200+230+230+200+210) \div 7 = N$   
 $1\ 470 \div 7 = N$   
 $210 = N$
- Check, look back and give the final answer.
  - The average number of chicken eggs laid in a week is 219 eggs.
  - The average number of duck eggs laid in a week is 210 eggs.

A pet store sells dogs, cats, birds and rabbits. The bar graph shows how many pets are for sale at the store.



A bird costs Php 200 and a rabbit costs Php 400. David paid Php 2 000 for 6 birds and rabbits. How many birds did he buy? How many rabbits did he buy? How many birds and rabbits were left?

This problem is an example of a non-routine problem.

**Non-routine problems** are those that require some degree of creativity to solve. These problems can be solved in multiple ways or using different strategies like Listing/Table Method, Guess and Check, Drawing/Diagram, Using Patterns, etc.

Let us solve the problem through Guess and Check:

	No. of Rabbits	Value	No. of Birds	Value	Total Value
First Guess	3	$3 \times 400 = 1\,200$	3	$3 \times 200 = 600$	$1\,200 + 600 = 1\,800$
Second Guess	4	$4 \times 400 = 1\,600$	2	$2 \times 200 = 400$	$1\,600 + 400 = 2\,000$

Therefore, he bought **4 rabbits and 2 birds**.

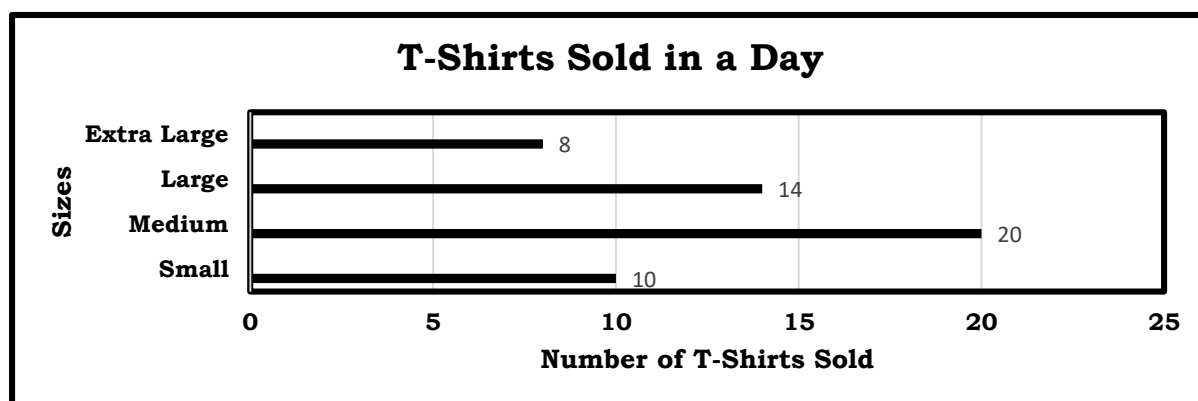
Total number of rabbits is  $6 - 4 = 2$ , there were 2 rabbits left in the store.

Total number of birds is  $10 - 2 = 8$ , there were 8 birds left in the store.



### What's More

Study the graph and use the given data to answer the following questions.



1. What is the average number of t-shirts sold in a day?
  - a. What is asked in the problem?
  - b. What information/facts are needed to solve the problem?
  - c. What operation will you use?
  - d. What is the number sentence?
  - e. What is the complete answer?

2. If a small shirt costs Php 300, a medium shirt costs Php 350, a large shirt costs Php 380, and an extra-large shirt costs Php 400, what is the total sales of the store on that particular day?
- What is the number sentence?
  - What is the complete answer?

Are you done answering?

If yes, time to check.

Please go to page 34 for the **Answer Key**.



### ***What I Have Learned***

How do we solve routine and non-routine problems using data presented in a bar graph?

Routine problems follow the 4-step solving method.

Understand:

What does the problem ask for?

What are the given data or information?

What is the hidden information?

Plan:

What operation/s is/are to be used?

What is the number sentence?

Solve:

Show the solution by using the operations.

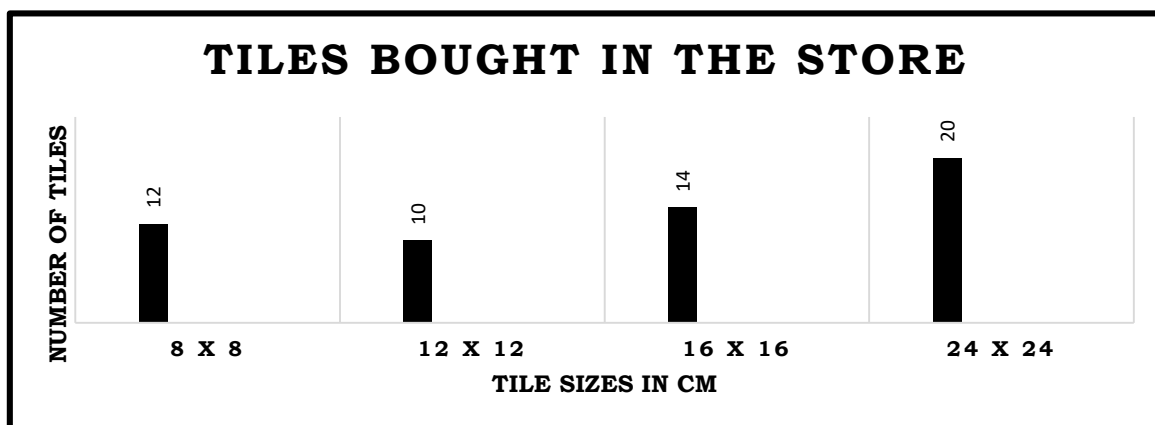
Check, look back and give the final answer.

