Mathematics

Quarter 4 – Module 1:
Finding the Area of a Circle

ALTERNATIVE DELIVERY MODE

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Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 1: Finding the Area of a Circle
First Edition, 2020

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Mathematics
Quarter 4 – Module 1:
Finding the Area of a Circle

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 Mathletes! This module was designed and written to help you gain an understanding of and to test your ability in finding the area of a given circle. We know that formula serves as the guide in solving for the area of a circle. Knowing how to derive the formula and how to use them in real-life situations is important, especially in solving for the area of a circle. So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to:

- describe the different terms used in the formula;
- appreciate the importance of formula in finding the area of a circle; and
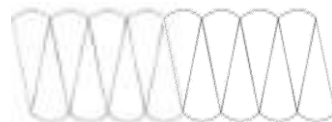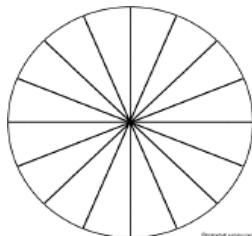- derive a formula in finding the area of a circle.

Before going any further, let us check your understanding about deriving the formula in finding the area of a circle.

What I Know

Directions: Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. A circle is cut into 16 identical sectors as shown in the figure. What will be formed if the 16 sectors are arranged in one row?

   (A) circle   (B) triangle   (C) parallelogram

2. Which figure has a formula for finding area that can be used to derive a formula of a circle?
   (A) triangle   (B) trapezoid   (C) parallelogram

3. The sectors of a circle are arranged in one row. Which part of the circle approximates the bases of the resembled figure?
(A) area   (B) diameter   (C)circumference

4. The sectors of a circle are arranged in one row. Which part of the resembled shape approximates the radius of the circle?
(A) base   (B) height   (C) diameter

5. Which is half of the diameter of a circle?
(A) arc   (B) radius   (C) circumference

6. A circle with radius r is cut into several sectors which are then arranged in one row. Which is equal to the base of the resembled figure?
(A) π (B) r (C) πr

7. If the diameter of a circle is given, what should you compute first to find its area?
(A) pi   (B) radius   (C) circumference

8. What is the formula for finding the area of a circle?
(A) $A = \pi \times r \times r$ (B) $A = 2 \times \pi \times r$ (C) $A = \pi \times d$

9. What is the area of a circle with a 5 cm radius? (use $\pi = 3.14$)
(A) 78.5 cm^2 (B) 23.7 cm^2 (C) 15.7 cm^2

10. What is the area of a circle with a diameter of 48 m?
(A) 24.8 m^2 (B) 48.2 m^2 (C) 50.24 m^2

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.

<table>
<tr><td>**Lesson**
1</td><td># Finding the Area of a Circle</td></tr>
</table>

Learning how to find the areas of circles plays a vital role in our everyday lives. There are many real-life situations where you would need to calculate the areas of various shapes, such as circles.

Are you ready? Let's explore the lesson.

What's In

In the previous lessons, you learned that the distance around the circle is the circumference. Let us recall how to find the circumference of a circle.

The distance around a circle is called its **circumference**. The distance across a circle through its center is called its **diameter**. We use the Greek letter π *(read as "Pī" with a short i)* to represent the ratio of the circumference of a circle to its diameter. When rounded off, π = 3.14.
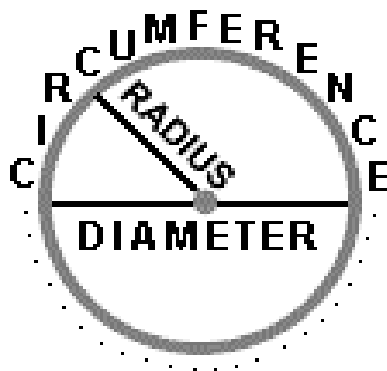
To get the **circumference** of a circle, we learned that the formula is:
$$C = \pi \times d \text{ or } C = 2 \times \pi \times r.$$

For simplicity, we use π = 3.14. Note that the diameter of a circle is twice as long as the radius. This relationship is expressed as *d = 2 x r.*

Answer the following exercises below. Solve for the **circumference** given the radius or diameter of a circle. Fill in the table. Write your answer on a separate sheet of paper.

|	Radius	Diameter	Circumference
1	4 m		
2		9 m	
3		24 m	
4	7 dm		
5	35 cm		

What's New

In this lesson, you are going to derive the area formula of a circle. Do you know that finding the area of a circle is easier if we use a formula?

Consider the figure below

Mr. Suarez is purchasing materials to build a do-it-yourself trampoline for his kids. If he wants the diameter of the mat to be 14 feet long, how much nylon does he need to purchase?
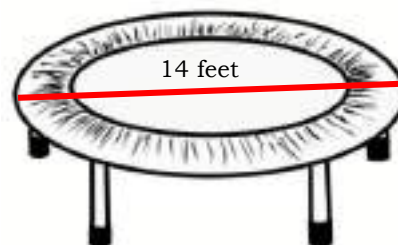
The red line through the center of this trampoline shows its diameter and can be used to calculate its area.

What Is It

Areas have many practical applications even in the past centuries.

- The *Chinese* knew how to calculate the area of many different two-dimensional shapes by about 100 B.C.
- *Johannes Keppler,* 1571 to 1630, measured the areas of sections of planetary orbits using formulas for calculating areas of ovals or circles.
- *Sir Isaac Newton* used the concept of area to develop *Calculus.*

The concept of area became even more useful when formulas in finding areas of different shapes were developed.

The area of a circle is the total region that is bounded by the circumference. Think of the area of a circle as the amount of surface enclosed inside the circle. The formula in finding the area of a circle is:

$$A = \pi \times r^2 \text{ or } A = \pi \times r \times r$$

In this formula, "A," is the *area*, "r" is the *radius*, and "π" is a Greek letter pronounced as "*pi*" which is constant and approximately equal to **3.14,** the ratio of the circumference to its diameter. Recall that the radius (*r)* of a circle is the distance from its center to any point on the circle.
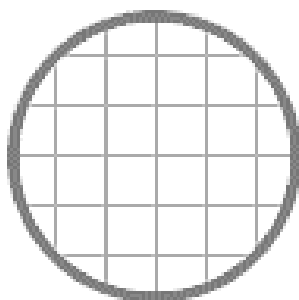
The area of a circle is the number of square units inside that circle. If each square in the circle has an area of 1 cm², you could count the total number of squares to get the area of this circle. Thus, if there were a total of 28.26 squares, the area of this circle would be 28.26 cm².
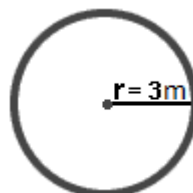
Let's look at some examples involving areas of circles. Use π = 3.14 in all examples and calculations.

Example 1:

The radius of a circle is 3 meters. What is the area of the circle?

Solution:
    $A = \pi \times r \times r$
    A = 3.14 x (3 m) x (3 m)
    A = 3.14 x (9 m²)
    A = 28.26 m²

r = 3m

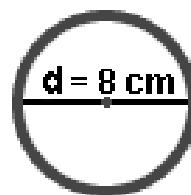**Example 2:**

The diameter of a circle is 8 centimeters. What is the area of the circle?

Solution:
    $d = 2 \times r$ $A = \pi \times r \times r$
    8 cm = 2 x r A = 3.14 x (4 cm) x (4 cm)
    8 cm ÷ 2 = r A = 3.14 x (16 cm²)
    r = 4 cm A = 50.24 cm²

d = 8 cm

What if the area is given? How will you find the radius of the circle?

Example 3:

      If a circular pool has an area of 78.5 square meters. What is the radius of the pool?
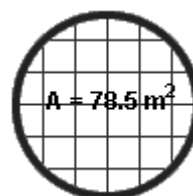
Solution:
    $A = \pi \times r \times r$
    78.5 m² = 3.14 x r x r
    78.5 m² ÷ 3.14 = r x r
    25 m² = r x r
    r = 5 m

A = 78.5 m²

Example 4:

      Let's answer the problem given in the previous part of the lesson.

      Mr. Suarez is purchasing materials to build a do-it-yourself trampoline for his kids. If he wants the diameter of the mat to be 14 feet long, what is the area of the nylon that he needs to purchase?

Solution:
    $d = 2 \times r$ $A = \pi \times r \times r$
    14 ft = 2 x r A = 3.14 x (7 ft) x (7 ft)
    14 ft ÷ 2 = r A = 3.14 x (49 ft²)
    r = 7 ft A = 153.86 ft²

      Therefore, the length of nylon that Mr. Suarez needs for his trampoline is 153.86 square feet.

Example 5:

      Gerry is making a circular glass top for a table with a radius of 6 dm. What is the smallest possible area of the glass that is needed to cover the top of the table?

    Solution:
$$A = \pi \times r^2$$
$$A = 3.14 \times (6\ dm)^2$$
$$A = 113.04\ dm^2$$

      Hence, the smallest possible area of the circular glass that is needed to cover the top of the table is $113.04\ dm^2$.
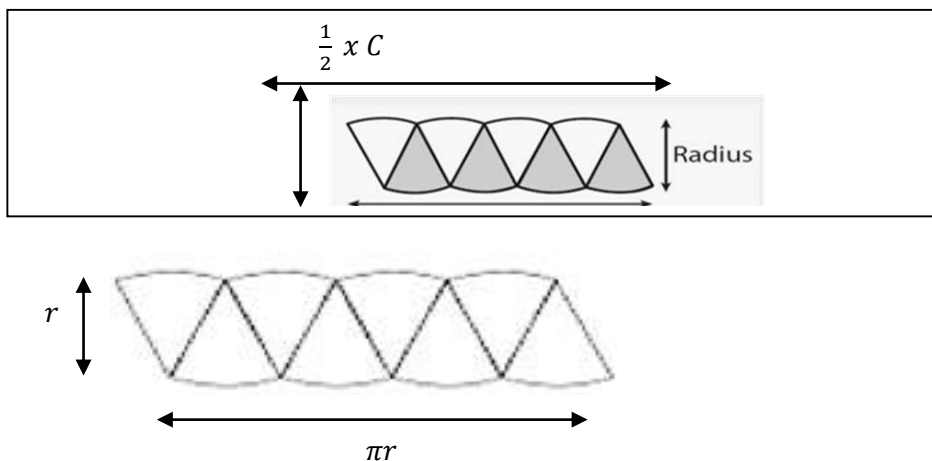
      To answer all the examples above, we used the formula $A = \pi \times r \times r\ or\ A = \pi \times r^2$ in finding the areas of circles. Where did we get this formula?

6

Derivation of Formula of the Area of a Circle ($A = \pi \times r^2$)

Consider a circle with circumference C and radius r. Divide it into 8 identical sectors as shown in the figure below.
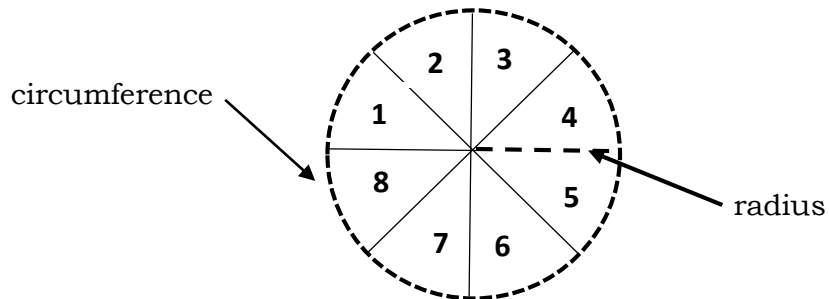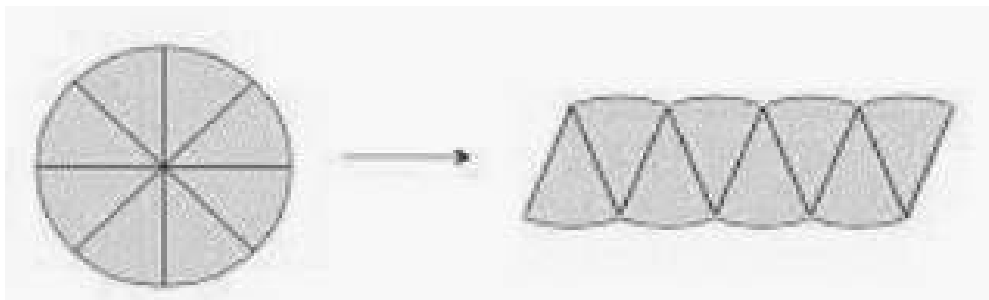

Then, arrange the 8 sectors of the circle as shown below.

What figure does it resemble?

The sectors of a circle when arranged in a row resemble a parallelogram.

Will the area of the sectors of the circle change after rearranging them to look like a parallelogram?

Let us increase the number of identical sectors to 16. Arrange the sectors in a row. Again, you form a figure that resembles a parallelogram.
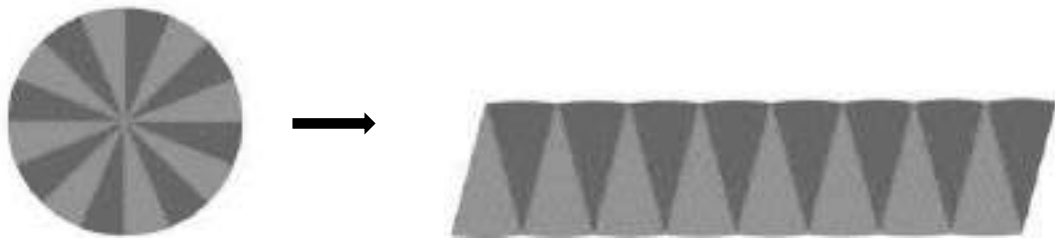
As we increase the number of identical sectors into which we cut the circle, the more the shape formed resembles a parallelogram. In particular, the shape looks like a rectangle.
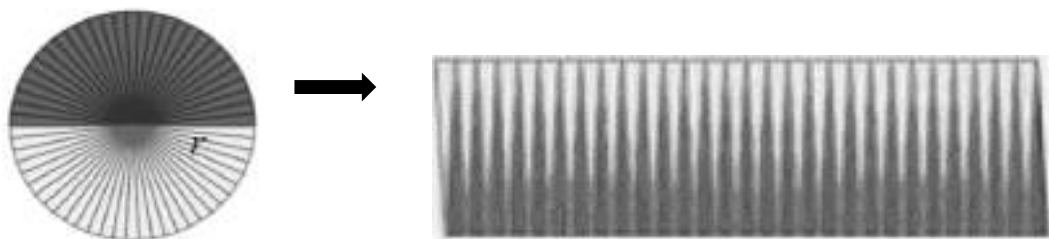
As we further increase the number of identical sectors into which the circle is cut, the difference between the shape formed and a rectangle gets smaller and smaller. Hence, when the number of equal sectors is sufficiently large, the difference becomes practically zero.

Height or width

Base or Length = ½ x C
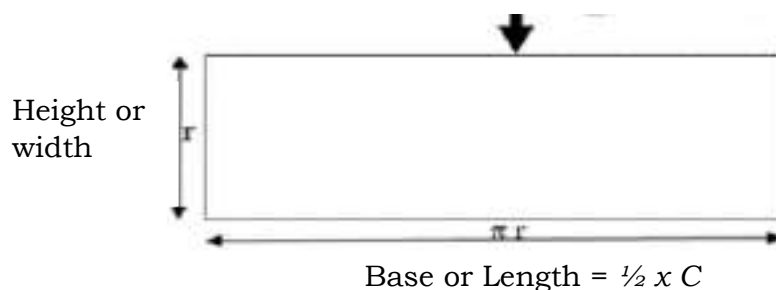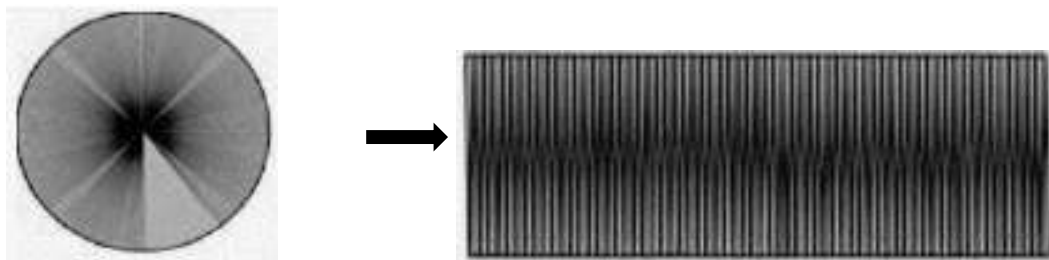
The radius of the circle approximates the width of the rectangle. Half of the circumference approximates its length.

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Recall the formula for finding the area of a parallelogram with base b and height h is $A = bxh$. A rectangle is a special kind of parallelogram, and so this formula also applies. The base is the length of the rectangle and the height is the width.

In the problem, the base is equal to $\frac{1}{2} x C$ and the height is equal to radius r. Therefore, we can find the area of a circle as follows:

$$A = \frac{1}{2} x\, C\, x\, r$$
$$A = \frac{1}{2} x\, 2\, x\, \pi\, x\, r\, x\, r, \qquad since\ C = 2\, x\, \pi\, x\, r$$
$$A = \pi\, x\, r\, x\, r$$
$$A = \pi\, x\, r^2$$

Hence, the formula in finding the area of a circle is now derived.

What's More

Activity 1: You Complete Me!

Directions: In the diagram, the circle has a radius of 6 cm. Find the area of the circle by filling out the blanks to complete the solution. Write your answer on a separate sheet of paper.

Solution:

$A = \pi$ x $\underline{\quad}$ x r
(1)

$A = \underline{\quad}$ x (6 cm) x ($\underline{\quad}$ cm)
(2)　　　　　　　　(3)

$A = 3.14$ x ($\underline{\quad}$)
(4)

$A = \underline{\quad}$ cm^2
(5)

(diagram: circle with d= 12 cm, r= 6 cm)

Activity 2: Correct Me, If I'm Wrong!

Directions: Consider a circle cut into many sectors. The sectors are then arranged in a row to resemble a parallelogram. Write **T** if the statement is true and **F** if it is false. Write your answer on a separate sheet of paper.

$\underline{\qquad}$ 1. We can use the area formula of a parallelogram to help us find the area of a circle.
$\underline{\qquad}$ 2. Half of the circumference of the circle is equal to the height of the parallelogram.
$\underline{\qquad}$ 3. Half of the circumference is equal to π x r.
$\underline{\qquad}$ 4. The diameter of the circle will substitute for the height of the parallelogram.
$\underline{\qquad}$ 5. The area formula of a circle is $A = \pi \, x \, r^2$.

Activity 3: Can You Measure Me?

Directions: Answer the following questions. Show your solutions. Write your answer on a separate sheet of paper.

1. The radius of a circle is 9 centimeters. What is the area of the circle?
2. The diameter of a circle is 12 meters. What is the area of the circle?
3. The radius of a circular rug is 4 feet. What is the area of the rug?
4. The area of a coin is 3.14 square centimeters. What is the radius of the coin?
5. The diameter of a bicycle wheel is 20 decimeters. What is the area of the wheel?

What I Have Learned

Directions: Fill in the blanks with the correct answers. Choose your answers in the box below. Write your answer on a separate sheet of paper.

area	*parallelogram*
interior	*radius*
$A = \pi \times r \times r$	$A = b \times h$

(1) _____ is the amount of inside the (2) _____ of the circle. The formula for the area of a circle is derived from the formula of the area of a (3) _____. The (4) _____ will be the height of the parallelogram.

The area of a parallelogram is $A = b \times h$. For the sectors of a circle which is made to resemble a parallelogram, the length of the base corresponds to πr and the height is *r*. Therefore, the formula in finding the area of a circle is (5) _____.

Excellent work! Just keep going!

What I Can Do

Directions: Do what is asked and answer the questions that follow. Write your answer on a separate sheet of paper.

- Cut out a circle. Draw a diameter. Fill the semicircles with two different colors.
- Cut the semi-circles. Cut each semicircle twice to have 8 identical sectors.
- Arrange the eight sectors in alternating colors, so they form a shape which resembles a parallelogram.

1. What quadrilateral did the shape resemble? _____

2. What is the area formula for a parallelogram? _____

3. The circumference is the distance around the circle. The formula to find-the circumference of a circle is _____.

4. Half of the circle goes to the top of the parallelogram, and the other half of the circle goes to the bottom. This is known as the base *b* of the parallelogram.

$$b = \frac{2 x \pi x r}{2} \text{ or } b = \underline{\hspace{2cm}} .$$

5. The height *h* of the parallelogram is the radius *r* of the circle.
$$h = r$$

Now let's substitute the information into the area formula of the parallelogram.
$$A = b \ x \ h$$
$$A = (\pi \ x \ r) x \ h$$
$$A = (\pi \ x \ r) \ x \ r$$
$$A = \underline{\hspace{2cm}}$$

You have derived the formula to find the area of a circle.

Just two more activities to be done and you are ready for the next module.

CO_Q4_Mathematics 5_ Module 1

Assessment

Directions: Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. The formula for the area of a parallelogram can be used to derive the formula for the area of a circle. Is this correct?
   (A) No   (B) Yes   (C) Maybe

2. Which will resemble the shape formed if the identical sectors of a circle are arranged in one row?
   (A) triangle   (B) trapezoid   (C) parallelogram

3. Half of the circle goes to the top of the parallelogram, and the other half goes to the bottom. What part of a parallelogram is this?
   (A) side   (B) base   (C) height

4. Which is equal to the base if a circle is made into parallelogram?
   (A) r (B) $\pi x r$ (C) $b \times h$

5. The sectors of a circle are arranged to resemble a parallelogram. Which part of the circle approximates the height of the parallelogram?
   (A) radius   (B) diameter   (C) circumference

6. The sectors of a circle are arranged to resemble a parallelogram. Which part of the parallelogram approximates half of the circumference?
   (A) base   (B) area   (C) height

7. If the formula for finding the area of a parallelogram is $A = b \, x \, h$, what is the formula for the area of a circle?
   (A) $A = 2 \, x \, \pi \, x \, r$ (B) $A = \pi \, x \, d$ (C) $A = \pi \, x \, r^2$

8. Kaye will compute for the area of a circle using the formula $A = \pi \, x \, r^2$. If the given is the diameter of a circle, what should be computed first?
   (A) base   (B) radius   (C) circumference

9. What is the area of a circle with a 5-meter radius? (Use $\pi = 3.14$)
   (A) 31.4 m²   (B) 78.5 m²   (C) 314 m²

10. What is the area of a circle with a radius of 2 m? (Use $\pi = 3.14$)
    (A) 6.28 m²   (B) 12.56 m²   (C) 50.24 m²

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Additional Activities

Directions: Match Column A with Column B to complete each statement. Write your answer on a separate sheet of paper.

Column A	*Column B*
1. The formula for the area of a circle is _____.	a. radius
2. The formula for the area of a parallelogram is _____.	b. $A = \pi \: x \: r^2$
3. The base of the parallelogram is half of the _____ of a circle.	c. $A = 50.24 \: cm^2$
4. The height of the parallelogram is the ____ of the circle.	d. $A = 379.94 \: cm^2$
5. The area of a circle with a radius of 11 cm is _____.	e. $A = bxh$
	f. circumference

Answer Key

What's More

Activity 1: You Complete Me!
1. r
2. 3.14
3. 6
4. 36
5. 113.04

Activity 2: Correct Me if I'm Wrong!
1. T
2. F
3. T
4. F
5. T

Activity 3: Can You Measure Me?
1. 254.34 cm²
2. 113.04 in²
3. 50.24 ft²
4. 1 cm
5. 314 in²

What I Can Do
1. Parallelogram
2. A = b x h
3. $C = 2\pi r$ or $C = d\times \pi$
4. $\pi \times r$
5. $A = \pi \times r \times r$ or $A = \pi r^2$

What I Have Learned
1. Area
2. Interior
3. Parallelogram
4. Radius
5. $A = \pi \times r \times r$

Additional Activities
1. B
2. E
3. F
4. A
5. D

Assessment
1. B
2. C
3. B
4. B
5. A
6. A
7. C
8. B
9. B
10. B

What's In

	r	D	C
1	**4m**	8m	**25.12m²**
2	4.5m	**9m**	**28.26m²**
3	12m	**24m**	**75.36m²**
4	**7dm**	14dm	**43.96dm²**
5	**35cm**	70cm	**219.8cm²**

What I Know
1. C
2. C
3. C
4. B
5. B
6. C
7. B
8. A
9. A
10. C

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Mathematics
Quarter 4 – Module 2:
Solving Routine and Non-Routine Problems Involving Area of a Circle

ALTERNATIVE DELIVERY MODE

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Mathematics – Grade 5
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First Edition, 2020

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DepED
DEPARTMENT OF EDUCATION

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What I Need to Know

Good day Mathletes! This module was designed and written to help you gain an understanding of and to test your ability in solving routine and non-routine word problems involving the area of a circle. We know that the formula serves as a guide in solving for the area of a circle. Knowing how to derive the formula of the area of a circle and how to use it in real-life situations is important.

So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to:

- describe the different terms used in the formula;

- appreciate the importance of the formula in finding the area of a circle; and

- solve routine and non-routine problems involving the area of a circle

Before going any further, let us check your understanding of the formula in finding the area of a circle.

What I Know

Directions: Read carefully each statement below. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper. Please use π = 3.14.

1. Find the area of the face of a circular wall clock with a radius of 10 cm.

   (A) 37.68 cm²   (B) 62.8 cm²   (C) 314 cm²

2. A circular swimming pool has a diameter of 4.2 m. Find its area.

   (A) 13.188 m²   (B) 13.8474 m²   (C) 55.3896 m²

3. If a circular flower garden has a diameter of 3.2m, what is the area of the circular garden?

   (A) 8.0384 m²   (B) 20.096 m²   (C) 32.1536 m²

4. What is the area of the circular fountain if its radius is 2.3m?

    (A) 19.7116 m²   (B) 16.6106 m²   (C) 13.8068 m²

5. If a circular rag has a radius of 25 centimeters, what is the area of the rag?

    (A) 1 962.5 cm²   (B) 490.625 cm²   (C) 19.625 cm²

6. Ariel wanted to know the area of a children's swimming pool which he will look after as a life guard. He was informed that its radius is 3.5m. What is its area?

    (A) 38.465 m²   (B) 43.685 m²   (C) 52.376 m²

7. The circumference of a circular table is 6.28 m. What is its area?

    (A) 3.14 m²   (B) 6.28 m²   (C) 12.56 m²
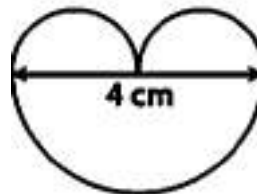
8. Find the area of the given figure at the right.

    (A) 78.5 m²

    (B) 39.25 m²

    (C) 19.625 m²

5 m
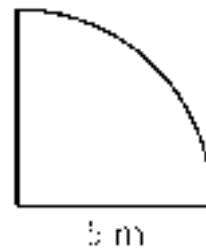
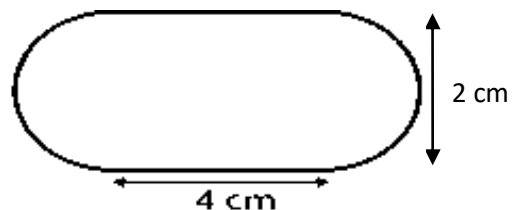9. Find the area of the given figure at the right.

The figure consists of 3 semicircles.

    (A) 9.42 cm²

    (B) 6.28 cm²

    (C) 3.14 cm²

4 cm

10. Find the area of the given figure at the right. The figure consists of a rectangle and two semicircles.

    (A) 11.14 cm²

    (B) 12.56 cm²

    (C) 14.28 cm²

2 cm

4 cm

2

Solving Routine and Non-routine Problem Involving Area of a Circle

Learning how to solve routine and non-routine problems involving area of a circle is important in the field of engineering, architecture, electrical jobs and even plumbing. Success in learning this lesson means you know how to find the area of a circle.

Are you ready? Let's start.

What's In

In the previous lessons, you learned what the area of a circle is. It is the total area enclosed by the circumference of the circle. The shaded portion inside the circle shown at the right represents the area of the circle.

The formula for the area of a circle is:
$$A = \pi r^2 \ or \ A = \pi \ x \ r \ x \ r$$

In this formula, **A**, is, again, the *area*, **r** represents the *radius*, and **π** is a Greek letter pronounced *pi*, which is approximately equal to **3.14**. The **radius** of a circle is half the diameter the distance from any point of the circle to the center. The **diameter** of a circle is the distance from two points of the circle through the center. The value **pi** or **π** is the ratio of a circle's circumference to its diameter. The value of pi is a nonterminating and nonrepeating decimal but we can use the value 3.14 or $\frac{22}{7}$ as its approximation. Radius and diameter may refer to the line segment or its length.
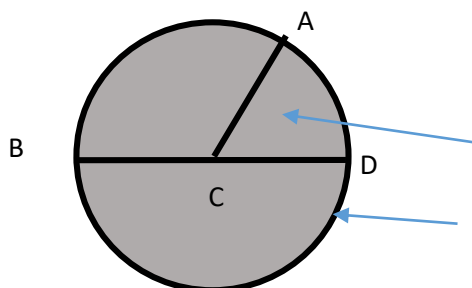
Diameter $\overline{BD}$ with length equal to d = 2r

Radius $\overline{AC}$ with length equal to r units

Area
The shaded region in the circle = πr²

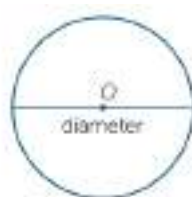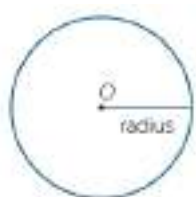**Circumference**
The outline around the circle = 2πr

π is a number approximately equal to 3.14

Let us refresh your memory and try to answer the following exercises below by determining if the statement is true or false.

1. The length of segment CD is twice the length of segment AB.
2. The radius is equal to the length of segment AB.
3. The center of the circle is at point A.
4. The length of line segment CD is the diameter of the given circle.

5. The red outline in the figure is the area of the circle.
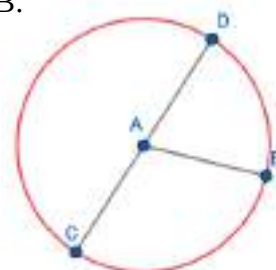
A diameter divides the circle into two congruent parts. Each part is a semicircle. If we draw a radius perpendicular to the diameter of a semicircle, the semicircle is further divided into two congruent parts, each is one-fourth (or a quarter) of a circle.

radius   diameter   semicircle   quarter of a circle
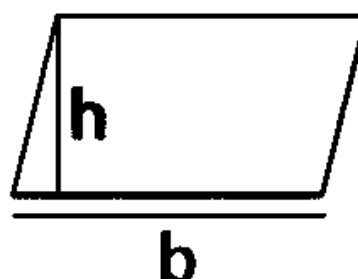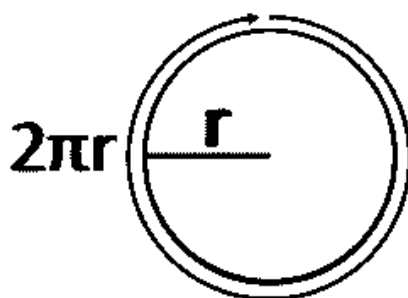

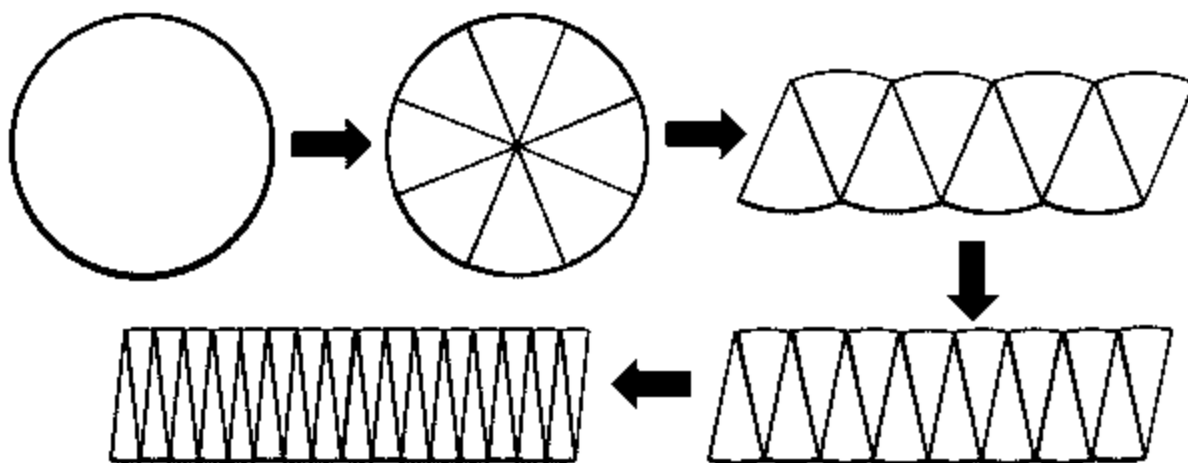# *What's New*

From the previous lessons, you were taught how to find the circumference of a circle and the area of a parallelogram.

$2\pi r$ r   h   b

Consider dividing the circle with radius r into equal parts, then arrange them as shown. Notice that as there are more parts the circle is divided into, the more it resembles the parallelogram.

Observe: the base of the parallelogram is one-half the circumference of the circle $(1/2 \times 2\pi r = \pi r)$ and the height of the parallelogram is the radius r.
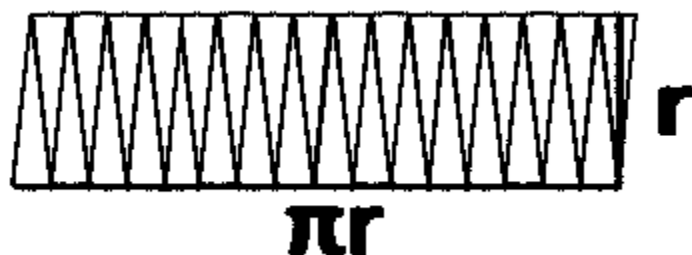
Area of the Circle = Area of the Parallelogram = base x height = $\pi r \times r = \pi r^2$

In this lesson, we will deal with solving routine and non-routine word problems involving area of a circle.

You will understand this concept as you go along with this module.

Analyze the problem below:

Consider the figure as a blueprint of a helipad to be installed on top of a building. Suppose that its radius is 12 m. What is the area of the helipad?

Note: A helipad is a landing area or platform for helicopters and powered lift aircraft.

Area of the circle = πr^2

= 3.14 x (12 m)²

= 3.14 x 144 m²

= 452.16 m²

5
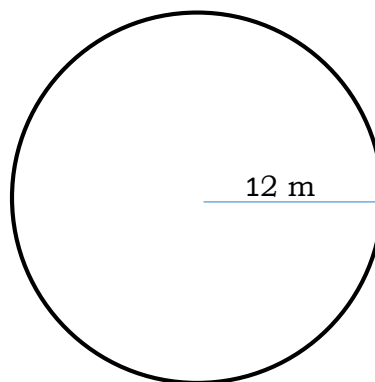
It's your turn. Find the area of the circle given its radius.

1. r = 11 cm   A = _____
2. r = 20 cm   A = _____
3. r = 1.5 m   A = _____
4. r = 2.2 m   A = _____
5. r = 8 m   A = _____

What Is It

The area of a circle is the number of square units inside that circle. It can be computed by using the formula $A = \pi r^2$. Solving the area of a circle is a helpful tool in Mathematics and real-life situations, because areas occur frequently in daily life and help to simplify many of our interactions by putting numbers into perspective.

1. The fence surrounding a circular garden is 31.4 m. What is the area of the garden?

To find the area of the circular garden, we need the radius. Let's use the given length of the garden's fence.

Length of the garden's fence = Circumference of the circle = $2\pi r$

$$31.4 \text{ m} = 2 \times \pi \times r$$

$$31.4 \text{ m} = 2 \times 3.14 \times r$$

$$31.4 \text{ m} = 6.28 \times r$$

$$r = \frac{31.4}{6.28} \text{ m} = 5 \text{ m}$$

Area of the circular garden = πr^2

$$= 3.14 \times (5 \text{ m})^2$$
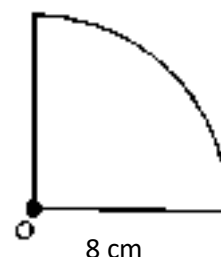
$$= 3.14 \times 25 \text{ m}^2$$

$$= 78.5 \text{ m}^2$$

Answer: The area of the circular garden is 78.5 m²

6

2. Find the area of the given figure.

The given figure is one-fourth of a circle. So, its area is

¼ time πr² = ¼ x 3.14 x (8 cm)²

= ¼ x 3.14 x 64 cm²

= 50.24 cm²

8 cm

What's More

Activity 1: Solve It!

Directions: Solve the given problems.

1. A circle's diameter is 10 m. What is its radius?
2. John draws a circle with a radius of 26 centimeters. What is the circumference of the circle?
3. A placemat has a diameter equal to 6 cm. If a red thread is to be knitted around it, how long is the knitted part of the circle?
4. Maria drew parallel horizontal lines around a flower pot as its design. How long is the flower pot's diameter if each horizontal line measures 314 cm?
5. How long is the radius of a circle if its circumference is 251.2 cm?

Activity 2: Find My Area!

Read, analyze each problem below. Write your solutions and answer in an extra sheet of paper.

1. The bottom of a children's swimming pool is circular with a radius of 4 meters is made up of green tiles. How many square meters is the circular swimming pool?
2. A water sprinkler sprays water within a radius of 3.5 m. What is the area of the surface that the sprinkler waters?
3. A circular pool has a diameter 2.8 meters long. What is the area of that pool?
4. The face of a circular clock with a diameter of 25 centimeters is attached to a wall. How much area does it cover?
5. Khalil rides a bike a distance of 94.2 m around a circular rink. What is the area of that rink?

7

What I Have Learned

Directions: Answer the following. *Let's see what have you learned so far.*

A. Fill in the blanks

The area of a circle is the number of (1) _____ units inside the circle. It may be computed by (2) A=_____ where r is the (3) _____ and pi or π is approximately equal to (4) _____ or _____.

What I Can Do

Directions: Answer the problem below. Show your complete solution. You may use a model or an illustration to help you solve the problem.

Mang Raul has a farm somewhere along the Diversion Road of Calbayog City. He has plenty of chickens and goats. He has this one goat who doesn't want to be with the rest of the goats. So, Mang Raul would tether his goat by a rope of 3.5 m long, far from the other animals. Find the maximum area in which the goat can graze.

*Just two more activities and you are done with this module.*

![pencil icon] **_Assessment_**

Directions: Read each problem carefully. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. Find the area of a plate with a radius of 11 cm.
    (A) 372.8 cm²   (B) 379.94 cm²   (C) 391.74 cm²

2. A children's pool has a diameter of 8.7m. Find its area.
    (A) 59.41665 m²   (B) 57.8965 m²   (C) 53.184 m²

3. If a circular table has a diameter of 1.3 m, what is the area of the circular table?
    (A) 1.805 m²   (B) 1.32665 m²   (C) 1.13545 m²

4. What is the area of a circular fountain if its radius is 3.1m?
    (A) 11.9764 m²   (B) 30.1754 m²   (C) 38.4374 m²

5. If a circular mat has a radius of 32 centimeters, what is the area of the mat?
    (A) 3 215.36 m²   (B) 213.76 m²   (C) 64.56 m²

6. Meryll made a pancake with a circumference of 125.6 cm. What is its area?
    (A) 884 cm²   (B) 1 256 cm²   (C) 1 468 cm²

7. If Amiel made a burger patty with a diameter of 8 centimeters, what is the area of the patty?
    (A) 200.96 cm²   (B) 50.24 cm²   (C) 25.12 cm²

8. Jed drew figure at the right. Each circle has a radius equal to 10 cm. What is the area of the red region?

    (A) 400 cm²
    (B) 314 cm²
    (C) 86 cm²
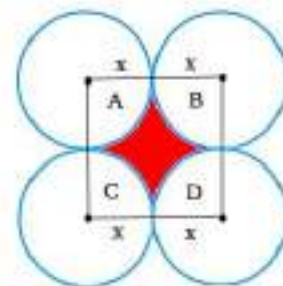
9. Joyce made a pancake with a diameter of 24 centimeters, while Jude's pancake has a radius of 13 centimeters. Who made the bigger pancake?
    (A) Joyce   (B) Jude   (C) Both

10. Refer to number 9 problem. How much bigger is the larger pancake than the other?
    (A) 30.6 cm²   (B) 52.16 cm²   (C) 78.5 cm²

    You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Additional Activities

Directions: Read, analyze and solve each problem.

1. The bottom surface of a circular pond with a diameter of 6 m will be tiled. Find the area of the surface that will be tiled.

2. Find the area of a manhole with a radius of 12 inches.

3. The table top has a diameter of 12 dm. What is the area of the glass to be put on top of the table?

4. Find the area of a pail's circular cover with a diameter of 32 cm.

5. If the area of the circular bed cover is 254.34 cm^2, what is its radius?

Answer Key

What I Know

1. C	6. A
2. B	7. A
3. A	8. C
4. B	9. A
5. A	10. A

What's New

1. 379.94 cm²
2. 1 256 cm²
3. 7.065 m²
4. 15.1976 m²
5. 200.96 m²

What's In

1. True
2. True
3. True
4. True
5. False

What's More

Activity 1: Solve It!

1. 5 m
2. 163.28 cm
3. 18.84 cm
4. 100 cm
5. 40 cm

Activity 2: Find my Area

1. 50.24 m²
2. 38.465 m²
3. 6.1544 m²
4. 490.625 cm²
5. 706.5 m²

What I Have Learned

A. 1. Square
2. πr^2
3. radius
4. 3.14 or 22/7

What I Can Do

Radius of the circle is the length of the rope.

Then, the radius is = 3.5 m

So, A = πr^2

= 3.14 x (3.5 m)²
= 3.14 x (12.25 m²)
= 38.465 m²

Assessment

1. B	6. B
2. A	7. B
3. B	8. C
4. B	9. B
5. A	10. C

Additional Activities

1. 28.26 m²
2. 452.16 in²
3. 113.04 dm²
4. 803.84 cm²
5. 9 cm

11

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5

Mathematics
Quarter 4 – Module 3:
Visualizing the Volume of a Cube and a Rectangular Prism

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 3: Visualizing the Volume of a Cube and a Rectangular Prism
First Edition, 2020

5

Mathematics

Quarter 4 – Module 3:
Visualizing the Volume of a Cube and a Rectangular Prism

DepED
DEPARTMENT OF EDUCATION

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 Mathletes! This module was written to help you gain an understanding of the volume of a cube and a rectangular prism. Always keep in mind that volume is the amount of space occupied by an object. It is very important to learn on how to visualize volume and use it in real-life situation. *So, what are you waiting for? Be ready and enjoy.*

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

- visualize the volume of a cube and a rectangular prism; and

- appreciate the importance of volume in daily living.

Before going any further, let us check your understanding about visualizing the volume of a cube and a rectangular prism.

What I Know

Directions: Read and understand each statement below. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. The washing machine measures 2 feet long, 3 feet wide and 4 feet high. Which is the correct expression to find the volume of the laundry that the washing machine can hold?

   (A) 2 + 3 + 4   B) 2 x 3 + 4   (C) 2 x 3 x 4   (D) 2 + 3 x 4

2. Ronnie is going to buy sand for his children's sandbox. The measurements for the sandbox are shown below.
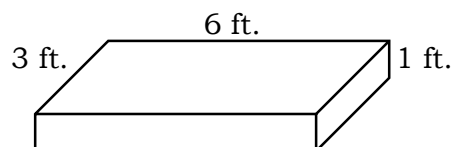
   Which expression shows how to find the volume of sand that the sandbox can hold?

   (A) 6 x 3   (B) 6 x 3 x 1   (C) 6 + 3 + 1   (D) 6 x 1

3. Carlo works for a packing and mailing service. A costumer brings in a box that measures 9 inches on each side. Which is the correct expression to find the volume of the box?

   (A) 9^1 (B) 9^2 (C) 9^3 (D) 9^4

4. Shane is going to buy a 3x3x3 Rubik's cube for the contest. How many unit cubes does the Rubik's have?

   (A) 27   (B) 12   (C) 9   (D) 3

5. A dictionary measures 15 cm long, 6 cm wide and 3 cm high, what is its volume?

   (A)270 cm³   (B)100 cm³   (C) 33 cm³   (D) 24 cm³

6. Shawn received a Balik-Bayan box from his mother. If the box measures 4 feet long, 3 feet wide and 6 feet high, what is the volume of the Balik-Bayan box?