Non-routine problems are those that require some degree of creativity to solve. These problems can be solved in multiple ways or using different strategies like Listing/Table Method, Guess and Check, Drawing/Diagram, Using Patterns, etc.



## What I Can Do

Mario wants to tile his porch. He bought several sizes of tiles in the store. The bar graph shows the sizes and the number of tiles he bought from the store.



Use the data in the given bar graph to answer the following questions.

1. What is the total number of tiles he bought from the store?
2. What area can be covered by 10 pieces of 12 x 12 tiles?
3. How many possible squares can be made by 12 pieces of 8 x 8 tiles?

Are you done answering?

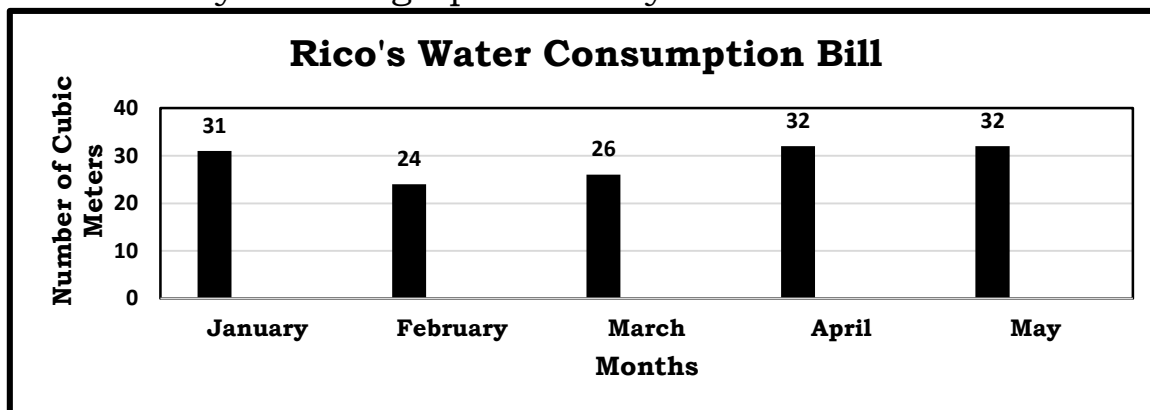
If yes, time to check.

Please go to page 34 for the **Answer Key**.



## Assessment

A. Study the bar graph carefully.



Use the data in the vertical bar graph above to solve the following problems. Choose the letter of the correct answer.

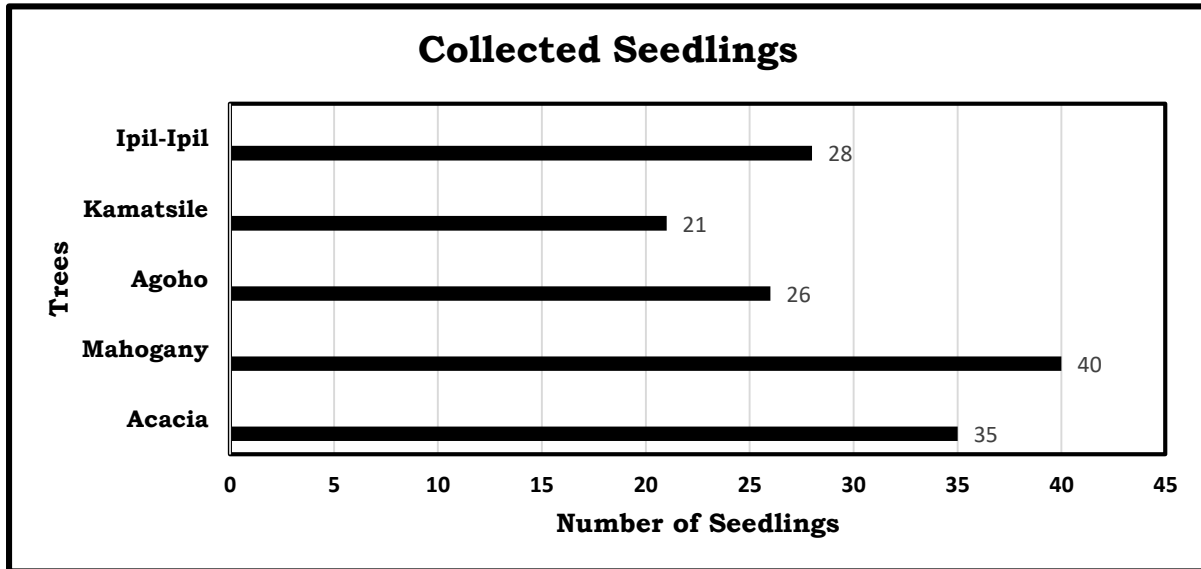
1. What is the total water consumption from January to May?  
a.  $144 \text{ m}^3$       b.  $145 \text{ m}^3$       c.  $146 \text{ m}^3$       d.  $147 \text{ m}^3$
2. What is the average water consumption bill for 5 months?  
a.  $28 \text{ m}^3$       b.  $29 \text{ m}^3$       c.  $30 \text{ m}^3$       d.  $147 \text{ m}^3$

For numbers 3 to 5:

Suppose the cost of water per cubic meter is Php 34.00.

3. How much would Rico pay for the month of January?  
a. Php 1540.00      c. Php 1054.00  
b. Php 1450.00      d. Php 1045.00
4. How much would he pay for the months of February and March?  
a. Php 1700.00      c. Php 1800.00  
b. Php 1750.00      d. Php 1900.00
5. What is the total water consumption bill for 5 months?  
a. Php 4309.00      c. Php 4930.00  
b. Php 4903.00      d. Php 4980.00

B. Marichu is the Chairman of the Committee on Barangay Beautification. She collected different kinds of seedlings for the tree planting activities. The table shows the numbers of seedlings she already collected.



Answer the following questions.

6. What is the total number of seedlings she collected?
  - a. What is the number sentence?
  - b. What is the final answer?
7. What is the average number of collected seedlings?
  - a. What is the number sentence?
  - b. What is the final answer?
8. If they are going to plant mahogany and acacia trees along side of the road with 4 meters interval, how many meters will it cover?
  - a. What is the number sentence?
  - b. What is the final answer?
9. If the road in front of the school will be planted with 21 *Kamatsile* trees and the trees are 3 meters away from each other. How far is the 10<sup>th</sup> tree away from the first one?
  - a. What is the number sentence?
  - b. What is the final answer?

10. If one seedling of agocho tree costs Php 100.00, how much would she pay for 26 agocho seedlings?
- What is the number sentence?
  - What is the final answer?

Are you done answering?

If yes, time to check. Please go to page 34 for the **Answer**

Got a score of 8 to 10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.



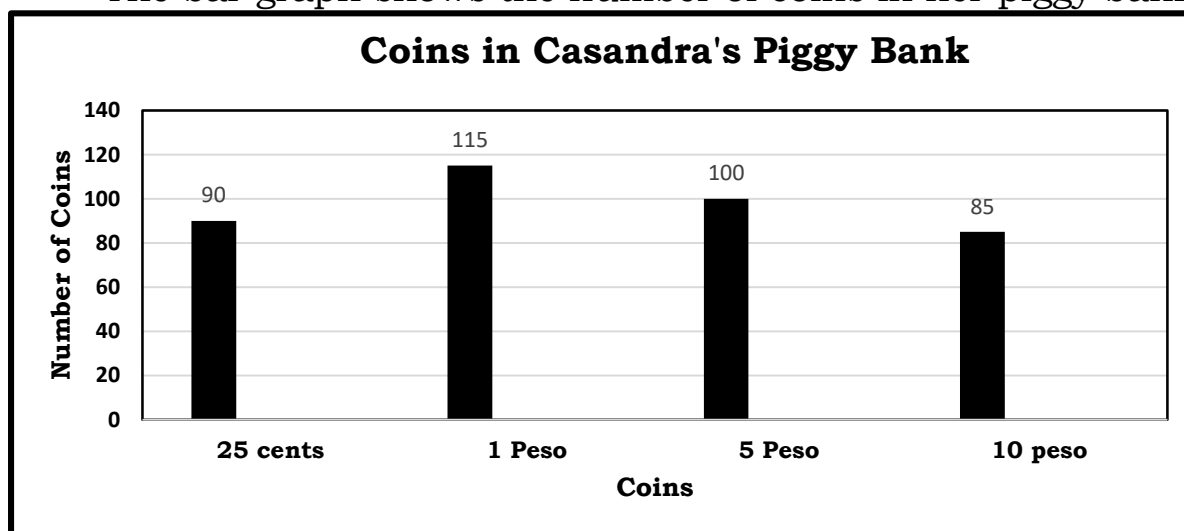




## Additional Activities

Cassandra used to save excess coins from her weekly allowance. At the end of the school year, she counted the coins in her piggy bank and graph the results.

The bar graph shows the number of coins in her piggy bank.



Use the data in the bar graph to answer the following questions.

1. What is the total amount of her savings?
2. She donated 20 pieces of each type of coins to the church choir.
  - a. How many total coins does she have left?
  - b. What is the total amount of the coins she donated?
  - c. What is the total amount of coins left?

Are you done answering?

If yes, time to check.

Please go to page 34 for the **Answer Key**.



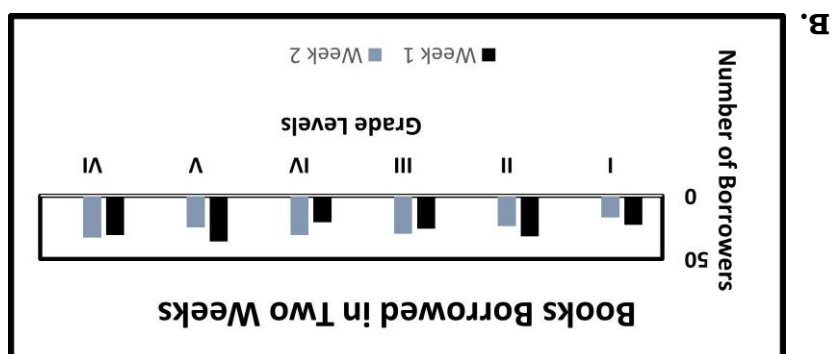
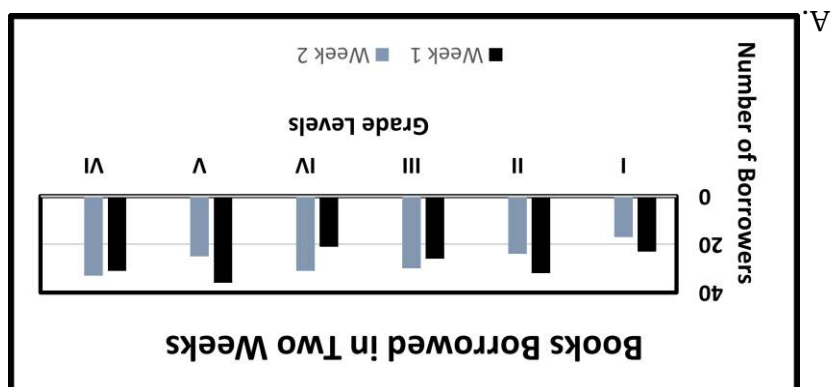
## Answer Key