   (A) 13ft³   (B) 18 ft³   (C) 24 ft³   (D) 72 ft³

7. Mang Albert built an 8m by 4m by 7m swimming pool in his backyard. What is the volume of the swimming pool?

   (A) 19 m³   (B) 39 m³   (C) 56 m³   (D) 224 m³

8. Mother bought a jewelry box for her accessories. The box measures 10 cm long, 5 cm wide and 3 cm high. Find its volume.

   (A)150 cm³   (B) 53 cm³   (C) 25 cm³   (D)18 cm³

9. What is the volume of the figure below?

   2 cm
   3 cm
   8 cm
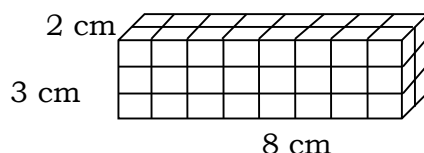
   (A) 8 cm³   (B) 24 cm³   (C) 46 cm³   (D) 48 cm³

10. Find the volume.   10 cm

    2 cm
    2 cm
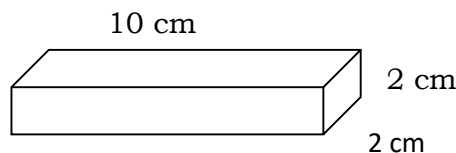
    (A) 40 cm³   (B) 16 cm³   (C) 8 cm³   (D) 4 cm³

<table>
<tr><td>**Lesson**
1</td><td># Visualizing the Volume of a Cube and a Rectangular Prism</td></tr>
</table>

This lesson will help you understand how architects and engineers use measurement in finding the area and volume of structures they will construct. After this lesson, you will know that the volume of a box-refers to the amount of space the box can hold and that it is the product of the side lengths in the 3 dimensions (length, width and height). Your skill in multiplying numbers can help you complete this lesson.

Are you ready? Then, we better get starting.
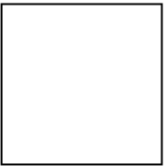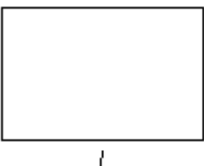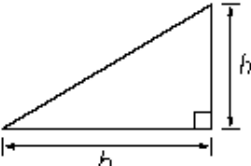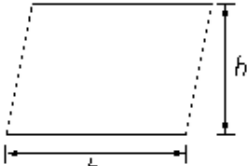
What's In

You learned how area of plane figures can be obtained. Area is the measure of how much space there is within a two-dimensional figure. A two-dimensional figure involves length and width such as a circle, a square, a rectangle, a parallelogram, a triangle, among others.

Area of a Rectangle   Area of a Square   Area of a Triangle

length 4 units
width 3 units

3 units
3 units

height 5 units
base 5 units

(Area = length × width)   (Area = ½ base × height)
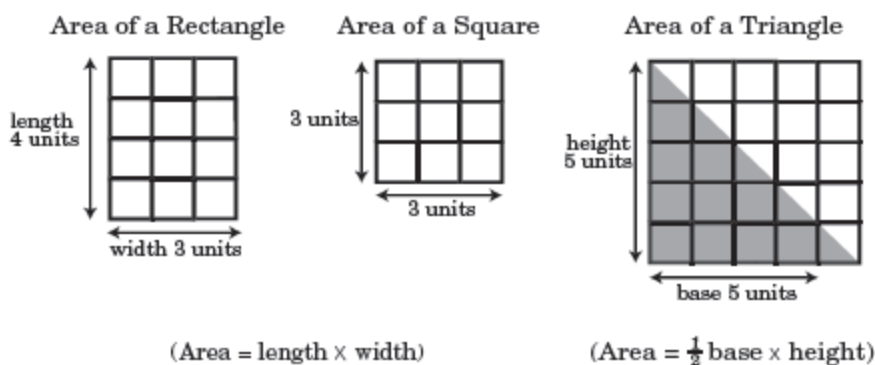
So, to find the area of the rectangle, the square and the triangle in the given examples above, we just count the unit squares enclosed by these. In general, we simply follow the formula, please see below.

The area of a shape is a measure of the size of its surface.

Square Area $= l^2$	Rectangle Area $= l \times w$	Triangle Area $= \frac{1}{2} b \times h$	Parallelogram Area $= b \times h$
l	w l	h b	h b

Circle Area $= \pi r^2$
r
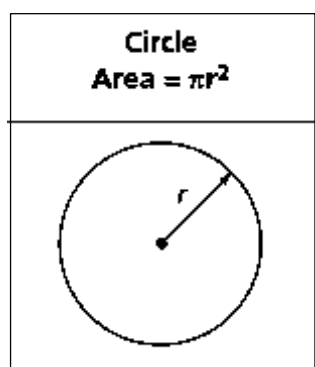
Let's see if you have learned that by answering the ff.

1. What is the area of the triangle shown? 12 20
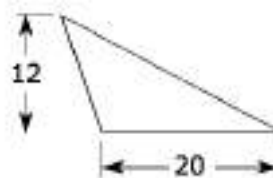
2. The surface of the teacher's table measures 1.5 m by 1 m. What is its surface area?
3. Each side of a square lot measures 10 m. What is its area?

What's New

Now let's proceed. From areas of two-dimensional figures, let's move on to volumes of three-dimensional figures. In this lesson, we will deal with visualizing the volume of a cube and a rectangular prism. But, do you know what a volume is?

Volume is the amount of space occupied by an object. You will understand this concept as you go along with this module.

Consider the situation below.

Joseph has been a consistent champion for Rubik's Cube competition for three years in a row. His expertise is solving a 3x3x3 cube. If Joseph will dismantle his Rubik's Cube, can you figure out how many layers the cube is made of? How many rows and columns are there in each layer? In your own idea, how many small cubes are there in the cube?

If we measure area by the number of unit squares a plane figure occupies, for example there are 6 unit squares in the green rectangle, how do we measure the volume of a cube or a rectangular prism?

CO_Q4_MATH5_MODULE3
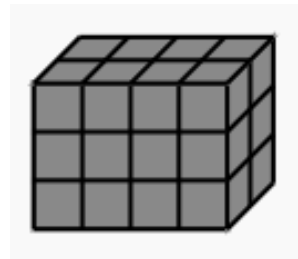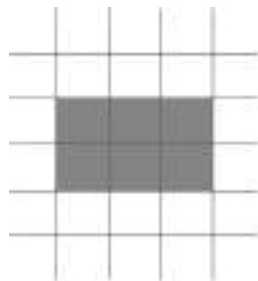
In finding the volume of a cube and rectangular prism, you have to consider its dimensions: length, width and height. Always remember that volume is the amount of space a solid figure occupies. A **cube** is a solid figure whose length, width and height are equal while a **rectangular prism** whose length, width and height may or may not be equal. Volume is expressed in cubic units. We write the cubic units: unit³.

We can visualize the volume of a cube and a rectangular prism by:

a. Using non-standard units to fill the container (like the use of marbles, pebbles, rice grains, seed, etc.) However, Non-standard units do not give consistent and accurate measure of the volume of a container as these materials may differ in sizes and shapes.

b. Using standard units, to find the volume of a space figure, count the number of cubic units needed to fill the space. Standard units are consistent and accurate.

Example 1

Let's take the problem shown in the previous part of this lesson., Joseph's 3x3x3 Rubik's Cube.
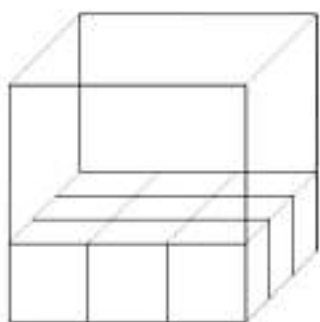
The total number of small cubes in the transparent container is its volume.

From the figure, consider each cube (▱) having each edge as **1 cm**. There are 3 layers and each layer has nine 1 cm cubes. Therefore, the Rubik's Cube contains 27 cubes. Its volume is 27 cubic centimeters or 27 cm³.

Now, let's try another one. This time, with computations how to get the volume of the cube.

Example 2 a 4x4x4 Rubik's Cube

The volume of a Rubik's Cube can be measured by its cubic unit. If each ⬜
measures 1 cubic cm, how many cubes does the figure contain? We can get its
volume by counting the cubes in each layer and then multiplying this with the
number of layers. Also, we can find the volume by multiplying its length, width and
the height.

⬜ 1 cm
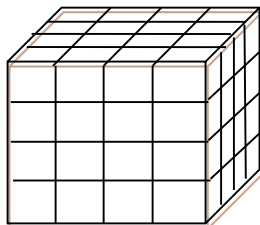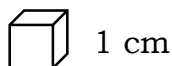
Let us put small cubes in the container. Up to how many cubes can you place
inside the container?

a. The number of cubes in one layer
can be found by multiplying the length and the
width. This is the area of the bottom face.
Example: 4 x 4 = 16 cubes
There are 16 cubes in each layer.
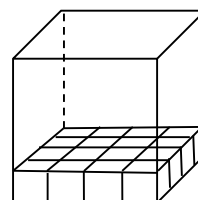
b. We then multiply the product we obtained by the number of layers or
the height of the cube. In this case, we have 4 layers of 16 cubes each
layer. So,

c. 16 x 4 = 64 cubes

Notice that the volume is equal to multiplying the length, the width and
the height of the cube, each of which is 4 units: 4 x 4 x 4 = 64 cubic
units.

In a cube, we are going to get the volume by multiplying its length, width, and
height, all of which are equal. For cubes we can use "*S*" for sides because its
dimensions are equal.

- V = S x S x S (V = S³)
  V = 4 cm x 4 cm x 4 cm
  V = 16 cm² x 4 cm
  V = 64 cm³

4 cm

4 cm

4 cm
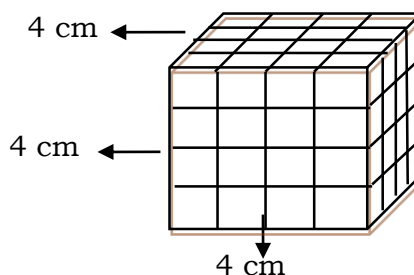
Example 3

For a rectangular prism, we can get its volume by multiplying its length, width and height. Look at the figure. You can now visualize how it looks like inside based on the previous examples. Now, let us find the volume of a container with 4 dm long, 2 dm wide and 6 dm tall.

- V = length x width x height
  V = 4 dm x 2 dm x 6 dm
  V = 8 dm² x 6 dm
  V = 48 dm³

6 dm

2 dm

4 dm
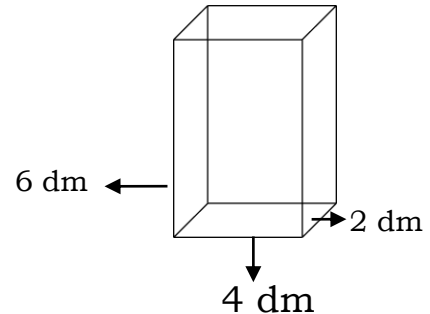
Example 4

A box is 10 cm long, 4 cm wide and 3 cm tall. What is its volume? Let us visualize the problem.

3 cm
Height
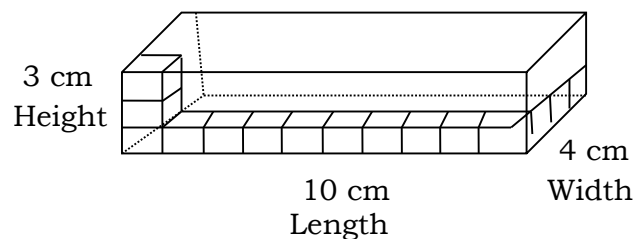
Cubic centimeter

1 cm

4 cm
Width

10 cm
Length

The figure above is a box whose dimensions are 10 cm long, 4 cm wide and 3 cm high. To find the volume, we need to know the number of cubes in the whole figure.

To find the total centimeter cubes,
- Multiply 10 and 4 to find the number of cubes on the bottom layer.
- Then multiply by the number of layers.

Multiply 10 cm by 4 cm by 3 cm:

10 cm x 4 cm x 3 cm = 120-centimeter cubes, the volume of the box is 120 cm³.

Thus, always keep in mind the formula in finding the volume:

Volume = length x width x height (V = L x W x H).

Answer the activities below to master the lesson.

![ABC blocks icon] ***What's More***

Activity 1: Count Me On!

Directions: Look at the figures carefully. Count the cubic units to find the volume of each figure. Follow the steps given above. Number 1 is done for you.

1. V = **27 cubic units**

2. V = _____

3. V = _____

4. V = _____
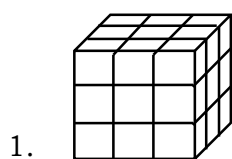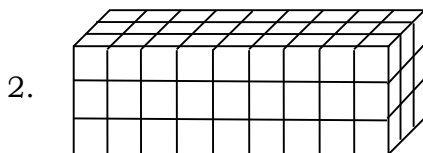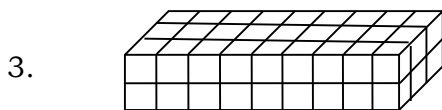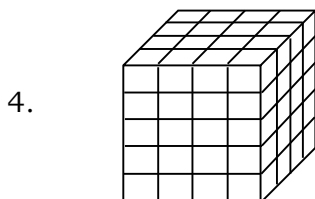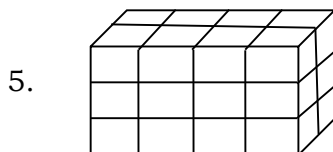
5. V = _____

Activity 2: Color Me!

Directions: Color the box with the correct color that corresponds to the dimensions found in the table. Write the correct volume in the last column.

Box Color	Length	Width	Height	Volume
red box	5 mm	5 mm	5 mm	
green box	8 cm	2 cm	3 cm	
blue box	5 dm	3 dm	4 dm	
orange box	10 m	2 m	5 m	
yellow box	6 ft	4 ft	5 ft	

1.

V = <u>48cm³</u>

2.   V = <u>120 ft³</u>

3.

V = <u>125 mm³</u>

4.

V = <u>60 dm³</u>

5.   V = <u>100 m³</u>
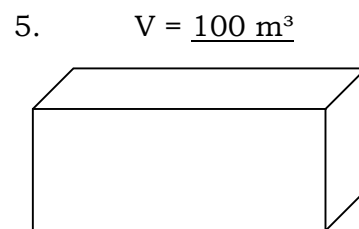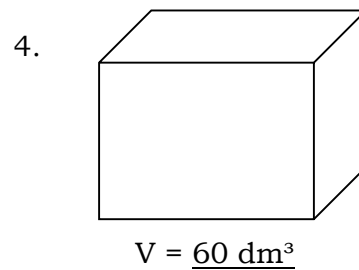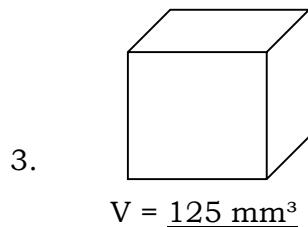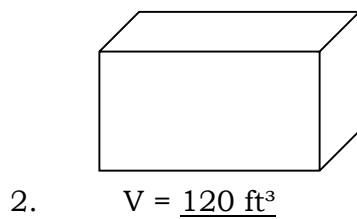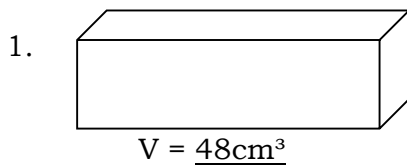
Activity 3: Reveal the Hidden Word!

Directions: Match each given volume with its corresponding dimensions found in the KEY by writing the letter on the box assigned to it.

512 cm³	240 m³	216 cm³	30 mm³	525 cm³	8 cm³

KEY:

M = L – 15 cm, W – 7 cm, H – 5 cm	C = S is 3 cm
A = 8 mm by 2 mm by 2 mm	O = L – 10 m, W – 6 m, H – 4 m
L = 6 cm x 6 cm x 6 cm	V = *length of each* side is 8 cm
B = L – 5 cm, W – 2 cm, H – 4 cm	U = 2 mm by 5 mm by 3 mm
E = S is 2 cm	R = L – 8 cm, W – 3 cm, H – 1 cm

Congratulations for reaching this far. Just keep learning!

What I Have Learned

Answer the following questions in one or two sentences.

1. What is volume?
2. What do you call the 3 dimensions of a rectangular prism?
3. When is a rectangular prism a cube?
4. Given the dimensions of a rectangular prism, how do you compute for its volume?
5. How do you compute for the volume of a cube given the length of its edge?

What I Can Do

Remember that a volume of an object is the amount of space the object occupies. Volumes are a helpful tool for knowing the measurement of solid around us, because volumes help us know the size of our personal things or belongings.

Directions: In each situation below, draw a figure to show the given dimensions. Then find the volume of the object. You can use an extra sheet of paper for your illustration. The first one is done for you.

1. A shoebox measures 12 cm long, 6 cm wide and 2 cm high. **V = __144 cm³__**
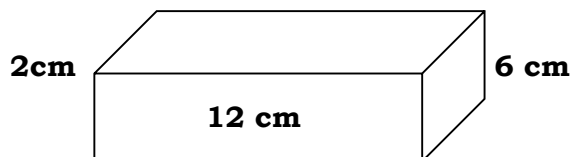
2. The classroom's dimension is 9 m long, 7 m wide and 4 m high.

V = _____

3. A dictionary is 14 cm long, 10 cm wide and 2 cm high.

V = _____

4. A box of milk is 8 in long, 4 in wide and 11 in high.

V = _____

5. A jewelry box is 8 cm long, 4 cm wide and 3 cm high.

V = _____

Keep it up! You are almost done with this module.

Assessment

Directions: Read and understand each statement below. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. Aling Letty bought an aquarium. It measures 5 dm long, 3 dm wide and 2 dm high. What is the volume of the aquarium?

   (A) 10 dm³   (B) 11 dm³
   (C) 17 dm³   (D)30 dm³

2. The air condition measures 2 feet long, 2 feet wide and 3 feet high. Which is the correct expression to find the volume of the air condition?

   (A) 2 x 2 x 3   (B) 2 x 2 + 3
   (C) 2 + 2 x 3   (D) 2 + 2 + 3

3. Mercy is going to buy a pair of shoes. The shoe box measures 30 cm by 20 cm by 12 cm. Can you tell how many cubic centimeters fit in the shoe box?

   (A) 7 200 cm³   (B) 600 cm³
   (C) 240 cm³   (D) 62 cm³

4. Jude bought a mathematics book, which measures 13 cm long, 6 cm wide and 2 cm high, find the volume.

   (A) 156 cm³   (B) 80 cm³
   (C) 25 cm³   (D) 21 cm³

5. Sam is shipping a carton, which is 11 inches long, 9 inches wide and 7 inches tall. Which expression shows how to find the volume of the shipping carton?

   (A) 11 x 7   (B) 11 + 9
   (C) 11 x 9 x 7   (D) 11 + 9 + 7

6. Cean bought a match for their experiment. The box measures 6 mm x 3 mm x 2 mm. What is the volume?

   (A) 11 mm³   (B) 12 mm³
   (C) 20 mm³   (D) 36 mm³

7. Andre played a 2x2x2 Rubik's Cube. How many 1-cm cubes does the Rubik's have?

   (A) 8 cm³   (B) 6 cm³
   (C) 4 cm³   (D) 2 cm³

8. Ana received a parcel from her auntie in Manila that measures 5 inches on each side. Which is the correct expression to find the volume of the box?

(A) 5^1 (B) 5^2 (C) 5^3 (D) 5^4

9. Find the volume of this figure.

4 m

3 m

7 m
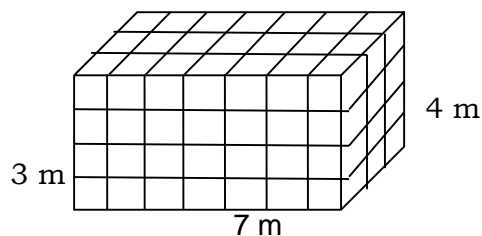
(A) 84 m³   (B) 21 m³   (C) 19 m³   (D) 14 m³

10. What is the volume of the cube?

4 cm
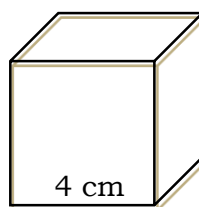
(A) 64 cm³   (B) 20 cm³   (C) 16 cm³   (D) 12 cm³

Good job you made it! Just one last activity to answer and you are done.

 Additional Activities

Directions: Look at the figures very carefully. Find the volume of each.

(1) 4 cm

9 cm

9 cm

(2) 6 cm

4 cm

4 cm

(3)

3 cm

3 cm

3 cm
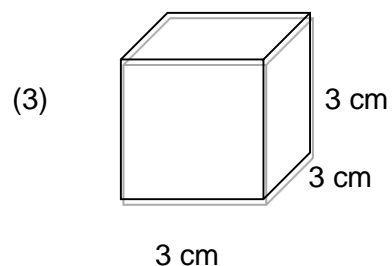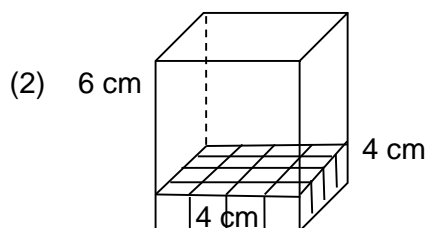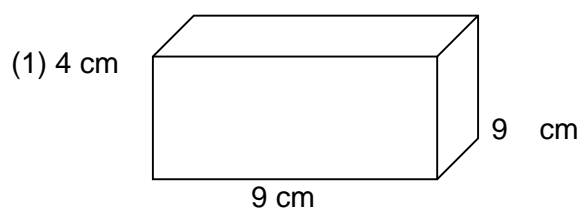
(4) Length = 10 units,
width = 6 units,
height = 4 units
V=_____

(5) 9 x 9 x 9
V=_____

14

Answer Key

What I Can Do
1. 144 cm³
2. 252 m³
3. 280 cm³
4. 352 in³
5. 96 cm³

Assessment

1. D	6. D
2. A	7. A
3. A	8. C
4. A	9. A
5. C	10. A

Additional Activities
1. 72 cm³
2. 96 cm³
3. 27 cm³
4. 240 cubic units
5. 729 cubic units

What's More
Activity 3: Reveal the Hidden Word

512 cm³	240 m³	216 cm³	30 mm³	525 cm³	8 cm³
V	O	L	U	M	E

What I Have Learned
1. Volume is the amount of a space an object occupies.
2. Length, width, and height
3. A cube is a rectangular prism where the length, the width, and the height are all equal.
4. Multiply the length, width and height. The unit of measurement is cubic units.
5. If we let s be the edge of the cube, the volume of the cube is s^3 = s x s x s

What's More
Activity 2 Color Me
1. Green box
2. Yellow box
3. Red box
4. Blue box
5. Orange box

What's More
Activity 1
1. 27 cubic units
2. 81 cubic units
3. 54 cubic units
4. 80 cubic units
5. 24 cubic units

What's In
1. 120 square units
2. 1.5 m²
3. 100 m²

What's More
Activity 2: Color Me!

Box Color	Length	Width	Height	Volume
red box	5 mm	5 mm	5 mm	125 mm³
green box	8 cm	2 cm	3 cm	48 cm³
blue box	5 dm	3 dm	4 dm	60 dm³
orange box	10 m	2 m	5 m	100 m³
yellow box	6 ft	4 ft	5 ft	120 ft³

What I Know

1. C	6. D
2. B	7. D
3. A	8. C
4. A	9. D
5. A	10. A

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CO_Q4_MATH5_MODULE3

Mathematics

Quarter 4 – Module 4:
Naming the Appropriate Unit
of Measure for Volume

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 4: Naming the Appropriate Unit of Measure Used For Measuring the Volume of a Cube and a Rectangle Prism
First Edition, 2020

5

Mathematics
Quarter 4 – Module 4:
Naming the Appropriate Unit
of Measure for Volume

DepED
DEPARTMENT OF EDUCATION

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 Mathletes! This module was designed to help you understand the appropriate unit of measure for the volume of cube and rectangular prism. Always remember that larger units are used to measure large amount of space occupied and smaller units are used to measure small amount of space occupied. Writing the appropriate volume unit measure gives the reader an accurate idea of how large or small the space occupied by the object. *So, what are you waiting for? Be ready and let's begin.*

At the end of this module, you are expected to:

- name the appropriate unit of measure for the volume of a cube and a rectangular prism; and

- appreciate the daily use of knowing and naming the appropriate unit of measure for the volume of a cube and a rectangular prism.

Before going any further, let us check your understanding about naming the appropriate unit of measure for the volume of a cube and a rectangular prism.

What I Know

Directions: Choose the appropriate unit of measure for the volume of the following objects. Write the letter of the correct answer on a separate sheet of paper.

1. The Department of Education delivered a Mathematics cabinet in each school. What unit is appropriate to use to measure the volume of the cabinet?

   (A) cm^3 (B) m^3 (C) mm^3 (D) dm^3

2. Teacher Efren bought Mathematics books for his additional references. What unit of measure is appropriate to use?

   (A) m^3 (B) mm^3 (C) dm^3 (D) cm^3

3. Cubic decimeters (dm^3) is the right unit of measure to use for a small die. True or False?

   (A) False   (B) True   (C) Maybe   (D) Undecided

1

4. Mang Nestor won a new refrigerator in the raffle. What unit of measure is appropriate for the volume of the refrigerator?

   (A)m³   (B) cm³   (C) mm³   (D) dm³

5. Mrs. Ortiz bought a new teacher's table for her classroom. What unit of measure is suited to the table?

   (A)mm³   (B) dm³   (C) m³   (D) cm³

6. Mr. Rama is going to repaint his chalkboard. He uses cm³ to measure the chalkboard. Is Mr. Rama using the right unit of measure?

   (A)Yes   (B) No   (C) Maybe   (D) Somehow

7. Mang Arturo is building an 8 x 4 x 7 swimming pool in his backyard for his grandchildren. What unit measure is appropriate to find the volume of the swimming pool?

   (A)m³   (B) dm³   (C) cm³   (D) mm³

8. Leo's father is a driver. He drives a mini cargo van. What unit measure is appropriate to use to find the volume of a mini cargo van?

   (A)cm³   (B) dm³   (C) mm³   (D) m³

9. If your sister needs to measure a 4x4x4 Rubik's Cube and said she will use cm³ to do that. Is she using the right unit of measure or not?

   (A)Yes   (B) No   (C) Maybe   (D) Somehow

10. You want to know the volume of a matchbox. What unit of measure best describes it?

    (A)m³   (B) cm³   (C) mm³   (D) dm³

In this module, you will understand why it is very important to know about measurements and how useful volume measurements are in our daily activities. Your mastery in visualizing the volume of a cube and a rectangular prism and the different types of measurements will be a big help in understanding this lesson. Now, are you ready to learn how to name the appropriate unit of measure for the volume of a cube and rectangular prism and a lot more. *So, let's get started.*

What's In

From the previous lesson, you learned how to visualize the volume of a cube and a rectangular prism. You have known what a volume is and you can visualize how the volume of a cube and a rectangular prism looks like. Volume is the amount of space occupied by an object. How about going backward a little bit? Let's review and answer the exercise below by giving the volume of the following figures.

1. 1.5 dm
    2 dm
    4 dm   V = _____

2.   V = _____
    5 cm

3.   8 ft   V = _____
    2.5 ft   2 ft

4.

5 m

2 m   6.5 m

V = _____

5.

5 cm

12 cm   3 cm

V = _____

![leaf icon] **What's New**
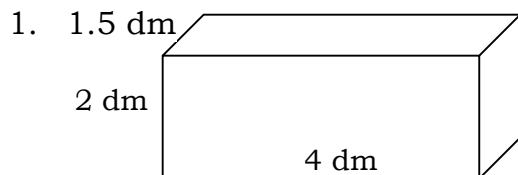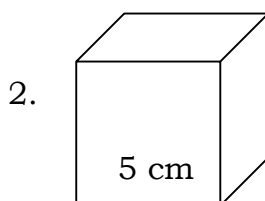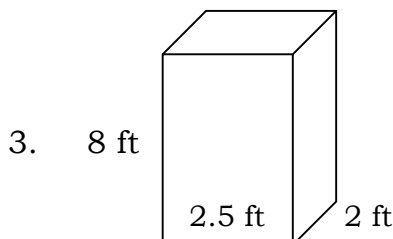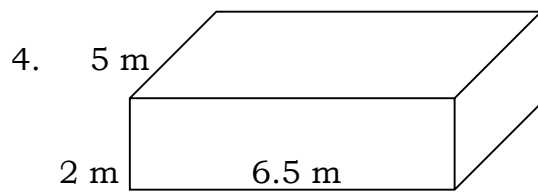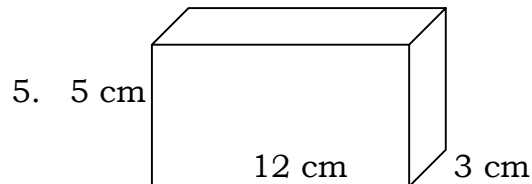
In this lesson, you are going to deal with naming the appropriate unit for measuring the volume of a cube and a rectangular prism. You will fully understand this concept as you go along with this module. Always remember that volume is the amount of space occupied by an object.

Consider the problem below.

> Your mother bought a box for your birthday "Pabitin". She told you to fill it up with chocolates, biscuits, candies and other goodies. As curious as you are, you want to know how you may be able to measure the capacity of the box.
>
> What do you think is the unit of measure to use for the volume of the objects in the box? Can you defend your answer?

What Is It

In naming the appropriate unit for measuring the volume of a cube and rectangular prism, you have to consider the amount of space occupied. It is important to remember that larger units are used to measure large amount of space occupied and smaller units are used to measure small amount of space occupied.

Any unit of length gives a corresponding unit of volume. For example, a **cubic centimeter** (cm^3) would be the volume of a cube whose sides are measured in **centimeters** (cm).

In the **International System of Units** (SI), the standard unit of volume is the cubic meter (m^3). Metric System also includes:

- cubic meter (m^3) is used to measure large amount of space occupied
- cubic decimeter (dm^3)
- cubic centimeter (cm^3)
- cubic millimeter (mm^3) is used to measure the small amount of space occupied

Example 1: A box of match and a balik-bayan box

Look carefully at the pictures below.

A box of match

A balikbayan box

From the pictures shown, a match box occupies a small space while the balikbayan box occupies a large space. The length, width, and the height of the match box, each can be measured in millimeters (mm). The length, width, and the height of the Balikbayan box, each can be measured in meters (m). Therefore, we use cubic millimeter (mm^3) for the match box and since, a balikbayan box occupies a large space we may use a cubic meter (m^3) for its volume.

Example 2: A 2x2x2 Rubik's cube and a small dice
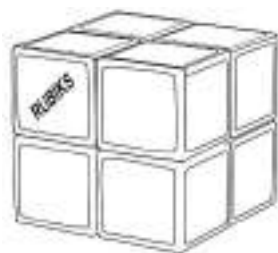
A 2x2x2 Rubik's cube   A small dice

From the pictures above, a 2x2x2 Rubik's cube occupies 8 cubic units while a die occupies 1 cubic unit. Thus, a Rubik's cube occupies a large space than a die which occupies a small space. Therefore, we use cubic centimeter (cm³) for Rubik's cube and cubic millimeter (m³) for the die.

Example 3: A pencil and a chalkboard eraser
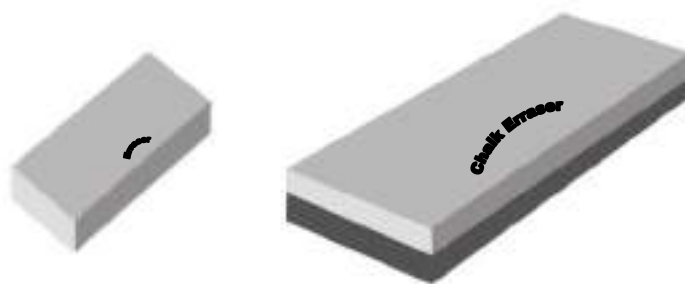
The two pictures are both erasers, but occupy different amount of space. The pencil eraser occupies a smaller space than the chalk eraser. Therefore, we can use cubic millimeter (mm³) for the pencil eraser and a cubic centimeter (cm³) for the chalk eraser as units of measurement of their volume.

Thus, always keep in mind that larger units are used to measure large volumes while smaller units are used to measure small amount of space occupied by an object.

![ABC blocks icon] ***What's More***

Activity 1: Put A Name On Me!

Directions: Name which cubic unit of measure is appropriate to be used for the following objects' volume. Use m³, cm³, dm³, mm³.

1. classroom _____
2. mathematics book _____
3. cellular phone _____
4. cooler _____
5. a piece of domino _____

Activity 2: Measure Me Up!

Directions: Look at the following figures carefully. Write the cubic unit of measure.

1. 2 m
   5 m
   10 m

3.
   9 mm

2. 8 cm
   3 cm   2 cm

4. 6 dm
   5 dm
   4 dm

5. 3 dm
   3 dm   3 dm
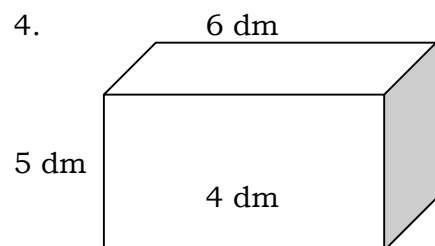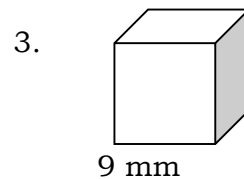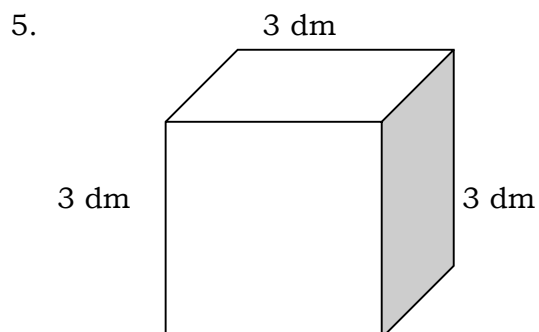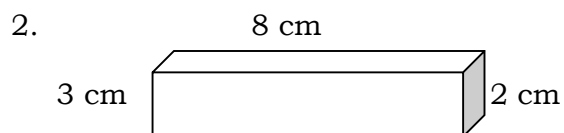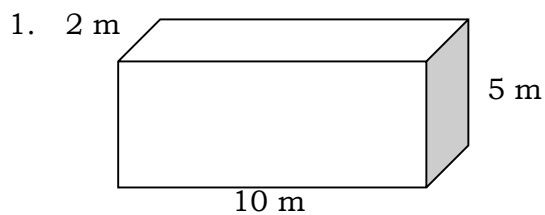
Activity 3: Correct Me If I'm Wrong!

Directions: Put a check mark ☑ if the unit measure used is appropriate for the object and X mark ☒ if it is not.

_____ 1. A 9x7x5 classroom measures 315 m³.

_____ 2. Meter can be used to measure the volume of a small clock.

_____ 3. A cellular phone sim card measures 3 cubic meters or 3 m³.

_____ 4. A Science cabinet can be measured by cubic decimeter or dm³.

_____ 5. Millimeter is used to measure a rectangular pencil eraser.

Congratulations for reaching this far. Are you having fun learning? Just go on.

What I Have Learned

A. Answer the following questions in one or two sentences.
1. What unit of measurement is properly used to determine the length of shorter or smaller objects? What about for longer or larger objects?
2. What unit of measurement is properly used to determine the volume of smaller objects? What about for larger objects?

What I Can Do

Directions:

List down all the words that you can find in the puzzle that are used for measuring the volume of a cube and a rectangle prism.

M	I	L	L	I	M	E	T	E	R	M
E	C	I	P	S	E	R	M	T	E	C
A	B	T	R	Y	M	E	C	I	T	E
S	V	E	I	S	E	S	B	L	E	N
U	O	R	S	T	T	P	S	A	R	T
R	L	I	M	E	E	A	M	R	I	I
E	U	M	S	M	R	C	A	G	T	M
M	E	E	R	U	T	E	L	E	N	E
E	M	T	C	C	M	S	L	R	E	T
N	R	E	T	E	M	I	C	E	D	E
T	A	T	S	T	A	N	D	A	R	R
S	C	E	E	W	M	E	R	A	C	D

Congratulations! Just two more activities and you are done with this module.

Assessment

Directions: Choose the appropriate unit of measure to be used for the following objects' volume. Write the letter of the correct answer on a separate sheet.

1. What appropriate unit of measure can be used in measuring a cellular phone?
   (A)cm³   (B) m³   (C) mm³   (D) dm³

2. Archie bought a pocket WIFI for his online classes. What unit of measure is fit to use to measure the volume of the said item?
   (A)m³   (B) dm³   (C) cm³   (D) m³

3. If you are going to measure a documentary stamp, what are you going to use?
   (A)mm³   (B) dm³   (C) m³   (D) cm³

4. Susan's room measures 8 by 3 by 2. What unit of measure would she use?
   (A)cm³   (B) mm³   (C) dm³   (D) m³

5. Argie bought a box of pineapple juice with 12 tetra packs inside. What unit of measure can be used to measure the box?
   (A)mm³   (B) dm³   (C) cm³   (D) m³

6. Aling Nene eats a bar of milk chocolate. Is it appropriate to use cm³ as a unit of measure to find the volume of the chocolate?
   (A)No   (B)Yes   (C) Maybe   (D) Undecided

7. Nicko used a globe to present her report in Araling Panlipunan to find the location of the Philippines. What unit measure is suited to find the volume globe?
   (A)mm³   (B) dm³   (C) m³   (D) cm³

8. What appropriate unit measure can be used for the volume of the door of a house?
   (A)m³   (B) cm³   (C) dm³   (D) mm³

9. Mang Nilo makes a fish pond in their backyard and he wants to fill it with water. To find how much amount of water the pond can hold, what unit of measure should he use?
   (A)dm³   (B) m³   (C) cm³   (D) mm³

10. Your classmate was asked by your teacher to measure a 3x3x3 Rubik's Cube. He chose to use mm³ to know its volume. Did your classmate use the appropriate unit of measure or not?
    (A)No   (B) Yes   (C)Maybe   (D) Undecided

Additional Activities

Directions: Tell in words and in exponential form the cubic unit of measure to be used in the following illustrations.

1.   3 mm

   3 mm

2.   3 cm

   4 cm

3.   3 dm

   6 dm

   4 dm

4.   2 m

   5 m

   7 m

5.   2 cm

   2 cm

   2 cm

![key icon] *Answer Key*
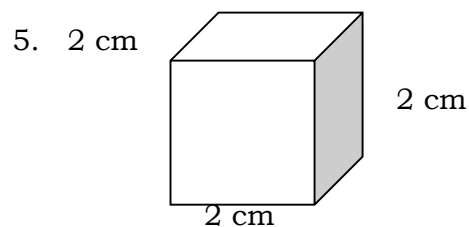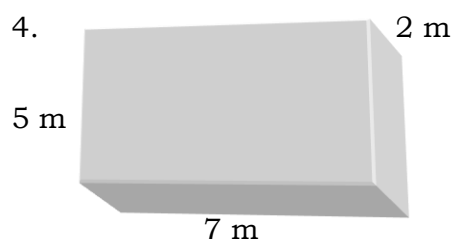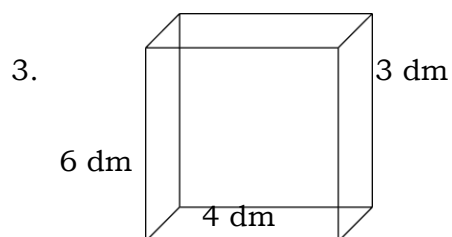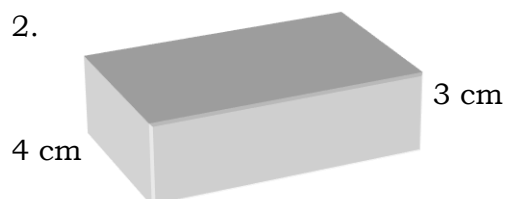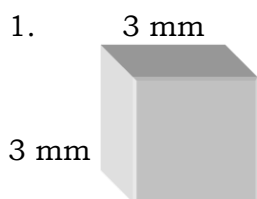
What's I Can Do

Additional Activities

1. cubic millimeter mm³
2. cubic centimeter cm³
3. cubic decimeter dm³
4. cubic meter m³
5. cubic centimeter cm³

Assessment

1. A	6. B
2. C	7. D
3. A	8. A
4. D	9. B
5. C	10. A

What's More
Activity 2: Tell Me!

1. cubic meter (m³)
2. cubic centimeter (cm³)
3. cubic millimeter (mm³)
4. cubic decimeter (dm³)
5. cubic decimeter (dm³)

What's More
Activity 3: Correct Me if I'm Wrong!

1. /
2. x
3. x
4. /
5. /

What I Have Learned

1. Smaller or shorter lengths have mm or cm or cm as units of measurement while larger or longer lengths have dm or m as units of measurement.

2. Smaller volumes use mm³ or cm³ while large volumes use dm³ or m³.

What's In

1. 12 dm³
2. 125 cm³
3. 40 ft³
4. 65 m³
5. 180 cm³

What I Know

1. B	6. B
2. D	7. A
3. A	8. D
4. D	9. A
5. C	10. C

References

Lumbre, Angelina P., and Alvin C. Ursua Ursua Donnel P. Placer, Jaime R. Burgos, Reynaldo A. Sy, Jr.. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

Grade 5 Teachers Guide and Learners Materials, LRMDS

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DEPARTMENT OF EDUCATION

Mathematics
Quarter 4 – Module 5:
Converting Units of
Measurement in Volume

ALTERNATIVE DELIVERY MODE
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Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 5: Converting cu. cm to cu. m and vice versa; cu. cm to L and vice versa
First Edition, 2020

5

Mathematics
Quarter 4 – Module 5:
Converting Units of
Measurement in Volume

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 Mathletes! This module was designed and written to help you gain an understanding on converting cu.cm to cu. m and vice versa; and cubic cm to L and vice versa. Knowing the rules in converting smaller unit to bigger/higher unit and vice versa make it easy for you. So, what are you waiting for? Stay focused and start up!

At the end of this module, you are expected to:

- Convert cubic cm to cubic m and vice versa; cubic cm to L and vice versa.

Before going any further, let us check your understanding about converting cu. cm to cubic m and cu. cm to L and vice versa.

What I Know

Directions: Convert the following units. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. How many cubic centimeters are there in 2 m^3?
   A. 200 cm^3 B. 2000 cm^3 C. 20 000 cm^3 D. 2 000 000 cm^3

2. If you get the equivalent of 45 m^3 to cm^3, what would the answer be?
   A. 45 000 000 cm^3 B. 450 000 cm^3 C. 45 000 cm^3 D. 4 500 cm^3

3. 35 000 000 cm^3 = _____ m^3
   A. 350   B. 35   C. 3.5   D. 0.35

4. If we convert 7 300 000 cm^3 to m^3, the answer is 73 m^3.
   A. True   B. False   C. Maybe   D. Undecided

5. What is 25 cm^3 equal to in m^3?
   A. 250   B. 2500   C. 0.000025   D. 25 000 000

6. 50 cm^3 = _____ L
   A. 5   B. 500   C. 0.05   D. 0.5

7. 650 L= _____ m³
   A. 6 500 000   B. 650 000   C. 6500   D. 0.65

8. If you convert 0.045 L to cm³. How much would it be?
   A. 45cm³   B. 0.45 cm³   C. 4.5 cm³   D. 450 cm³

9. 20 cm³ is equivalent to 0.02 L, true or not?
   A. True   B. False   C. Maybe   D. Undecided

10. What is 96 cm³ in liters?
   A. 960 L   B. 9.60 L   C. 0.096 L   D. 0.96L

Lesson 1

Converting Units of Measurement in Volume

In order to convert a measurement to a smaller or bigger value unit, you need to master the basic skills on simple conversion. In this module, you will learn how to convert cu. cm to cu. m and cu.cm to L and vice versa.

Are you ready?