### Lesson I

#### What I Know

1. d
2. a
3. d
4. b
5. a
6. b
7. a
8. a
9. b
10. c

#### What's In



#### What's More

- A.
1. Number of Bottle Days in a week
  2. Number of Empty Bottles Collected each day in a Week
  3. Friday, 60
  4. Tuesday, 24
  5. 202

**Lesson 1****What I Can Do****A.**

1. Grade VI borrowed the most number of books while Grade IV borrowed the least number of books

2. 320

B.

a,c,d,e

**Assessment**

- |      |       |
|------|-------|
| 1. b | 6. c  |
| 2. c | 7. c  |
| 3. b | 8. a  |
| 4. c | 9. a  |
| 5. b | 10. d |

**Additional Activities**

- Registered Girl and Boy Scouts
- There are 264 registered Girl Scouts and 220 registered Boy Scouts.
- San Isidro has the highest registered scouts while San Ramon has the lowest.

**Lesson II****What I Know**

- c
- c
- a
- a.  $(47 + 38 + 42 + 45 + 48)/5 = N$   
b. 44 kgs
- a.  $(6 \times 42) - (47 + 38 + 42 + 45 + 48) = N$   
b. 32 kgs
- c
- b
- d
- a.  $(23 + 42 + 31 + 30 + 26 + 22) \times \text{Php } 450.00 = N$   
b. Php 78,300.00
- b

**Lesson 2****What's In**

1. Friday has the highest profit while Sunday has the lowest profit.
2. Tuesday and Thursday has the same amount of profits.
3. An increase of Php 50.00
4. A decrease of Php 100.00
5. Php 2900.00
6. March has the highest attendance
7. January has the lowest attendance
8. 1470
9. 1440
10. 30

**What's More**

1. a. The average number of T-shirts sold in a day.  
b. 8, 14, 20, 10 t-shirts  
c. addition and division  
d.  $(8 + 14 + 20 + 10) \div 4 = N$   
e. 13 is the average sales in a day  
2. a.  $(10 \times \text{Php } 300.00) + (20 \times \text{Php } 350.00) + (14 \times \text{Php } 380.00) + (8 \times \text{Php } 400.00) = N$   
b. Php 18 520.00

**What I Can Do**

1. 56 tiles
2. 1440 sq cm
3. 3

**Assessment**

1. B  
2. B  
3. C  
4. A  
5. C
6. a.  $28 + 21 + 26 + 40 + 35 = N$   
b. 150
7. a.  $(28 + 21 + 26 + 40 + 35) \div 5 = N$   
b. 30
8. a.  $34 \times 4 = N$   
b. 136 m
9. a.  $9 \times 3 = N$   
b. 27 m
10. a.  $26 \times \text{Php } 100.00 = N$   
b. Php 2600.00

**Additional Activities**

1. Php 1487.50
2. a. 310 coins  
b. Php 325.00  
c. Php 1162.50

## ***References***

K to 12 Mathematics Curriculum Guide, August 2016

Tabilang, Alma R., Arce, Ian Jay B., Pascua, Rodrigo V., Calayag, Nelma P., Dacubo, Lolita p., Borais, Diolata B., Buemia, Rafael B., collao, Myra T., Morandante, Larry G., Danao, Amado B., Gonzaga, Laura N., Briones, Isagani A., Daganta, John Antonio D., 2015, Mathematics 4 Teacher's Guide, Department of Education

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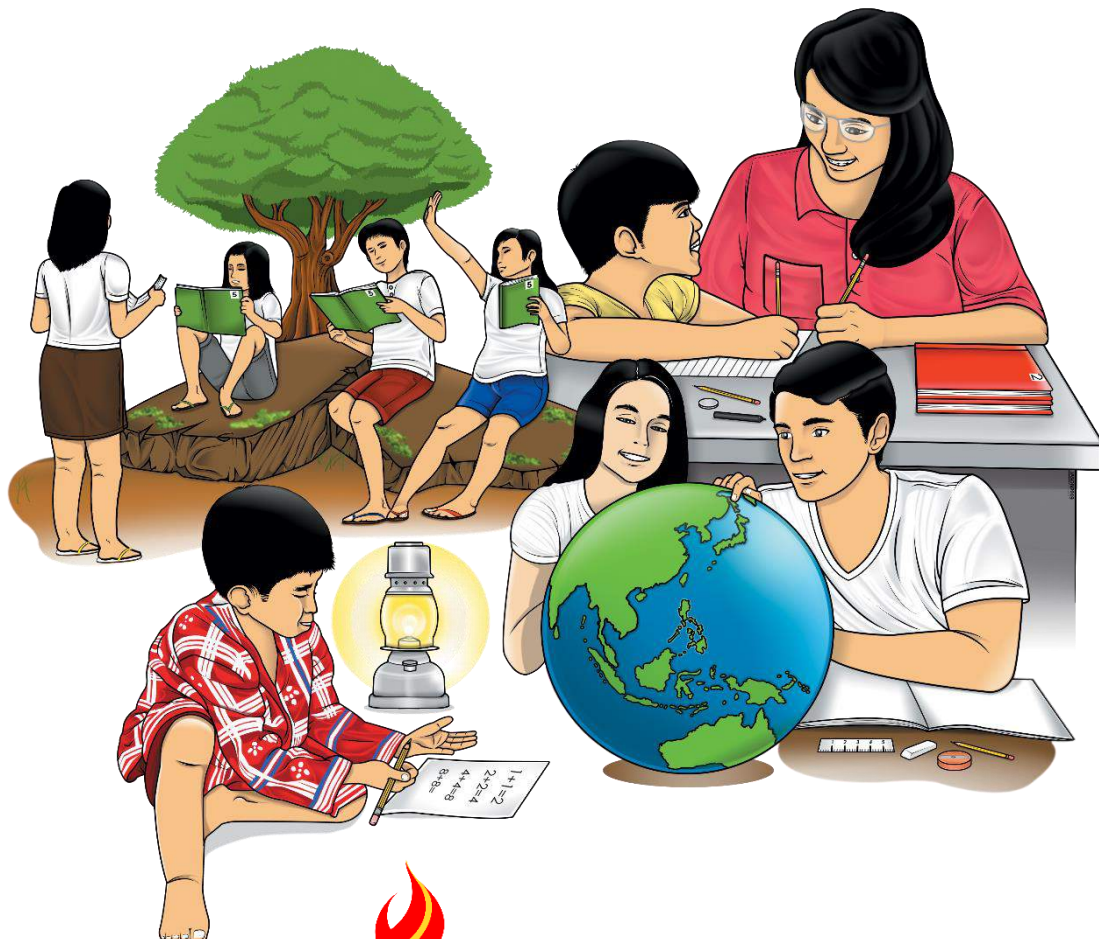
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# Mathematics

## Quarter 4 – Module 8: Probability



**Mathematics – Grade 4**  
**Alternative Delivery Mode**  
**Quarter 4 – Module 8: Probability**  
**First Edition, 2020**

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Published by the Department of Education  
Secretary: Leonor Magtolis Briones  
Undersecretary: Diosdado M. San Antonio

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**Printed in the Philippines by \_\_\_\_\_**

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Rawis, Legaspi City 4500  
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# **Mathematics**

## **Quarter 4 – Module 8: Probability**

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

This module was designed in order to assist you in learning about probability.

In this lesson, you will learn how to record, express and explain outcomes. The learning activities allow you to explore and discover how you can properly give the outcomes in simple experiments.

After going through this module, you are expected to be able to:

1. record favorable outcomes in a simple experiment;
2. express the outcome in a simple experiment in words, symbols, tables, or graphs;
3. explain the outcomes in an experiment; and
4. solve routine and non-routine problems involving simple experiments.



## What I Know

Read the situations and answer the questions that follow. Look for the correct answers in the box.

- I. Sylvia has six marbles. One is colored red, two marbles are yellow, and the three remaining marbles are blue. She puts the marbles inside a box and calls her friend Melinda. She told her to pick one marble without looking at it.

1. What is the chance that Melinda will pick a yellow marble?
2. What is the chance that she will pick a blue marble?
3. What is the probability that she will pick a red marble?
4. What is the probability that she will pick a green marble?
5. How many times will Melinda pick to get all marbles?

- |               |               |               |
|---------------|---------------|---------------|
| a. 0 out of 6 | c. 6          | e. 1 out of 6 |
| b. 3 out of 6 | d. 2 out of 6 |               |

- II. Using the illustrations below, color the part showing the chance of picking the desired color of marbles.

green	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
yellow	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
blue	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
red	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>
all colors	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>

Check your answers with the **Answer Key**.



If you got all correct answers, GREAT JOB! The activities in this module would be easy tasks for you. If not, you need to study well the lesson and exercises in this module.



## ***What's In***

In our daily lives, there are plenty of things that we are not sure to happen. We are not sure of what the weather would be on a particular day - maybe sunny or rainy. But if we see very dark clouds in the sky, we are almost certain that it will rain.

In this module, we will study about the chance or probability of an event to happen.



## ***What's New***

In her English class, Mrs. Santos gave an activity. The names of the days of the week were written on flashcards which were then placed in a basket. The students were asked to pick a card from the basket. Arwin was the first to pick a flashcard. What is the probability that he would pick a card showing a day that begins with S?



## What Is It

Let us write down the days of the week.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
--------	--------	---------	-----------	----------	--------	----------

- What is the probability that he would pick a day that begins with **S**?

What is probability?

**Probability** is the chance or likelihood that an event will happen. It is the ratio of the number of ways an event can occur to the number of total possible outcomes.

$$\textbf{Probability} = \frac{\text{Number of outcomes of an event}}{\text{Total number of possible outcomes}}$$

How many days are there in a week? - 7

What day starts with **S**? - Sunday, Saturday

How many days start with **S**? - 2

Since there are 2 out of the seven days then, the probability of picking a day that begins with S is:

$$\textbf{2 out of 7, or } \frac{2}{7}$$

- What is the probability that he would pick a day that begins with **M**?