What's In

In the previous lesson, you were able to learn and name the appropriate unit of measure for the volume of a cube and a rectangular prism. Volume is measured in cubic units such as cubic centimeters (cm³), cubic meters (m³), cubic millimeters (mm³), and cubic decimeters (dm³).

Directions: Let us refresh your memory and try to answer the following exercises below by giving the appropriate unit of measure to be used in finding the volume of the object. Write your answer on your paper.

1. thumbtacks box   _____

2. bottle of vinegar   _____

3. cabinet   _____

4. a die   _____

5. gravel and sand truck   _____

What's New

From the previous lesson, you were taught on how to name the appropriate unit of measure for the volume of a cube and a rectangular prism. The smaller the object, the smaller unit of measure is being used while the bigger the object, the bigger/larger unit of measure is being used.

In this lesson, you are going to deal with converting the unit of measure used such as cu. cm to cu. m and vice versa; cu. cm to L and vice versa.

Consider the problem and illustration below:

As the Covid-19 cases continue to rise Anna and Allan were getting bored at home. So, their father bought them a rectangular aquarium and different types of fish for them to enjoy while staying at home. The aquarium is 20 cm long, 15 cm wide and 20 cm high.

But first, the siblings need to fill up the aquarium with four liters of water. What is its equivalent value in cubic centimeters (cm³)? How much water in cm³ can the aquarium hold? Will the aquarium be able to hold the 4-liter water?
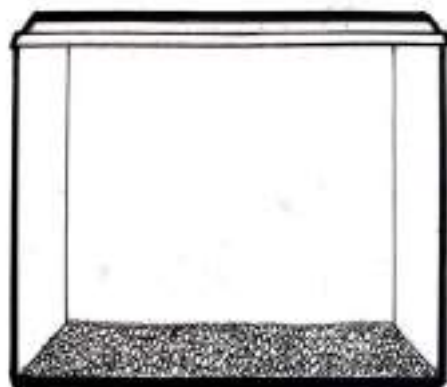
What Is It

The problem calls for the capacity of the aquarium and whether the amount of water to be poured in, is within the allowable volume limit. To compare two quantities, they have to be in the same unit of measurement. That is, when one object is given in cubic meter, the other should be in cubic meters as well. Otherwise, you need to convert.

Let's study the following examples:

- Let's convert 1 cubic meter to cubic centimeters.

$$1 \text{ m}^3 = 1 \text{ m}^3 \times \left(\frac{100 \text{ cm}}{1 \text{ m}}\right)^3 = 1 \text{ m}^3 \times \frac{100^3 \text{ cm}^3}{1 \text{ m}^3} = 100^3 \text{ cm}^3 = 1\ 000\ 000 \text{ cm}^3$$

- Let's convert 1 cubic centimeter to cubic meter.

$$1 \text{ cm}^3 = 1 \text{ cm}^3 \times \left(\frac{1 \text{ m}}{100 \text{ cm}}\right)^3 = 1 \text{ cm}^3 \times \frac{1 \text{ m}^3}{100^3 \text{ cm}^3} = \frac{1}{1\ 000\ 000} \text{ m}^3 = 0.000001 \text{ m}^3$$

3

Containers such as the aquarium can hold liquid such as water. Containers come in different sizes and shape. If they are in the shape of a cube or a rectangular prism, we can determine its volume by its dimensions length, width, and height, each of which can be measured in terms of unit lengths such as the metric units: millimeters, centimeters, decimeters, and meters. However, the volume of liquids is usually in milliliters and liters. So, we need to learn how to convert cubic centimeters and cubic meters into milliliters or liters.

1 cc = 1 ml
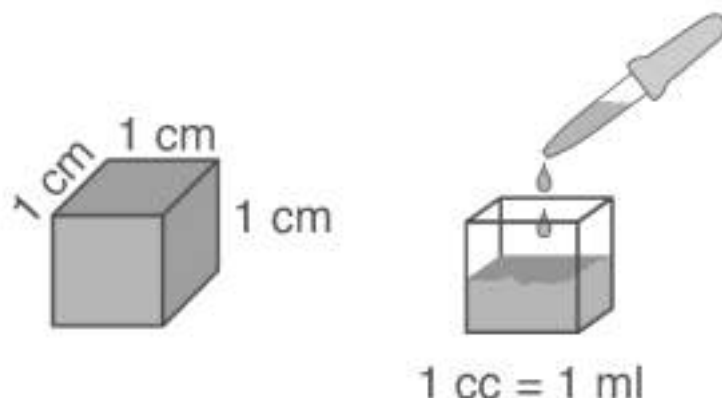
Each cubic centimeter (1 cc or 1 cm³) is equal to 1 ml.

Let's convert 1 liter to cubic centimeters.

1 liter = $1 \, \cancel{L} \times \frac{1000 \, mL}{1 \, \cancel{L}}$ = 1000 mL = 1000 cm³

Now, it's your turn. Convert 1 cm³ to liters by filling out the missing value that will make the equation true. Take note of the following:

a. In multiplying a whole number to a fraction, multiply the whole number to the numerator and copy the denominator. In multiplying two fractions, multiply the numerator to numerator and denominator to denominator.
Example $5 \times \frac{1}{6} = \frac{5 \times 1}{6} = \frac{5}{6}$

b. 1 liter = 1000 cm³

Now, Convert 1 cm³ to liters

$1 \text{ cm}^3 = 1 \text{ cm}^3 \times \frac{}{1000 \, cm^3} = \frac{L}{} = \underline{} \text{ L}$

Let us study the relationship between some units of measurement below. Do you see any pattern?

1 cu. m (m³) = 1,000,000 cu. cm (cm³)
1 cu. cm (cm³) = 0.000001 cu. m (m³)
1 liter = 1000 cu. cm (cm³)
1 cu. cm (cm³) = 0.001 L

Example 1: Let's answer the problem presented in the previous part of the lesson.

What we need to know is the equivalent value of 4 L in cm³? Which is larger a cubic centimeter or a liter? How many cubic centimeters are there in a liter (L) and vice versa?

We need to convert liters to cubic centimeters because the unit of measure used in the aquarium is in centimeters, so its volume is in cubic centimeters and to avoid waste of water it is important to be accurate as to the exact amount of water the aquarium can hold.

Since: 1 liter (L) = 1000 cu. cm (cm³)

From the problem:

Since a cubic centimeter is smaller than a liter, we multiply by 1000 using the conversion shown above.

4 L = _____?_____ cm³

4 L = 4 x 1000 cm³ = 4,000 cm³

The water's volume is 4,000 cm³.

The volume of water that the aquarium can hold is:

Length x width x height = 20 cm x 15 cm x 20 cm = 6 000 cm³.

Since the amount of water they will pour into the aquarium is less than the maximum water the aquarium can hold: 4 000 cm³ < 6 000 cm³. The aquarium will be able to hold the 4,000 cm³ of water the siblings will pour.

Example 2:

Consider the following and look for the pattern:

a. 0.002 m³ = 2 000 cm³   2 000 cm³ = 0.002 m³
b. 1.5 m³ = 1 500 000 cm³   1 500 000 cm³ = 1.5 m³
c. 5 m³ = 5 000 L   5 000 L = 5 m³
d. 3,200 cm³ = 3.2 L   3.2 L = 3,200 cm³
e. 25 000 cm³ = 25 L   25 L = 25 000 cm³

In converting from one cubic unit to another we can use the appropriate conversion factor. Study the following:

a. $2\ 000\ cm^3 \times \dfrac{1\ m^3}{1,000,000\ cm^3} = 0.002\ m^3$

b. $1.5\ m^3 \times \dfrac{1,000,000\ cm^3}{1\ m^3} = 1,500,000\ cm^3$

c. $5\ m^3 \times \dfrac{1000\ L}{1\ m^3} = 5,000\ L$

d. $3{,}200 \ \cancel{cm^3} \times \dfrac{1L}{1{,}000 \ \cancel{cm^3}} = 3.2 \ L$

e. $25 \ \cancel{L} \times \dfrac{1{,}000 \ cm^3}{1 \ \cancel{L}} = 25{,}000 \ cm^3$

Explain how to change and convert a smaller unit to a larger/bigger unit? From a higher unit to a smaller unit?

When converting from larger/bigger unit to a smaller unit, use multiplication. When converting from a smaller unit to a larger/bigger unit, use division. The mnemonic device below can help us go about the conversion.

Larger Unit				Smaller Unit
m³	→ x 1000	L	→ x 1 000	mL, cm³, or cc

Smaller Unit				Larger Unit
mL, cm³, or cc	→ ÷ 1000	L	→ ÷ 1 000	m³
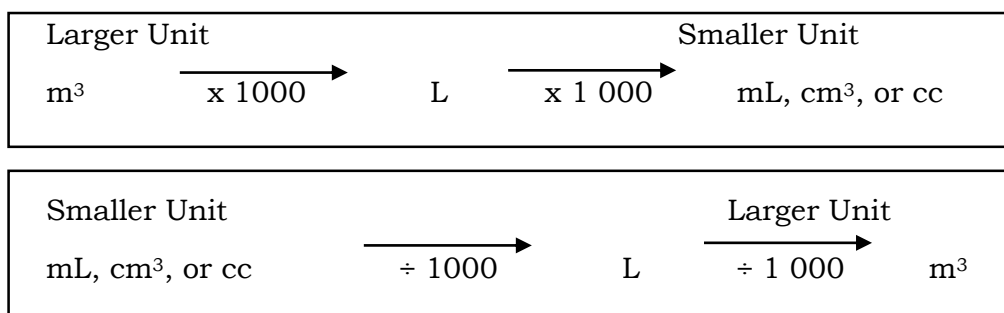
From the examples above you can understand now how to convert unit of measurement into smaller or bigger unit and vice versa.

You can try it now. Good luck! ☺

What's More

Activity 1: Change Me!

Directions: Change to the required unit measure. Write the letter of your answer in the blank before the number. The first item is done for you as your guide.

__A__ 1. 25 cm³ = ____ L	A. 0.025	B. 25 000
_____ 2. 89 m³ = ____ cm³	A. 8.9	B. 89 000 000
_____ 3. 57 cm³ = ____ L	A. 0.057	B. 570
_____ 4. 126 m³ = ____ L	A. 1260	B. 126 000
_____ 5. 50 L = _____ cm³	A. 5 000	B. 50 000

Activity 2: Happy or Sad!

Directions: Write ☺ if the conversion is correct and ☹ if it is incorrect.

       _____ 1. 7 cm³ = 7 000 m³
       _____ 2. 5 000 m³ = 50 L
       _____ 3. 5 m³ = 500 000 L
       _____ 4. 20 000 cm³ = 0.02 m³
       _____ 5. 17 m³ = 17 000 L

Activity 3: Supply Me!
Directions: Convert the volume of the following object to a larger or smaller unit.
1. 50 m³ of water in the swimming pool = _____L
2. 2 L of soft drinks = _____m³
3. A box of toy with 30 cm³ = _____m³
4. 10 L of gasoline in the container = _____cm³
5. A 25 000 cm³ of liquid in the jar = _____ L

What I Have Learned

Let's see what you have learned. Answer the following questions:

1. Why is it possible to convert volume of cubic units measurement to liters or milliliters and vice versa?
2. How do you convert from a bigger/larger unit to a smaller unit of measurement?
3. How do you convert from a smaller unit to a bigger/larger unit of measurement?

What I Can Do

      In our daily lives we are surrounded with things which have volume, so we should learn how to convert its volume from a smaller to bigger unit of measurement, or vice versa. Answer the problem below.

      Look for one grocery item you have at home that is in tetra pack. Find out if the label correctly displays the volume by measuring the rectangular prism's length, width, and height, and converting the computed volume in cubic units to milliliters or liters.

Assessment

Directions: Convert the following units. Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. 198 cm³ = _____ m³
    A. 19.08   B. 1.0098   C. 0.000198

2. 1 200 000 m³ = _____ L
    A. 1 200 000 000   B. 1 200   C. 12

3. Find its conversion: _____ cm³ = 35 m³
    A. 35 000 000   B. 3 500   C. 350

4. Is 25 000 cm³ the correct conversion of 25 dm³?
    A. Yes   B. No   C. Maybe

5. What is 89 m³ equal to in _____cm³?
    A. 890   B. 8 900   C. 89 000 000

6. The conversion of 1.5 L to m³ is 0.015. True or False?
    A. True   B. False   C. Maybe

7. If we convert 1.5 m³ to cm³, then the answer would be?
    A. 1 500 000 cm³   B. 1500 cm³   C. 150 cm³

8. 4000 cm³ is equivalent to 4 L, true or not?
    A. True   B. False   C. Maybe

9. What is 8 900 L in cubic centimeters?
    A. 8 900 000 cm³   B. 89 000 cm³   C. 8900 cm³

10. Find the conversion of 264 cubic meters in liters.
    A. 26.4 L   B. 264 000 L   C. 0.264 L

Additional Activities

Finally, you are in the last activity. Answer it correctly so you could get your reward.

Directions: You need to fill up an Erlenmeyer flask with water in the lesser number of pours and without spilling it over. The Erlenmeyer flask or known as a conical flask can hold 8.2 m^3 of liquid. If you have three glasses that contains different amount of water as your choices. How many glasses and amount of water do you need to fill up the flask without spilling? Then, find the conversion of 8.2 m^3 in liters and cubic centimeters.

2.10 m^3 1.5 m^3 0.4 m^3

Congratulations! You made it!

Answer Key

What's In

Note: Answers will vary

1. mm³
2. L
3. m³
4. mm³
5. m³

Assessment

1. C	6. B
2. A	7. A
3. A	8. A
4. A	9. A
5. C	10. B

Additional Activities

(Answer may vary. A sample is given below)

3 glasses of 2.10 m³
1 glass of 1.5 m³
1 glass of 0.4 m³

So, 5 glasses only to fill up the conical flask without spilling the water.

8.2 m³ = 8 200 000 cm³
8.2 m³ = 8 200 L

What's More

Activity 1: Change Me!

1. A
2. B
3. A
4. B
5. B

Activity 2: Happy or Sad!

1. ☹
2. ☹
3. ☺
4. ☺
5. ☺

Activity 3: Supply Me!

1. 50 000
2. 0.002
3. 0.00003
4. 10,000
5. 25

What I Can Do

(Students' answer may vary but the main ideas are the ff.)

1. It is possible to convert volume of cubic units of measurement to liters or milliliters and vice versa because 1 cubic centimeter is equal to 1 milliliter.
2. To convert from a bigger/larger unit of measurement, we use multiplication and the conversion factors: 1000L=1m³ and 1000 cm³ = 1L. Alternative answer: we multiply 1000 as we go from m³ to L, and L to cm³.
3. To convert from a smaller unit to a bigger/larger unit of measurement, we use division and the conversion factors: 1000L = 1m³ and 1000 cm³ = 1L. Alternative answer: we divide 1000 as we go from cm³ to L and L to m³.

What I Have Learned

(Students' answer may vary but the main ideas are the ff.)

1. It is possible to convert volume of cubic units of measurement to liters or milliliters and vice versa because 1 cubic centimeter is equal to 1 milliliter.
2. To convert from a bigger/larger unit of measurement, we use multiplication and the conversion factors: 1000L=1m³ and 1000 cm³ = 1L. Alternative answer: we multiply 1000 as we go from m³ to L, and L to cm³.
3. To convert from a smaller unit to a bigger/larger unit of measurement, we use division and the conversion factors: 1000L = 1m³ and 1000 cm³ = 1L. Alternative answer: we divide 1000 as we go from cm³ to L and L to m³.

What I Know

1. D	6. C
2. A	7. D
3. B	8. A
4. B	9. A
5. C	10. C

10

CO_Q4_Mathematics5_Module5

References

Ursua, Alvin C. and Angeline P. Lumbre. 2016. *21st Century Mathletes Textbook.* Quezon City: Vibal Group Inc.

Coronel, Carmelita C. and Bamba, Nelia D. 2010. *Mathematics for a Better Life Textbook.* Quezon City: SD Publications, Inc.

Grade 5 Teacher's Guide

Prnksokhal, n.d. *1 Cubic Centimeter 1 Ml , Free Transparent Clipart - ClipartKey.* [online] clipartkey.com. Available at: <https://www.clipartkey.com/view/ihoRoRb_1-cubic-centimeter-1-ml/> [Accessed 10 April 2021].

Mathematics

Quarter 4 – Module 6: Finding the Volume of a Given Cube and a Rectangular Prism and Using cm³ and m³

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 6: Finding the Volume of a Given Cube and a Rectangular Prism and Using cm³ and m³
First Edition, 2020

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Mathematics
Quarter 4 – Module 6:
Finding the Volume of a Given Cube and a Rectangular Prism and Using cm³ and m³

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, Mathletes!

This module was designed and written to help you gain an understanding of key concepts involved in finding the volume of a given cube and a rectangular prism and expressing these in cubic centimeters and cubic meters.

Volume is the amount of space that is enclosed in a 3-dimensional or solid figure. Cubes and rectangular prisms are some examples of solid figures. To get their volumes, you may need to determine first their dimensions: lengths, widths and heights.

So, what are you waiting for? Proceed and stay focused.

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

- find the volume of a given cube and rectangular prism using cubic centimeters and cubic meters; and
- appreciate the value of understanding the concept of and being able to find the volumes of cubes and rectangular prisms.

Before going any further, let us check your understanding about finding the volume of a given cube and a rectangular prism using cubic centimeters and cubic meters.

What I Know

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper.

1. Which of the following could be done to get the volume of a rectangular prism?
   A. Add its length, width and height.
   B. Get the average of its length, width and height.
   C. Find the product of its length, width and height.
   D. Multiply its length and width. Then, add the height to the product.

2. The length, width and height of a rectangular prism are 9 m, 4 m and 3 m, respectively. Which of the following is the volume of the prism?

   A. 16 m³   B. 100 m³   C. 108 m³   D. 1 080 m³

3. A rectangular box is filled with 60 cubes. Each cube measures 2 cm on each edge. Which of the following is the volume of the box?

   A. 62 cm³   B. 68 cm³   C. 120 cm³   D. 480 cm³

4. If a side of a cube measures 5 cm, which of the following is the amount of space occupied by the cube?

   A. 5 cm³   B. 125 cm³   C. 225 cm³   D. 625 cm

5. The length, width and height of a rectangular box are 50 cm, 20 cm and 60 cm, respectively. Which of the following is the volume of the box?

   A. 43.33 cm³   B. 130 cm³   C. 60 000 cm³   D. 80 000 cm³

6. Which of the following is the volume of the figure below?

   3 m   A. 54 m³   C. 36 m³
                B. 45 m³   D. 12m³
   6 m   3m

7. Which of the following is the volume of the figure below?

8 cm
8 cm
8 cm
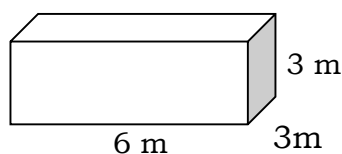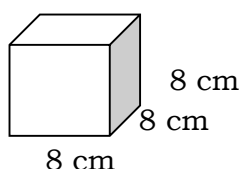
A. 8 cm³   C. 64 cm³
B. 24 cm³   D. 512 cm³

8. Which of the following is the volume of the prism below?

10 cm
5 cm
15 cm
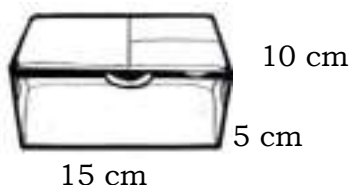
A. 750 cm³
B. 225 cm³
C. 200 cm³
D. 30 cm³

9. Which of the following is the amount of space occupied by the pool with dimensions: 10 m, 5 m and 3 m?

A. 18 m³
B. 150 m³
C. 220 m³
D. 225 m³

10. Which of the following is the volume of the figure below?

3 cm   3 cm

3 cm
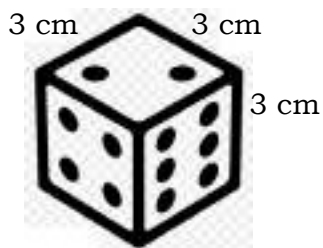
A. 3 m³
B. 9 m³
C. 18 m³
D. 27 m³

Compare your answers with the Answer Key at the end of this module. If you got 9 or 10 correct answers, you may skip this module and proceed to the next. Otherwise, go to the next page to gain a better understanding of the concept of the volume of a cube and a rectangular prism and learn how to find it. Let's go!

Lesson 1

Finding the Volume of a given Cube and a Rectangular Prism Using cm³ and m³

In order to find the volume of a given cube or a rectangular prism, you may need to master the skills in identifying the edge of the cube and the height, length and width of the rectangular prism. These basic skills may help you easily find the volume of a cube and a rectangular prism using cubic units.

Are you ready? Let's proceed!

What's In

In the previous lesson, you were able to learn how to convert cubic centimeters (cm³) to cubic meters (m³) and vice versa. You also converted cubic centimeters (cm³) to liters (L) and vice versa.

On a separate sheet of paper, copy and complete the following.

1. 7 000 cm³ = _____ m³
2. 25 L = _____ cm³
3. 15 000 cm³ = _____ m³
4. 4 m³ = _____cm³
5. 2 cm³ = _____L

What's New

In this lesson, you are going to deal about finding the volume of a given cube and a rectangular prism using cubic centimeters (cu. cm or cm³) and cubic meters (cu. m or m³).

Remember, volume is the amount of space that a solid figure takes up or occupies. Consider the problem below.

Teacher Leny brought to her class a 3 × 3 × 3 Rubik's cube. She told the class to determine the amount of space enclosed in the object. A Rubik's cube is a solid figure which contains (⬜) cubic units.

If each ⬜ is a cubic unit, how many cubic units are there in the figure? How many cubic units are there in one layer? How many layers are there? How many cubic units are there?

What Is It

You already know that volume is the amount of space that is enclosed in a 3-dimensional or solid figure. Since it is an amount of space, it has to be expressed in cubic units. If the dimensions are in centimeters, the volume would be measured in cubic centimeters or cm³. If the dimensions are in meters, the volume would be in cubic meters or m³. Cubes and rectangular prisms are some examples of solid figures.

How can we find the volume of a cube or rectangular prism? In the previous module, you already derived the formula for finding the volume of a given cube and a rectangular prism. The volume is computed by multiplying the length, width and height of the rectangular prism.

The faces of a cube are squares. Its length, width, and height are equal. The sides of the square are called the edges of the cube. The edges are usually symbolized by s.

Therefore, the volume of a cube is s × s × s or s³.

s = 4 m
$$V = s \times s \times s$$
$$V = 4 \text{ m} \times 4 \text{ m} \times \text{m}$$
$$V = 64 \text{ m}^3$$

5
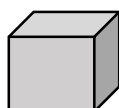
Note that 64 m³ can be read either as 64 cubic meters or 64 meter cubes.
Now, let's answer the problem in What's New.
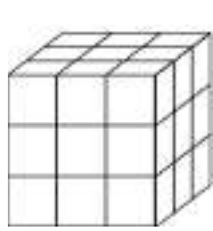
There are 9 ⬜s in each layer. There are 3 layers.

Then, the volume is 3 × 3 × 3 = 27 ⬜s.

Hence, there are 27 ⬜s in the Rubik's cube.

In a rectangular prism, the base is always a rectangle. The area of the base is the product of its length (l) and width (w). Thus, to get the volume of the prism, we may multiply the area of the base with the height (h).

Volume of a rectangular prism = area of the base × height of the prism

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

Study the rectangular prism below and the computation for its volume on the right.

4 cm

3 cm

5 cm
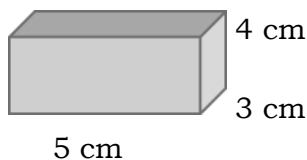
V = l × w × h
V = 5 cm × 3 cm × 4 cm
V = 60 cm³

Study the examples below.
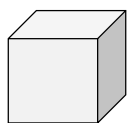
Example 1

s = 5 cm

Formula: V = s × s × s
Solution: V = 5 cm × 5 cm × 5 cm
Answer: V = 125 cm³

Note that 125 cm³ is read either as 125 cubic centimeters or 125 centimeters cube.

Example 2   h = 3 cm

w = 5 cm

l = 4 cm
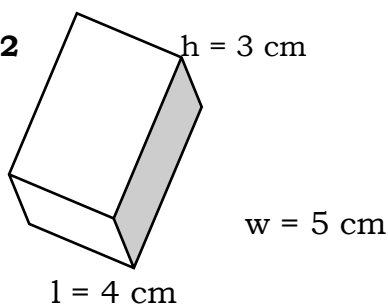
Formula: V = l × w × h
Solution: V = 5 cm × 3 cm × 4 cm
Answer: V = 60 cm³

Example 3

What is the amount of space that is occupied by a rectangular pool which is 5.5 m in width, 10 m in height and 7 m in depth (height).

Formula: V = l × w × h
Solution: V = 5.5 m × 10 m × 7 m
Answer: V = 385 m³
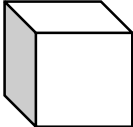
You are now ready to find the volume of a cube and a rectangular prism using cubic centimeters and cubic meters. Keep going!

What's More
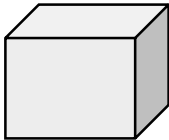
Activity 1: Complete Me!

Direction: Find the volume of the cubes and rectangular prisms. On your answer sheet, copy and supply your answers for the following.
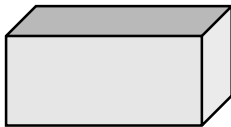
1.
s = 2 m

V = s × s × s

= 2 m × 2 m × 2 m

= _____
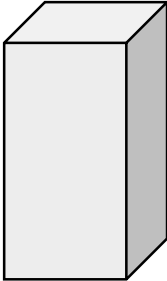
4.
h= 5 cm
w = 6 cm
l = 10 cm

V = l × w × h

= 10 cm × ____ × 5 cm

= _____

2.
s = 3 cm
s = 3 cm
s =3 cm

V = s × s × s
 = 3 cm ×____ × ____
 = 27 cm³

5.
h = 10 m
w = 5 m
l = 8 m

V = l × w × h

= 8 m × 5 m × _____

= _____

7

3.

s = 4 cm

V = s × s × s

= ___ ×____ × 4 cm

= _____

Activity 2: True or False!

Directions: Read the statement below. On your answer sheet, write T if the sentence is correct and F, if it is incorrect.

_____1. The volume of a cube with 9-m side is 27 cu. m.

_____2. The volume of a cube can be found by multiplying the length of its edge by 3..

_____3. The volume of rectangular solid with dimensions 3 m × 4 m × 7 m is 84 cu. m.

_____4. A prism, with dimensions 15 cm × 8 cm ×10 cm, has a volume of 400 cu. cm.

_____5. Volume is the number of cubic units needed to fill a shape.

Activity 3: Find Me!

Directions: Find the volume of the solid figures below. Write your answers in your Math Activity notebook. You may use a calculator.

1.

4 m
4 m
8 m

2.

10 cm

3.

15 m
10 m
15 m

4.

20 cm
7 cm
15 cm

8

5.

7.5 m

7.5 m

7.5 m
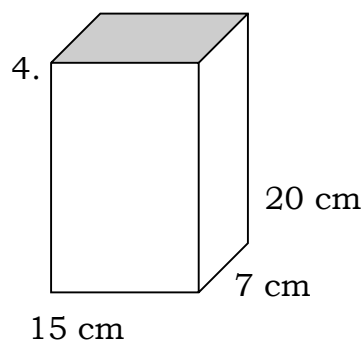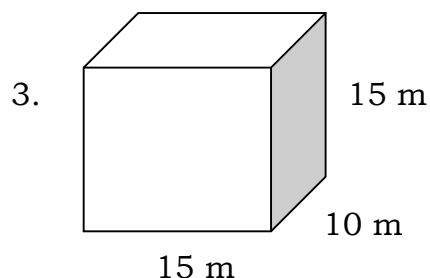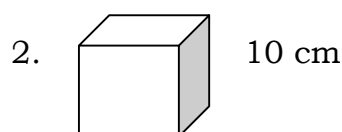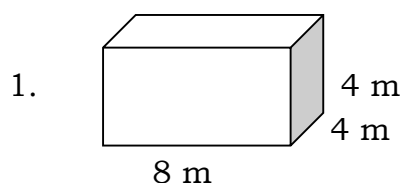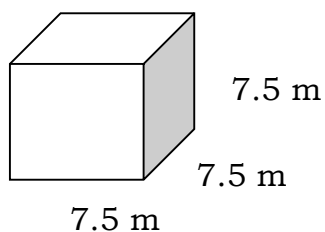
What I Have Learned

In your own words, explain how to find the volume of a cube and a rectangular prism. You may use the figure below in your explanation.

1.

2 cm
2 cm
10 cm

2.

10 m
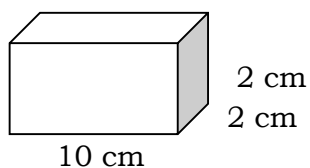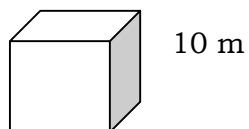
You have reached this far. You are doing fine. Keep going!

What I Can Do

Directions: Find the volume of the following objects using the appropriate
formula. Write your answers and solutions on a separate sheet of paper.
You may use a calculator.
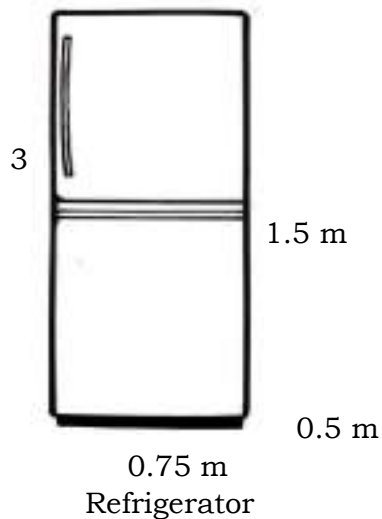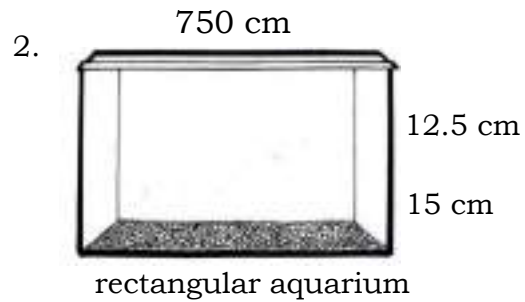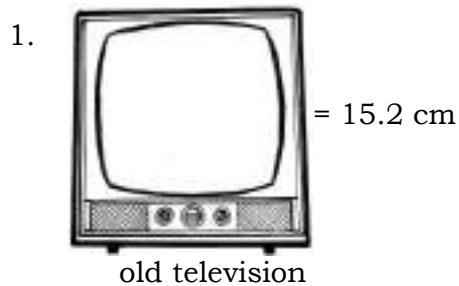
1.

= 15.2 cm

old television

2.

750 cm

12.5 cm

15 cm

rectangular aquarium

3

1.5 m

0.5 m

0.75 m

Refrigerator

4.

1 m

5 m

3 m

5.

12 cm

10 cn

15 cm

lunch box

Assessment

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write the chosen letter on a separate sheet of paper.

1. What is the volume of a rectangular wooden–box whose length, width and height are 50 cm, 20 cm and 60 cm, respectively?

    A. 60 cm³   B. 130 cm³   C. 60 000 cm³   D. 120 000 cm³

2. What is the amount of space enclosed in a rectangular box with dimensions 10 cm, 8 cm and 5 cm?
    A. 400 cm³   B. 400 m³   C. 500 cm³   D. 500 m³

3. If a rectangular box measures 8 cm, 5 cm and 3 cm, what is the volume of the box?
    A. 200 cm³   B. 120 m³   C. 120 cm³   D. 100 m³

4. A rectangular can of meatloaf measures 12 cm by 5 cm by 7 cm. What is the amount of space that is occupied by the can?
    A. 520 m³   B. 420 m³   C. 420 cm³   D. 400 cm³

5. If a sandbox measures 10 m × 8 m × 0.5 m, what is the amount of space enclosed in the sandbox?
    A. 18.5 m³   B. 40 m³   C. 48 m³   D. 480 m³

6. Which of the following is the volume of the cube shown below?

 s = 9 cm
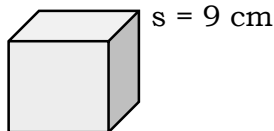
                                       A. 27 cm³   C. 709 cm³
                                         B. 81 cm³   D. 729 cm³

7. Which of the following is the volume of the prism shown below?

15 cm

8 cm
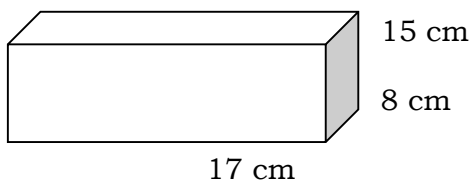
      A. 50 cm³   C. 2 400 m³
      B. 2 040 cm³   D. 2 4000cm³

17 cm

11

CO_Q4_Mathematics 5_ Module 6

8. Which of the following is the volume of the object shown below?

80 cm

80 cm

80 cm
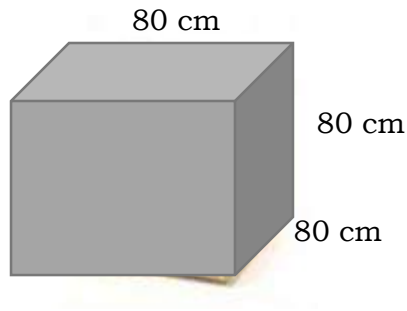
A. 512 000 cm³
B. 504 000 cm³
C. 64 000 cm³
D. 240 cm³

9. Which of the following is the volume of the object shown below?

7 m

3 m

10 m
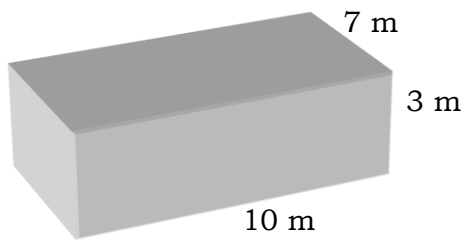
A. 320 m³
B. 255 m³
C. 210 m³
D. 20 m³

10. A wooden cube chair has an edge measuring 20 centimeters. Which of the folowing is the volume of the wooden chair?

A. 60 cm³   C. 8 000 cm³
B. 120 000 cm³   D. 200 000 cm³

20 cm
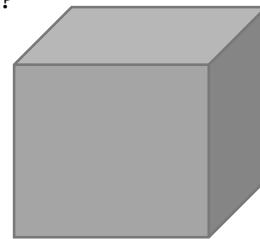
You're almost done. Do the last activity.

Additional Activities

A. On a separate sheet of paper, draw figures that may represent cubes or
   rectangular prisms with the following measures.
   Find their volumes.

   1. l = 4 m   4. l = 8 cm
       w = 1 m   w = 3 cm
       h = 3 m   h = 10 cm

   2. s = 14 cm   5. s = 12 m

   3. s = 20 cm

B. As shown below, the edge length of each cube that the prism is made up
   of is 0.5 cm. What is the volume of the prism? Write your solution and
   your answer on a separate sheet of paper.
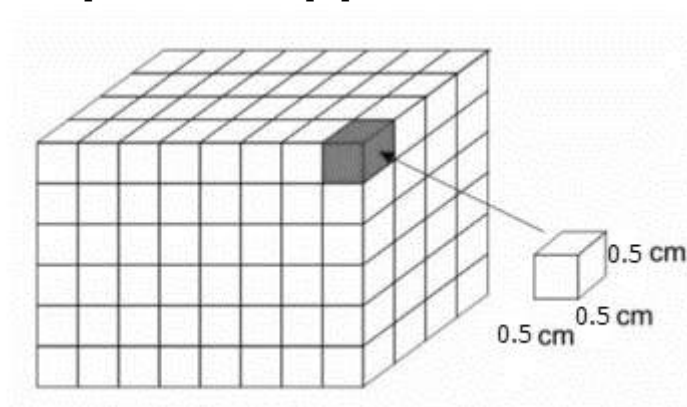
C. Collect at least 5 objects that can represent cubes or rectangular prisms.
   Measure the length, width and height in meters and centimeters of each
   object. Copy and complete the table below on a separate sheet of paper.
   You may use a calculator.

Object	Length	Width	Height	Volume
1.				
2.				
3.				
4.				
5.				

Hurray! You did it! You need to take a break!

Answer Key

Assessment

1. C	6. D
2. A	7. B
3. C	8. A
4. C	9. C
5. B	10. C

Additional Activities

A.
1. 12 m³
2. 2 744 cm³
3. 8 000 cm³
4. 240 cm³
5. 1 728 m³
(Note: Figures may vary.)

B. 24 cm³

C. Answers vary.

What's More

Activity 2: True or False!
1. F
2. F
3. T
4. F
5. T

Activity 3: Find Me!
1. 128 m³
2. 1 000 cm³
3. 2 250 m³
4. 2 100 cm³
5. 421.875 m³

What's More

Activity 1: Complete Me!

1. $V = s \times s \times s$
   $= 2\ m \times 2\ m \times 2\ m$
   $= 8\ m^3$

2. $V = s \times s \times s$
   $= 3\ cm \times 3\ cm \times 3\ cm$
   $= 27\ cm^3$

3. $V = s \times s \times s$
   $= 4\ cm \times 4\ cm \times 4\ cm$
   $= 64\ cm^3$

4. $V = l \times w \times h$
   $= 5\ cm \times 6\ cm \times 10\ cm$
   $= 300\ cm^3$

5. $V = l \times w \times h$
   $= 8\ m \times 5\ m \times 10\ m$
   $= 400\ m^3$

What I Have Learned

Explanations vary.
1. 40 cm³
2. 1 000 m³

What I Can Do

1. 3 511.808 cm³
2. 9 375 cm³
3. 0.5625 m³
4. 15 m³
5. 1 800 cm³

What's In

1	0.007 m³
2	25 000 cm³
3	0.015 m³
4	4 000 000 cm³
5.	0.002 L

What I Know

1. C	6. A
2. C	7. D
3. D	8. A
4. B	9. B
5. C	10. D

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Grade 5 Teacher's Guide

Mathematics

Quarter 4 – Module 7: Estimating and Using Appropriate Units of Measure for Volume

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 7: Estimating and Using Appropriate Units of Measure for Volume
First Edition, 2020

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Mathematics
Quarter 4 – Module 7:
Estimating and Using Appropriate Units of Measure for Volume

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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Thank you.

What I Need to Know

Hi, Mathithinik!!! This module was made for you to gain knowledge and ideas on how to estimate and use appropriate units of measure for volume. There are units of measure which are used for large volumes and so are for small volumes. Knowing this lesson is very much important in our real-life. So, be ready and focus as we start our lesson.

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

- identify the units of measure for large volumes and small-volumes; and

- estimate and use appropriate units of measure for volume.

Before we proceed to the main lesson, let us check what you know about estimating and using the appropriate units of measure for volume.

What I Know

Directions: A. Select the appropriate unit of measure for the volume of each of the following objects. Write the letter of your answers on your answer sheet.

1. a sling bag

   (A) m^3 (B) in^3 (C) mm^3 (D) km^3

2. a refrigerator

   (A) cm^3 (B) mm^3 (C) ft^3 (D) km^3

3. an ice bucket

   (A) yd^3 (B) m^3 (C) cm^3 (D) mm^3

4. a van

   (A) cm^3 (B) mm^3 (C) m^3 (D) km^3

5. a pack of biscuits

   (A) cm^3 (B) ft^3 (C) m^3 (D) km^3

Directions: B. Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper.

6. Which of the following can be the volume of a standard die?
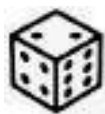
   A. 8 cm³   B. 8 m³   C. 8 ft³   D. 8 km³

7. Which of the following can be the amount of space enclosed in a shoe box?

   A. 10 cm³   B. 60 km³   C. 200 m³   D. 6 000 cm³

8. An aquarium is in the shape of rectangular prism. Its length, width and height are 2.8 m, 1.2 m and 0.75 m, respectively. Which of the following is the best estimate for the amount of space that is enclosed in the aquarium?

   A. Less than 1 m³   B. Between 1 m³ and 2 m³

   C. Between 2 m³ and 3 m³   D. More than 3 m³

9. A wooden box is in the shape of a cube. If the length of the edge of the cube is 5.1 cm, which of the following is the best estimate for the volume of the box?

   A. 5 m³   B. 5 cm³   C. 25 cm³   D. 125 cm³

10. A cabinet is in the shape of rectangular prism. Its length, width and height are 1.6 m, 2.1 m and 0.75 m. Which of the following is the best estimate for the amount of space enclosed in the cabinet?

   A. 1 m³   B. 2 m³   C. 4 m³   D. 10 m³

Compare your answers with the Answer Key at the end of this module. If you got 9 or 10 correct answers, you may skip this module and proceed to the next. Otherwise, go to the next page to gain a better understanding of the concept of estimating and using appropriate units of measures for volume! Let's go!

In order to estimate and use appropriate units of measure for volume, you may need to determine if the object has large volume or small volume. It may help you understand the concept of the lesson.

Keep going!

What's In

In the previous lessons, you were able to learn the different units of measures. Also, you were able to learn on how to classify the different units of measure as to their uses.

Let us recall some of the different cubic units of measure in the metric system arranged from smallest to largest unit.

mm^3 cm^3 dm^3 m^3 dam^3 hm^3 km^3

Example: 1) an encyclopedia   2) ice cube
                   unit of length: cm   unit of length: mm
                   cubic unit: cu. cm or cm^3 cubic unit: cu.mm or mm^3

           3) water tank
              unit of length: m
              cubic unit: cu. m or m^3

When estimating and using cubic unit for volume of an object, consider how big or small the object is. Refer to the different cubic units listed above.

What's New

Have you ever measured the length, height and width of a book? Which of the following units of measure would be appropriate to use?

Explain your answers.

A. centimeters	B. meters	C. inches
D. kilometers	E. millimeters	F. yards
G. feet	H. liters	I. kilograms

What Is It

You already have an idea how big or small everyday objects are. You should have an idea of how big or small the different units of volume are so you can match these with the objects.

The common units of measure for lengths, width, and height are meter, centimeter, millimeter, foot, yard and inch. In our country, we are usually using the units in metric system like meters, kilometers, centimeters and millimeters. Other countries use the units in imperial system like feet, yards and inches. You may have seen people using feet, yards and inches for measuring lengths.

If we need to measure the dimensions of a small object, we can use centimeter, millimeter, decimeter, or inches. However, for bigger, longer or wider objects, the units that can be used are foot, yard, meter or kilometer.

You already know that volume is the amount of space that is enclosed in a 3-dimensional or solid figure. Since it is an amount of space, it has to be measured in cubes. For instance, if the dimensions of a solid figure are in meters, the volume would be measured in cubic meters or m^3. If the 3-dimensional figure is measured in inches, the volume would be in cubic inches or in^3.

Let's consider the example in the previous part of the lesson.

What do you think is an appropriate unit of measure to be used for finding the volume of the book?

A book may represent a solid figure. Its dimensions are small. Hence, the volume is also small.

Therefore, you may use inches or centimeters as units of measure for the length, width and height of the book. The volume of the book can be in cubic inches or cubic centimeters.

Read and study the examples below.

Example 1 For the volume of the water in an aquarium, the appropriate units of measure to use are cubic centimeters (cm^3) or cubic inches (in^3).
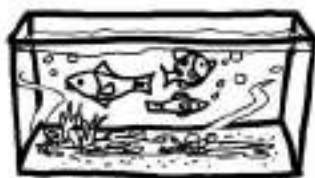
Example 2 The appropriate unit of measure for the amount of space enclosed in the tank is cubic meters or m^3.

Example 3 Let the volume of Figure A be 100 cm^3. We can estimate the volumes of the other figures.
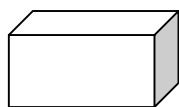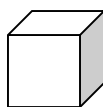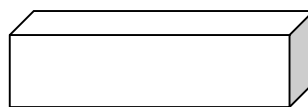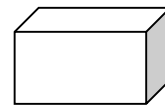
Figure A   Figure B   Figure C   Figure D

Figure B is almost half of the size of Figure A.

Figure C is almost double the size of Figure A.

Figure D is about the same size of Figure A.

Thus, the volumes of Figures B, C and D are approximately 50 cm^3, 200 cm^3

and 100 cm^3, respectively.

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Example 4 A box is in the shape of rectangular prism. Its length, width and height are 2.8 m, 1.1 m and 0.95 m. Multiplying the dimensions, rounded off to the nearest whole numbers, gives a good estimate of the volume of the prism.

Length: 2.8 m is rounded up to 3 m.

Width: 1.1 m is rounded down to 1 m.

Height: 0.95 m is rounded up to 1 m.

Approximate volume = length × width × height = 3 m $\times 1\,m \times 1\,m$ = 3 m³

Thus, an estimate for the volume of the box is 3 m³. It could also between 2 m³ and 3 m³.

Example 5 A piece of wood is in the shape of a cube. If its edge is 0.21 m, estimate the volume of the piece of wood.

Solution: If we are going to estimate the volume of the piece of wood, it is not logical to round it off to the nearest whole number, as that would be zero. This would give us a zero cubic meter for volume.

Since rounding off to the nearest whole number is not a good strategy, we may do it another way. You already know that 1 m = 100 cm. It follows that

$$0.21 \text{ m} = 21 \text{ cm} \approx 21 \text{ cm.}$$

Let us use 20 cm as our estimate.

Approximate volume = $20\,cm \times 20\,cm \times 20\,cm$ = 8 000 cm³

Thus, an estimate for the volume of the wood is 8 000 cm³. It must be less than a cubic meter.
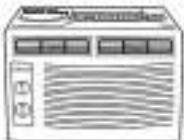
You are now ready to estimate and use appropriate units of measure in finding the volume of a solid figure. Keep going!

Activity 1: Choose Me In!

Directions: Select the appropriate unit of measure for the volumes of the following objects. Write your answers on a separate sheet of paper.

1. km^3 cm^3 mm^3

2. km^3 cm^3 m^3

3. km^3 cm^3 mm^3

4. km^3 cm^3 m^3

5. ft^3 dm^3 km^3

Activity 2:   Pair Me Up!

Directions: Match the items in column A with the units of measure in column B
in finding the volume of the given objects. Write the letter of your
answer on your answer sheet.

1.   a can   a. m^3

2.   The Earth   b. cm^3

3.   mattress   c. hm^3

4.   a packet of biscuit   d. mm^3

5.   an earring   e. km^3

                                                         f. nm^3

Activity 3: Don't Underestimate Me!

Directions: A. Let the volume of Figure A be 100 cm^3. Estimate the volumes of the
other figures shown below. Write your answers on your answer sheet.

Figure A   Figure B   Figure C   Figure D

B. A box is in the shape of rectangular prism. Its length, width and height are 1.95
m, 1.02 m and 0.97 m. Estimate of the volume of the box.

C. A coffee pod is in the shape of a cube. If its edge is 19.2 cm, estimate the volume
of the pod in cubic centimeters.

9
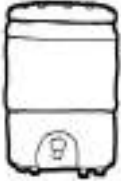
What I Have Learned

A. In your own words, explain how to estimate the volume of a given solid. You may give examples in your explanation.

B. Give at least 3 examples of units of measure for small volumes.

C. Give at least 3 examples of units of measure for large volumes.

What I Can Do

Directions: Write on a separate piece of paper the appropriate unit of measure used for volumes of the following items in our kitchen. Estimate the volume of each.

1.   a jug full of water

2.   one tub of rice

3.   a refrigerator

4.   a kitchen cabinet

5.   a round food container

Assessment

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper.

1. Which of the following is an appropriate unit of measure for the volume of a book?
   A. mm^3 B. cm^3 C. m^3 D. km^3

2. Which of the following is an appropriate unit of measure for the amount of space occupied by the planet Mercury?
   A. mm^3 B. cm^3 C. m^3 D. km^3

3. Which of the following is an appropriate unit of measure for the volume of the water an Olympic swimming pool?
   A. mm^3 B. cm^3 C. m^3 D. km^3

4. Which of the following can be the volume of a standard die?

   A. $8\ cm^3$ B. $8\ m^3$ C. $8\ ft^3$ D. $8\ km^3$

5. Which of the following can be the volume of a shoe box?

   A. $10\ cm^3$ B. $60\ km^3$ C. $200\ m^3$ D. $6\ 000\ cm^3$

For items 6 and 8, let the volume of Figure A be $20\ cm^3$.

Figure A   Figure B   Figure C

6. Which of the following can be the best estimate for Figure B's volume?
   A. $10\ cm^3$ B. $20\ cm^3$ C. $40\ cm^3$ D. $100\ cm^3$

7. Which of the following can be the best estimate for Figure C's volume?
   A. $10\ cm^3$ B. $20\ cm^3$ C. $40\ cm^3$ D. $80\ cm^3$

8. An aquarium is in the shape of rectangular prism. Its length, width and height are 2.9 m, 1.13 m and 0.94 m, respectively. Which of the following is the best estimate for the volume of water that the aquarium can hold?
   A. Less than $1\ m^3$ B. Between $1\ m^3$ and $2\ m^3$
   C. Between $2\ m^3$ and $3\ m^3$ D. More than $3\ m^3$

9. A container is in the shape of a cube. The length of the edge of the cube is 2.1 m. Which of the following is the best estimate for the volume of the box?

A. 2 m³   B. 3 m³   C. 8 m³   D. 21 m³

10. A cabinet is in the shape of rectangular prism. Its length, width and height are 1.7 m, 2.05 m and 0.96 m. Which of the following is the best estimate for the volume of the cabinet?

A. 1 m³   B. 2 m³   C. 4 m³   D. 10 m³

Additional Activities

Awesome!!! You have reached this far. Keep going!

Directions: A. Name at least 5 objects of different shapes and sizes. For each object, state an appropriate unit of measure to express their volumes. Estimate their volumes. On your answer sheet, copy and complete the table below.

Object	Unit of Measure for Volume	Estimated volume

B. As shown below, the edge length of each cube that the prism is made up of is 0.49 cm. Estimate the volume of the prism. What is the exact volume of the prism? You may use a calculator. Write your solution and your answer on a separate sheet of paper.

0.49 cm
0.49 cm
0.49 cm

12
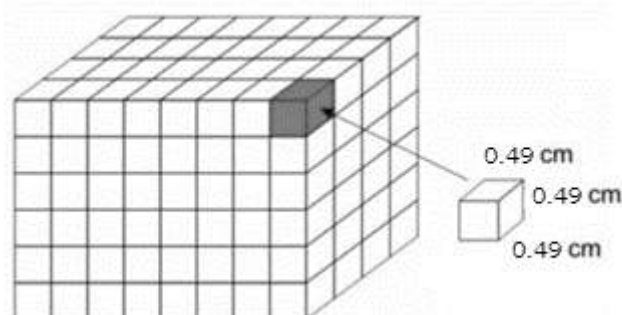
![Answer Key icon]

Answer Key

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Additional Activities

A. Answers vary.

B. Let the edge of a cube be 0.5 cm.
The approximate volume of the prism is 24 cubic centimeters.

The exact volume of a cube is
$0.49\ cm \times 0.49\ cm \times 0.49\ cm$
$= 0.117649\ cm^3$

The exact volume of the prism is
$4 \times 6 \times 8 \times 0.117649\ cm^3$
$= 22.588608\ cm^3$

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Assessment

1. B	6. A
2. D	7. C
3. C	8. C
4. A	9. C
5. D	10. C

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What's More

Activity 3: Do not under estimate me!

A. Figure B = 200 cm³

Figure C = 50 cm³

Figure D = 100 cm³

B. 2 m³

C. 8 000 cm³

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What's More

Activity 2: Match Me Up!

1. b or d
2. e
3. a
4. d
5. d or f

</td><td>

What's More

Activity 1: Choose Me In!

1. cm³
2. m³
3. cm³
4. cm³
5. ft³

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What I can do

1. cm³ or in³
2. cm³ or in³
3. m³ or ft³
4. m³ or ft³
5. cm³ or in³

</td><td>

What I Have Learned

Answers vary.

What I Know

1. B	6. A
2. C	7. D
3. C	8. C
4. C	9. D
5. A	10. C

</td></tr>
</table>

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CO_Q4_Mathematics 5_ Module 7

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DEPARTMENT OF EDUCATION

Mathematics

Quarter 4 – Module 8:
Solving Routine and Non-routine Problems Involving Volume of a Cube and a Rectangular Prism in Real-life Situations Using Appropriate Strategies and Tools

ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 8: Solving Routine and Non-routine Problems Involving
      Volume of a Cube and a Rectangular Prism in Real-life Situations Using
      Appropriate Strategies and Tools
First Edition, 2020

5

Mathematics

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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

What's Up, Mathgagaling? This module was made for you to learn on how to solve routine and non-routine problems involving volume of a cube and a rectangular prism in real-life situations using appropriate strategies and tools. Formulas may serve as guides in solving for the volume of a cube and a rectangular prism. Knowing how to derive and use the formula properly in real-life situations is important, especially that we are surrounded every day by objects that have volumes.

So, are you excited to learn? Ok! Let's start.

After finishing this module, you are expected to be able to:
- solve routine and non-routine problems involving volume of a cube and a rectangular prism in real-life situations using appropriate strategies and tools, and
- appreciate the value of being able to solve problems involving volumes of cubes and rectangular prisms.

But before going any further, let us check first your prior knowledge about the lesson.

What I Know

Directions: Read each problem carefully. Write your solutions and the letters of your answers on a separate sheet of paper. You may use a calculator.

1. The height of a storage room for meat products is 5 m. The width is 4 m. The length is 6 m. What is the the amount of space enclosed in the room?

    (A) 120 m^3 (B) 102 m^3 (C) 15 m^3 (D) 12 m^3

2. Find the volume of a Rubik's cube with edge measuring 9 cm.

    (A) 27 cm^3 (B) 81 cm^3 (C) 729 cm^3 (D) 879 cm^3

3. A wooden rectangular block has a volume of 64 cubic centimetres. Which of the following could be the dimensions of the block?
   (A) 2 cm, 4 cm, 20 cm   (B) 1 cm, 8 cm, 10 cm
   (C) 2 cm, 4 cm, 8 cm   (D) 8 cm, 8cm, 8 cm

4. If the amount of space that is enclosed in a Balikbayan box is 1 cubic meter, which of the following could be the dimensions of the box?
   (A) 1 cm, 1 cm, 1 cm   (B) 2 cm, 5 cm, 100 cm
   (C) 20 cm, 50cm, 100 cm   (D) 100 cm, 100 cm, 100 cm

5. The amount of space that is enclosed in a wooden box is 2 cubic meters. Which of the following could be the dimensions of the box?
   (A) 2 cm, 2 cm, 2 cm   (B) 2 m, 2 m, 2 m
   (C) 200 cm, 50 cm, 100 cm   (D) 200 cm, 500 cm, 20 cm

6. The Grade 5 Mathematics book's dimensions are 2 in, 6 in and 12 in. What is the volume of the book?
   (A) 144 in³   (B) 24 in³   (C) 20 in³   (D) 14 in³

7. If your grandmother has an old chest with width of 20 cm, height of 60 cm and length of 2 m, what is the amount of space that is enclosed in the chest?
   (A) 82 cm³   (B) 280 m³
   (C) 2 400 cm³   (D) 240 000 cm³

8. A plywood's dimensions are 12 mm, 1 220 mm and 2 440 mm. Which of the following is the plywood's volume?
   (A) 357. 21 m³   (B) 3 672 mm³
   (C) 35 721.6 cm³   (D) 35 721.6 mm³

9. A rectangular aquarium has a length of 120 cm and a width of 30 cm. A toy is placed in the aquarium. If the water level of the aquarium rises by 1 cm, which of the following can be the volume of the toy?
   (A) 151 cm³   (B) 3 600 cm³
   (C) 3 600 m³   (D) It cannot be determined.

2

10. A rectangular plastic container has a base that is 30 cm long and 20 cm wide. The container is filled with water to a height of 10 cm. If all the water is poured into a square based container, it will rise to a height of 15 cm as shown. What is the length of the edge of the square based container?
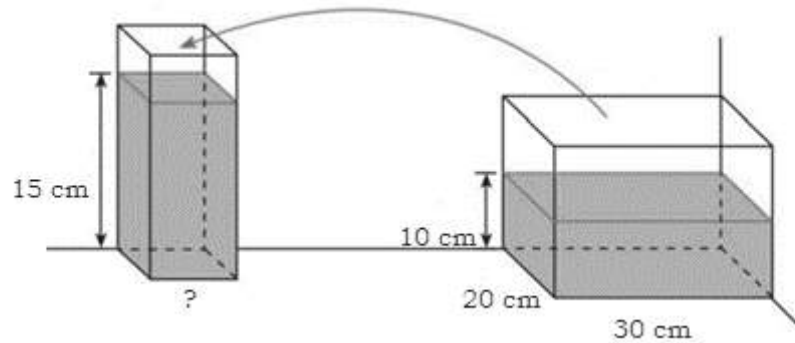
(A) 15 cm   (B) 20 cm   (C) 60 cm   (D) 75 cm

Compare your answers with the Answer Key at the end of this module. If you got 9 or 10 correct answers, you may skip this module and proceed to the next. Otherwise, go to the next page to gain a better understanding of the concept of solving routine and non-routine problems involving volume of a cube and a rectangular prism! Let's go!

In solving word problems involving volume of a cube and a rectangular prism in real-life situations, you need to master the skills in multiplying numbers, determining if the given object is a cube or a rectangular prism, and familiarizing formulas that may help you understand the concept of this lesson.

Here we go, Mathgagaling!

What's In

In the previous modules, you learned that **volume** is the amount of space enclosed in a *three-dimensional* object. You also learned the formula of finding the volume of a cube and a rectangular prism. The formula for the volume of a cube is written as $V = s^3$ where s is the length of the edge of the cube. The formula for the volume of a rectangular prism is given by $V = lwh$ where l (length), w (width) and h (height) are the dimensions of the prism.

So, let us test your memory. Answer the following exercises below ~~in~~ by finding the volume of each figure. Write your solutions and your answers on a separate sheet of paper.
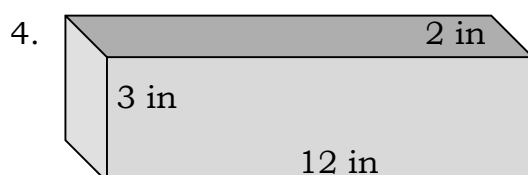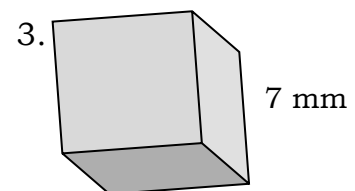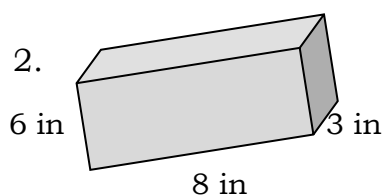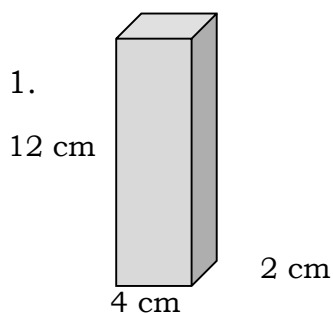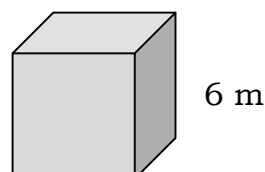
1.
12 cm

2 cm
4 cm

2.
6 in

8 in

3 in

3.
7 mm

4.
2 in
3 in
12 in

5.
6 m

4

What's New

In this lesson, we will deal with solving routine and non-routine word problems involving volume of a cube and a rectangular prism in real-life situations using appropriate strategies and tools.

Teachers need to print a lot of learning materials for their students such as modules and activity sheets for their pupils. Miss Santos bought a box of bond papers. Suppose in the back portion of the box it says, 20 in ×18 in × 10 in.

18 in

10 in   20 in

What is the amount of space that is enclosed in the box?

What Is It

In solving word problems involving volume of a cube and a rectangular prism, you have to determine if the object is a cube or a rectangular prism so that you can decide the formula to use.

Note that the unit of measure for the volume is expressed in cubic units. The edges of a cube are equal in length. Therefore, the formula is $V = s^3$ or $V = s \times s \times s$ where s is the length of an edge of the cube. The volume of a rectangular prism is $V = lwh$ or $V = l \times w \times h$ where l (length), w (width) and h (height) are the dimensions of the prism.

You need to remember as well how to solve routine and non-routine word problems. In solving routine word problems, it involves using at least one arithmetic operation. We will be using the following Polya's famous formulated steps in solving problems.

Step 1 – Understand
    a. What is asked in the problem?
    b. What are given?
    c. What are the hidden questions?

Step 2 – Make a Plan
    a. What operations will be used?
    b. What is the mathematical sentence?

Step 3 – Carry Out the Plan
This includes the solution or solutions of the problem.

Step 4 – Look Back
Is the answer reasonable?
Estimate to check.

On the other hand, non-routine problems can be solved in multiple ways and strategies. The following are some of the different strategies in solving non-routine word problems.
- Look for a pattern.
- Guess and check.
- Work backward.
- Make a model or visualize the problem.
- Break up the problem into smaller parts and solve each part.

Example 1
Let us consider the earlier problem.

• **Understand.** - Identify the question. - Identify the relevant facts.	- The problem is asking about the volume of the box of bond papers. - The dimensions of the box are 20 in, 18 in and 10 in.
• **Plan.** - Choose a strategy.	- The strategy to use is using a formula.

• **Solve.**
 - Perform the strategy.
	We know that the box is a rectangular prism. Therefore, we use $V = lwh$ or $V = l \times w \times h$
	       $V = 20 \text{ in} \times 18 \text{ in} \times 10 \text{ in}$
	         $= 3\ 600 \text{ in}^3$

• **Check.** - Verify the reasonableness of the answer.	The product of 20, 18 and 10 is less than 4 000. Hence, the answer is reasonable.

Answer: The volume of the rectangular box of bond papers is 3 600 in³.

Example 2

Jessa has a box where she keeps all her little toys. Its length is 3 in. Its width is 4 in. Its height is 5 in. What is the amount of space enclosed in the box?

Step 1 What is asked?
The problem is asking for the amount of space that is enclosed in the box.

Step 2 What are the given facts?
The dimensions of the box are 3 in, 4 in and 5 in.

Step 3 What is the strategy to use?
Using the formula is the appropriate strategy to use.

Step 4 Write the answer.
$$V = lwh$$
V = [3 in × 4 in] 5 in
V = 12 in² × 5 in
V = 60 in³ or 60 cubic inches

Answer: The volume of the box is 60 in³.

Example 3

Babies learn how to read letters at home in so many ways using different strategies. One example of these is by using a wooden letter cube. If an edge of a wooden letter cube measures 5 cm, what is the volume of the cube?

5 cm **M**
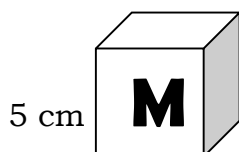
To solve this, we have the following.

Step 1: Write the formula appropriate to the given object.
V = s³   where s is the length of an edge of the cube.

Step 2: Substitute s with the given length.
V = 5 cm × 5 cm ×5 cm

Step 3: Multiply the numbers
V = 25 cm² × 5 cm

Step 4: Write the cubic units after your answer.
V = 125 cubic cm or 125 cm³

7

Example 4

Your younger sister received a birthday gift. It was packed in a cube box with an edge measure of 12 inches. How are you going to solve for the amount of space enclosed in the box?
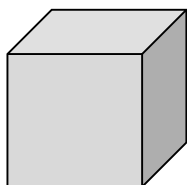
$V = s^3$

$V = (12 \text{ in} \times 12 \text{ in})\ 12 \text{ in}$

$V = 144 \text{ in}^2 \times 12 \text{ in}$

$V = 1\ 728$ cubic inches or $1\ 728 \text{ in}^3$

Hence, the amount of space enclosed in the box is 1 728 cubic inches.

Example 5

A box of fresh milk has 15 small retail boxes. The small boxes are arranged at the bottom layer of the box with no spaces in between them. The big box can hold three layers of the exact number of small boxes in each layer. See the illustrations below. What is the volume of the box?
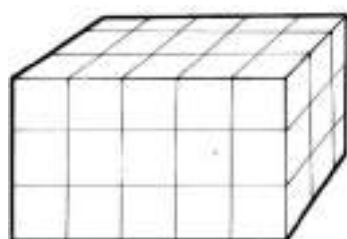
3rd layer

2nd layer

1st layer

There are 15 of this retail boxes inside fit perfectly in the bottom layer of the box.

You may notice that lengths, widths and heights of the boxes are not mentioned. We may visualize the situation to get the volume of the big box.

So, we can assume that in order to find its volume we simply multiply 15 boxes (for the base) by 3 layers (height or *h*).

$$V = Bh, \text{ wherein } B \text{ is } l \times w$$
$$V = 15 \times 3$$
$$V = 45$$

Therefore, the volume of the box of fresh milk is 45 s.

 What's More

Activity 1. Show Me How!

Directions: Read and solve the following word problems. Copy and complete the following on an extra sheet of paper. You may use a calculator.

1. A ream of a bond paper measures 12 in height, 2 in width, and 9 in length. What is the volume of the ream of paper?

   Solution:　　*V = lwh*

   $V =$ _____ in × 2 in × 9 in

   $V =$ _____ in² × 9 in

   $V =$ _____ in³

2. The delivery boy brought us a Balikbayan box from my sister abroad. Its shape is a cube. It measures 20 inches on each edge. What is the amount of space enclosed in the box?

   Solution:　V = S³

   V = (20 in × _____ in) 20 in

   V = _____ in² × 20 in

   V = _____ in³
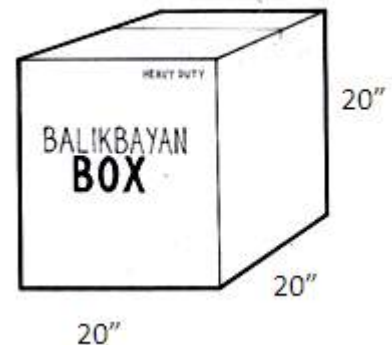
3. Cherrie Mae decided to save some of her money. Every day, she drops a few coins in her wooden coin bank. The coin bank dimensions are 50 cm, 40 cm and 9 cm. What is the amount of space enclosed in the coin bank?

   Solution:　　*V = lwh*

   $V =$ _____ cm × 40 cm × 9 cm

   $V =$ _____ cm² × 9 cm

   $V =$ _____ cm³

9

4. Archie will be making a toy house from an empty box for his project in TLE. The width of the box that he will need is 20 cm. The height is 50 cm. The length is 6 cm. What is the amount of space enclosed in the box?

        Solution: *V = lwh*

$$V = \underline{\quad} \text{ cm} \times \underline{\quad} \text{ cm} \times \underline{\quad} \text{ cm}$$

$$V = \underline{\quad} \text{ cm}^2 \times \underline{\quad} \text{ cm}$$
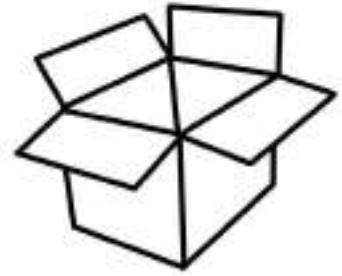
$$V = \underline{\quad} \text{ cm}^3$$

5. Marissa has a pack of succulent seeds to be planted in a seed box. The dimensions of the seed box are 5 in, 15 in and 25 in. What is the amount of space enclosed in the box?

        Solution: *V = lwh*

$$V = \underline{\quad} \text{ in} \times \underline{\quad} \text{ in} \times \underline{\quad} \text{ in}$$

$$V = \underline{\quad} \text{ in}^2 \times \underline{\quad} \text{ in}$$

$$V = \underline{\quad} \text{ in}^3$$

Activity 2: Match ME Up!

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper. You may use a calculator.

1. Brgy. Malipayon has a Purok Project which is an MRF (Materials Recovery Facility). Their MRF's dimensions are 2 m, 2 m and 10 m. What is the amount of space that is enclosed in the facility?
    (A) 14 m³   (B) 16 m³   (C) 20 m³   (D) 40 m³

2. An ice chest has dimensions of 14 in, 25 in and a 3 in. It is perfect food storage for camping. What is the amount of space that is enclosed in the ice chest?
    (A) 1 005 in³   (B) 1 050 in³   (C) 1 105 in³   (D) 1 500 in³

3. Mr. and Mrs. Ompad bought a Super Blender for their fruit shake business. It models a rectangular prism. Its dimensions are 8 in, 20 in and 9 in. Which of the following is the amount of spaced enclosed in the blender?
   (A) 180 in³   (B) 900 in³   (C) 1 440 in³   (D) 1 740 in³

4. Edgar customized a bird cage for his love birds. It models a cube. It measures 75 cm on each side. What is the amount of space enclosed in the cage?
   (A) 421 875 cm³ (B) 421 758 cm³ (C) 412 875 cm³ (D) 225 cm³

5. Sherryl is reviewing her clothes. The not needed clothes are placed in a plastic container. The width of the container is 50 cm. The length is 1 m. The height is 1.5 m. Which of the following is the amount of space enclosed in the container?
   (A) 2.5 m³   (B) 0.75 m³   (C) 7.5 m³   (D) 52.5 m³

Activity 3 Tell Me What!

Directions: Solve the following word problems. Show your solutions on your answer sheet. Copy and complete the boxes below by writing the letter that corresponds to the value below each box.

720 in³   154 cm³ 16 m³ 343 in³ 432 in³

A What is the amount of space enclosed in a cargo truck with dimensions of 2 m, 4 m and 2 m?

H Melissa's bag measures 3 in wide, 16 in long and 9 in high. What is the amount of space enclosed in her bag?

I A shoe box's dimensions are 9 in, 20 in and 4 in. What is the amount of space enclosed in the shoe box?

T Today is Angela's 81st birthday. She received a gift from her grandchildren. The gift was wrapped in a huge box. The box is a cube with 7 inches in each edge. What is the amount of space enclosed in the box?

M The dimensions of a piece of wood are 2 cm, 11 cm, and 7 cm. What is the volume of the piece of wood?

What I Have Learned

A. In your own words, explain how to solve problems involving the volume of a cube or rectangular prism. You may use and solve the problem below for your explanation. Write your explanation and your answer on a separate sheet of paper.

B. A piece of wood is in the shape of a rectangular prism. Its dimensions are 2 cm, 10 cm and 50 cm. What is the volume of the piece of wood?

What I Can Do

Directions: Read and understand the following. Write your solutions and your answers on a separate sheet of paper. You may use a calculator.

A. A chocolate bar is in the shape of a rectangular prism. Its dimensions are 60 mm, 10 mm and 1 mm. What is the volume of the chocolate bar?

B. A koi fish is placed in a rectangular aquarium that has a length of 75 cm and a width of 35 cm. If the water level rises 2 cm when the fish is placed in the aquarium, what is the volume of the fish?
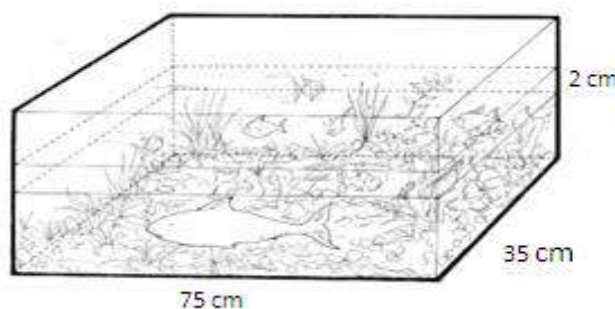
Assessment

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write your solutions and the letters of your answers on a separate sheet of paper. You may use a calculator.

1. The dimensions of a wood are 1.8 cm, 122 cm and 244 cm. Which of the following is the wood's volume?
    - (A) 367.8 cm³
    - (B) 53 582.4 cm³
    - (C) 53 582.4 mm³
    - (D) 367 800 cm³

2. The dimensions of a chocolate bar are 10 mm, 20 mm and 45 mm. Which of the following is the chocolate bar's volume?
    - (A) 9 000 mm³
    - (B) 900 cm³
    - (C) 320 cm³
    - (D) 75 cm³

3. The center stone of a ring has dimensions of 14 mm, 12 mm and 5 mm. Which of the following is the volume of the center stone of the ring?
    - (A) 31 mm³
    - (B) 90 mm³
    - (C) 840 mm³
    - (D) 900 cm³

4. Ruby prepares souvenirs for her birthday. A souvenir is placed in a plastic box which measures 5 inches long, 3 inches wide and 6 inches high. What is the amount of space that is enclosed in the box?
    - (A) 39 in³
    - (B) 40 in³
    - (C) 60 in³
    - (D) 90 in³

5. Your mother bought a new plastic shoe rack with dimensions of: h = 4 ft, w = 2 ft and l = 8 ft. What is the amount of space that is enclosed in the rack?
    - (A) 64 ft³
    - (B) 62 ft³
    - (C) 48 ft³
    - (D) 14 ft³

6. A rectangular cake has dimensions of 10 cm, 20 cm and 45 cm. Which of the following is the cake's volume?
    - (A) 75 cm³
    - (B) 7 500 cm³
    - (C) 9 000 cm³
    - (D) 9 000 mm³

7. What is the amount of space that is enclosed in a sewing kit box that is 45 cm long, 32 cm wide and 24 cm high?
    - (A) 101 cm³
    - (B) 34 460 cm³
    - (C) 34 500cm³
    - (D)34 560 cm³

8. The dimensions of a rectangular kakanin are 10 mm, 8 cm and 0.4 m. Which of the following is the volume of the kakanin?
   (A) 3.2 cm³   (B) 18.4 cm³
   (C) 320 cm³   (D) 3 200 mm³

9. A rectangular aquarium has a length of 110 cm and a width of 40 cm. A toy is placed in the aquarium. If the water level of the aquarium rises by 1 cm. Which of the following is the volume of the toy?
   (A) 150 cm³   (B) 151 cm³
   (C) 4 400 cm³   (D) It cannot be determined.

10. A rectangular plastic container has a base that is 30 cm long and 20 cm wide. The container is filled with water to a height of 10 cm. If all the water is poured into a second container with a square base, it will rise to a height of 15 cm. What is the length of the edge of the square based container?

15 cm

10 cm

20 cm

30 cm

?

   (A) 15 cm   (B) 20 cm   (C) 60 cm   (D) 75 cm

CO_Q4_Mathematics5_ Module8
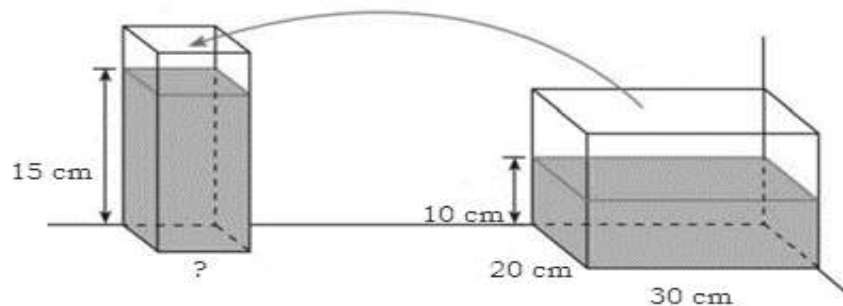
![Gears icon] *Additional Activities*

Hurraaaaaay!!! Finally, you're on the last activity. I'm sure you are excited to finish this module. Keep going!

Directions: Read and understand the following carefully. Write your solutions and your answers on a separate sheet of paper. You may use a calculator.

1. A wooden box is customized such that its length is 3 times its width. The length and height are equal. As shown, the rectangular base has an area of 7 500 square centimeters. What is the amount of space that is enclosed in the box?
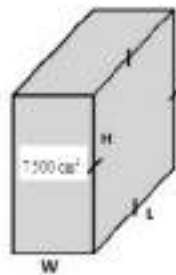
2. The inner dimensions of a glass container are shown below. There are two types of wooden blocks that can be used to fill the container. Give at least 3 arrangements of completely filling the blocks in the container. You may use Block As only, Block Bs only or combinations of both blocks. One arrangement is done for you.

  Side = 2 cm

Block A

 Length= 4 cm

6 cm
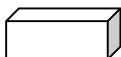
8 cm
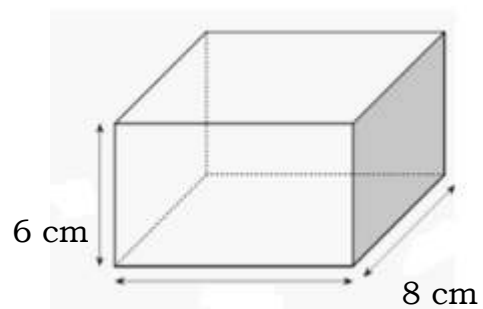
Block B Width = 2 cm 20 cm
Height = 2 cm Glass container

One Arrangement: It is possible to fill the container with 120 Block As.

Answer Key

What I Can Do

A. 6 000 cubic millimeters

B. When the fish is placed in the aquarium, the rise in water level creates a right rectangular prism. The prism's volume is equal to the volume of the fish. So, to find the volume of the fish all we have to do is to find the volume of the prism that is formed in the rise of the water level.

Solution:

$$V_{prism} = V_{fish}$$

$V = Bh$ or $(lw)h$ or lwh
= (75cm × 35cm)(2cm)
= (2625)(2)
= 5 250cm³

Therefore, the volume of the fish is also 5250 cm³.

Additional Activities

1. The length is 150 cm. The width is 50 cm. The height is 150 cm. The volume is 1 125 000 cubic centimeters.

2. The following may be the arrangements.

- 60 Block Bs
- 30 Blocks As and 45 Block Bs
- 60 Blocks As and 30 Block Bs

There are other arrangements that can be made.

Assessment

1. B	6. C
2. A	7. D
3. C	8. C
4. D	9. C
5. A	10. B

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Caingat, Maria Rovil L.2005.*Enjoying Mathematics Workbook.* JEDIGAR
Enterprises, Mandaluyong City.

5

Mathematics
Quarter 4 – Module 9:
Reading and Measuring Temperature Using Thermometer in Degree Celsius

ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 9: Reading and Measuring Temperature Using Thermometer in Degree Celsius.
First Edition, 2020

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5

Mathematics
Quarter 4 – Module 9:
Reading and Measuring Temperature Using Thermometer in Degree Celsius

DepED
DEPARTMENT OF EDUCATION

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, Mathletes! This module was designed and written to help you gain understanding on how to read and measure temperature using a thermometer in degree Celsius. Have fun! You will learn a lot in this module.

At the end of this module, you are expected to be able to:
- read and measure temperature using a thermometer (alcohol and/or digital) in degree Celsius; and
- appreciate the importance of reading and measuring temperature in our daily life.

Before going any further, let us check your understanding about reading and measuring temperature.

What I Know

Directions: Read each statement carefully. Choose the letter that corresponds to the correct answer. Write your answers on a separate sheet of paper.

1. Which of the following means the degree or intensity of heat present in a thing?
   (A) circumference   (B) temperature   (C) volume   (D) area

2. Which of the following is **not** an example of unit of meausure for temperature?
   (A) Degrees Celsius (^{o}C)   (C) Degrees Fahrenheit (^{o}F)
   (B) Kelvin (K)   (D) Degrees Latitude (^{o}L)

3. Which of the following instruments is **not** used in measuring temperature?
   (A) alcohol thermometer   (C) digital thermometer
   (B) thermal scanner   (D) scanner radio

4. What temperature is shown in the digital thermometer below?

(A) 3.7⁰C   (C) 37⁰C
(B) 27⁰C   (D) 370⁰C

5. What temperature is shown in the analog thermometer on the right?

(A) 11⁰C   (C) 21⁰C
(B) 15⁰C   (D) 34⁰C
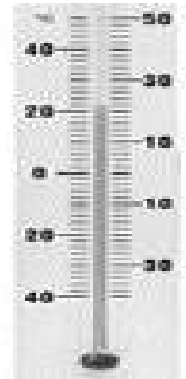
6. Chef Marlon always inserts a meat thermometer in the thickest part of roasted chicken. His restaurant has a rule that a meat is considered fully cooked when the temperature is 75 degrees Celsius or higher. Which of the following thermometer shows that the meat is fully cooked?

46°C   56°C   72.5°C   76.1°C

(A)   (B)   (C)   (D)

7. According to a weather forecast, the entire province of Samar will be experiencing cold weather in the coming weeks. Nestor is planning to make and sell special ice candies in the coming weeks. What do you think should Nestor do best to earn a living?

(A) Nestor should stop selling ice candies.
(B) Nestor should prepare more special ice candies.
(C) Nestor should cook "lugaw" or porridge. He will sell it in their locality since it is good for cold weather condition.
(D) Nestor should continue to make ice candies for next week even if the temperature is not suitable for everyone to eat cold foods.

8. Below are the steps in reading and measuring temperatures in degree Celsius. Which of the following are the correct steps in reading and writing temperatures?

1. Affix the symbol ⁰C next to the number based on the number scale where the end of the mercury is located.

2

2. Locate the position of the end of the liquid mercury or alcohol in the number scale.
3. Take the temperature by noting the number where the liquid mercury end is located in the number scale.

(A) 2-3-1 (B) 2-1-3 (C) 1-2-3 (D) 3-2-1

9. The Grade 5- Amethyst class in Nijaga Elementary School experienced hot air temperature in the classrooom. Their teacher used a room thermometer and discovered that the room temperature was 35⁰C. Which of the following thermometers is showing the temperature?

10.

(A) (B) (C) (D)
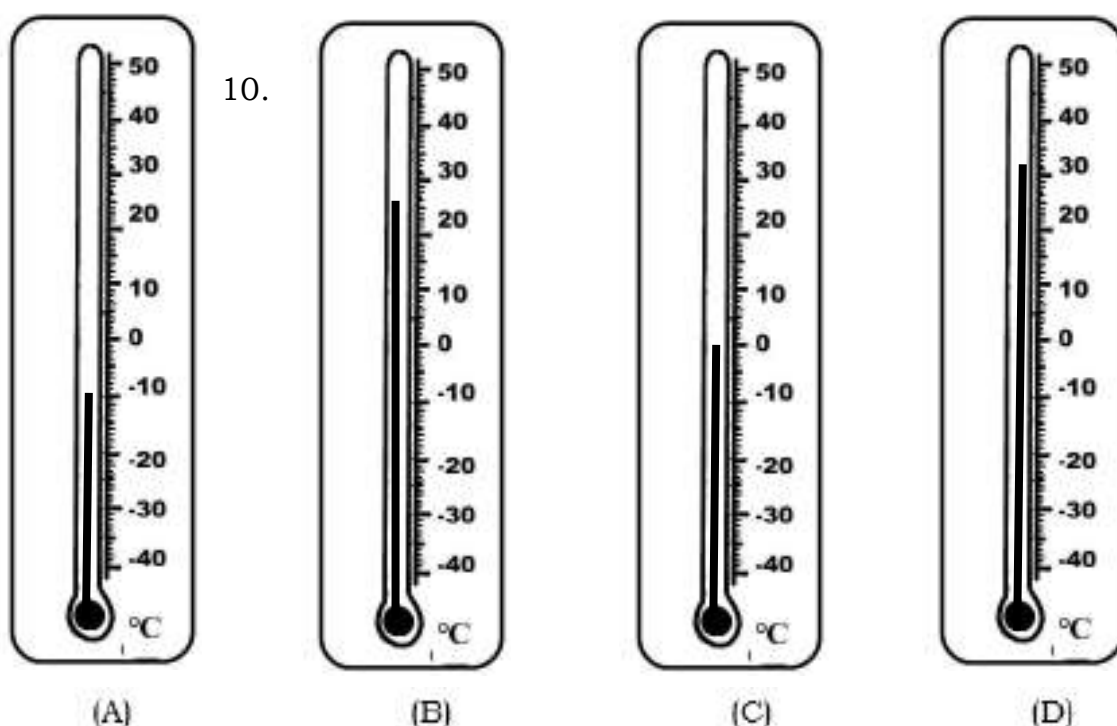
10. Which of the following is **not** showing the importance of knowing how to read and measure temperature?
   (A) It helps us reduce the fever of sick persons.
   (B) It helps us decide the suited activities to do.
   (C) It helps us decide the types of clothes to wear.
   (D) It gives us an idea of how hot or cold the places are.

Compare your answers with the Answer Key at the end of this module. If you got 9 or 10 correct answers, you may skip this module and proceed to the next. Otherwise, go to the next page to gain a better understanding of the concept of reading and measuring temperatures using a thermometer in degrees Celsius! Let's go!

CO_Q4_Mathematics5_ Module9

Reading and Measuring Temperature Using a Thermometer in Degree Celsius

Have you touched your neck, forehead or armpit recently? Do you feel hot or cold? You probably ate halo-halo or cold fruit shakes during a hot weather. How did it feel? All of these have something to do with our new lesson.

In this module, you will learn how to read and measure temperature using a thermometer in degrees Celsius.

Are you excited to learn new things about our topic? Keep going!

What's In

In the previous lessons, you were able to learn the concept of reading and measuring time. How is time measured? What devices are used to measure time? What units of measure are used in expressing time? What is the importance of understanding and learning time measurement to our daily life?

Let us first check your understanding about our past lesson by answering this short activity.

Directions: Match the items in Column A with the items in Column B. Write the letter of your answer on the space before the number on a separate sheet of paper.

COLUMN A	COLUMN B
1. another word for a clock	A. second
2. the standard unit of time	B. digital watch
3. a clock with moving hands	C. watch
4. a clock with digital display	D. analog clock/watch
5. a particular point in the day	E. time

4

What's New

Temperature may be defined as the degree or intensity of heat present in a body, place or thing. We may use a thermometer to measure temperature. Temperature is often expressed in degree Celsius (Centigrade) or ^{o}C in symbols.

Imagine if someone in your family is having symptoms of fever. Will you be able to use a thermometer to know the body temperature?

Suppose you are planning to have a vacation in Baguio or Tagaytay. It can be cold there during Christmas season. What should you plan to bring or wear when your family plans to visit there during Christmas vacation?

In the said situations, we can say that learning about temperature is important to us. Now, consider this situation.

> *Rowan Jennika is a Grade 5 pupil in a public elementary school in Calbayog City. Her teacher asked their class to record the temperature of the different places that they may visit during their Christmas vacation. Knowing Calbayog City as "City of Waterfalls," her family plans to visit some of the beautiful falls in the city: the Pan-as, Tabokno, Bangon-Bugtong, Ton-ok and Tarangban falls. However, she does not know the tool to use to measure temperature. She also does not know how to read and measure the temperature.*

If you were Rowan Jennika, what instrument will you use or bring for you to be able to measure the temperature of the places that you will visit?

Do you know how to read and measure temperature? Do you know what unit of measure is used for temperature? For you to know all the answers to these questions, it is time for you to focus on the following discussions.

What Is It

We may need a thermometer to measure the temperature of a body, place or thing. Did you know that it was only in the 16th century that the first thermometer was invented? With the advancement of technology, people can now use digital thermometers. Some even use mobile phones for knowing temperature.

Temperature is expressed in degrees units. These are the commonly used temperature scales: the Fahrenheit, Celsius and the Kelvin scales. In this module, we will focus on reading thermometers in degree Celsius or ^0C.

We should take into consideration that thermometers come in different types, sizes and materials. There are two main types of thermometer based on its structure: the **analog** and **digital thermometers**. An analog thermometer can be a thermometer with liquid inside a tube that moves when heat is applied like mercuric thermometer and alcohol thermometer. A digital thermometer is battery-operated or solar thermometer with digital display.

There are different thermometers for different uses. The following are some examples.

The digital **room thermometer** on the right shows time, temperature, and humidity. The temperature shown is 24.5^{o}C.

Clinical thermometers are used to check a person's body temperature. The thermometer A below shows 38.3^{o}C. The thermometer B shows 36.5^{o}C. Thermometer C is an example of noncontact digital thermometer that uses infrared.

Thermometer A   Thermometer B   Thermometer C

6

There are also thermometers for cooking. They can be digital or analog thermometers.

Below is an illustration of the parts of an analog thermometer.