How many days are there in a week? - 7

What day starts with **M**? - Monday

How many days start with **M**? - 1

Since it is only 1 out of the seven days, then the probability of picking the day that begins with M is:

$$\textbf{1 out of 7, or } \frac{1}{7}$$

- What is the chance that he would pick a day that begins with R? Is there a day that begins with R? **None**.  
Therefore, the chance that he would pick a day that begins with R is:

**0 out of 7 or  $\frac{0}{7}$  or 0.**

This is also called **zero probability**. This is an event that is **impossible to happen**.

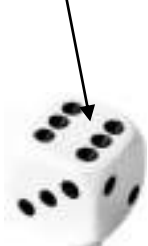
Did you understand how to compute the probability of an event?

Let us have another example.

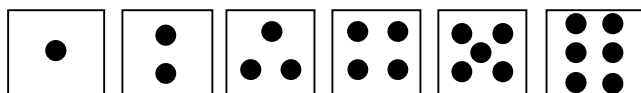
Lemuel and Ian will play scrabble. In order to know who will play first, they will roll a die with six faces. Whoever rolls the higher number will play first.

What is the probability that Lemuel will roll a six? The illustrations below are the possible outcomes in rolling a die.

upturned face  
(side facing upward)



A die has 6 faces.



How many faces of the die has six dots? **Only 1**

How many faces does a die have? **6**

Let  $P(6)$  be the probability of getting 6 dots in one roll of a six-sided die.

**$P(6) = 1 \text{ out of } 6, \text{ or } \frac{1}{6}$**

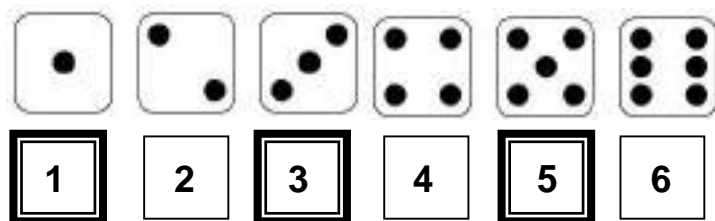
Let us examine the table of the probabilities of the other outcomes.

Probability of getting $n$ dots	Probability
P (6)	1 out of 6 or $\frac{1}{6}$
P (5)	1 out of 6 or $\frac{1}{6}$
P (4)	1 out of 6 or $\frac{1}{6}$
P (3)	1 out of 6 or $\frac{1}{6}$
P (2)	1 out of 6 or $\frac{1}{6}$
P (1)	1 out of 6 or $\frac{1}{6}$

How about the probability of rolling a 7? Is there a face in a die with 7 dots? **None.** So, it is **impossible to happen**. Therefore, the probability of getting **7 dots is 0 out of 6**.

$$P(7) = \frac{0}{6} \text{ or zero probability}$$

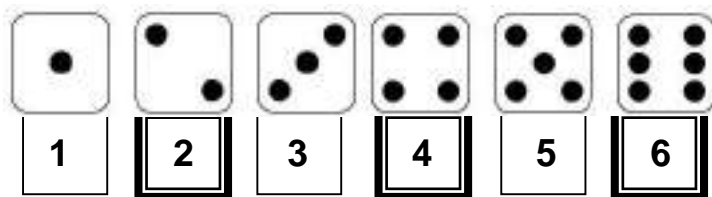
What is the probability of getting an odd number when a six- faced die is rolled once? How many faces of a die have odd number of dots?



Three out of the six faces of a die have an odd number of dots. These are 1, 3, and 5. The probability of getting an odd number in one roll of a die is **3 out of 6 or  $\frac{3}{6}$  or  $\frac{1}{2}$** .



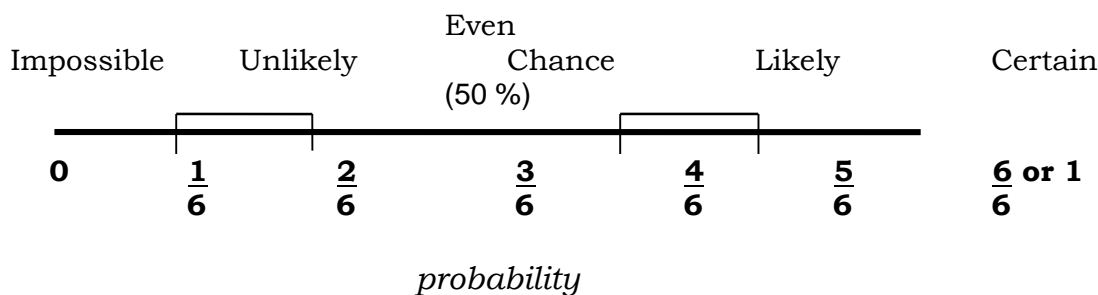
How about even numbers? How many faces of the die have an even number of dots?



Three out of the six faces of a die have an even number of dots. These are 2, 4, and 6. The probability of getting an even number in one roll of a die is **3 out of 6 or  $\frac{3}{6}$  or  $\frac{1}{2}$** .

The probability of getting an even number is equal to the probability of getting an odd number when a six-sided die is rolled once.

Look at the **Probability Line**.