Parts of a Thermometer
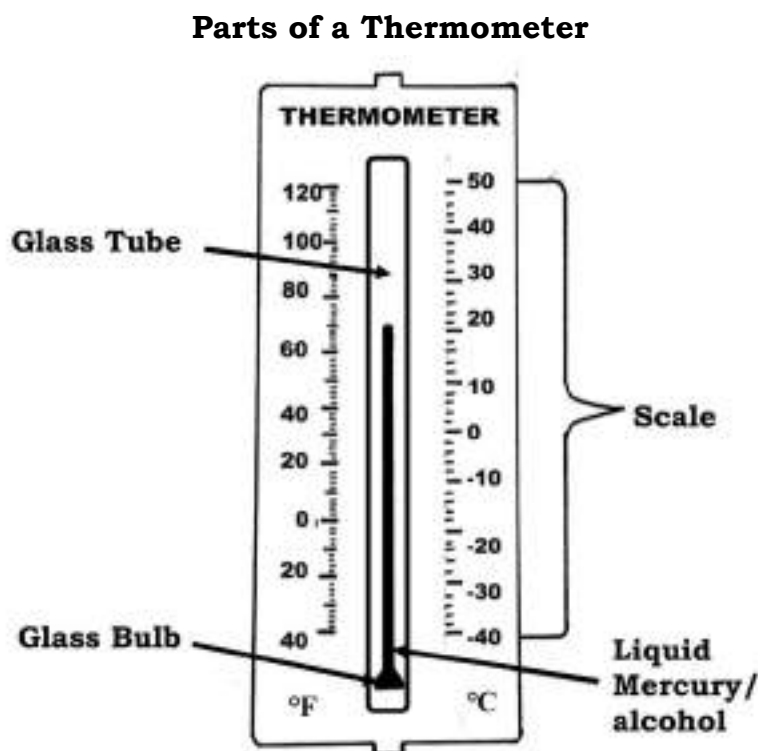
An **analog thermometer** may consist of a temperature sensor and a scale. The temperature sensor is the bulb. The scale shows the measurement of temperature. The glass bulb is attached to a glass tube with a number scale. *Alcohol and liquid mercury* are the common liquids found inside a scale that rises or lowers in a scale. Each space in the number scale represents $1^{\circ}C$. The number below zero (0) is written with a minus (-) sign.

Carefully read the instructions before using a thermometer. If instructions are not available, ask a trusted grown up to help you. In reading temperature using an alcohol thermometer, you need to locate the top end of the liquid. The top end is the dark red, blue or silver line. Then take the reading of the temperature by looking at the number scale where end of the liquid is located.

Example 1 shows that the temperature reading is $20^{\circ}C$ or read as "twenty degree Celsius." In Example 2, temperature is $-5^{0}C$ or read as "negative 5 degrees Celsius" since the thermometer reading is $5^{0}C$ below zero. In Example 3, the temperature reading is $11^{0}C$ or read as "11 degree Celsius."

7

| Example 1 | Example 2 | Example 3 |

End of the liquid mercury is pointing at 20 ºC

End of the liquid mercury is pointing at -5ºC.

End of the liquid mercury is pointing at 11 ºC

| 20⁰C | -5⁰C | 11⁰C |
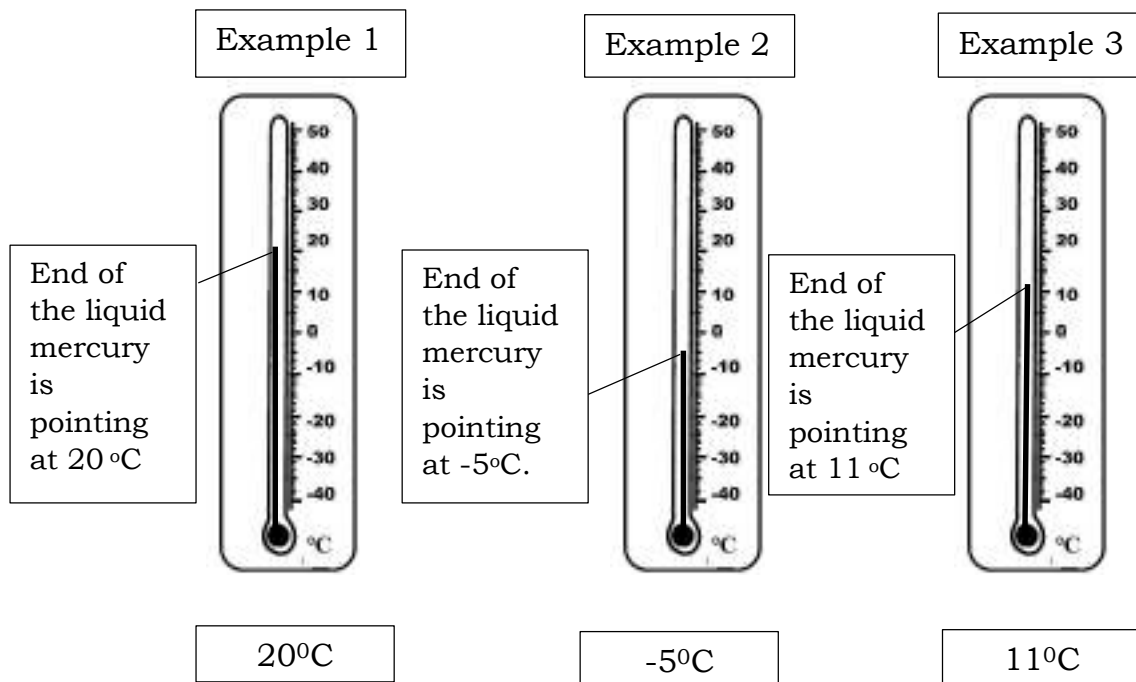
What's More

Activity 1: Read the Temperature

Directions: Read the temperatures below. Match the temperatures with the thermometers below. Write your answers on a separate sheet of paper.

1. 75ºC   3. 43ºC   5. 63ºC
2. 99ºC   4. 81ºC

A   B   C   D   E

8

CO_Q4_Mathematics5_ Module9
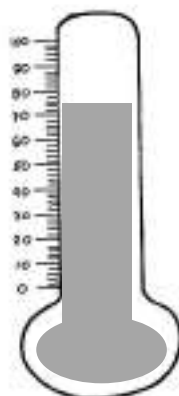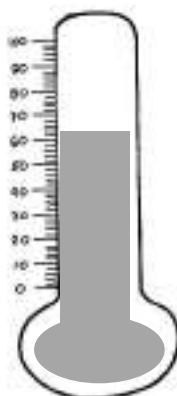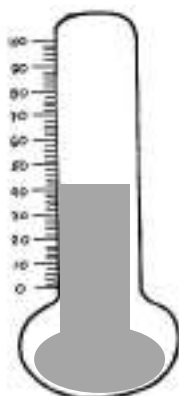
Activity 2: Correct Me if I'm Wrong!

Directions: Determine if the following readings of temperature are correct or not. On your answer sheet, put a check mark ☑ if the given is correct. Otherwise, put an x mark ☒.

1.	2.	3.	4.	5.
15ºC	4 ºC	-31 ºC	9 ºC	50 ºC
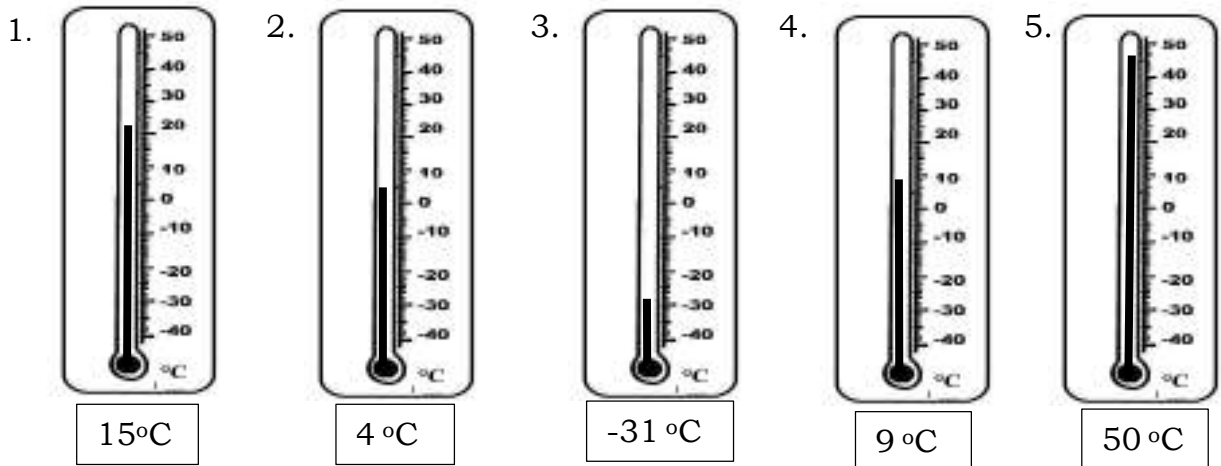
What I Have Learned

A. Directions: On a separate sheet of paper, copy and complete the following sentences by supplying a word or words that will make the sentence correct.

A device used in measuring temperature is called a (1)_____ .

There are two types of thermometer. The (2) _____ is a thermometer that contains liquid mercury or alcohol. , and a The (3) _____ is a thermometer with display screen to flash the temperature reading.

A (4) _____thermometer is used to get the temperature of the air in a room or place while a (5) _____ thermometer is used to check body temperature.

B. Directions: Using your own words, explain how to read and measure temperature using a thermometer. Write your explanations on your answer sheet.

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What I Can Do

Activity 1

Directions: With the use of a thermometer measure the temperature of the following in degrees Celsius. Write your answer on a separate sheet of paper.

1. tap water
2. ice water
3. hot coffee

4. your neck
5. ice candy

Activity 2

Directions: Copy the following on your answer sheet. Shade and plot the temperature reading in your paper. The first one is done for you.
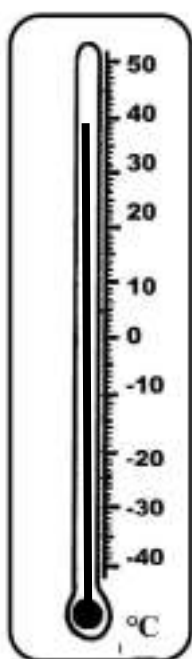
| 1. 37ºC | 2. -20 ºC | 3. 15 ºC | 4. 45 ºC | 5. -35 ºC |
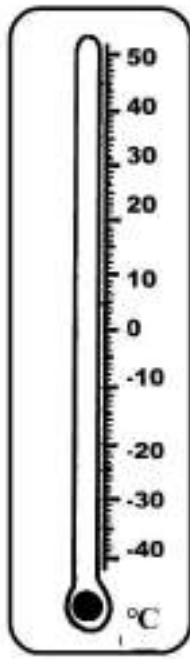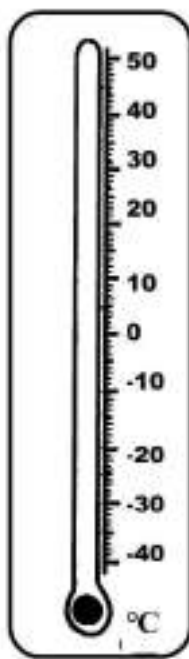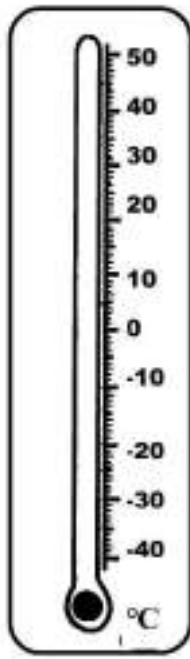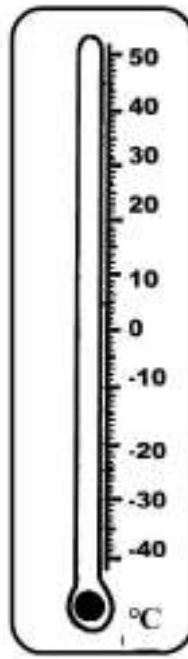
![Pencil icon] *Assessment*

Directions: Read each statement carefully. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following is **not** a tool for measuring temperature?
   - (A) alcohol thermometer
   - (B) thermal scanner
   - (C) digital thermometer
   - (D) barcode scanner

2. Which of the following means temperature?
   - (A) freezing point of ice
   - (B) boiling point of water
   - (C) rise and fall of alcohol levels
   - (D) hotness or coldness of an object

3. Which of the following is the temperature shown in the digital meat thermometer?
   - (A) 0.234°C
   - (B) 2.34 °C
   - (C) 23.4°C
   - (D) 234°C

4. Which of the following devices is used in measuring temperature?
   - (A) wind vane
   - (B) anemometer
   - (C) barometer
   - (D) thermometer

5. Which of the following is temperature shown in the digital room thermometer?
   - (A) 8.29 °C
   - (B) 17.1 °C
   - (C) 61°C
   - (D) 171°C

6. A restaurant has a rule that a meat is considered fully cooked when the temperature is 75 degrees Celsius or higher. Which of the following thermometer shows that the meat is fully cooked?
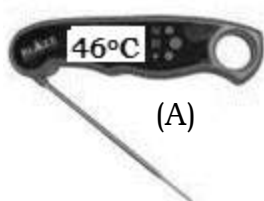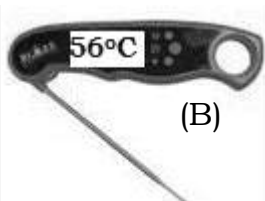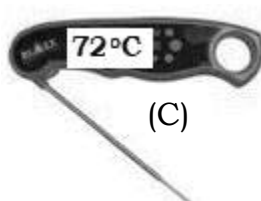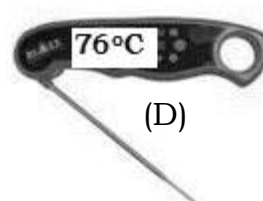
46°C	56°C	72°C	76°C
(A)	(B)	(C)	(D)

7. Which of the following is the temperature shown in the thermometer?

        (A) 23°C   (C) 30°C

        (B) 65 °C   (D) 72°C

8. Below are the steps in reading and measuring temperature in degree Celsius using an alcohol thermometer. Which of the following is the correct series of steps in reading and writing temperature?

    1. *Affix the symbol ⁰C next to the number based on the number scale where the end of the mercury is located.*

    2. *Locate the position of the end of the liquid mercury or alcohol in the number scale.*

    3. *Take the temperature by noting the number in the scale where the liquid mercury end is located.*

       (A)1-3-2   (B) 2-3-1   (C) 3-2-1   (D) 2-1-3

9. Alex measured his body temperature. His thermometer showed 38 degrees Celsius. Which of the following shows the temperature?
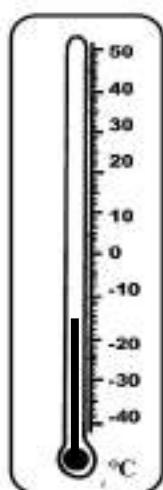
    (A)   (B)   (C)   (D)
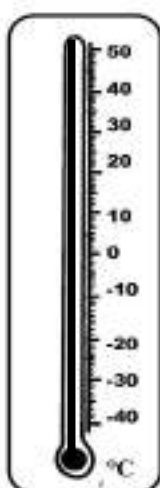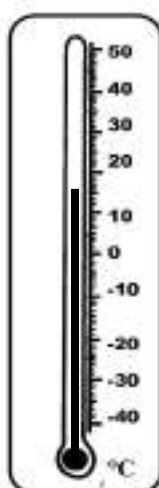
10. Which of the following shows the importance of knowing how to read and measure temperature?

    (A) It gives us an idea on how hot or cold the places are.

    (B) It helps us decide the types of clothes to wear.

    (C) It helps us decide the suited activities to do.

    (D) All of the above.

CO_Q4_Mathematics5_ Module9

Additional Activities

You made it! Finally, you're on the last activity. Hurray!

Activity 1 Thermometer Around Me

Directions: Do any of the following. Make sure to ask help from your parents or trusted grown up.

1. Check if you have a thermometer at home. Ask a grown up to teach you how to use it.

2. Visit a restaurant. Ask if they have a thermometer for cooking. If possible, request the restaurant personnel to show you on how to use their food thermometer.

3. Visit a hospital or a medical clinic. If possible, request the medical staff to show you on how to use their thermometer.

4. Use the internet to know the recent temperature and the predicted highest and lowest temperatures of your favorite town for the next 7 days.

Activity 2 Word Search

Directions: Copy the following on a separate sheet of paper. Search and encircle the following words.

1. THERMOMETER
2. CELSIUS
3. KELVIN
4. FAHRENHEIT
5. ANDERS CELSIUS
6. LORD KELVIN
7. DANIEL FAHRENHEIT
8. SCALE
9. GLASS TUBE
10. MERCURY

X	D	F	A	H	R	E	N	H	E	I	T	K	W	T
G	O	J	W	N	I	V	L	E	K	D	R	O	L	B
A	I	H	R	A	K	W	T	H	Z	H	P	A	C	M
K	N	T	E	M	P	E	R	A	T	U	R	E	W	I
U	P	D	T	M	F	W	L	G	Q	N	L	H	G	X
Q	O	S	E	E	J	A	H	V	J	S	W	B	W	B
V	G	T	M	R	M	I	J	S	I	T	A	M	L	K
C	H	I	O	C	S	X	M	U	B	N	L	U	R	M
Y	G	B	M	U	J	C	S	P	K	H	B	A	V	K
S	A	C	R	R	Q	V	E	F	X	S	R	P	W	J
F	M	P	E	Y	O	W	Z	L	S	E	Z	H	D	U
X	D	I	H	C	X	S	R	A	S	K	L	C	S	K
J	P	W	T	F	Q	U	L	U	N	I	T	A	Q	O
Z	C	B	V	C	J	G	F	X	S	O	U	R	C	L
W	Y	N	G	L	A	S	S	T	U	B	E	S	T	S

Congratulations! You made it! Give yourself a pat on your shoulder.

13

Answer Key

What I Know

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

What's In

1. C
2. A
3. D
4. B
5. E

What I Can Do

Activity 1
(Varied Answers)

Activity 2

1. 37ºC   2. -20ºC   3. 15ºC   4. 45ºC   5. -35ºC

What I Have Learned

A.
1. thermometer
2. analog thermometer
3. digital thermometer
4. room thermometer
5. clinical

B. Explanations vary.

What's More

Activity 1. Read the temperature
1. C
2. D
3. A
4. E
5. B

Activity 2: Correct Me if I'm Wrong!
1. ☒
2. ☑
3. ☑
4. ☑
5. ☒

Additional Activities

Answers vary.

Assessment

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

References

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Bamba, Nelia D., and Carmelita C. Coronel. 2010. *MATHEMATICS for a Better Life 5 Textbook*. Quezon City: SD Publications, Inc.

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

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K5learning.com. https://www.k5learning.com/worksheets/math/grade-2-reading-a-thermometer-metric-d.pdf> [Accessed 6 July 2020].

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Mathematics

Quarter 4 – Module 10: Solving Routine and Non-Routine Problems Involving Temperature in Real-Life Situations

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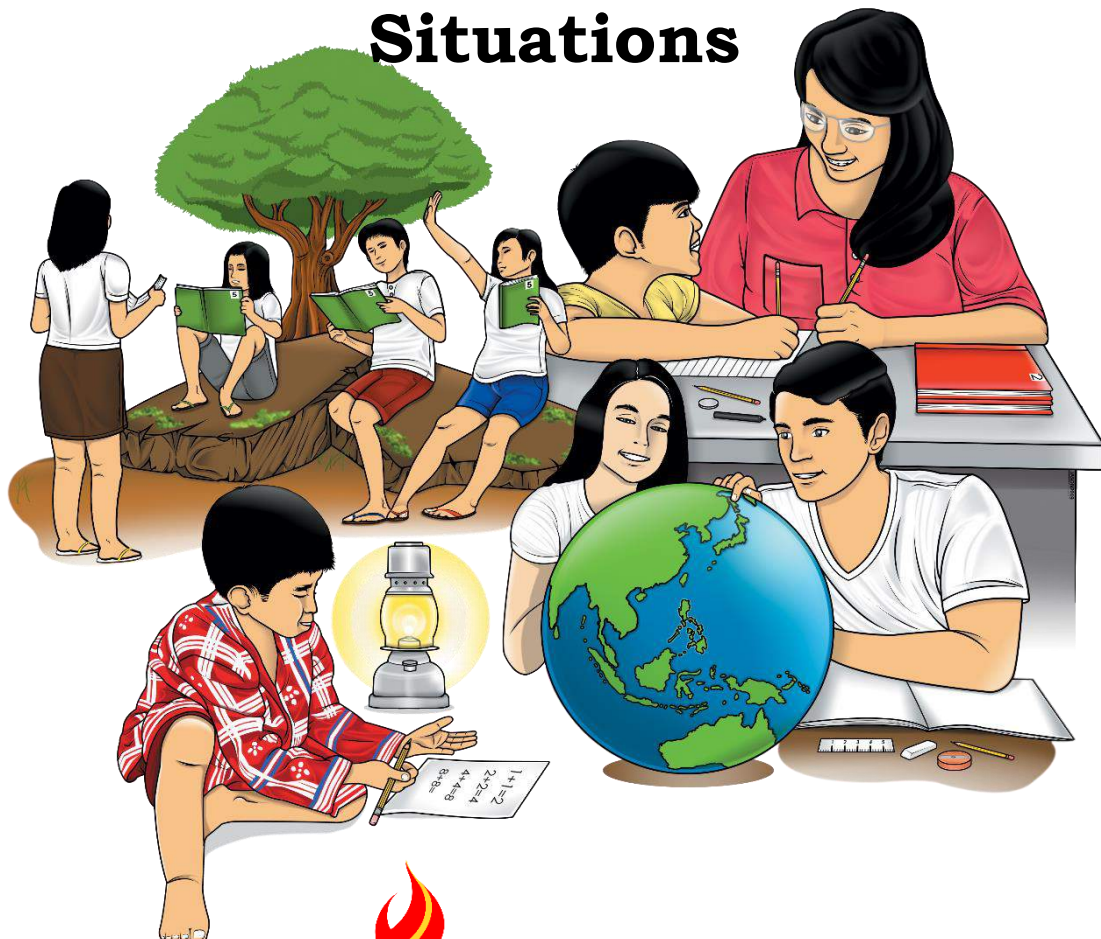
Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 10: Solves routine and non-routine problems involving temperature in real life situations.
First Edition, 2020

5

Mathematics
Quarter 4 – Module 10: Solving Routine and Non-Routine Problems Involving Temperature in Real-Life Situations.

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DEPARTMENT OF EDUCATION

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, Mathlete!

This module was designed and written to help you gain an understanding of the concepts and skills needed to solve routine and non-routine problems involving temperature in real-life situations.

Have fun and enjoy because you will learn a lot in this module.

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

- solve routine and non-routine problems involving temperature in real life situations.

- appreciate the importance of solving routine and non-routine problems involving temperature in our daily lives.

What I Know

Directions: Read each statement carefully. Choose the letter that corresponds to the best answer. Write your answers on a separate sheet of paper.

1. At 5:00 AM, the outside temperature was 24.9°C. By 10:30 AM, it was 33.2°C. Was there a change in the outside temperature? If so, what was the change?

    a. No, it was just the same.   c. Yes, it went down by -8.3 C°.
    b. Yes, it went up by 8.3 C°. d. Yes, there was a 9.7 C° change

2. Chariz's temperature this morning was 38.5°C. After an hour, her temperature was down to 37.4°C. Which is/are TRUE about her condition?

    a. Her condition worsened.   c. Her temperature went down by 1.1 C°.
    b. Her condition improved.   d. Both B and C.

3. The temperature of a hot cup of coffee was 97°C. After some time, it had gone down by 11 C°. What is its temperature now?

    a. 83°C   c. 85°C
    b. 84°C   d. 86°C

4. The TV news weather report forecast the lowest temperature for the day to be 22°C and the highest, 35°C. What is the difference between the lowest and highest temperature forecasts for the day?

    a. 13°C   c. 15°C
    b. 14°C   d. 13.5°C

5. At 8:00 AM, the temperature in the room was 25.6°C. By noon, it had gone up by 2.5 C°. But by 6:00 PM, it had gone down by 3.3 C°. What was the temperature in the room at 6:00 PM?

    a. 28°C   c. 28.4°C
    b. 24.8°C   d. 28.5°C

6. At 1:00 PM, the temperature was 31.9°C. By 5:30 PM, it was 20.6°C. By how many degrees did the temperature drop? Which of the following problem-solving strategies can be used to solve the problem?

    a. make a drawing or a diagram
    b. work backwards
    c. write a number sentence
    d. all of the above

7. Mark's temperature this morning was 38.2°C. After 2 hours, it was 39.5°C. All are true about Mark's condition EXCEPT

    a. His condition worsened.
    b. His condition improved.
    c. His temperature went up by 1.3 C°
    d. He has high fever.

8. What would be a person's temperature if it is 3.8 C° higher than normal?

    a. 40.3°C   c. 33.2°C
    b. 40.8°C   d. 34.8°C

9. Ten minutes after it had stopped boiling, the water in the pot had cooled down by 8C°. After 30 minutes, its temperature had dropped by another 16C°. What is the temperature of the water in the pot now?

    a. 92°C   c. 84°C
    b. 76°C   d. 24°C

10. Rowan Jennika set her aircon at 28.6°C. At 11:30 AM, she lowered the setting by 3.5 C°. After an hour, she set it at 19°C. By how many degrees did she lower down the setting of the aircon at 12:30?

    a. 6.1°C   c. 25.1°C
    b. 9.6°C   d. 32.1°C

Lesson 1 — Solves Routine and Non-Routine Problems Involving Temperature in Real Life Situations

Nice to see you again, Mathletes!

I hope you learned a lot in our lesson on reading and measuring temperature. In this module, you will learn how to apply the skills you learned in our previous lesson. Sometimes, there are life situations that involve temperature. This lesson will help you understand and learn how to solve routine and non-routine word problems involving temperature.

Are you excited to learn new things about our topic? Then read and study this module for you to understand our lesson.

What's In

In the previous lesson, you learned the concept of temperature and the different types of thermometers. You also learned how to read and measure temperature in degree Celsius. In this module, you will learn how to solve routine and non-routine problems involving temperature in real-life situations.

Before we go to our lesson let us have a quick review.

Which is the better estimate of the temperature of each item?

1.	high fever	a. 40°C	b. −10°C
2.	cold soft drinks	a. 10°C	b. 30°C
3.	air-conditioned room	a. 35°C	b. 19°C
4.	fruit shake	a. 5°C	b. 75°C
5.	sunny day	a. 15°C	b. 33° C

What's New

There are times when we find it difficult to solve real-life problems involving temperature. Some of these problems do not actually need the use of a formula to solve. All we have to do is be creative and devise some strategy

Read and study the story below.

> *Arjan was nursing a fever. By ten o'clock in the morning, his temperature had gone up by 1.5°C from his temperature at 7 AM. By 3:00 o'clock in the afternoon, though, his temperature had gone down by 1.2 C°. But at 10 PM, his temperature was again up by 1.1 C°. If his temperature at 10 PM was 39.5°C, what was his temperature at 7 AM?*

Have you experienced answering a word problem involving a situation like this? Do you know how to solve this type of a problem? What strategies can you use to come up with the correct answer?

There are different problem-solving strategies that can help you solve word problems. Always remember that not all problems require a particular formula or strategy to solve. Sometimes, you may just need to act it out or make a sketch or a drawing or some other technique.

This module will present some strategies that may help you solve routine and non-routine word problems involving temperature in real-life situations.

CO_Q4_Mathematics 5_ Module 10

What Is It

In solving problems involving temperatures in real-life situations, study the four-step plan to solve routine and non-routine word problems below.

The Four- Step Plan in Solving Word Problems

1. Understand the problem.
   a. Identify the question.
   b. Identify the relevant facts.

2. Plan what to do.
   a. Choose a strategy to help you solve the problem. There are different strategies for different problems. It is up to you which strategy you think may best help you solve the word problem much more easily. Below is a list of problem-solving strategies that you may use.
      ➤ Draw a picture or a diagram.
      ➤ Make a table or list.
      ➤ Guess and check.
      ➤ Write a number sentence.
      ➤ Break problem into smaller parts.
      ➤ Solve a simpler problem.
      ➤ Look for a pattern.
      ➤ Act it out.
      ➤ Make a model.
      ➤ Work backwards.
      ➤ Use logical reasoning.

3. Solve for the answer / Carry out the Plan.
   a. Perform the strategy.

4. Check / Look back
   a. Verify if the answer is correct.

Let us go back to the problem. Let us try to solve this one with the use of the four-step plan in solving problems.

> *Arjan was nursing a fever. By ten o'clock in the morning, his temperature had gone up by 1.5°C from his temperature at 7 AM. By 3:00 o'clock in the afternoon, though, his temperature had gone down by 1.2 C°. But at 10 PM, his temperature was again up by 1.1 C°. If his temperature at 10 PM was 39.5°C, what was his temperature at 7 AM?*

CO_Q4_Mathematics 5_ Module 10

STEP 1 **Understand the problem**

Identify the question ➡ What was Arjan's temperature at 7 AM

Identify the relevant facts ➡ Arjan was nursing a-fever.
By ten o'clock in the morning, his temperature had gone up by 1.5°C from his temperature earlier at 7 AM.
By 3:00 o'clock PM, his temperature had gone down by 1.2 C°.
At 10 PM, his temperature was again up by 1.1 C°.

STEP 2 **Plan what to do**
Choose a strategy. ➡ Drawing a diagram or Workingbackwards

STEP 3 **Solve for the answer**
Perform the strategies (by using a diagram) ➡ Illustrate the problem by using a diagram

| | +1.5 | -1.2 | +1.1 | |
| ? | ➡ | ? | ➡ | ? | ➡ | 39.5°C |

7 AM   10 AM   3 PM   10 PM
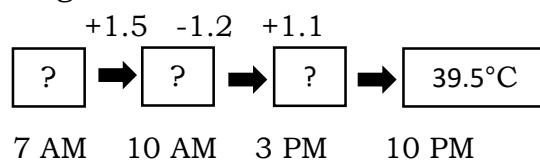
STEP 4 (by working backwards) ➡ Work backwards. Start with the last fact. Remember that addition and subtraction are inverse operations.

| | -1.1 | +1.2 | -1.5 |
| 39.5 | ➡ | ? | ➡ | ? | ➡ | ? |

10 PM   3 PM   10 AM   7 AM

7
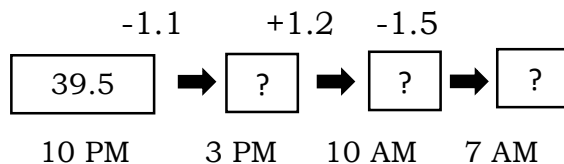
At 3 PM: 39.5°C – 1.1 = 38.4°C
At 10 AM: 38.4°C + 1.2 = 39.6°C
At 7 AM: 39.6°C – 1.5 = 38.1°C

Answer : Arjan's body temperature at 7 AM was 38.1°C

Check your answer

Verify if the answer is correct.

➡️ Substitute the values for each of the boxes in the first diagram above and perform the indicated operations.
 38.1°C + 1.5 = 39.6°C
 39.6°C - 1.2 = 38.4°C
 38.4°C + 1.1 = 39.5°C

Therefore, the answer is correct.

What's More

Activity 1 Problem Solving

Read each problem carefully and follow the steps in solving problem.

1. The lowest temperature in the Philippines that was officially recorded by PAGASA was 6.3°C. It was recorded in Baguio on January 18, 1961. The highest was 42.2 degrees Celsius in Tuguegarao, Cagayan on May 11, 1969. What is the difference between these two temperatures?

2. A freezer was set at 0°C. Sophia reset it to 8.5°C. Would the temperature in the freezer likely rise or drop? By how many degrees?

Activity 2 Solve it, wisely!

Solve the problems below using any strategy

1. A group of tourists noticed that the temperature in Tarangban Falls in Calbayog City was 6.5°C lower than the temperature in the city proper. What was the temperature in Tarangban Falls if the temperature in the city proper was 32.3°C?

2. An air conditioner was set at 24°C in the morning. It was reset to 19°C at 12 noon. Would the temperature likely rise or drop after that? By how many degrees?

3. The recorded temperatures for 5 days in Calbayog City, Samar were 33°C, 31°C, 32°C, 32°C and 35°C. What is was the average temperature in Calbayog City for the 5 days?

Activity 3 Strategize and Solve!

Cesca measured the temperatures of three different liquids in her Science class. The temperature of the soft drink was 7°C. The temperature of the vinegar was 8 C° higher than the temperature of the soft drink. If the temperature of the ice water was 15 C° lower than the temperature of the vinegar, what was the temperature of the ice water?

What I Have Learned

A. Fill in the blanks.
   Below are the steps in solving problems involving temperature.
   Fill in the blanks with the correct word or phrases to make the statements complete.

   In order to solve routine and ___(1)___ word problems involving (2)_____ in real life situations, we follow the ____(3)____.

   The steps in the four-step plan are __(4)____, ___(5)_____, _____(6)_, and _____(7)_____.

B. Enumeration.

What are some of the different problem solving strategies that we can use in solving routine and non-routine problems involving temperature in real life situations? Give at Least 5.

1._____
2._____
3._____
4._____
5._____

What I Can Do

Use the facts in the table below to answer the questions that follow.

Element	Melting Point °C
Gold (Au)	1 064.43
Lead (Pb)	327.50
Sodium (Na)	97.72
Aluminum (Al)	660.37
Helium (O)	-272.20
Tungsten (W)	3,414°C

1. How much-higher is the temperature needed to melt gold than the temperature needed to melt lead?

2. How much lower is the temperature needed to melt sodium than the temperature needed to melt aluminum?

3. How much higher is the melting point of tungsten compared to the boiling point of water?

4. Which among the elements in the list above has the lowest melting point? What is its melting point?

5. Which among the elements in the list above has the highest melting point? At what temperature will it melt?

Assessment

A. Directions: Read and understand the questions that follow. Choose the letter that corresponds to the correct answer. Write your answer on a separate sheet of paper.

1. Mr. Castillo measured the temperature in the classroom at 12:00 noon. It was 34.8°C. By 5:30 pm, it was 28.6°C. The following problem-solving strategies can be used to solve the problem EXCEPT

   a. Make a drawing or a diagram   c. Write a number sentence
   b. Work backwards   d. Compose a song

2. One morning, the outside temperature was 24.9°C. By noon, it had gone up by 1.3°C. But by 5 PM, it had gone down by 1.4°C. What was the temperature at 5 PM??

   a. 27.6°C   c. 28.4°C
   b. 25°C   d. 24.8°C

3. Luisa's temperature this morning was 39.5°C. After an hour, her temperature was 37.5°C. Which statement best describes her condition?

   a. Her condition worsened
   b. Her condition improved
   c. Her temperature went down by 2°C
   d. Her temperature went up by 2°C

4. The temperature of freshly baked hot malungay pandesal is 68°C; while hot coffee is 85°C. What is the difference between the two temperatures?

   a. 15°C   c. 23°C
   b. 17°C   d. 2.3°C
   c.

5. The forecast for today's lowest temperature is 25°C and the highest temperature is 36.5°C. What is difference between the highest and lowest temperature forecasts for the day?

   a. 13°C   c. 15°C
   b. 11°C   d. 11.5°C

6. At 9 AM, the temperature in a room was 25.6°C. At 11:30 AM, it was up by 1.3°C. If the temperature at 12:30 PM was 27.4°C, what was the change in the temperature in the room from 11:30 AM to 12:30 PM?

   a. 0.8°C   c. 0.5°C
   b. -0.5°C   d. 1.8°C

7. Fiona's temperature at 10 AM this morning was 38.2°C. An hour later, her temperature had gone down by 1.2 C°. Which of the following statements is TRUE about Fiona's condition at 11 AM?

    a. Fiona's condition worsened.
    b. Fiona's condition was normal.
    c. Her temperature went down because she took her medicines.
    d. She still has high fever.

8. The reading rose by 1.2 C°. What is the present reading?

    a. 37°C   c. 39.4°C
    b. 39.2°C   d. 40°C

9. The newspaper weather report says the lowest temperature for the day will be 9°C and the highest temperature, 28°C. If the temperature at 10:00 AM was midway between the forecast coldest and hottest temperatures for the day, what was the temperature at 10:00 AM?

    a. 19°C   c. 19.5°C
    b. 18.5°C   d. 18°C

10. The temperature yesterday in Seoul, the capital of South Korea, was 2 C° below freezing point of water. What was the temperature in Toronto, Canada yesterday if it was 2 C° lower than it was in Seoul?

    a. -2°C   c. -4°C
    b. 2°C   d. 4°C

Additional Activities

Hooray! You made it! Finally, you're in the last activity. If you answer the questions correctly, you are set to go to next lesson.

Solve the following problems. Follow the steps in solving word problems.

1. Princess Luz's temperature is 2.5 C° above normal. What is her temperature?

2. One sunny afternoon, the temperature was 32°C. It then went up to 33.5°C.After a few hours, it was down by 3 times the temperature difference between the first and second readings. What was the third temperature reading?

Answer Key

What I Know

1. B	6. D
2. D	7. B
3. D	8. B
4. A	9. B
5. B	10. A

What's In

1. A	3. B.
2. A	4. A
3. B	5. B

What's More

Activity 1:
1. Square35.9 ° C
2. the temperature would likely rise, by 8.5 °C

Activity 2:
1. 25.8 ° C
2. the temperature would likely dropped, by 5 ° C
3. 32.6 ° C

Activity 3:

Ice Water (I)	Soft drink (S)	Vinegar (V)
S - 15	7	S + 8
S – 15	7	15
0	7	15

The temperature of the ice water was 0°C

What I Have Learned

A. Fill in the blanks
1. non-routine
2. temperature
3. four- step plan
4. Understand the problem
5. Plan what to do
6. Solve for the answer
7. Check your answer

B. Enumeration (possible answers)
Draw a picture or a diagram.
Guess and check.
Break problem into smaller parts.
Look for a pattern.
Make a model.
Use a logical reasoning.
Make a table or list.
Write a number sentence.
Solve a simpler

What I Can Do

1. 736.93
2. 562.65
3. 314
4. Helium,-272.2
5. Tungsten; 3,414°C

Assessment

1. D	6. C
2. D	7. B
3. B	8. C
4. B	9. B
5. D	10. C

Additional Activities

1. Princess Luz's temperature: 39.5 ° C
2. 29°C

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

Bamba, Nelia D., and Carmelita C. Coronel.2010. *MATHEMATICS for a Better Life 5 Textbook*. Quezon City: SD Publications, Inc.

5

Mathematics

Quarter 4 – Module 11:
Organizing Data in Tabular Form and Presenting them in a Line Graph

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 11: Organizing Data in Tabular Form and Presenting them
                               in a Line Graph Title
First Edition, 2020

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Mathematics

Quarter 4 – Module 11:
Organizing Data in Tabular Form
and Presenting them
in a Line Graph

DepED

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 Mathletes!

This module was designed and written to help you gain an understanding of the principle involved and the skills needed in organizing data in tabular form and presenting them in a line graph, and its advantages. Remember that there are different kinds of graphs. The lessons you learned about pictographs and bar graphs in your previous grades will surely help you go through this module.

The skills you will learn in this lesson are important because you can use them in real-life situations. Often, we deal with information or data that need to be organized for us to more easily see the changes as well as the trends. These would then enable us to possibly predict the outcomes of events.

So, what are you waiting for? Stay focused and start-up.

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

- enumerate the steps in organizing data in tabular form and presenting them in a line graph;
- organize data in tabular form and present them in a line graph; and
- appreciate the importance of organizing data and presenting them in a line graph.

Before we proceed, let us first check your understanding of organizing data in tabular form and presenting them in a line graph.

What I Know

Directions: Read the story below.

> *Mateo helps his parents by selling empty plastic soft drink bottles. He collects them after class. Last week, he collected the following number of plastic bottles from his neighborhood: Monday – 20; Tuesday - 35; Wednesday – 25; Thursday – 30; and Friday 20.*

The information or *data* given above are presented in a table or are tabulated below.

Mateo's Collection of Plastic Bottles by Day

Days	No. of plastic bottles collected
Monday	20
Tuesday	35
Wednesday	25
Thursday	30
Friday	20

The same set of data are presented in the line graph below.

Mateo's Collection of Plastic Bottles by Day
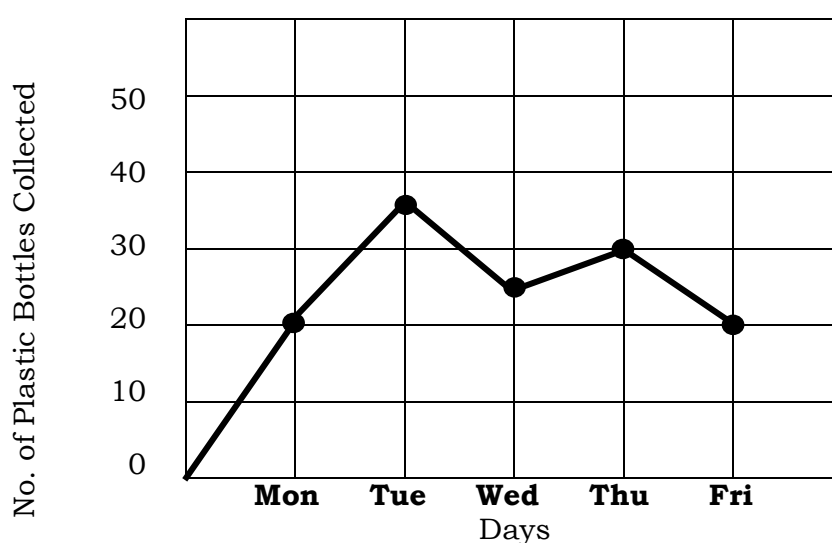
Refer to the table and the graph above and answer the following. Write your answer on a separate sheet of paper.

1. What kind of graph is shown above?
   A. Bar graph
   B. Pie graph
   C. Line graph
   D. Pictograph

2. What is the title of the graph?
   A. Mateo's Collection of Plastic Bottles by Day
   B. Mateo's Number of Days
   C. Mateo's Number of Plastic Bottles
   D. Mateo's Collection of Plastic Bottles

3. What is the independent variable?
   A. Day
   B. Number of bottles Collected
   C. Weeks
   D. Number of days

4. What is the dependent variable?
   A. Day
   B. Number of plastic bottles collected
   C. Collected plastic bottles
   D. Daily collection

5. What was the interval used in the graph for the data on the number of plastic bottles collected?
   A. 5
   B. 10
   C. 20
   D. 15

6. Which of the following statements is TRUE when organizing data using tables?
   A. It is impossible to organize data in a table form.
   B. It is important to properly label the rows and columns including the title.
   C. There is no need to properly label the rows and columns including the title.
   D. Label only the rows and columns and there is no need to write a title for the table.

7. One of the steps in presenting data in a line graph is putting a mark for each ordered pair of values of the independent and dependent variables. You do this by
   A. by plotting a point
   B. by drawing a line
   C. by creating a table
   D. by graphing

8. What do the points plotted in a line graph represent?
   A. An ordered pair of values of the independent and dependent variables.
   B. Nothing, it is used as a mark only.
   C. The data.
   D. A view of the graph.

9. What kind of line is used to connect the points in the line graph?
   A. ray
   B. line segment
   C. angle
   D. parallel lines

10. Which of the following is the correct order of the steps in presenting data in a line graph?
    A. Draw the X– axis and the Y – axis.
    B. Label the data given on the Y – axis and the X – axis. Compute the range of the data. Decide what interval to use. Begin the scale with 0.
    C. Plot the points by drawing a dot to show respective information.
    D. Connect the points by a line segment.
    E. Write the title on the top of the graph.

    A. A-B-C-D-E
    B. B-C-A-D-E
    C. B-A-D-C-E
    D. A-C-D-B -E

3

Lesson 1

Organizing Data in Tabular Form

Every statistical investigation begins with a question to be answered, or a statement to be tested or proved. To do this, we need to have information or data. You can get these data through interviews, surveys, direct observation or other data collection techniques. Once you have your data, these need to be organized. Tables and line graphs help us to more easily see, analyze and interpret the data. They not only help us see how variables change but also whether there are trends.

In this module, you will learn how to organize and present data in tabular form as a way of interpreting the collected data in one to two variables. Are you ready?

What's In

Before we start with the lesson, let us first check your knowledge and understanding of some very important concepts and skills.

Read the story below and answer the questions that follow.

Mr. Dela Cruz asked his students to identify the fruit they like best. Below is a tally of the students' responses.

mango	mango	santol	papaya	banana
banana	papaya	mango	mango	banana
mango	banana	mango	santol	papaya

Summarize the students' responses by completing the table below.

Responses	mango	Banana	papaya	santol
Tally	卌 I	4	3	2

Based on the tally,
1. How many students like bananas best?
2. How many students like mangos best?
3. How many students like papayas best?
4. How many students like santols best?
5. How many different kinds of fruits in all did the students say they like best?

Organizing data in tabular form allows you to more easily interpret and analyze data. The data may consist of any information about any subject of your interest. This may be such information as your quarterly grades, your scores in quizzes in different subjects, or even game results in your school's sports activities. You will understand this better as you go through this module.

Let us consider the scenario below:

Ms. Partuza recorded the Math Quiz results of her Grade 5 students.

The scores are listed below.

```
5   4   3   5   1   4   3   5   5   2   4   3   4
4   4   5   5   4   4   5   4   4   3   5   4   5
3   5   3   4   4   5   1   4   2   5   4   5   4
```

Based on the above data, how many students got 5? How many students got below 3? If the passing score is 4, how many passed the quiz? What was the lowest score obtained by a student?

How may Ms. Partuza analyze her quiz results and answer the questions?

Organizing data in tabular form is one way of presenting data.

Let us recall our earlier problem concerning the Math quiz scores of Ms. Partuza's Grade 5 students. Look at the tally of the scores again.

```
5   4   3   5   1   4   3   5   5   2   4   3   4
4   4   5   5   4   4   5   4   4   3   5   4   5
3   5   3   4   4   5   1   4   2   5   4   5   4
```

We are being asked to answer the following questions:
1. How many students got 5?
2. How many students got below 3?
3. If the passing score is 4, how many passed the quiz?
4. What was the lowest score obtained by a student?

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It is easy to see that the way the data are presented does not allow us to readily answer the questions asked. We need to organize and sort the scores – through the use of tables.

When organizing data in a table, it is important to plan how the table should look like. We need to know how many columns and rows the table should have, and how to put in the data.

So, how do we present data in tables? We illustrate the steps using the data of Ms. Portuza's Grade 5 students' scores in the Math quiz.

Step 1: Create a table. Before we make the table, we need to know how many rows and columns the table should have.

Our data consists of two sets of information: the scores and the number of students who got such scores. These are our variables.

The table then should show the scores, a tally for each of the scores and the total number students who got a particular score based on the tally, or what is referred to as *frequency*. Our table then should have 3 columns.

There are five different scores. The table should therefore have seven rows: one for the column headings, five for the scores and one for the totals.

We therefore need a table with 3 columns and 7 rows.

Step 2: Write the labels or column and row headings. The labels or column and row headings make it easier for us to organize and sort the data. They also help us interpret and analyze the data. This is shown below.

Scores	Tally	Frequency
5		
4		
3		
2		
1		
Total		

Step 3: Make a tally. Make a tally for each of the scores and complete the table.

Scores	Tally	Frequency
5	H̶H̶ - H̶H̶ - III	13
4	H̶H̶ - H̶H̶ - H̶H̶ I	16
3	H̶H̶ - I	6
2	II	2
1	II	2
Total		39

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Step 4: **Write an appropriate title the table**. The title of a table gives a brief description of the table to let the readers know immediately what the table and the data in it are about. The title also makes it easy to refer to the table.

The complete table is shown below.

Ms. Portuza's Grade 5 Students' Math Quiz Results

Scores	Tally	Frequency
5	HHI - HHI - III	13
4	HHI - HHI - HHI - I	16
3	HHI - I	6
2	II	2
1	II	2
Total		39

With our table now complete, we are ready to answer the questions.

From the table it is easy to see the information we need to answer the questions about Ms. Portuza's class: there 13 students who got 5, 4 students got scores below 3, 29 students who got passing scores, and one student who got 1, the lowest score.

A table such as what we have just created above is called a **frequency table**.

One important note - In case the data is so large that it is impractical to include the tally in the table, this may be omitted. The column on frequency would be enough to serve the purpose. There is also no need for a tally if the frequency is already given.

Let us have another example:

Example 1:

Dianne and Kirby are Grade 5 students in Calbayog East Central Elementary School. They asked their classmates what their favorite sport was. The responses, including Dianne's and Kirby's are listed below.

Basketball	Table Tennis	Basketball
Table Tennis	Basketball	Table Tennis
Basketball	Badminton	Table Tennis
Basketball	Basketball	Basketball
Table Tennis	Badminton	Table Tennis
Volleyball	Volleyball	Badminton
Table Tennis	Badminton	Table Tennis
Badminton	Volleyball	Volleyball
Badminton	Volleyball	Basketball
Basketball	Basketball	Volleyball

Again, we go through the steps in tabulating the data.

Step 1: Create a table. How many columns and rows should the table have? What about the rows, how many should there be? Yes, the table should have three columns: one for the sports, one for the tally, and one for the frequency. There should be 7 rows – 1 for the column headings, 5 for the sports, and 1 for the total.

Step 2: Label the columns and rows. The table with the appropriate headings is shown below.

Sport	Tally	Frequency
Basketball		
Volleyball		
Table Tennis		
Badminton		
Total		

Step 3: Make a tally and complete the table.

Sports	Tally	Frequency
Basketball	ĦĦ - ĦĦ	10
Volleyball	ĦĦ - I	6
Table Tennis	ĦĦ - III	8
Badminton	ĦĦ - I	6
Total		30

Step 4: **Write an appropriate title**.

Favorite Sport of the Students in Dianne and Kirby's Class

Sports	Tally	Frequency
Basketball	ĦĦ - ĦĦ	10
Volleyball	ĦĦ - I	6
Table Tennis	ĦĦ – III	8
Badminton	ĦĦ – I	6
Total		30

Example 2: Tabulate the data given in the story below.

John Francis wanted to know how many of his 25 classmates have which birth month. He recorded the responses as follows: January – 4, February – 2, March – 1, May - 3, June- 6, August – 2, September – 1, October – 5, November – 1.

Follow the steps.

Step1: Create a table. For this example, there will only be two columns. There is no need to tally as the frequencies are already given. There will be one row for the column headings and twelve rows for the twelve months.

Step 2: Label the columns and rows with the appropriate headings. The table with the appropriate headings is shown below.

Birth Month	Frequency
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Step 3: Make a tally. There is no need to make a tally here as the frequencies are already given. We just need to complete the table with the collected or given data. The completed table is shown below.

Birth Month	Frequency
January	4
February	2
March	1
April	0
May	3
June	6
July	0
August	2
September	1
October	5
November	1
December	0

Step 4: **Write an appropriate title for the table.** The final table is shown below.

John Francis Classmates' Birth Months

Birth Month	Frequency
January	4
February	2
March	1
April	0
May	3
June	6
July	0
August	2
September	1
October	5
November	1
December	0

Example 3: Tabulate the data given in the story below

The Subject Club Adviser conducted a survey about the top favorite subject of students. These are the results of the survey. Mathematics - 13, English - 14, Science - 11, Filipino - 9, Aral., Pan. – 6, MAPEH – 5, EPP – 8.

We follow the same steps.

Step1: Create a table. Determine the number of columns and rows. Again, there will only be two columns. There will be eight rows. Why?

Step 2: Label the columns and rows with appropriate headings. This is shown below.

Subjects	Frequency
Mathematics	
English	
Science	
Filipino	
Aral. Pan.	
MAPEH	
EPP	

Step 3: Make a tally and complete the table. Again, there is no need to tally as the frequencies are already given. You just need to complete the table using the collected or given data.

Subjects	Frequency
Mathematics	13
English	14
Science	11
Filipino	9
Aral. Pan.	6
MAPEH	5
EPP	8

Step 4: **Write an appropriate title for the table.**

The final table is shown below.

Students' Top Favorite Subject

Subjects	Frequency
Mathematics	13
English	14
Science	11
Filipino	9
Aral. Pan.	6
MAPEH	5
EPP	8
Total	66

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What's More

Activity 1: Follow my Steps!

Directions: Make a frequency table of the given data. Write your answer on a separate sheet of paper.

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1. Marjorie' s quarterly grading period grades in Mathematics 5 are as follows: first quarter – 85, second quarter - 88, third quarter – 90, fourth quarter – 95.
2. The weather station recorded the day's highest temperatures for the past week as follows: Monday 29°C; Tuesday – 28°C; Wednesday - 27°C; Thursday- 30°C; Friday - 32°C; Saturday – 26°C; Sunday - 31°C.

Step 1: Create a table.
Step 2: Label the columns and rows using appropriate headings.
Step 3: Tally and complete the table.
Step 4: Write an appropriate title for the table.

Activity 2: Fill Me In!

Directions: Tabulate the data and write a title for the table. Write your answer on a separate sheet of paper.

1. The school physician recorded the gender of the patients who entered the school clinic between 8:00 AM and 5:00 PM. The school physician used G for girls and B for boys. The data are shown below:

G G B B G B G B G B B G G G B G B G G B G B G B G

Title: _____

Gender	Tally	Frequency

2. Carl recorded the color of the balloons in a party. The data are shown below.

white	orange	blue	red	orange	blue
orange	white	blue	red	orange	white
orange	orange	white	orange	blue	white
red					

Title: _____

Color of Balloons	Tally	Frequency

Activity 3: Complete Me!

Directions: Organize the data in a table with an appropriate title and label each row and column. Write your answer on a separate sheet of paper.

1. The Grade 5 class advisers recorded the ages of their students. They combined their data and got the following. 12 y. o. – 15; 11 y. o. – 25, 10 y. o. – 25, 10 y. o. - 40; and 9 y. o. – 35.

2. The librarian made this report on the number of students by grade level who used the library within a period of one month. Grade1 - 50, Grade 2 - 70, Grade 3 - 65, Grade 4 – 120, Grade 5 - 135 and Grade 6 – 200.

What I Have Learned

Based on what you have learned, answer the following questions. Write your answer on a separate sheet of paper.

What are the steps in organizing data in tabular form?

Step 1: _____.

Step 2: _____.

Step 3: _____.

Step 4: _____.

What I Can Do

A. Directions: Study each problem below and organize the data in tabular form. Write your answer on a separate sheet of paper.

1. During the Recycling Drive of Calbayog East Central Elementary School, the Grade 5 students collected used plastic bottles in their barangay. The breakdown of the number of plastic bottles collected per section was as follows: 50 for Gr. 5–Bangon Falls, 100 for Gr. 5–Lologayan Falls, 100 for Gr. 5–Pan as Falls, 150 for Gr. 5-Tabokno Falls and 200 and for Gr. 5–Ton–ok Falls.

2. All the 4P's Beneficiaries of Barangay Hamorawon were required to collect used plastic wrappers. They intended to use the plastic wrappers in making bags, pockets, etc. They were able to collect-wrappers of the following products: Kopiko White - 60, Mang Juan - 40, Chippy – 55, Nescafe Original - 70, Cracklings – 35, and Oishi – 50.

B. SURVEY TIME! Write your answer on a separate sheet of paper.
1. Conduct a survey among the members of your family about:
   a. their favorite home-cooked foods
   b. their most liked TV or internet personality
   c. their pastime activity during community quarantine

Organize the data in 3 tables. Label the rows and columns with the proper headings and write an appropriate title for each table. From the tables, name the items with the highest frequencies.

Lesson 2: Presenting Data in a Line Graph

In order to present the organized data in a line graph, you need to master the skills in organizing, sorting, and tabulating data.

In this module, you will learn how to present data in a line graph.

Are you ready?

What's In

In the previous lesson, you learned about organizing and presenting data in in tables. To do this, a step-by-step process was discussed. Following these steps will help you organize the data in table form.

Follow these steps to organize data in a table.

Mr. Rosales, who owns a store, recorded his past month's sales of 5 kinds of snacks: sold for a month. The snacks were Pancit, Sandwich, 2000; Egg Sandwich, 1000; Bread Roll, 800; Banana Cue, 900; and Hotdog Burger, 1500.

Step 1: Make a table. Determine the number of columns and rows.

Step 2: Write the column and row labels or headings.

Step 3: Make a tally. Complete the table using the collected or given.

Step 4: Write a title for the table.

What's New

In Lesson 1, you were taught how to organize data in tabular form. In this lesson, we will learn how to present data in a line graph. The steps in presenting data in a line graph may be best illustrated using an example. We start with the story below.

Charito's record of sales of eggs for the week is shown in the table below.

Number of Eggs Sold by Charito for the Week

Day	Number of Eggs (in dozens)
Sunday	20
Monday	10
Tuesday	40
Wednesday	30
Thursday	20
Friday	50
Saturday	70

How do we present the same set of data in a line graph?

![What is It](magnifying glass icon) ***What is It***

A line graph is one way of presenting data involving two sets of information – one set for the independent variable and one set for the dependent variable. It is constructed using a rectangular coordinate system which consists of a pair of axes – the horizontal or x-axis and the vertical or y-axis. The x-axis shows the values of the independent variable; the y-axis, the values of the dependent variable. The data are represented by points using the values of the variables as coordinates.

Let us look at the table again.

Sunday	20
Monday	10
Tuesday	40
Wednesday	30
Thursday	20
Friday	50
Saturday	70

Here, the independent variable is Day of the Week; the dependent variable, the Number of Eggs Sold. The axes are labeled using these.

We next lay out the days of the week along the x-axis; the number of eggs sold along the y-axis, in intervals of 10 as it is not practical to lay out all the numbers from 0 to 70. We draw gridlines coinciding with the laid-out values of the variables to aid us in graphing.

These are all shown below.

CO_Q4_Mathematics 5_ Module 11
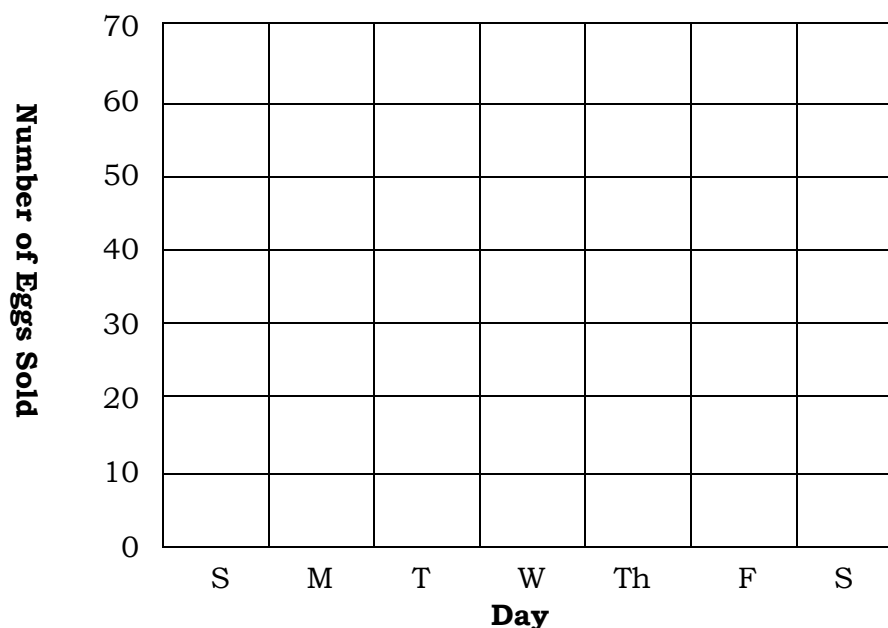
Next, we plot the points using ordered pairs of values of the independent and dependent variables from our given data. From the table, we have the following ordered pairs: (Sunday, 20), (Monday,10), (Tuesday,40), (Wednesday,30), (Thursday,20), (Friday,50), and (Saturday, 70).

Then, starting from the origin, we connect the points consecutively from left to right using lines.

CO_Q4_Mathematics 5_ Module 11
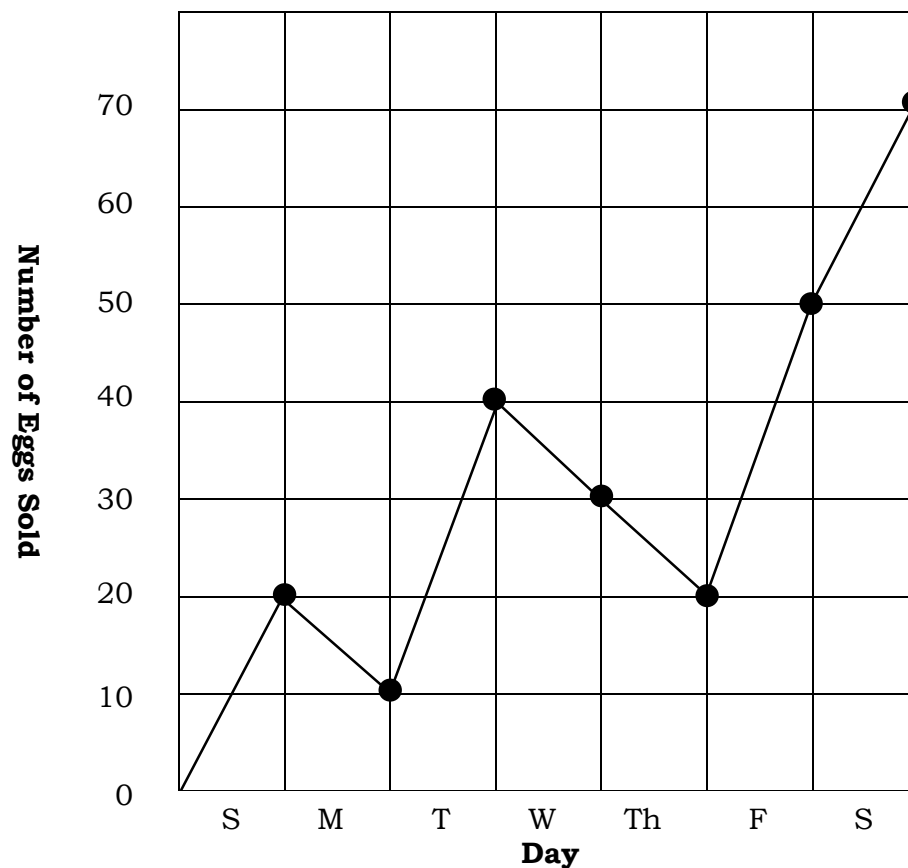
Finally, to give a brief description of the data being presented, we give our line graph a title. – The Number of Eggs Charito Sold for the Week.

The Number of Eggs Charito Sold for the Week
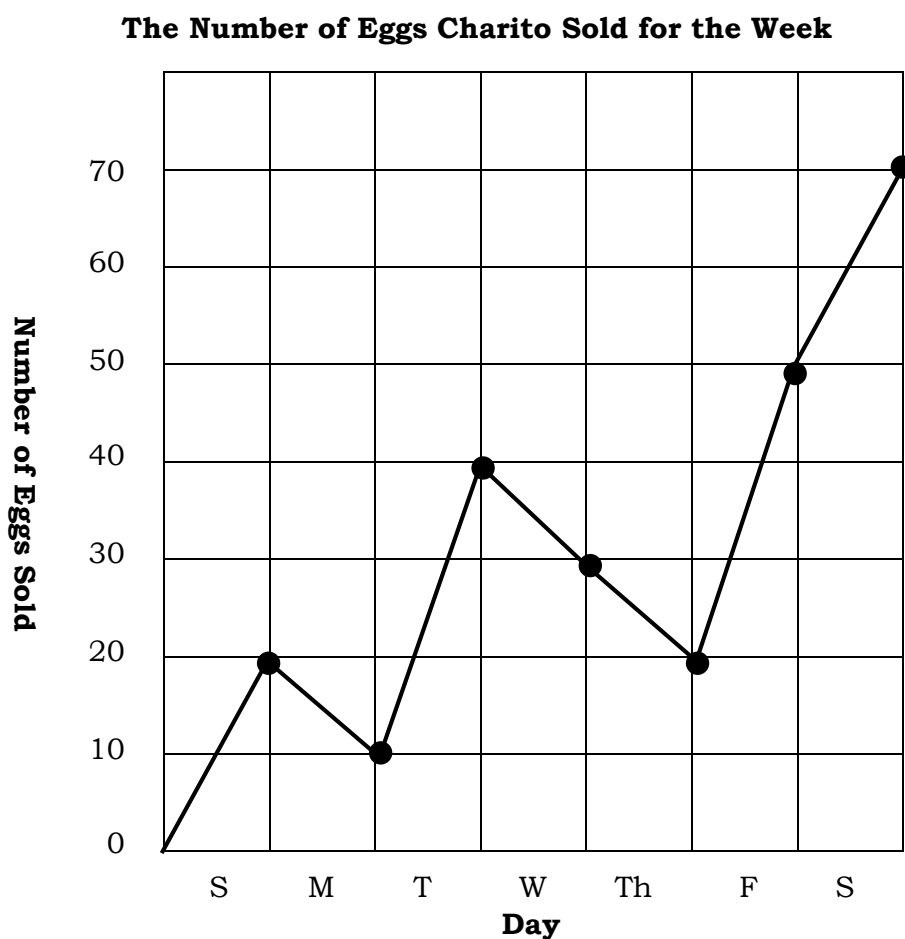
As you can see, the line graph gives us a pictorial view of the data. As the saying goes, "A picture paints a thousand words". Thus, we can immediately see the changes as well as trends in the values of the variables.

Let us now summarize what we have done and outline the steps in presenting data in a line graph.

1. **Determine the independent and dependent variables**.

2. **Draw and label the x and y axes**. Draw the axes and label the x-axis using the using the independent variable and the y-axis using the dependent variable.

3. **Lay out the values of the variables.** Lay out the values of the independent variable along the x-axis, and the values of the dependent variable along the y-axis, using appropriate intervals, if necessary. Draw a grid with vertical lines and horizontal lines coinciding with the laid-out values of the variables.

CO_Q4_Mathematics 5_ Module 11

4. **Plot and connect the points.** Using ordered pairs of values of the independent and dependent variable from the data, plot the corresponding points. Then, starting from the origin, connect the points consecutively from left to right.

5. **Write an appropriate title above the graph.**

Let us have another example.

Example1: Draw a line graph for the given data.

Marjorie's Quarterly Grade in Mathematics 5	
Quarter	Grade
1st	84
2nd	88
3rd	90
4th	95

We follow the steps.

Step 1: Determine the independent and dependent variables. The independent variable is "Quarter e.g. 1st"; the dependent variable, "Grade e.g. 84".

Step 2. Draw and label the x and y axes. Draw the x-axis and label it "Quarter", and the y-axis and label it "Grade".

CO_Q4_Mathematics 5_ Module 11
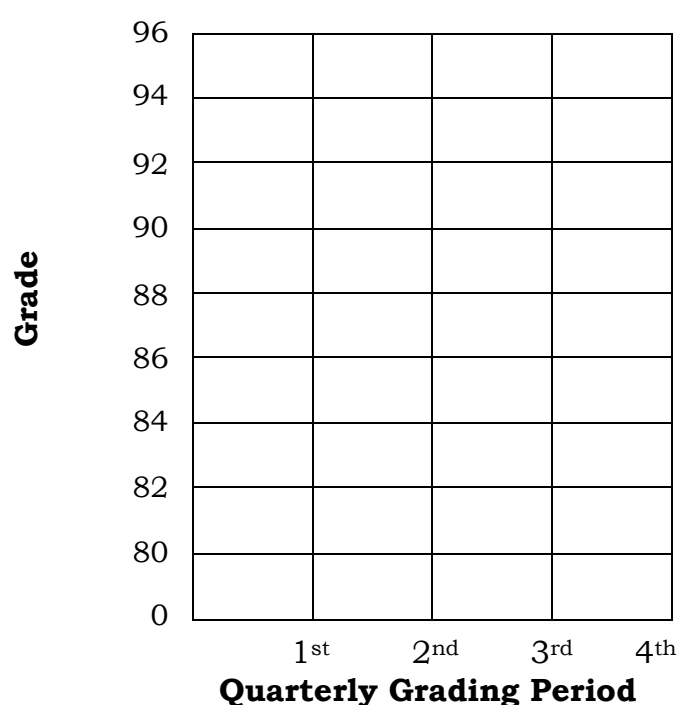
Step 3. Lay out the values of the variables. Lay out the quarters 1st, 2nd, 3rd, and 4th along the x-axis. Given the way the grades are clustered, you may just lay out the values 0 and then 80 to 96 in intervals of 2 along the y-axis. Put the mark "II" between 0 and 80 to indicate a break in the scale. Then, draw a grid with vertical lines and horizontal lines coinciding with the laid-out values of the variables.

Step 4. Plot the points and connect the dots. Plot the points corresponding to the ordered pairs of values of the independent and dependent variables from the table. Then, starting from the origin, connect the dots consecutively from left to right.

20   **CO_Q4_Mathematics 5_ Module 11**
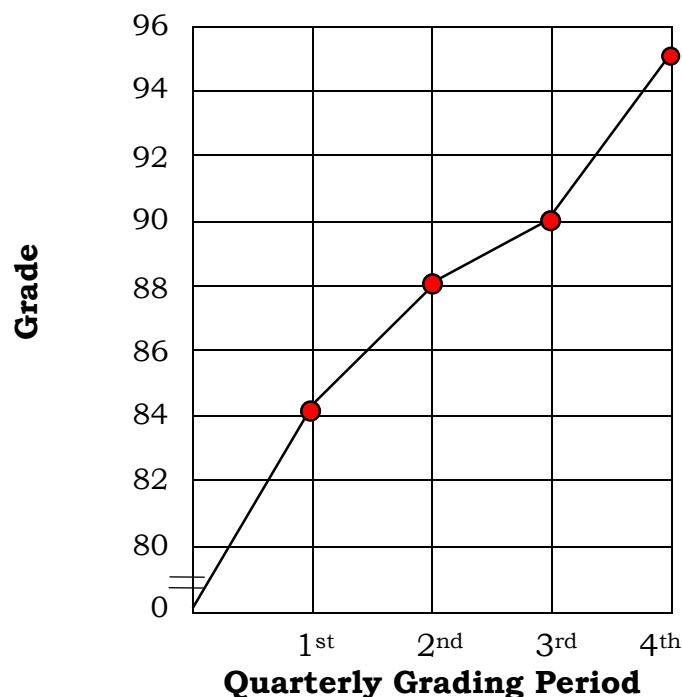
Step 5: **Write an appropriate title above the graph.**

Marjorie's Grade in Mathematics 5 in every Quarter
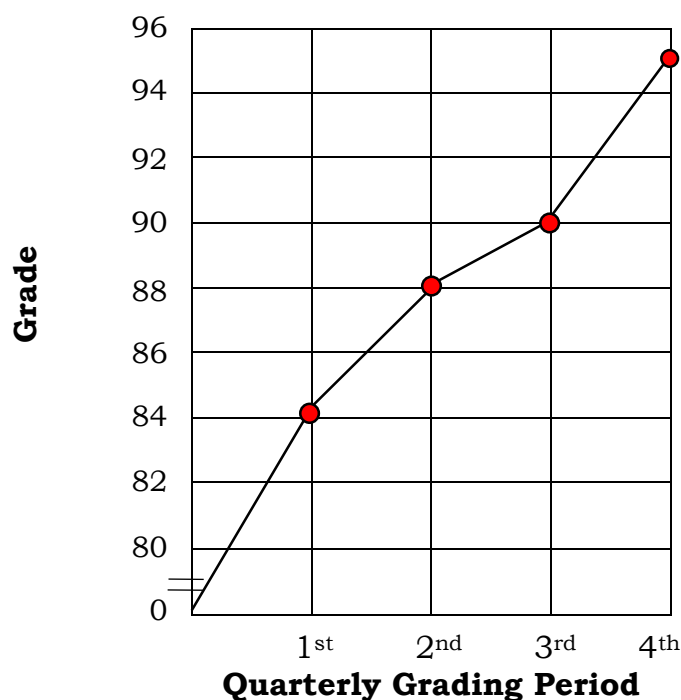
Example 2: Construct a line graph using the data in the table below.

Marbles Collected by the Students

Student	Number of marbles collected
Jelian	20
Marielle	30
Danilo	25
Andrie	35
Matthew	30
Yuan	40

Follow the steps.

Step 1: Determine the independent and dependent variables. The independent variable is "Student e.g. Jelian"; the dependent variable, "Number of Marbles Collected e.g. 20".

Step 2. Draw and label the x and y axes. Draw the x-axis and label it "Student", and the y-axis and label it "Number of Marbles Collected".

21   **CO_Q4_Mathematics 5_ Module 11**
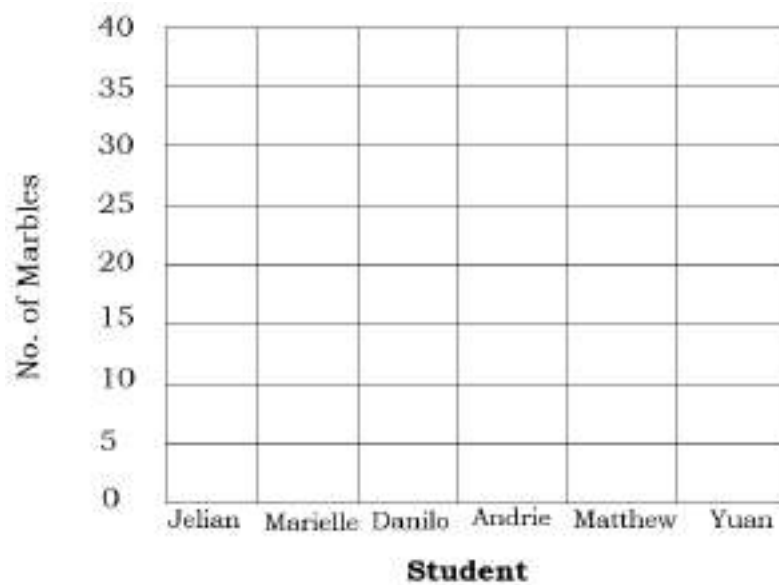
Step 3. Lay out the values of the variables. Lay out the names of the students along the x-axis and the values 0 to 40 in intervals of 5 along the y-axis. Then, draw a grid with vertical lines and horizontal lines coinciding with the laid-out values of the variables.

22   **CO_Q4_Mathematics 5_ Module 11**
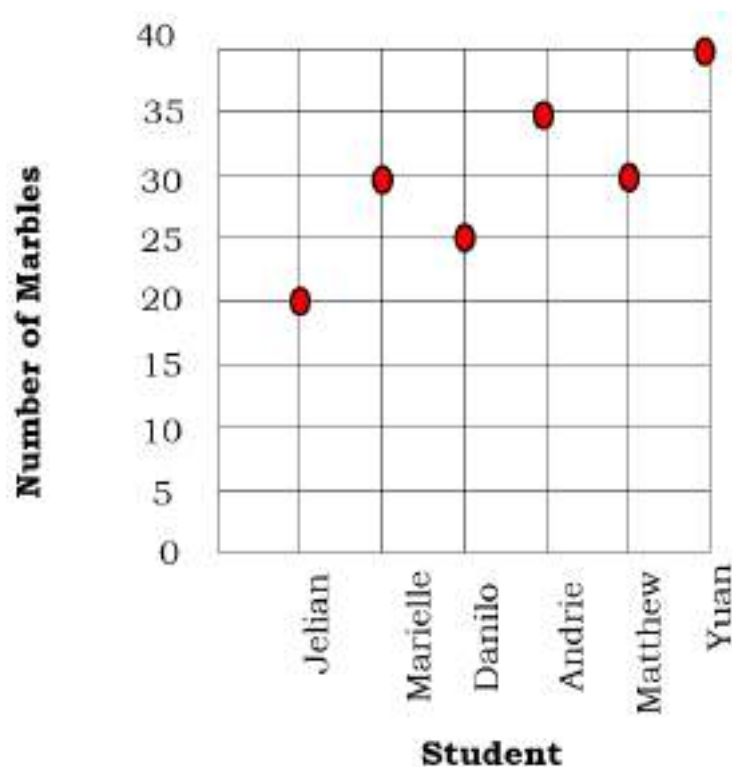
Step 4. Plot the points and connect the dots. Plot the points corresponding to the ordered pairs of values of the independent and dependent variables from the table. Then, starting from the origin, connect the dots consecutively from left to right.
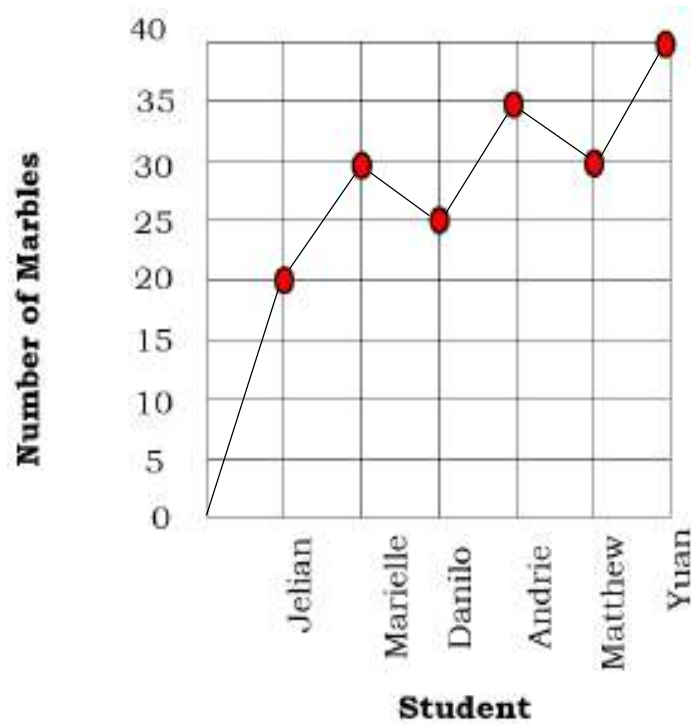
Step 5: **Write an appropriate title above the graph.**

Marbles Collected by the Students

CO_Q4_Mathematics 5_ Module 11
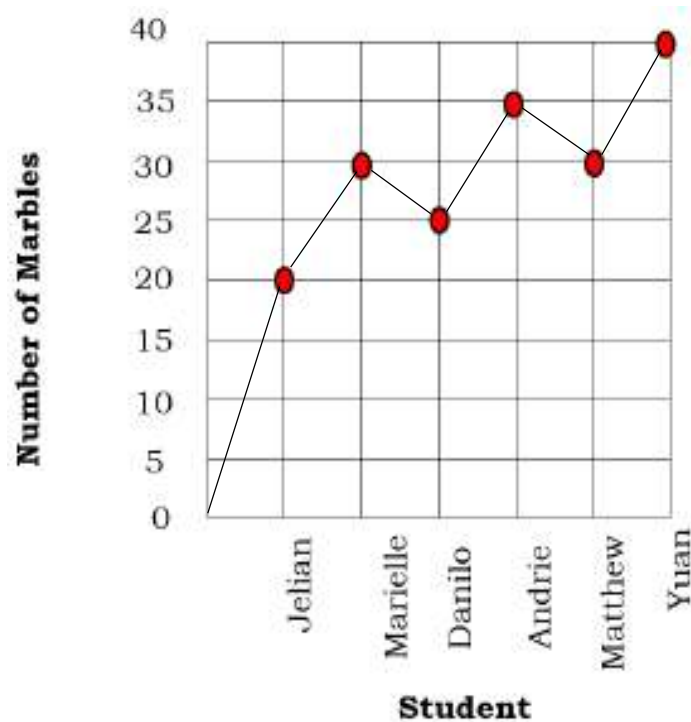
Example 3: Construct a line graph using the data in the table below.

MPB Department Store's Monthly Sales

Month	Sales
March	₱ 20,000
May	₱ 40,000
June	₱ 30,000
July	₱ 35,000
August	₱ 25,000
September	₱ 15,000

Follow the steps.

Step 1: Determine the independent and dependent variables. The independent variable is *Month*; the dependent variable, *Sales*.

Step 2: Draw and label the x and y axes. Label the x-axis "Month" and the y-axis "Sales". Lay out the months March through September along the x-axis and the amounts 0 to 40,000 along the y-axis. We thus have,

CO_Q4_Mathematics 5_ Module 11
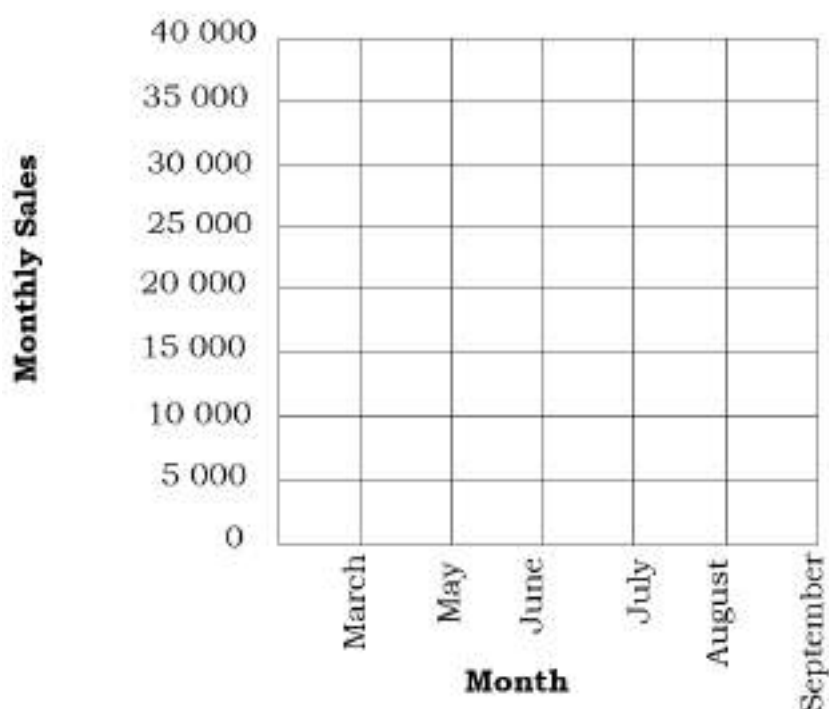
Step 3: **Layout the values of the variables.** Lay out the months along the x-axis and the values 0 to 40 000 in intervals of 5 000 along the y-axis. Then, draw a grid with vertical lines and horizontal lines coinciding with the laid-out values of the variables.

Step 4: **Plot the points and connect the dots.** Plot the points corresponding to the ordered pairs of values of the independent and dependent variables from the table. Then, starting from the origin, connect the dots consecutively from left to right.

CO_Q4_Mathematics 5_ Module 11
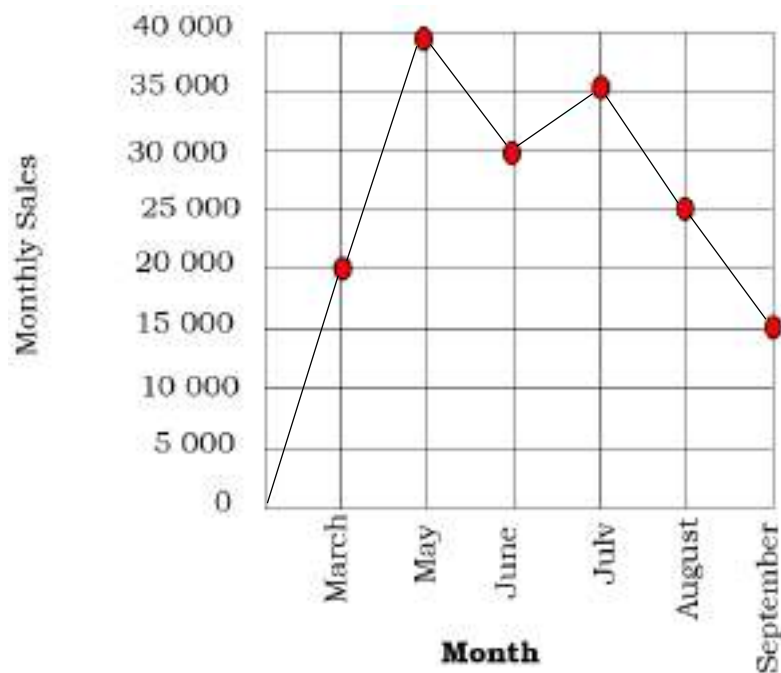
Step 5: **Write an appropriate title above the graph.**

MPB Department Store's Monthly Sales

CO_Q4_Mathematics 5_ Module 11
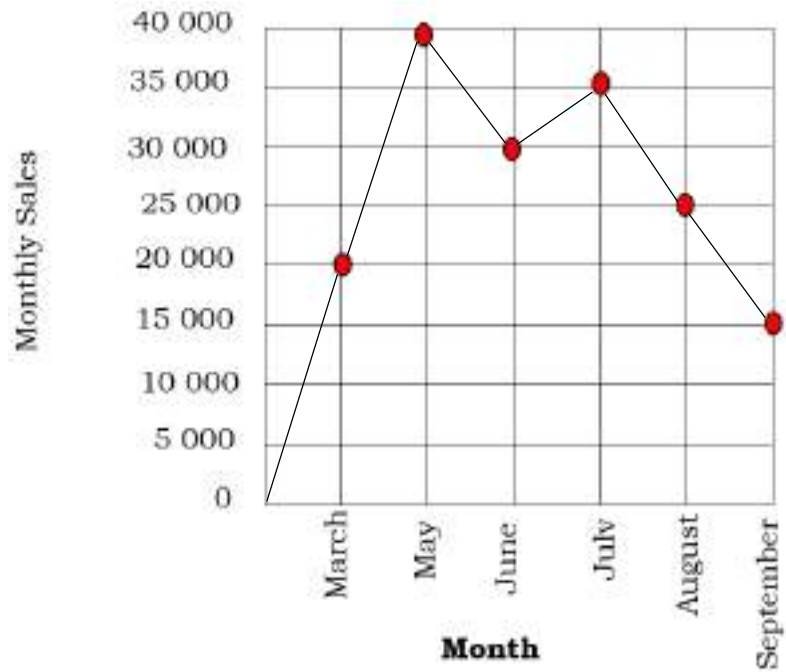
What's More

This time let us find out how well you have understood the topic on presenting organized data in a line graph. You can check your answers with the **Answer Key**.

Exercise No. 1

Directions: Fill in the line graph with the data in the table. Write your answer on a separate sheet of paper.

Neiljan's Weight (January – June, 2021)

Month	Weight (in kg)
January	32
February	33
March	35
April	39
May	41
June	40
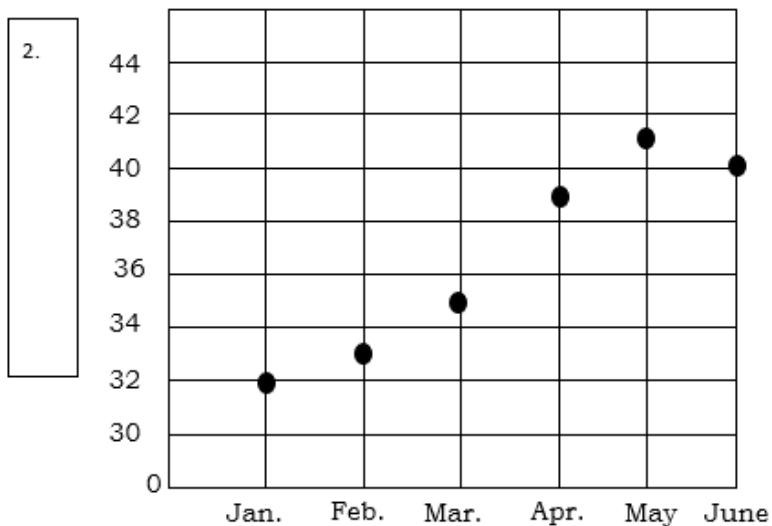
1. Write the title of the graph.
2. Label the y – axis with using the independent variable.
3. Label the x – axis using the dependent variable.
4. The scale/interval used is ____.
5. Connect the points using line segments.

Exercise No.2

Directions: Use the table below to present the data in a line graph. Write your answer on a separate sheet of paper.

Children's Favorite Vegetable	
Vegetable	**Frequency**
Ampalaya	30
Squash	35
Eggplant	40
String beans	20
Okra	15
Upo	10

Exercise No. 3

Directions: Construct line graphs using the data in the tables. Write your answer on a separate sheet of paper. Number 1 is already done to serve as your guide.