- The probability of getting 6 when a die is rolled once is only  $\frac{1}{6}$ . The event of getting a six when a die is rolled once is **unlikely to happen**. There is a small chance that this event will happen; it is below 50%.

$$P(6) = \frac{1}{6}$$

- The probability of getting an **even number** when a die is rolled once is  $\frac{3}{6}$  or  $\frac{1}{2}$ . The probability of getting an **odd number** when a die is rolled once is also  $\frac{3}{6}$  or  $\frac{1}{2}$ . There are **even** or **equal chances** for these two events to happen. There is a 50/50 chance of getting an even number in one roll of die. There is also a 50/50 chance of getting an odd number in the given situation. These are **equally likely events**.

$$P(\text{odd}) = \frac{3}{6} = \frac{1}{2} \qquad P(\text{even}) = \frac{3}{6} = \frac{1}{2}$$

- The probability of getting **a number of dots less than 6** when a die is rolled once is 5 out of 6 or  $\frac{5}{6}$ . This is **likely to happen**.
- The probability of getting a number of dots **less than 7** when a die is rolled once is **6 out of 6** or **1**. There are 6 numbers-less than 7 in a die, and these are 1, 2, 3, 4, 5 and 6. There are 6 possible outcomes when a die is rolled once which are 1, 2, 3, 4, 5, 6. Therefore, the probability of getting a number less than 7 is 1. This event is **certain or sure to happen**.

$$P(\text{less than 7}) = \frac{6}{6} = 1$$

- The probability of getting **7 dots** in rolling a die once is zero. This is an **impossible event** because there is no face with 7 dots. It has a **zero probability**, and so it will never happen.

Hey kids, did you understand the process of computing the probability of an event? Remember to look for the number of outcomes in an event and the total possible number of outcomes.



## ***What's More***

### **Activity 1 – “Spin the Wheel”**

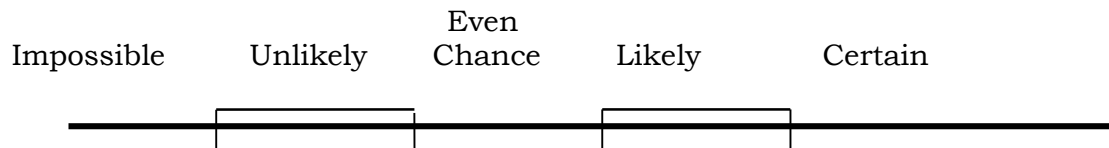
A grade five class plays “Spin the Wheel.” The wheel is divided into 8 parts. It contains the numerals 3, 7, 9, 6, 1, 5, 10,



1. What is the probability that in one spin of the wheel, the pointer will land on an odd number?
2. If the pointer lands on any numeral less than 5, what are the possible outcomes?
3. What is the probability of landing on a numeral greater than 10
4. If the pointer will land on an even number, list down the possible outcomes.
5. Is it possible that the pointer will land on numeral 2? Why?

## Activity 2 – “Plot It”

Using the answers in activity 1, plot them in the probability line below.



## Activity 3 – “Pick The Pen”

Ian has four pens of different colors inside the pocket of his bag. One is blue, two are red, and one is black. Without looking at them, Ian will pick one pen from the pocket of his bag.

1. What is the probability that he will get a black pen?
2. Is there a possibility that he will pick an orange pen? Why?
3. What is the probability that he will get a blue pen?
4. What is the probability that he will pick a yellow pen?
5. How many possible outcomes are there in picking a pen? Why?

Check your answers with the **Answer Key**.



If you got a score of 12-15, CONGRATULATIONS! You did well in this lesson. You will not find difficulty in performing other activities in this module.

If your score is below 12, kindly go back and study carefully the examples given.



## ***What I Have Learned***

How do we interpret the data in different bar graphs?

Let us remember:

**Probability** is the chance or likelihood that an event will happen. It is the ratio of the number of outcomes of an event to the total number of possible outcomes.

- **An event impossible to happen** has a **zero probability**.
- An event is **unlikely** to happen if there is a **very small chance for it to happen**. Its probability is **greater than 0 but below 50 %**.
- An event has **even chance** if it has **50% probability** to happen.
- An event is **likely** to happen if the chance is big or **more than 50%**.
- An event is **certain** if it is **100 % sure to happen**.



## ***What I Can Do***

Toss 2 coins at the same time. How many possible outcomes are there? What are those possible outcomes? List them down using head or trail.

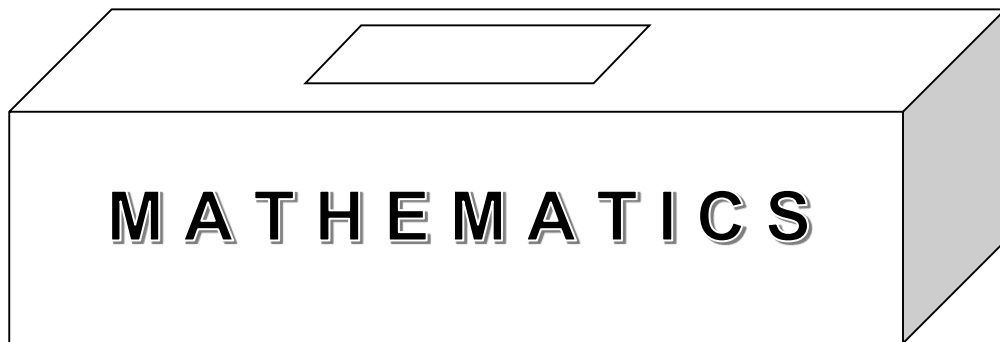
Coin 1	Coin 2

Got it? If yes, you may now answer the **Assessment**. If not, kindly go back to the previous discussion in this module and study the explanations and examples.



## ***Assessment***

- I. The letters of the word MATHEMATICS are placed in a box. Give the probability in fractional form.



1. If you are to pick one, what is the probability of picking letter M?
2. How many possible outcomes are there?
3. What are the possible outcomes of picking vowels? List them down.
4. What is the probability of picking consonants?
5. Is there a chance that you can pick letter N? Why?