1.

| Temperature of the Classroom at each Hour ||
Time	Temperatures
9:00 a.m.	25°C
10:00 a.m.	26°C
11:00 a. m.	27°C
12 :00 noon	29°C
1:00 p.m.	28°C
2:00 p.m.	27°C
3:00 p.m.	26°C
4:00 p.m.	24°C
5:00 p.m.	22°C

Answer:

Temperature of the Classroom at each Hour

CO_Q4_Mathematics 5_ Module 11
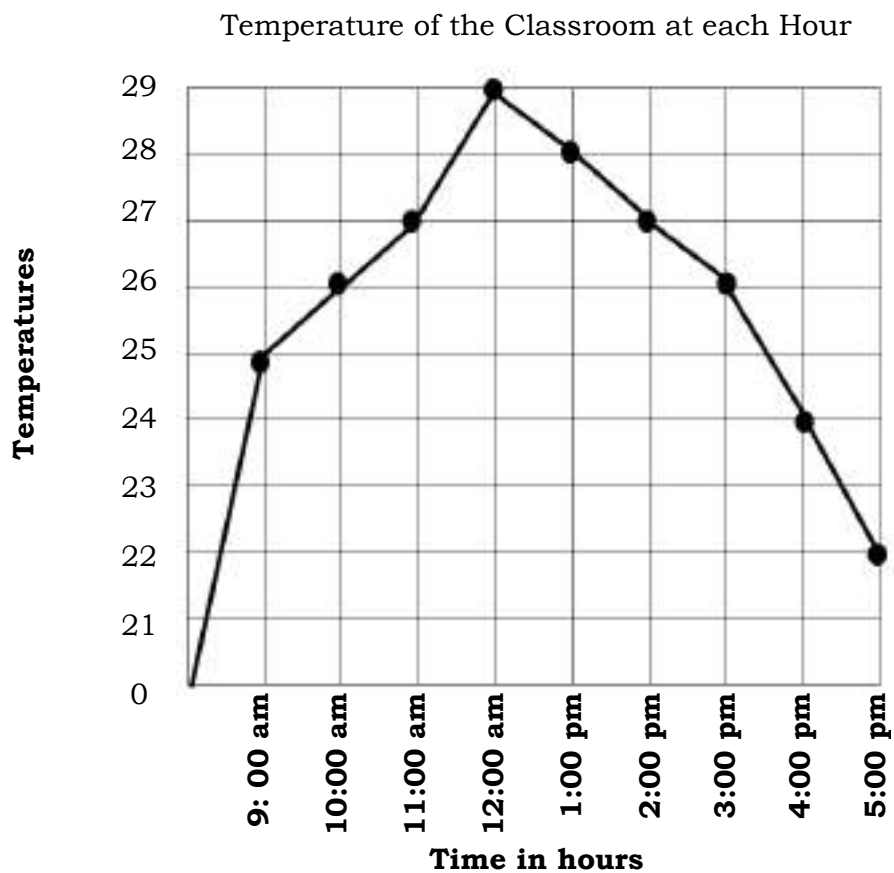
2.

Students Using the Computer Room	
Days	Number of Students
Monday	15
Tuesday	13
Wednesday	10
Thursday	11
Friday	8

3.

Carl's Score in Computer Games	
Games	Scores
1st	5
2nd	10
3rd	10
4th	15
5th	20

CO_Q4_Mathematics 5_ Module 11

What I Have Learned

Based on what you have learned, answer the following questions. Write your answer on a separate sheet of paper.

1. What are the steps in presenting the organized data in a line graph?

Step 1: _____.

Step 2: _____.

Step 3: _____.

Step 4: _____.

Step 5: _____.

2. What other learnings did you get?

I also learned that _____

_____

_____.

What I Can Do

Directions: Using your graphing paper construct a line graph using the data given in the table below. Write your answer on a separate sheet of paper.

Children's Favorite Computer Games

Computer Games	Number of Children
Counter – Strike	15
Left for Dead	20
Book Worm	10
Minecraft	15
Mobile Legends	30
Candy Crush	25

Assessment

Directions: Read each statement carefully. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

The GSP Council joined the Green Movement. They planted seedlings along the highway consisting of 10 ipil-ipil; 15 acacia; 10 lauan; 5 narra and 25 mango.

Seedlings planted by GSP Council

Seedling	Number planted
Ipil – Ipil	10
Acacia	15
Lauan	10
Narra	5
Mango	25

Different Seedlings Planted by the GSP Council
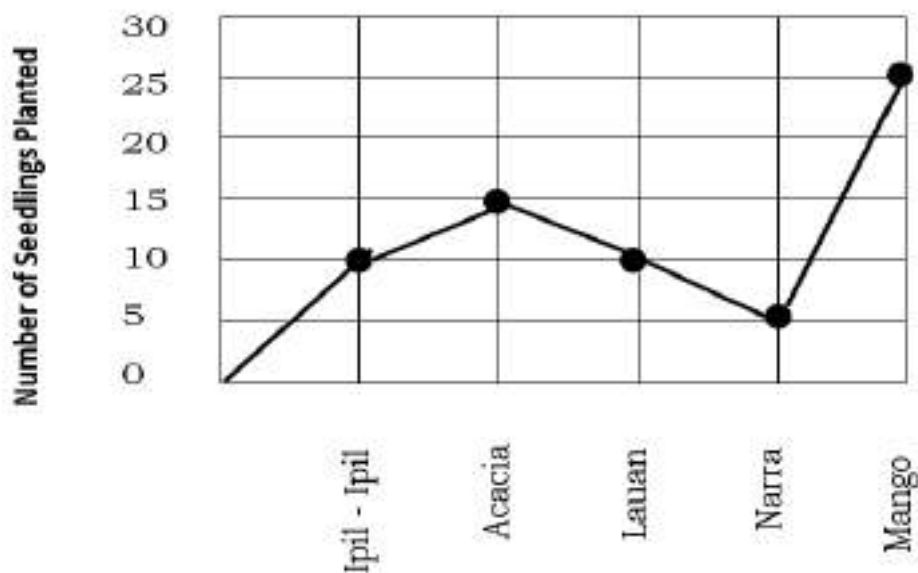
Name of Different Seedlings

1. What kind of graph is shown above?
   A. Bar graph
   B. Pictograph
   C. Pie graph
   D. Line graph

2. What is the graph all about?
   A. Different Seedlings Planted by the GSP Council
   B. Number of Seedlings
   C. Name of Different Seedling
   D. Different Plants

3. What data is represented by the y – axis?
   A. Number of seedlings planted
   B. Number of plants
   C. Number of fruits
   D. Name of Different seedlings

4. What is the independent variable?
   A. Different fruits
   B. Number of fruits
   C. Name of Different Seedlings
   D. Number of seedlings planted

5. What interval was used for the dependent variable values laid out along the
   y – axis?
   A. 5
   B. 10
   C. 15
   D. 20

6. The following statements are all true, EXCEPT.
   A. It is important to organize the data.
   B. The collected data is organized in table form.
   C. It is easy to interpret and analyze the organized data.
   D. It is not important to properly label the rows and columns and the title.

7. How do you connect the points plotted in constructing a line-graph?
   A. Use rays.
   B. Use line segments.
   C. Use a hidden line.
   D. Use broken lines.

8. The following are steps in organizing the data in table form. Which should be the last step?
   A. Make a table.
   B. Write the title above the table.
   C. Determine the different answers.
   D. Make a tally of frequency or number of occurrences of each answer.

9. The points plotted in the line graph correspond to the _____.
   A. kind of seedling and number planted
   B. kind of plant and number planted
   C. kind of fruit and number of fruits
   D. kind of seed and number planted

10. Why is a line graph useful?
    A. It helps one write the data in a line graph.
    B. It helps one read the data in a line graph.
    C. It helps one see the data in a line graph.
    D. It helps one easily and clearly see the changes in the data.

Additional Activities

A. Directions: Construct a line graph based on the data below. Write your answer on a separate sheet of paper.

Monthly Deposit

Months	Deposits
Jan	₱ 800
Feb	₱ 750
March	₱ 500
April	₱ 750
May	₱ 400
June	₱ 350

B. Directions: Study these data. Organize them in table form. Decide what interval to use, then make a line graph. Write your answer on a separate sheet of paper.

The nutritionist made a track of the calories he burned per hour during activities he performed. He wants to organize the data he collected. These are the data: sleeping – 50, skipping rope – 700, aerobics – 450, walking at a normal pace – 250, jogging at 8 kilometers per hour – 500.

C. Chart your own scores in your 5 Math quizzes. Present this data in a line graph.

Answer Key

Lesson 1

What I Have Learned

The steps in organizing the data in tabular form are

Step 1: Make a table

Step 2: Determine the different answers

Step 3: Make a tally of frequency or number of occurrences of each answer.

Step 4: Write the title above the table.

What I Can Do

A.

1.

Grade 5 Students Collected Plastic Bottles for the Recycling Drive

Sections	Number of plastic bottles collected
Bangon Falls	50
Lologayan Falls	100
Pan as Falls	100
Tabokno Falls	150
Ton-ok Falls	200

2.

4 P's Beneficiaries Collected Plastic Wrappers of any Products

Plastic wrappers of any products	Number of plastic wrappers collected
Bangon Falls	50
Lologayan Falls	100
Pan as Falls	100
Tabokno Falls	150
Ton-ok Falls	200

B. Survey

Answers may vary.

What's More

Activity 1. Continuation

1.

Step 1: Make a table

Step 2: Determine the different answers

Days	Temperature
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Step 3: Make a frequency of each range

Days	Temperature
Monday	29°C
Tuesday	28°C
Wednesday	27°C
Thursday	30°C
Friday	32°C
Saturday	26°C
Sunday	31°C

Step 4: Write the title above the table

Temperature for one week

Days	Temperature
Monday	29°C
Tuesday	28°C
Wednesday	27°C
Thursday	30°C
Friday	32°C
Saturday	26°C
Sunday	31°C

What's More

Activity 2. Fill In Me!

1.

Patients entering the school clinic

Gender	Tally	Frequency
Girls	HHH – HHH – IIII	14
Boys	HHH – HHH – I	11

2.

Different Colors of Balloons

Color of Balloon	Tally	No. of Balloons (Frequency)
White	HHH	5
Red	III	3
Orange	HHH – II	7
Blue	IIII	4

Activity 3. Complete Me!

1.

Ages of Grade 5 Students

Ages	Number of Students
12 yrs. old	15
11 yrs. old	25
10 yrs. old	40
9 yrs. old	35

2.

Different Grade Level used the Library

Grade Level	Number of Students
Grade 1	50
Grade 2	70
Grade 3	65
Grade 4	120
Grade 5	135
Grade 6	200
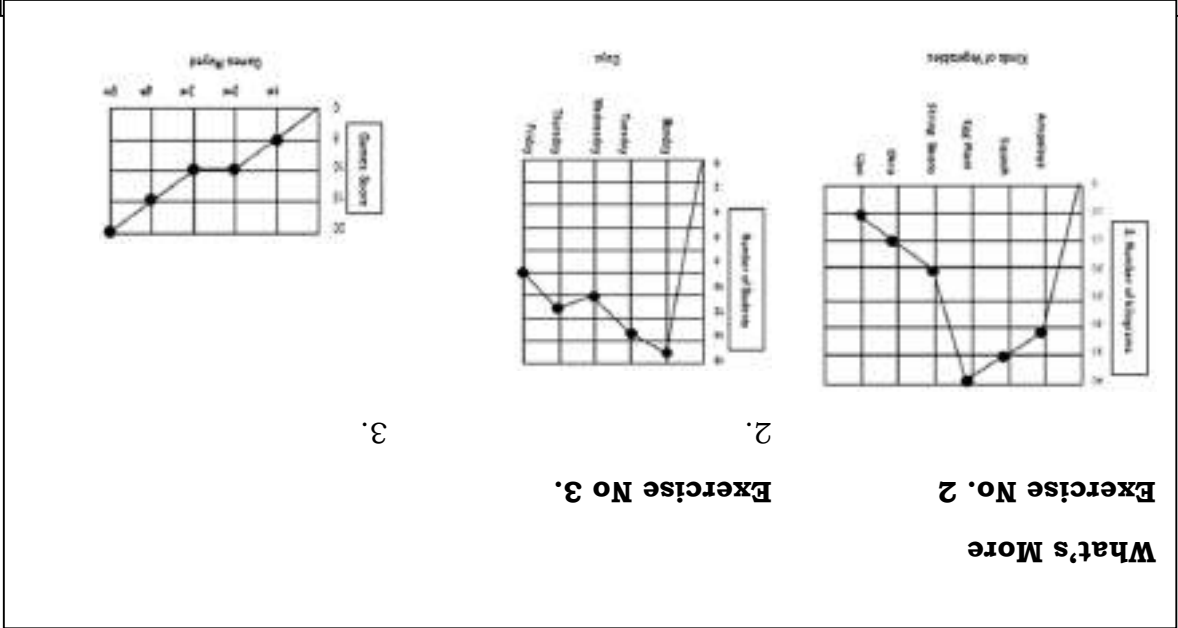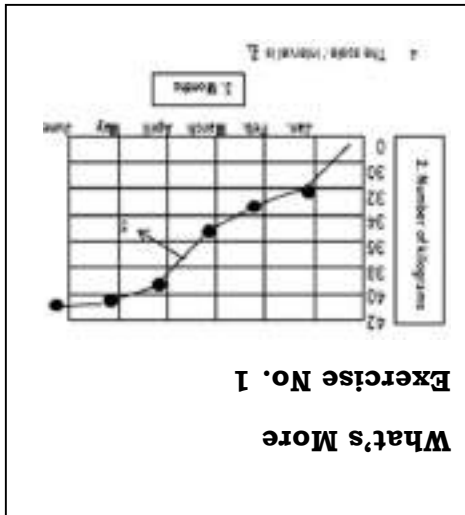
What I Have Learned

1. The steps in presenting the organized data in a line graph are

Step 1: Draw the lines for X-axis and the Y-axis

Step 2: Label the data given on the Y-axis and the X-axis. Compute the range of the data. Decide what interval to use. Begin the scale with O.

Step 3: Plot the corresponding point by drawing a dot to show respective information.

Step 4: Connect the points by a line segment.

Step 5: Write the title on the top of the graph.

2. Note: Students may give varied answer.

What I Can Do

What's More

Exercise No. 2

2.

3.

What's More

Exercise No. 1

References

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Villamor, Adela C., and Amelia C. Celeridad – Wright. 2015. *Math for Life 5*
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DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 4 – Module 12:
Interpreting Data Presented in Different Kinds of Line Graphs (Single and Double-Line Graphs)

ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 12: Interpreting Data Presented in Different Kinds of Line Graphs
(Single and Double-Line Graphs)
First Edition, 2020

5

Mathematics
Quarter 4 – Module 12:
Interpreting Data Presented in Different Kinds of Line Graphs (Single and Double-Line 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

Good day Mathletes! This module was designed and written to help you gain an understanding of and to test your ability in interpreting data presented in different kinds of line graphs. Remember that a line graph is a rectangular coordinate system consisting of the x and y axes.

Line graphs allows us to easily see changes in the values of the variables as well as trends, if there are any.

So, what are you waiting for? Stay focused and go.

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

- identify the kinds of line graphs;
- appreciate the importance of line graph labels; and
- interpret data presented in different kinds of line graphs (single to double-line graph). **(M5SP-IVh-3.5)**

Before going any further, let us check your understanding of and your skills in interpreting data presented in different kinds of line graphs.

What I Know

Directions: Study the graph presented below.

Lito's and Lita's Incomes for the Day from Online Selling
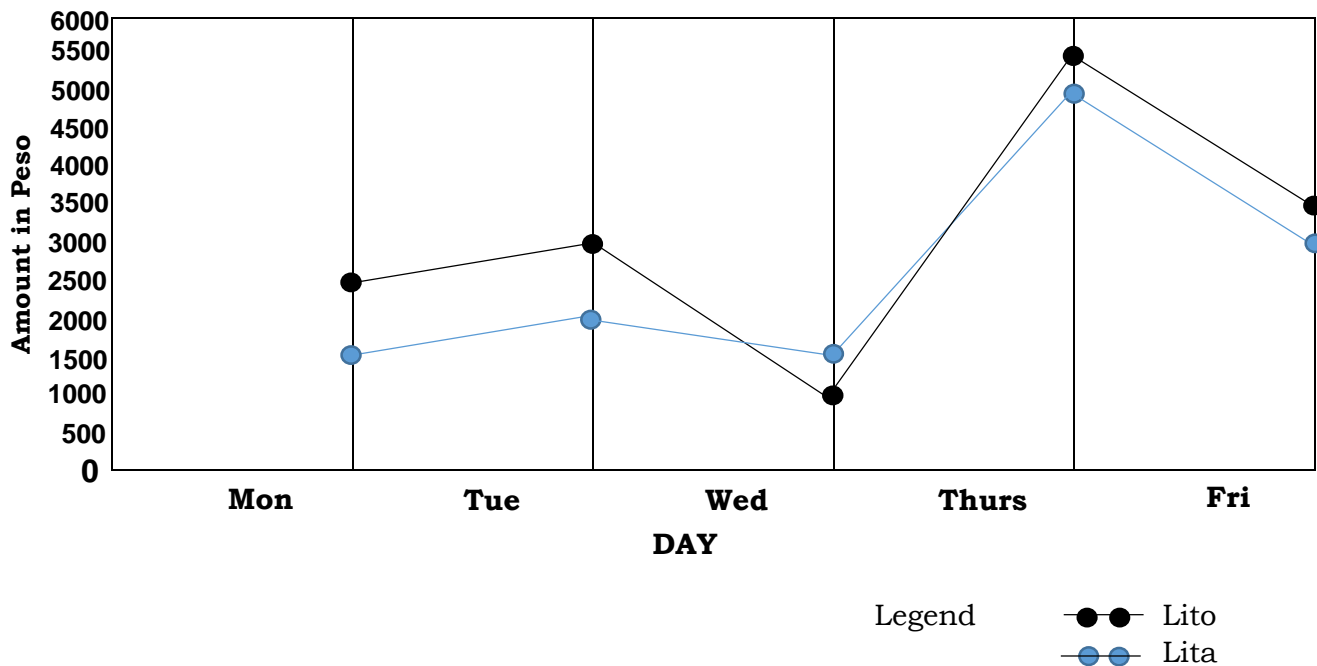
Answer the following questions using the data presented in the graph. Write your answers on a separate sheet of paper.

1. What is the title of the line graph?
   A. Lito's Income for the day from Online Selling
   B. Lita's Income for the day from Online Selling
   C. Lito's and Lita's Income for the day from Online Selling
   D. Lito's and Lita's Income for the day

2. What values are laid out along the y-axis?
   A. amounts in Peso
   B. days of the week
   C. Lito and Lita
   D. daily income

3. What values are laid out along the x-axis?
   A. Days
   B. amounts in Pesos
   C. income
   D. Lito and Lita

4. How many points are plotted in the graph?
   A. 2
   B. 5
   C. 10
   D. 12

5. What kind of graph is shown above?
   A. Bar graph
   B. Single-line graph
   C. Double-line graph
   D. Pictograph

6. What was Lito's lowest income for the day for the five-day period?
   A. ₱ 1,000
   B. ₱ 2,000
   C. ₱ 3,000
   D. ₱ 2,500

7. On which day did Lito earn his highest income for the day for the five-day period?
   A. Wednesday
   B. Thursday
   C. Friday
   D. Tuesday

8. What was Lito's total income for the five-day period?
   A. ₱ 15,000
   B. ₱ 15,500
   C. ₱ 16,000
   D. ₱ 13,000

9. On which day/s did Lita earn the least?
   A. Monday and Tuesday
   B. Monday and Wednesday
   C. Monday and Thursday
   D. Wednesday only

10. What was the total combined income of Lito and Lita for the five-day period?
    A. ₱ 28,500
    B. ₱ 26,000
    C. ₱ 28,000
    D. ₱ 29,000

3

Interpreting Data Presented in Different Kinds of Line Graphs

In order to interpret data presented in different kinds of line graphs, you need to be familiar with the various parts of line graphs – the title, the independent and dependent variables, the labels, and the plotted points. These will help you interpret and analyze the data.

In this module, you will learn how to interpret data presented in different kinds of line graphs. Are you ready?

What's In

In the previous lessons, you learned how to construct-a line graph. Recall the five steps in constructing a line graph. These are:

Step 1. Determine the independent and dependent variables.

Step 2. Draw the x and y axes and label them using the independent variable and dependent variables, respectively.

Step 3. Lay out the values of the independent variable along the x-axis and the values of the dependent variable along the y-axis, and draw the gridlines.

Step 4. Plot and connect the points.

Step 5. Write an appropriate title above the graph.

Let us refresh your memory. Answer the questions in the activity and use the data in the table below to construct a line graph. Write your answers on a separate sheet of paper.

Number of Sunflowers which Bloomed in Rosa's Garden

Week of Blooming	Number of Sunflowers which Bloomed
1	15
2	5
3	40
4	20
5	30

1. The independent variable is "Week of Blooming" and the dependent variable, "Number of Sunflowers which Bloomed".
2. Draw the x and y axes and use the independent and dependent variables to label them respectively.
3. Lay out along the x-axis the weeks in which the sunflowers bloomed – 1, 2, 3, and 4; and along the y-axis, the number of flowers which bloomed. The number of sunflowers which bloomed may indicated in intervals of 5, starting from 0 to 45.
4. Plot the points using the ordered pairs of the independent and dependent variables as coordinates and connect the points using line segments.
5. Write an appropriate title for the graph.

What's New

In the previous activity, Blooming Sunflowers in Rosa's Garden, you learned how to organize data in tables and present them in a line graph.

What if there are also sampaguita plants in Rosa's Garden? How would you present the other set of data in the same set of x and y axes or coordinate system? Do you know that your tabulated data can be presented and interpreted using different kinds of line graphs?

Let us try this next challenge which deals with different kinds of line graphs (single and double-line graphs).

The table below presents the data on flowers which bloomed in Rosa's Garden in particular weeks. Make a double line graph to present the two sets of data - the data showing the number of sunflowers which bloomed in particular weeks, and the number of sampaguita flowers which bloomed in those weeks.

Number of Flowers which bloomed in Rosa's Garden

Week of Blooming	Number of Sunflowers which Bloomed	Number of Sampaguita flowers which Bloomed
1	15	10
2	5	20
3	40	25
4	20	25
5	30	35

In interpreting data presented in line graphs, you have to know what the variables are and understand what they mean or represent.

- The x-axis contains the values of the first or independent variable. Its values may refer to classes or categories, periods of time, etc. In our previous activity about the number of flowers which bloomed in Rosa's Garden, the variable refers to the weeks in which the flowers bloomed.

- The y-axis contains the values of the second or the dependent variable. As you go up the y-axis, the values are increasing. The variable may refer to any type of numerical data such as amounts of money, scores, number of people, temperature, grades etc. In our previous activity about the flowers blooming in Rosa's Garden, it represents the number of flowers which bloomed in a particular week.

Let us go back to the activity about the flowers in Rosa's Garden for us to better understand our lesson on double line graphs We will be constructing line graphs, one for the sunflowers and one for sampaguita flowers. In plotting the points and connecting these with line segments, we will use black for the sunflowers and blue for the sampaguita flowers.

Flowers in Rosa's Garden

Weeks of Blooming	Number of Sunflowers which Bloomed	Number of Sampaguita which Bloomed
1	15	10
2	5	20
3	40	25
4	20	25
5	30	35

To construct a line graph for the data on the sunflowers, start by drawing the x and y axes. Label the x-axis with "Week of Blooming", the independent variable, and the y-axis with "Number of Flowers which Bloomed", the dependent variable.

Next, lay out the numbers 1 to 5 along the x-axis, the week in which the sunflowers bloomed. Then, lay out the numbers 0 to 45 in intervals of 5 along the y-axis.

Draw horizontal lines coinciding with the laid-out values along the y-axis. These lines will serve as guides when we plot the points later on. The pair of axes, properly labeled, with the values of the independent and dependent variables laid out is shown below.

Weeks of Blooming
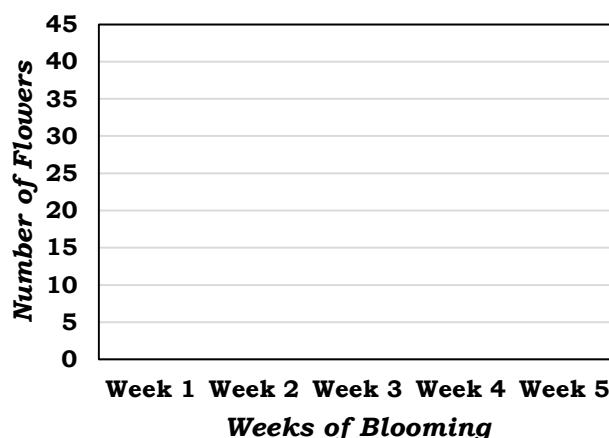
Next, plot the points to represent the data from the table. To do this, and using the data from the table, pair one value of the independent variable with the corresponding value of the dependent variable. You should then have these ordered pairs: (1,15), (2,5), (3,40), (4,20), (5,30). Using these pairs as coordinates, plot the points and connect them consecutively from left to right. The completed line graph is shown below.

Legend:

━━●━━ Number of Sunflower that Bloom

Weeks of Blooming
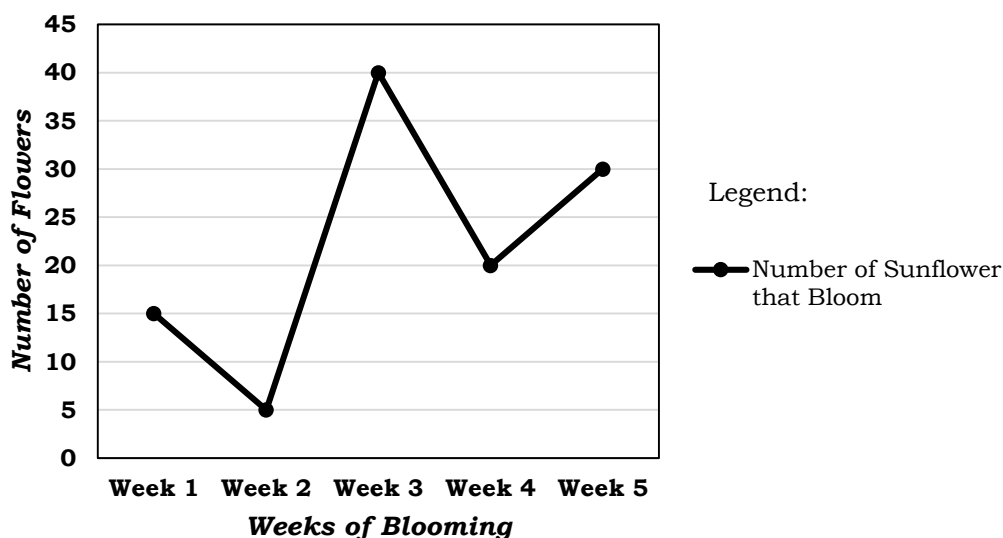
In the same set of axes and following the same steps, make another line graph this time using the data on the number of sampaguita flowers which bloomed during the same 5-week period. Add a legend to inform readers which line graph is for which set of data.

Finally, write an appropriate title for the double-line graph. This final double line graph is shown below.

Flowers in Rosa's Garden
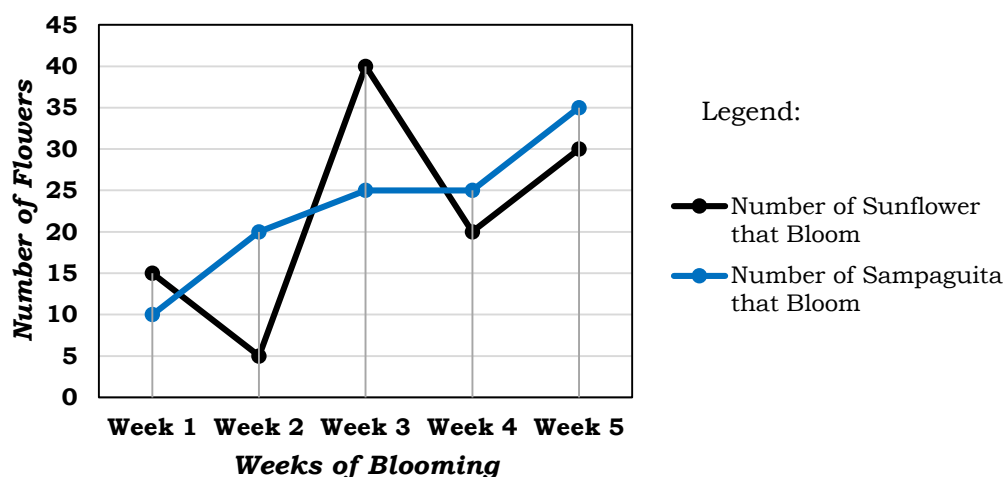
Looking at the graph for the sampaguita flowers, it is easy to see that the number of sampaguita flowers which bloomed was consistently increasing during the 5-week period. The total number of sampaguita flowers which bloomed during the period was 115.

On the other hand, the line graph for the sunflower shows that the number of sunflowers that bloomed peaked or was highest in week 3 From a high of 40 in week 3, it fell to 20 the following week. But it was up again the following week, to 30. The total number of sunflowers which bloomed during the period was 110.

All in all, there were 225 sampaguita flowers and sunflowers which bloomed in Rosa's Garden during the 5-week period.

Let us now try to interpret the data in the next double-line graph.

Pedro and Ana's Expenses in School

CO_Q4_Mathematics 5_ Module 12
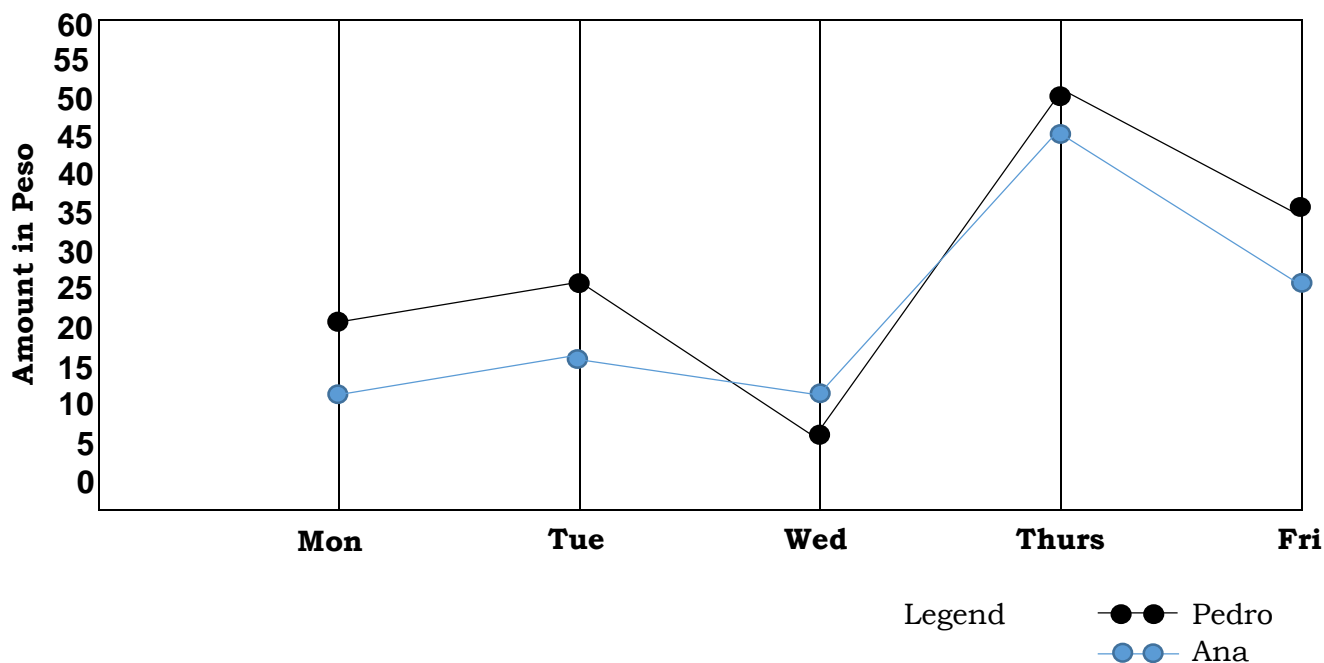
The line graphs show Pedro's and Ana's daily expenses in school. The legend at the bottom right of the line graph tells us that the graph in black refers to Pedro's expenses; the one in blue to Ana's.

Study the double-line graph and answer the following questions.

1. What do you think would be an appropriate title for the graph?

    Based on the given data, "Pedro's and Ana's Daily Expenses in School" would be an appropriate title for the graph.

2. What does the scale in the y-axis represent?

    The y-axis represents the amount of Pedro's and Ana's expenses in school in pesos.

3. On which day/s was Ana's expenses in school higher than Pedro's?

    Ana's expenses in school was higher than Pedro's on Wednesday.

4. What is the difference between their Friday expenses in school?

    The difference between their Friday expenses in school is 10 pesos.

5. Who had less expenses in school for the five days? Explain.

    Ana had less expenses in school than Pedro.

6. What is the difference between their total expenses in school for the five days?

    The difference in their total expenses is 30 pesos.

Solutions for questions 5 and 6

For number 5,

Add all of Pedro's expenses from Monday to Friday

Pedro's total expenses = ₱20 + ₱25 + ₱5 + ₱50 + ₱35 = ₱135

Add all Ana's expenses from Monday to Friday

Ana's total expenses = ₱10 + ₱15 + ₱10 + ₱45 + ₱25 = ₱105

Ana had less expenses compared to Pedro.

For number 6,

Subtract Ana's total expenses from Pedro's

₱135 – ₱105 = ₱ 30

What's More

Activity 1: Interpret Me!

Directions: Interpret and study the graph carefully, then answer the questions that follow. Write your answers on a separate sheet of paper.
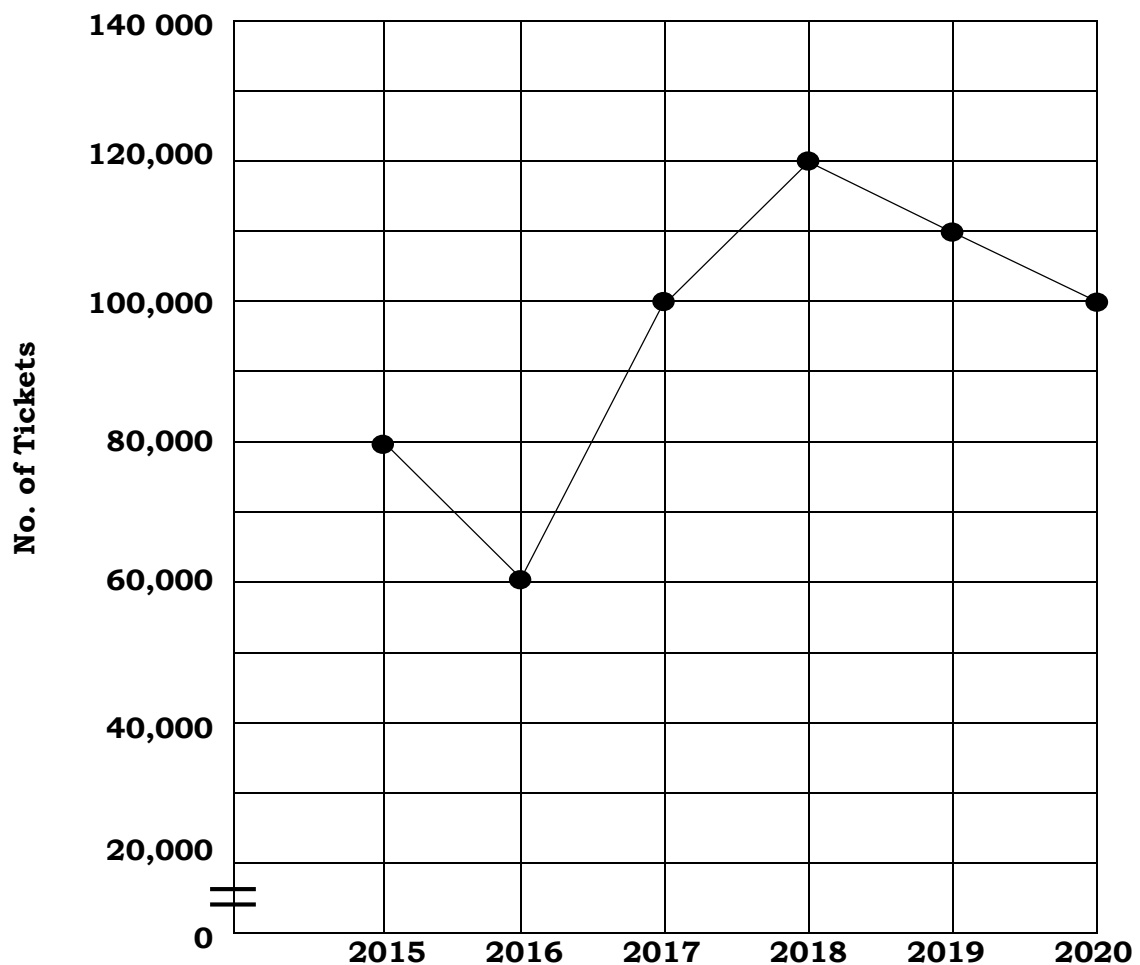
_____1. How many tickets were sold in 2019?

_____2. In what year was the number of tickets sold lowest?

_____3. In what year was the number of tickets sold highest?

_____4. Did the number of tickets sold increase or decrease from 2019 to 2020?

_____5. How many more tickets were sold in 2020 than in 2015?

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Activity 2: Double Check!

Directions: Use the data in the double line graph to answer the questions. Write your answers on a separate sheet of paper.

Nestor's and Alma's Exam Scores
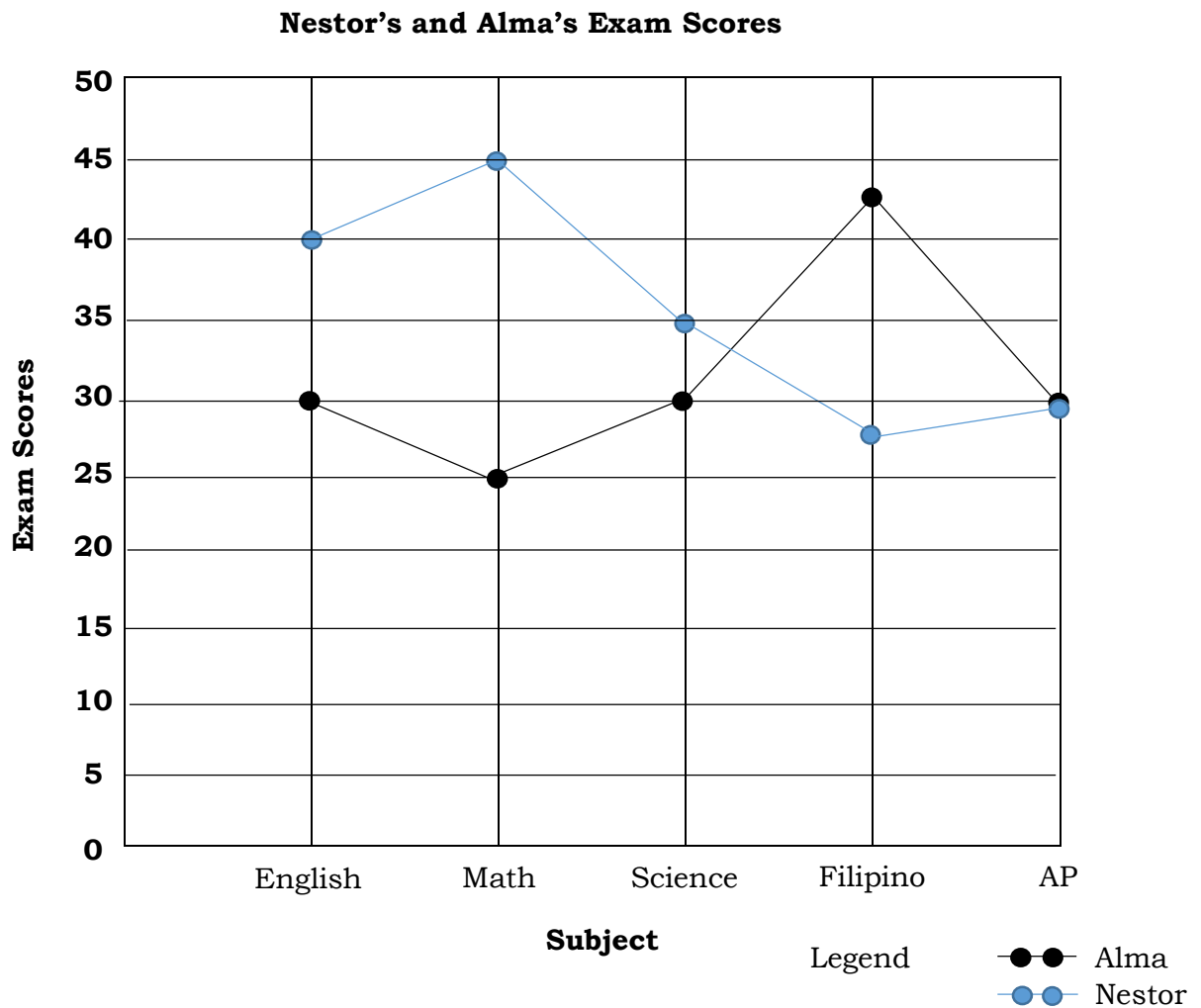
1. What is the graph all about?
2. What do the numbers on the x-axis tell us?
3. In which subject did Nestor and Alma get the same score?
4. In which subject/s did Nestor get higher score/s than Alma?
5. In which subject did Alma get a higher score than Nestor?

Activity 3. Fill It Out

Study the graph below and fill in the blanks. Write your answers on a separate sheet of paper.

Jayson's Quarterly Grades in Mathematics and English
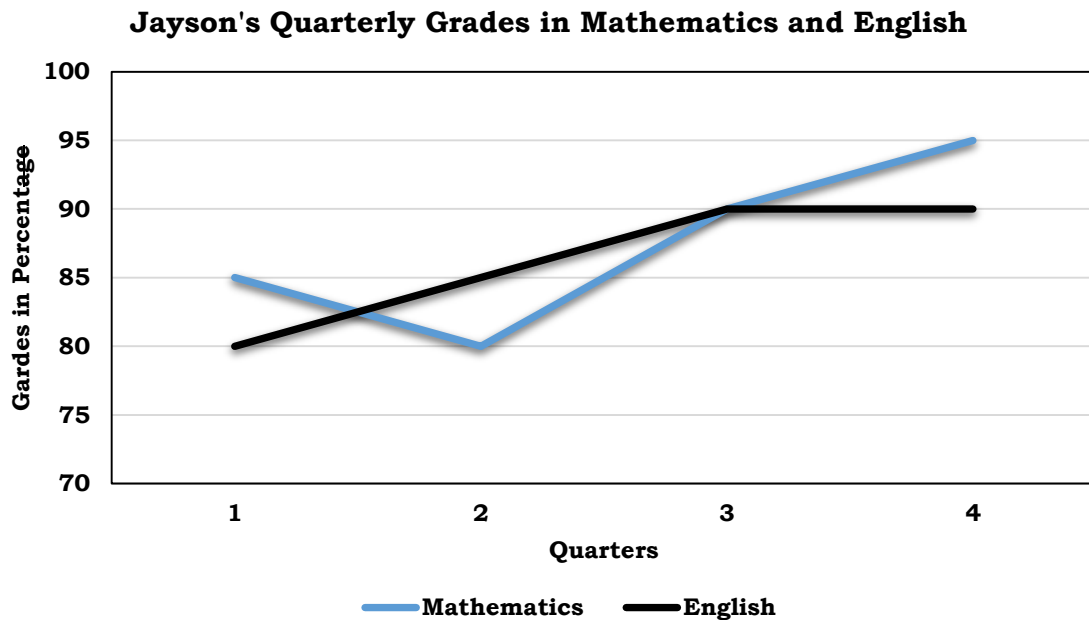
The graph above is all about (1) _____. The data on the y-axis represent the grades in percent–while the data on the x-axis represent the (2) _____.

Jayson's highest grade was (3) _____ percent which he got in the subject (4)_____. In the 4th quarter, his grade in English was (5) _____ percentage points lower than his grade in Mathematics.

What I Have Learned

Fill in the blanks. Write your answers on a separate sheet of paper.

In a line graph, the 1) _____ line or the y-axis shows the values of the second or dependent variable. These values may refer to any type of numerical data such as amounts of money, scores, number of people, temperatures, grades etc.