II. Study the given situation. Identify the probability of each event. Record the outcomes using the statements listed in the box.

A teacher introduced a game “Pick and Win” for his 20 learners. He prepared 20 balls in a box with numbers 1 to 20. Whoever picks an even number will receive a pencil.

1. What is the probability of getting an even number?  
\_\_\_\_\_
2. What is the probability of getting numbers below 5?  
\_\_\_\_\_
3. What is the probability of getting numbers below 15?  
\_\_\_\_\_
4. What is the probability of getting numbers above 20?  
\_\_\_\_\_
5. What is the probability of getting any number from 1 to 20?  
\_\_\_\_\_

impossible to happen      unlikely to happen      equal chance  
likely to happen      certain to happen

If you got 8 to 10, YOU’VE DONE A GREAT JOB! You are now ready for the next module. Answer the additional activities below.

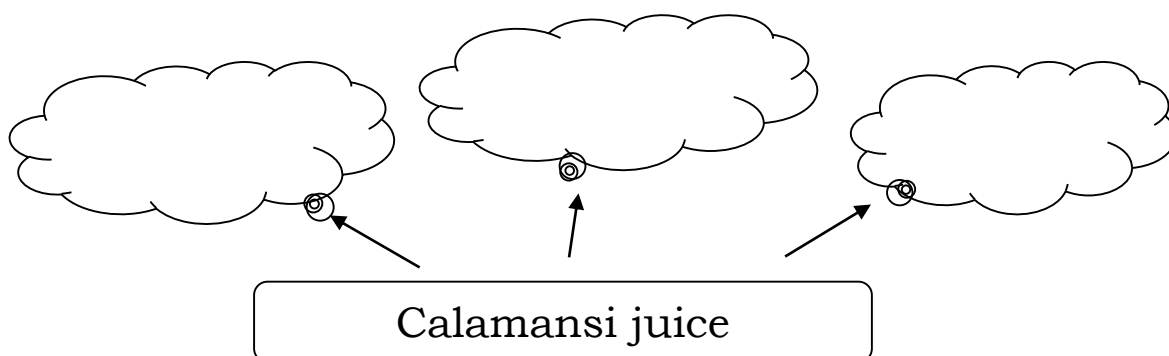
If not, please study again the examples and explanations in this module.



## ***Additional Activities***

Neil went to the canteen to buy food. He bought calamansi juice. There are different snacks to choose from such as pansit, pandesal, banana cue, spaghetti, camote chips and ensaymada.

1. Using a cloud diagram, show all the possible outcomes of pairs of calamansi juice and snacks. Sample diagram is shown below.



2. How many possible outcomes are there if he would only choose one pair of snacks?
3. What is the probability that he would choose bread?
4. What are the possible outcomes if he would not choose bread? List them down.
5. Is choosing *puto* possible to happen? Why?





## Answer Key

**What I Know**

- I.
1. d. 2 out of 6
2. b. 3 out of 6
3. e. 1 out of 6
4. a. 0 out of 6
5. c. 6

II.

**What's More**

Activity 1: "SPIN THE WHEEL"

1. 5 out of 8  $\frac{5}{8}$
2. 3, 1, 4
3. Zero or  $\frac{0}{8}$
4. **6, 10 4**
5. **No, it is impossible because there is no numeral 2 in the same space**

Activity 2: "PLOT IT"

all colors

red

blue

yellow

green

### Activity 3: "PICK THE PEN"

1. 1 out of 4 or  $\frac{1}{4}$
2. No, because there is no orange pen in the sample space.
3. 1 out of 4 or  $\frac{1}{4}$
4. Zero probability or 0/4
5. 4 because there are 4 pens

### What I Can Do

Coin 1	Head
Coin 1	Tail
Coin 2	Head
Coin 2	Tail

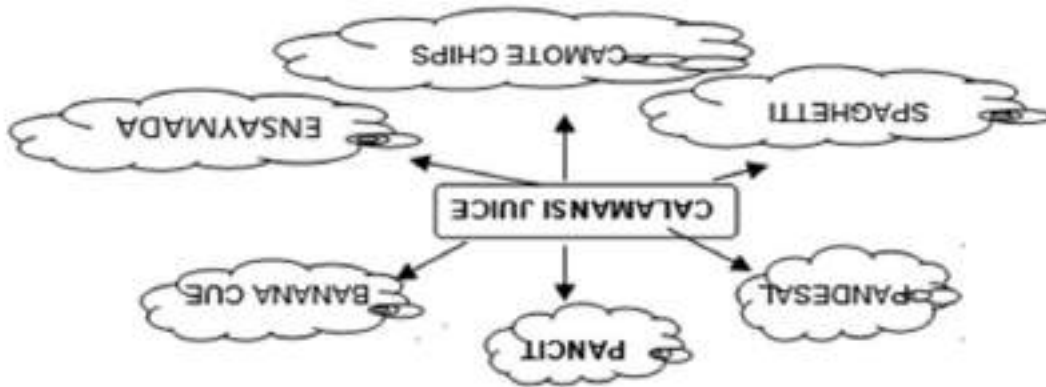
### Assessment

II.

1. Equal chance
2. Unlikely to happen
3. Likely to happen
4. Impossible to happen
5. Certain to happen

### Additional Activities

2. 6
3. 2 out of 6 or  $\frac{2}{6}$  or  $\frac{1}{3}$
4. Pansit, banana cue, spaghetti, camote chips
5. No because there is no puto in the options



## ***References***

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