The 2) _____ line or the x-axis shows the values of the first or the independent variable. These values may refer to categories or classes or points in time, etc.

When a line connecting two points on the line graph is sloping upwards to the right, that indicates that there is an 3) _____ in the value of the dependent variable. When it is sloping downwards to the right, that indicates a 4) _____ in the value of the dependent variable. When it is neither sloping upwards nor sloping downwards, which means it is horizontal, that indicates that there is no change in the value of the dependent variable.

A double line graph uses a 5) _____ to tell the reader which line graph refers to which set of data.

What I Can Do

Directions: Interpret the graph to answer the questions that follow. Write your answers on a separate sheet of paper.

Monthly Average Peso – US Dollar Exchange Rate in 2018
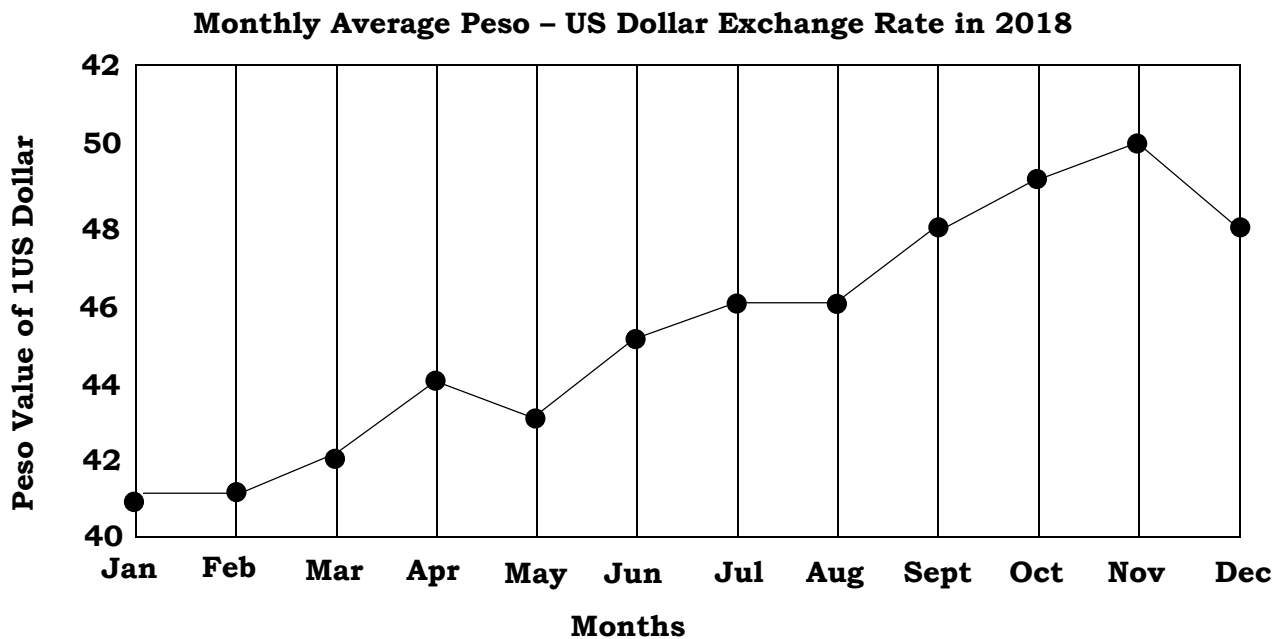
1. What is the graph about?

   _____

2. How much was the least recorded peso value of 1 US dollar?

   _____

3. In what month did the peso have the highest exchange rate?

   _____

4. What was the highest peso value of 1 US dollar during the period?

   _____

5. If your friend had 3 US dollars in April and planned to exchange her dollars for pesos with the money changer in May, what would you have advised him/her then if you knew what would happen?

   _____

CO_Q4_Mathematics 5_ Module 12

Assessment

Directions: Use the data presented in the double-line graph to answer the questions that follow. Choose the letter that corresponds to the best answer. Write answers on a separate sheet of paper.

Mario's and Marta's Weights (2015 – 2019)

Legend   Mario ●●●
          Marta ●●●
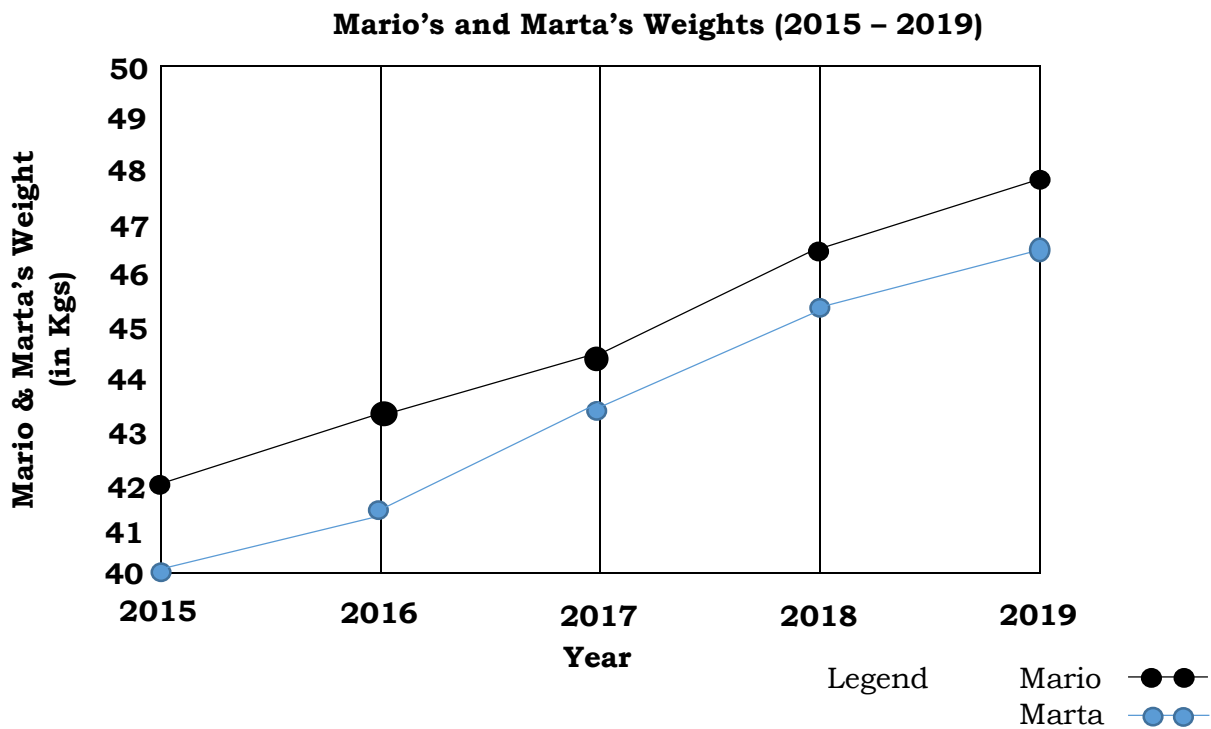
1. What is the title of the graph?
    A. Mario's & Marta's Weights (2015-2019)
    B. Mario's Weights from 2015 to 2019
    C. Marta's Weights (2015-2019)
    D. Weights in 5 years

2. What are being compared in the graphs?
    A. Mario's & Marta's Weights in pounds
    B. Mario's and Marta's Weight in 5 years
    C. Mario & Marta's Weights from 2015-2019
    D. Mario's and Marta's Weights from 2015-2019

3. How many points are in the graph?
    A. 5
    B. 8
    C. 10
    D. 14

4. What is the label of the y-axis?
   A. weight
   B. kilograms
   C. years
   D. height

5. What is the label of the x-axis?
   A. weight
   B. kilograms
   C. year
   D. height

6. How much heavier was Mario in 2019 compared to how he was in 2015?
   A. 5.5 kg
   B. 6.5 kg
   C. 6.0 kg
   D. 6.5 kg

7. How would you describe Mario's weight during the 5-year period?
   A. unchanging
   B. increasing
   C. decreasing
   D. fluctuating

8. Between the two, who was heavier on the average during the five-year period?
   A. Mario
   B. Marta
   C. both
   D. none

9. What was the highest weight recorded by either one during the five-year period?
   A. 50.5
   B. 48.5
   C. 50
   D. 49

10. What was the lowest weight recorded by either one during the five-year period?
    A. 42
    B. 41
    C. 40
    D. 40.5

Additional Activities

You made it! Finally, you're on the last activity. Answer all the questions correctly and you're done with this module!

Directions: Interpret the data presented in the double-line graph and answer the questions that follow. Write your answers on a separate sheet of paper.

Longlong and Dodong's 5-Day Income of Selling Tinapa
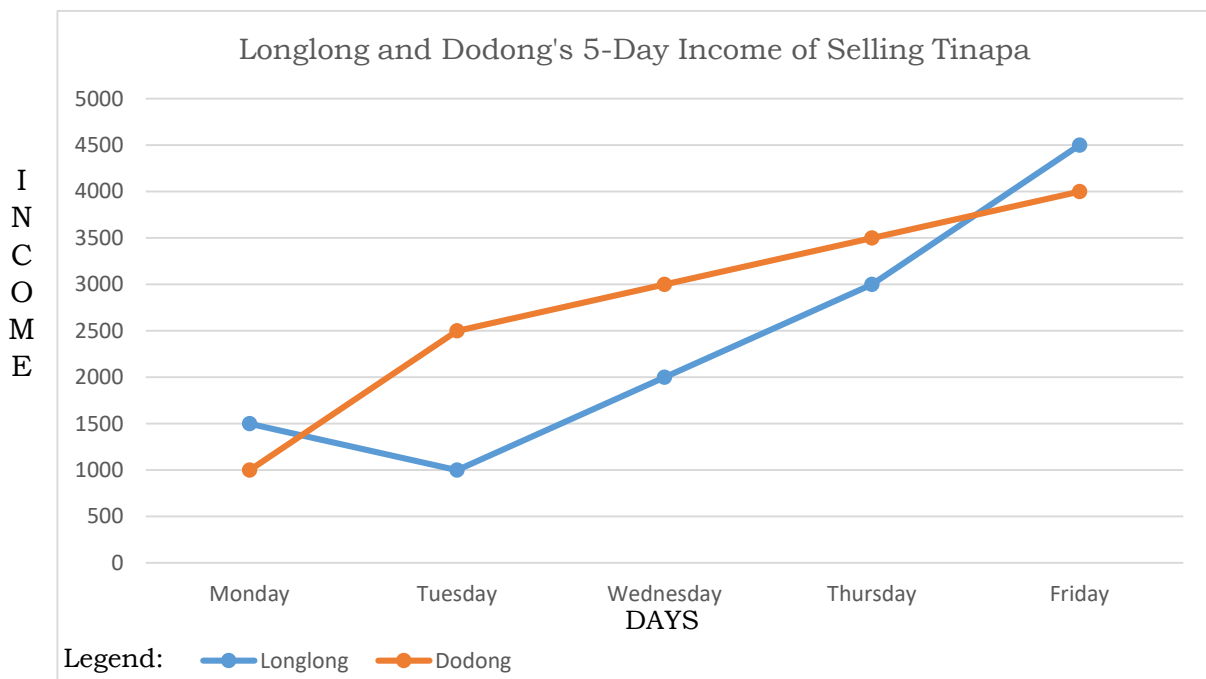
1. What is the double-line graph about?

2. What does the y-axis represent?

3. In which day did Longlong and Dodong earn their highest combined income?

4. What is the difference between their incomes on the fifth day?

5. Who had the higher total income for the period?

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook.* Quezon City: Vibal Group, Inc.

Regional Test Item Bank, *Mathematics 5*

5

Mathematics
Quarter 4 – Module 13:
Solving Routine and Non-Routine Problems Using Data Presented in a Line Graph

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 13: Solving Routine and Non-Routine Problems Using Data Presented in a Line Graph
First Edition, 2020

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Mathematics
Quarter 4 – Module 13:
Solving Routine and
Non-Routine Problems Using
Data Presented in a Line Graph

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 Mathletes!

This module was designed and written to help you gain an understanding of the skills needed in solving routine and non-routine problems using data presented in a line graph. Routine problems are those that may be solved following standard procedures; and non-routine problems are problems that can be solved with some creativity and even without following standard steps or procedure.

So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to be able to solves routine and non-routine problems using data presented in a line graph. (M5SP-IVh-4.5)

Before going any further, let us check your skills in solving routine and non-routine problems using data presented in a line graph.

What I Know

Directions: Solve the problem using data presented in a line graph.

Debbie's class voted on which ice cream flavor was their favorite. The results are presented in the line graph below.

Votes for Favorite Ice Cream Flavor
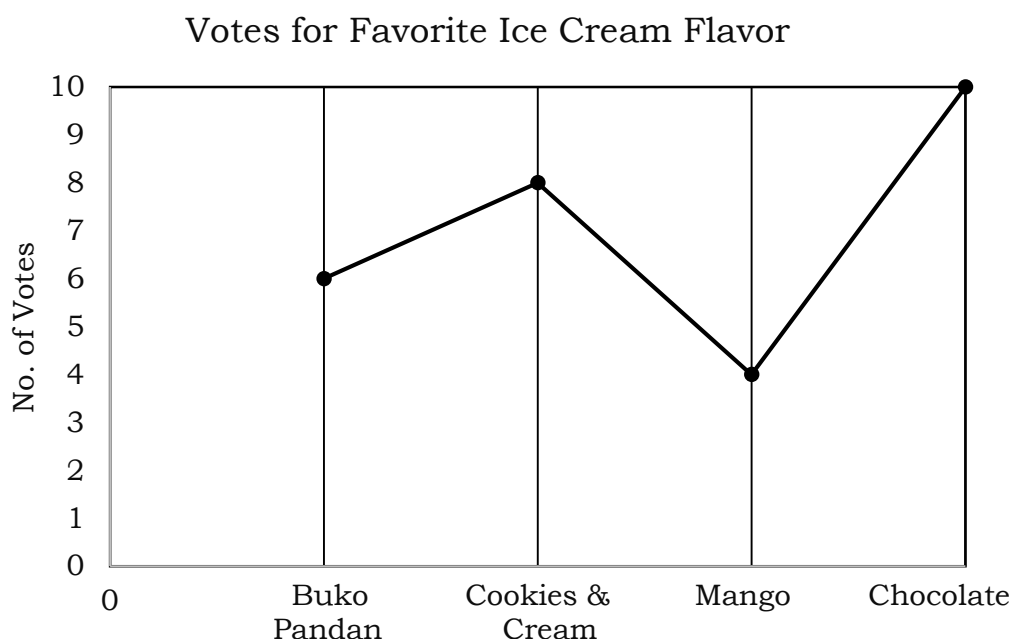
1. What is the problem about?
    a. Debbie's class
    b. Ice cream flavors
    c. The favorite ice cream flavor of Debbie and her classmates
    d. Votes for favorite flavor of ice cream

2. What is the combined number of votes for Mango and Buko Pandan?
    a. 10   b. 12   c.14   d. 16

3. What is the combined number of votes for Buko Pandan and Chocolate?
    a. 14   b. 16   c. 18   d. 20

4. What was the difference between the highest number of votes and the lowest number of votes?
    a. 12   b. 10   c. 8   d. 6

5. What is the average number of votes for the 4 ice cream flavors?
    a. 6   b. 7   c.8   d. 12

6. Which ice cream flavor got the least number of votes?
    a. Buko Pandan
    b. Cookies and Cream
    c. Mango

7. Which ice cream flavor got the most number of votes?
    a. Chocolate   b. Mango   c. Buko   d. Pandan

8. What was the total number of votes?
    a. 28   b. 30   c. 32   d. 42

9. How many more voted Buko Pandan than Cookies and Cream?
    a. 1   b. 2   c. 3   d. 4

10. What is the difference between the number of votes for Cookies and Cream and for Mango?
    a. 4   b.6   c.8   d. 10

Routine problems are solved using a standard set of steps. On the other hand, non-routine problems are solved with some creativity. Whether routine or non-routine, problems are more easily solved when data are presented in a line graph.

In this module, you will learn how to solve routine and non-routine problems using data presented in a line graph. Are you ready?

What's In

In the previous lessons, you learned to read and interpret data presented in a line graph.

The basic elements of the line graph, the title, the column and row headings, the plotted points and the line connecting the points all help us analyze and interpret data. Because line graphs are visual, changes as well as trends are also more easily seen.

Before we proceed, let us refresh your memory. Study the line graph and answer the questions that follow.

Directions: Interpret the data presented in the double-line graph.

Temperatures in Samar and Manila

Legend:
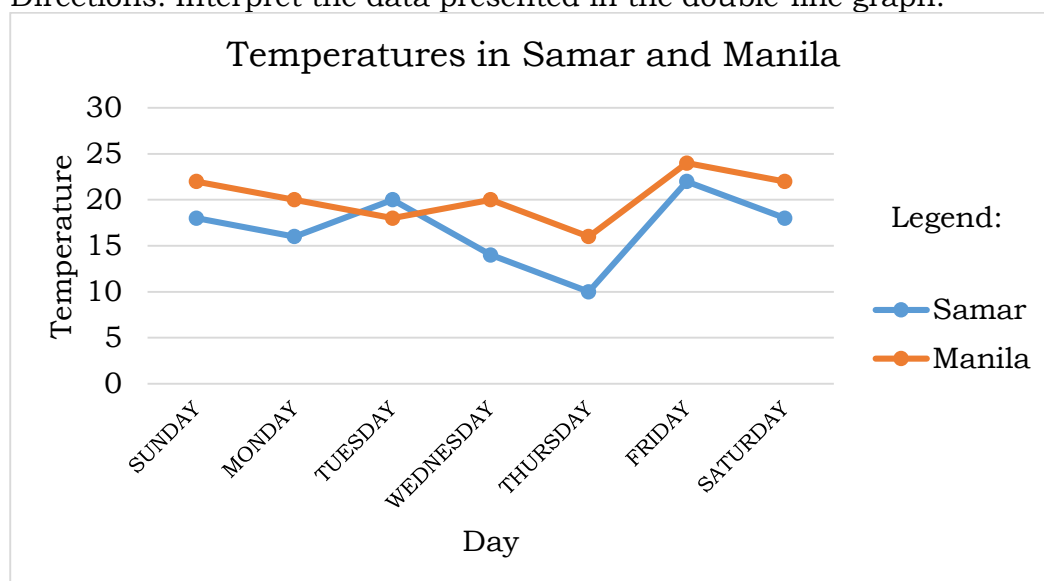
—●— Samar
—●— Manila

1. What is the graph about?

   _____

2. What day had the highest temperature recorded for either Samar or Manila?

   _____

3. What was the lowest temperature recorded in either Samar or Manila?

   _____

4. What was the lowest temperature recorded in Samar?

   _____

5. Which city had the highest temperature recorded for the period?

   _____

What's New

From the previous lesson, you learned how to interpret data presented in either single-line or double-line graphs. In this module, you will learn to solve-routine and non-routine problems using data presented in a line graph.

Study the line graph below.

Mr. Sanchez' Sales

A line graph titled "Mr. Sanchez' Sales" with the vertical axis labeled "Sales in Pesos" ranging from 0 to 45,000 in increments of 5,000, and horizontal axis labeled "Months" showing January, February, March, April, May, June. Plotted points: January 26,000; February 20,000; March 35,000; April 30,000; May 15,000; June 42,000.
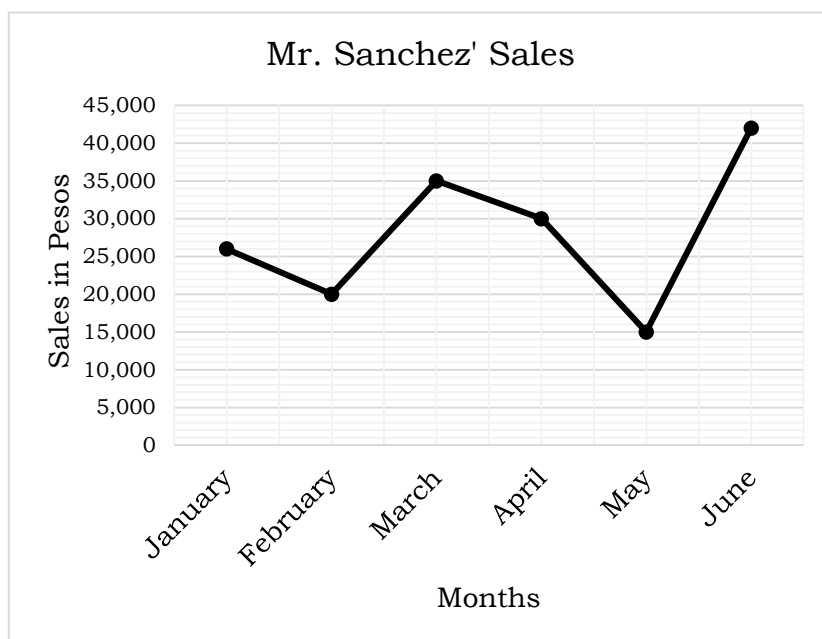
What is It

Before answering questions about the line graph above, recall the steps in the **Four-step plan** in solving problems. These are:

   1) *Understand*: What is the problem asking? What are the given data? What is the word clue?;

   2) *Plan*: What operation is/are to be used? What is the mathematical sentence?;

   3) *Solve*: Solve the problem using the mathematical sentence; and

   4) *Check and Look Back*: Check if the answer is correct and state the final answer.

   Answer the following questions using the data presented in the line graph above.

1. What was the total sales for the first three months?

   Step 1. Understand:
   a. What is asked?
      • Find out *the total sales for the first three*
   b. What facts are needed to solve the problem?

      Sales for the first 3 months:
         January –   Php 26,000
         February-   Php 20,000
         March -   Php 35,000

   After getting the data from the table,

   Step 2. Plan: What strategy can we use to solve the problem? Since the data is asking for the total sales for the first 3 months, we can use *addition.* It is now easy to make the mathematical sentence. We have, Total Sales for the first three months, T,

      T = January sales + February sales + March sales

   Step 3. Solve.
         T = 26,000 + 20,000 + 35,000 = Php 81,000

   Step 4. Check and Look Back.

Example 2: *Let us take a look again at the same line graph.*

Mr. Sanchez' Monthly Sales
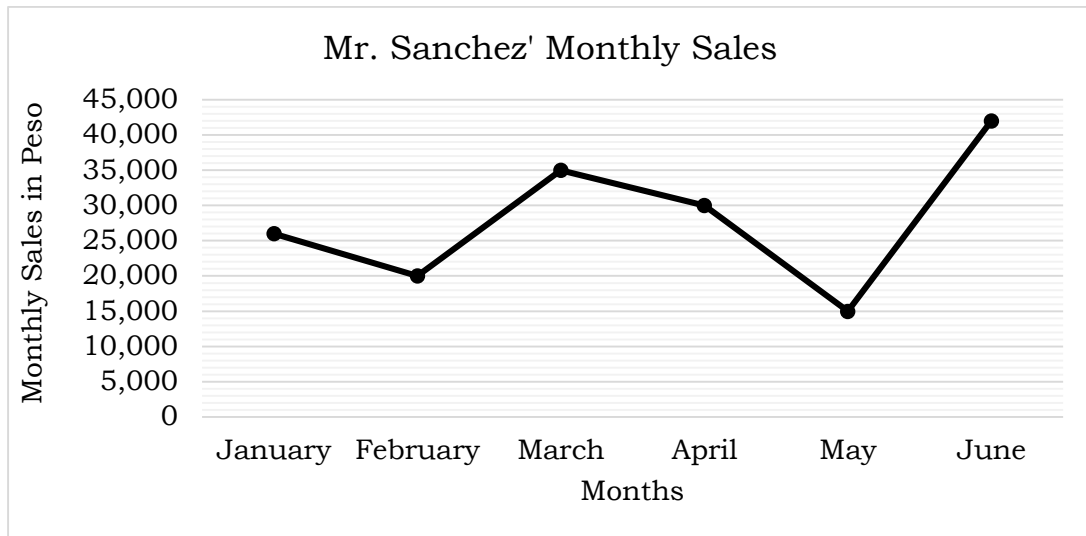
Solve and answer the following questions using the 4-step plan of solving routine and non-routine problems.

1. How much more was Mr. Sanchez's sales in March than his sales in February?
    • What is asked? How much more was Mr. Sanchez's sales in March than his sales in February

    a. What facts are needed to solve the problem?
        1. *Sales for February – Php 20,000*
        2. *Sales for March – Php 35,000*

    b. What operation will be used?
        Subtraction (word clue: how much more)

    c. What is the number sentence?
        By how much was March Sales more than February sales (D)

        D = March Sales – February Sales = Php 35,000 – Php 20,000 = Php 15,000

    d. What is the complete answer?
        35,000 – 20,000 = 15,000

Let us have another example:

Example 3:

What was his total sales from January to June?

    a. What is asked?
        o The total sales from January to June

b. What facts are needed to solve the problem?
    Sales for:

January:	26,000
February:	20,000
March:	35,000
May:	15,000
April:	30,000
June:	42,000

c. What operation will be used?
    o Addition *(word clue: total)*

d. What is the number sentence?
    o 26,000+20,000+35,000+30,000+15,000+42,000 = n

e. What is the complete answer?
    o 26,000+20,000+35,000+30,000+15,000+42,000
       = 168,000

Example 4: (Involves two operations)

What was his average sales for the six-month period?

a. What is asked?
    o The average sales for the six-month period.

b. What facts are needed to solve the problem?
    Sales for:

January:	26,000
February:	20,000
March:	35,000
May:	15,000
April:	30,000
June:	42,000

    January to June is 6 months.

c. What operation will be used?
    Addition and Division

d. What is the number sentence?
    Total Sales T:
    T = 26,000 +20,000 +35,000 + 30,000 + 15,000 + 42,000
    Average for the six months A = T/6

    Solve:
    T = 26,000 +20,000 +35,000 + 30,000 + 15,000 + 42,000
    T = 168,000
    A = T/6 = 168,000/6 = 28,000

![ABC logo] ***What's More***

Activity 1: Follow my Steps!

Directions: Use the information below to solve the problem. Follow the 4-step plan in solving the problem. The first question is done for you to start you off.

> The Grade Five pupils were tasked to collect empty plastic bottles for their fund-raising project. The gathered data of collected bottles by each group for 5 days were presented in the line graph below.

Number of Bottles Collected
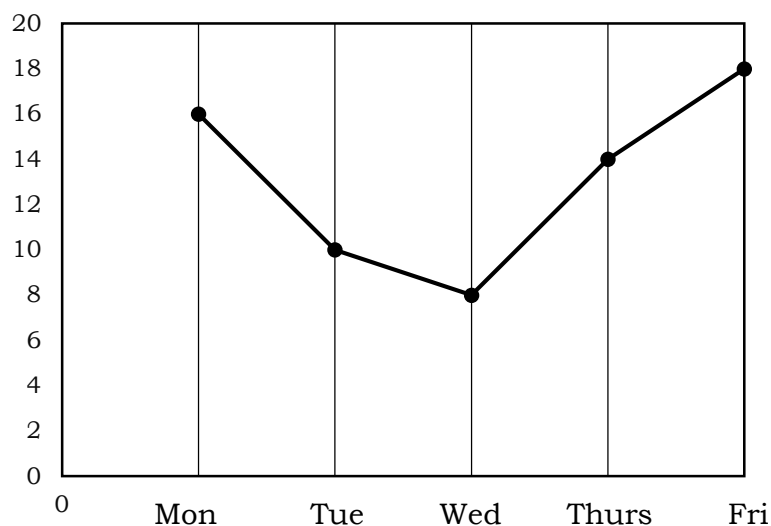
1. How many more plastic bottles were collected on Monday than were collected on Tuesday?

   Step 1: Understand

   a. What is asked?
      How many more plastic bottles were collected on Monday than were collected on Tuesday?

   What are the given data?
      Number of bottles collected on Monday – 17
      Number of bottles collected on Tuesday – 11

   What is the word clue?
      How many more

Step 2: Plan

    a. What operation is/are to be used?

        Subtraction

    b. What is the mathematical sentence?

        n = 17 - 11

Step 3: Solve

What is the complete answer? n = 17 - 11= 6

Step 4: Check

    a. Check if the answer is correct: 6 + 11 = 17

State the final answer:

The number of bottles collected on Monday was 6 more than the number of bottles collected on Tuesday

2. How many plastic bottles all in all were collected on Monday, Tuesday and Wednesday?

Step 1: **Understand**

    a. What is asked? _____

    b. What are the given data? _____

    c. What is the word clue? _____

Step 2: Plan

    a. What operation is/are to be used? _____

    b. What is the mathematical sentence?_____

Step 3: Solve

What is the complete answer? _____

Step 4: Check

    a. Check if the answer is correct: _____

    b. State the final answer: _____

3. What is the difference between the number of plastic bottles collected on Friday and Wednesday?

Step 1: Understand

    a. What is asked? _____

    b. What are the given data? _____

    c. What is the word clue? _____

Step 2: Plan

    a. What operation is/are to be used? _____

    b. What is the mathematical sentence?_____

Step 3: Solve

What is the complete answer? _____

Step 4: Check

    a. Check if the answer is correct: _____

    b. State the final answer: _____

What I Have Learned

A. Fill in the blanks.

Solving routine problems follows a (1) _____ procedures while non-routine problems ca be solved even (2) _____ following standard procedures.

The first step to solve a routine problem is to (3) _____ what does the problem is asking? what are the given data? what is the word clue?

The second step to solve routine problem is to (4) _____ what operation is/are to be used? What is the mathematical sentence?

The third step to solve routine problem is to (5) _____ show how the solution is done using the operation.

And finally, you have to (6) _____ if the answer is correct and state the final answer.

What I Can Do

Congratulations for having reached this far! Let's try some real-life Data presented in a line graph allow us to more easily see changes and trends in the values of variables. There are occasions in our real lives when we have to solve problems using data presented in line graphs. Some of these may be solved using standard procedure or strategies. There are, however, instances when problems may not be solved using these standard strategies. We therefore also need to be familiar with some strategies to solve these non-routine problems.

Directions: Use the data presented in the line graph to solve and answer the questions that follow.

Average Daily Sales at Lorna's Fruit Stall
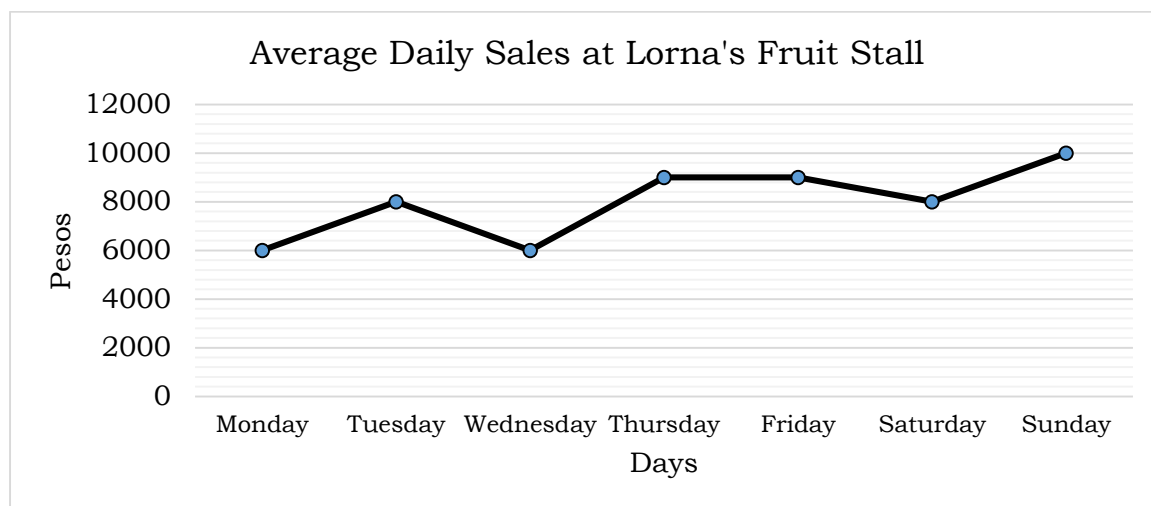
1. What is the total sales at Lorna's Fruit Stall for the whole week?
   a. What is asked?
      _____
   b. What facts are needed to solve the problem?
      _____
   c. What operation will you use?
      _____
   d. What is the number sentence?
      _____
   e. What is the complete answer?
      _____

2. What was the sales for the first 3 days?
   a. What is asked?
   _____
   b. What 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?
   _____

3. What was the total sales from Monday to Saturday?
   a. What is asked?
   _____
   b. What 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?
   _____

4. What was her average daily sales for 7 days?
   a. What is asked?
   _____
   b. What 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?
   _____

Assessment

Directions: Study carefully the line graph below and answer the questions that follow. Choose the letter that corresponds to the best answer.

Amount of Renato's Bank Deposits
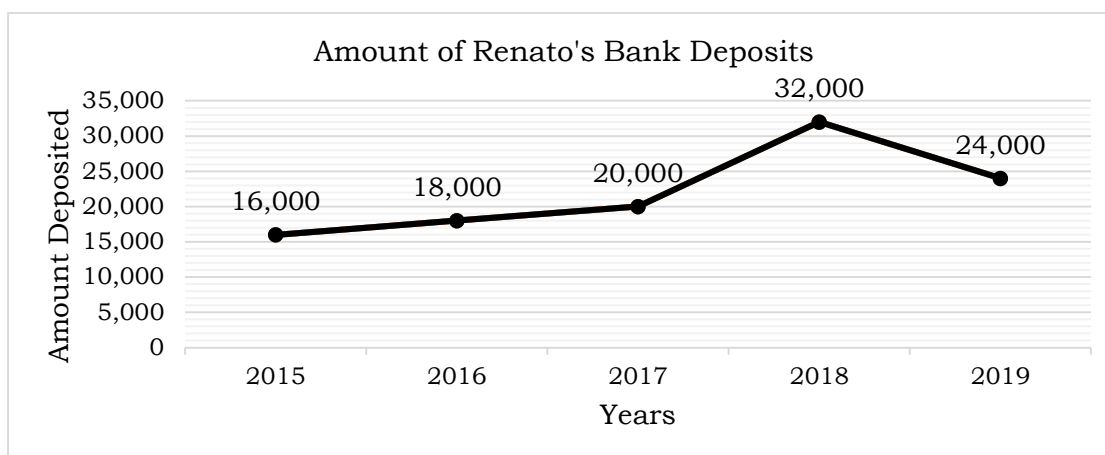
1. How much did Renato deposit for the first 3 years?
    a. 20000, 32000 and 24000
    b. 16000, 18000 and 20000
    c. 16000, 20000 and 24000

2. What is the difference between the lowest and the highest amounts Renato deposited?
    a. 16000   b. 18000   c. 20000

3. How much more did Renato deposit in 2018 than he did in 2019?
    a. 4000   b. 6000   c. 8000

4. What was the total of the 2 lowest amounts Renato deposited?
    a. 32000   b. 34000   c. 36000

5. What was the total amount Renato deposited for the whole 5 years?
    a. 100,000   b. 110,000   c. 112,000

For number 6 -10: What was the average amount he deposited in 5 years?

6. What is asked
    _____

7. What facts are needed to solve the problem?
    _____

8. What operation will you use?
    _____

9. What is the number sentence?
    _____

10. What is the complete answer?
    _____

![Additional Activities icon] *Additional Activities*

You made it! Finally, you're on the last activity. Answer all the questions correctly so you can climb to the top and get your trophy.

Directions: Solve the problem using the data presented in the line graph.

October 4 was the Feast day of St. Francis and the pupils of San Francisco Elementary School were asked to bring their pets to be blessed. The line graph below shows the kinds of animals as well as the number of each kind of animal the pupils brought that day.

Animal Pets to be Blessed

No. of Pets (vertical axis: 0, 20, 40, 60, 80, 100, 120, 140)

DOG 120, CAT 90, BIRD 70, HAMSTER 36, PIG 82, DUCK 68, CHICKEN 112

Name of Animal Pets

—●—Series 1
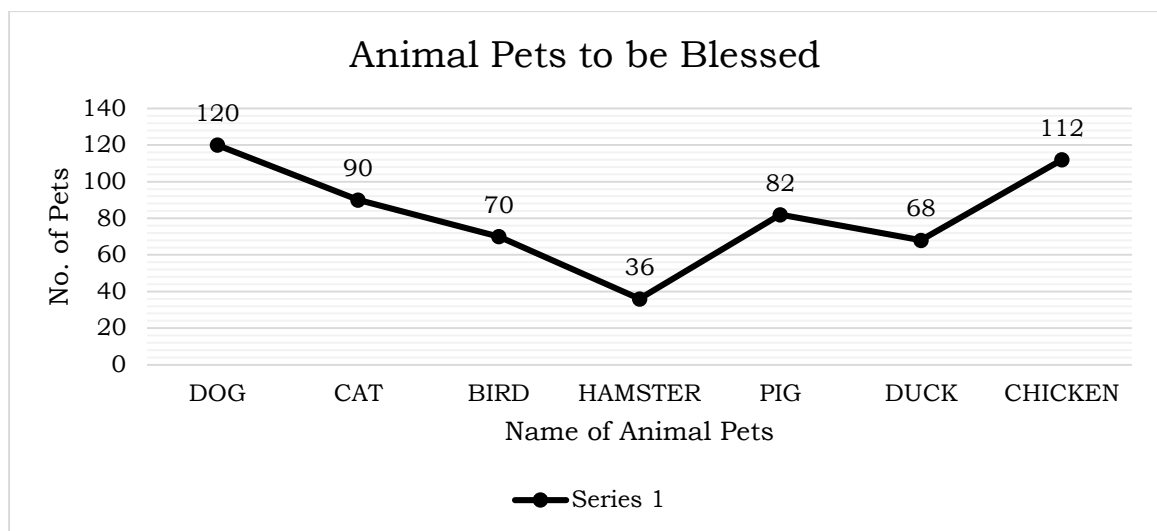
1. How many more dogs than chickens were brought by the pupils to be blessed?
   a. What is asked?
      How many more dogs than chickens were brought by the pupils to be blessed?

      What facts are needed to solve the problem?
      The number of dogs and the number of chickens brought by the pupils.

   b. What operation will you use?
      Subtraction

   c. What is the number sentence?
         d = number of dogs – number of chickens What is the complete answer? n = 120 – 112 = 8

      The pupils brought 8 more dogs than chickens to be blessed on the Feast Day of St. Francis.

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2. What is the total number of animals the pupils brought during the Feast Day?
   a. What is asked?
   _____
   b. What 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?
   _____

Answer Key

Assessment

1. B   2. A   3. C   4. B   5. B

6. the average amount deposited in 5 years

7. Given: 16000 - amount deposited in 2015
18000 - amount deposited in 2016
20000 - amount deposited in 2017
32000 - amount deposited in 2018
24000 - amount deposited in 2019

8. addition and division

9. N = 16000+18000+20000+32000+24000

10. 16000+18000+20000+32000+24000 =
110000

= The average amount deposited in 5 years
is 110000.

Additional Activities

1. The total number of animals brought during Feast day.

2. Given Facts:
120- no. of dogs, 90-no. of cats, 70-no. of birds, 36- no. of hamster, 82- no. of pigs, 68--no. of ducks, 112- no. of chickens

3. Addition

4. N = 120+90+70+36+82+68+112

5. 120+90+70+36+82+68+112=578

The total number of animals brought during Feast day is 578.

What I Can Do

1. a. The total sales at Lorna's Fruit Stall for the whole week.
b. 6000 sales on Monday
8000 sales on Tuesday
6000 sales on Wednesday
9500 sales on Thursday
9500 sales on Friday
6000 sales on Saturday
10,000 sales on Sunday
c. Addition
d. N = 6000 + 8000 + 6000 + 9500 + 9500 + 6000 + 10000
e. 6000 + 8000 + 6000 + 9500 + 9500 + 6000 + 10000 = 55000

The total sales Lorna's Fruit Stall for the whole week is 55000.

2. a. The total sales at Lorna's Fruit Stall for the first 3 days.
b. 6000 sales on Monday
8000 sales on Tuesday
6000 sales on Wednesday
c. Addition
d. N = 6000 + 8000 + 6000
e. 6000 + 8000 + 6000 = 20000

The total sales Lorna's Fruit Stall for the first 3 days is 20000.

3. a. The total sales at Lorna's Fruit Stall from Monday to Saturday.
b. 6000 sales on Monday
8000 sales on Tuesday
6000 sales on Wednesday
9500 sales on Thursday
9500 sales on Friday
6000 sales on Saturday
c. Addition
d. N = 6000 + 8000 + 6000 + 9500 + 9500 + 6000
e. 6000 + 8000 + 6000 + 9500 + 9500 + 6000 = 45000

The total sales Lorna's Fruit Stall from Monday to Saturday is 45000.

4. a. The average daily sales at Lorna's Fruit Stall for 7 days.
b. 6000 sales on Monday
8000 sales on Tuesday
6000 sales on Wednesday
9500 sales on Thursday
9500 sales on Friday
6000 sales on Saturday
10000 sales on Sunday
c. Addition and Division
d. N = 6000 + 8000 + 6000 + 9500 + 9500 + 6000 + 10000 ÷ 7
e. 6000 + 8000 + 6000 + 9500 + 9500 + 6000 + 10000 = 55000
55000 ÷ 7 = 7857.14

The average daily sales at Lorna's Fruit Stall for 7 days is 7857.14

What I Have Learned

A.
1. standard
2. without
3. Understand
4. Plan
5. Solve
6. Check and Look back

What's More

Activity 1: Follow My Steps!

1. UNDERSTAND:
a. The total no. of plastic bottles collected on Monday, Tuesday, and Wednesday
b. Given Facts:
17- plastic bottles on Monday
11- plastic bottles on Tuesday
9- plastic bottles on Wednesday
c. word clue: how many
PLAN:
a. Addition
b. N = 17 + 11 + 9
SOLVE: 17 + 11 + 9 = 37
State your answer: The total number of plastic bottles collected on Monday, Tuesday and Wednesday is 37.

2. UNDERSTAND:
a. The difference in the number of plastic bottles collected on Friday and Wednesday
b. Given:
19 - plastic bottles collected on Friday
9 - plastic bottles collected on Wednesday
c. difference

PLAN:
a. Subtraction
b. N = 19 - 9
SOLVE: 19 - 9 = 10
CHECK:
a. 10+9=19
b. The difference in the number of plastic bottles collected on Friday and Wednesday is 10 bottles.

3. UNDERSTAND:
a. The total number of plastic bottles collected in 5 days
b. Given:
17 - plastic bottles collected on Monday
11 - plastic bottles collected on Tues.
9 - plastic bottles collected on Wed.
15 - plastic bottles collected on Thurs.
19 - plastic bottles collected on Friday
c. Total number
PLAN:
a. Addition
b. N = 17+11+9+15+19
SOLVE: 17+11+9+15+19 = 71
The total number of plastic bottles collected in 5 days is 71.

What I Know
1. C
2. B
3. B
4. A
5. B
6. C
7. A
8. A
9. B
10. A

What's In
1. Daily Temperature in Samar and Manila
2. Friday
3. 10
4. 10
5. Manila

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

Mathematics

Quarter 4 – Module 14:
Drawing Inferences Based on the Data Presented in a Line Graph

ALTERNATIVE DELIVERY MODE

ADM

5

Mathematics

**Quarter 4 – Module 14:
Drawing Inferences Based on the
Data Presented in a Line Graph**

DepED

DEPARTMENT OF EDUCATION

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 Mathletes!

   This module was designed and written to help you gain understanding and test your ability in drawing inferences based on the data presented in a line graph. We knew that a line graph is a kind of graph which presents data or information gathered and points were connected with line segment. Drawing inferences from line graph can give information both directly and indirectly. In other words, readers sometimes may have to make inferences or draw conclusions based on the data given.

   Knowing how to draw inferences based on the data presented in a line graph and how to use them in real-life situations is important, especially in decision making on what will we do next and what will be happen before or after the event based on the gathered data or information. So, what are you waiting for? Stay focused and start-up.

   At the end of this module, you are expected to:

   • draw inferences based on the data presented in a line graph.

   Before going any further, let us check your understanding about drawing inferences based on the data presented in a line graph.

What I Know

Directions: For numbers 1-5, draw inferences based on the data presented. On your answer sheet, select the best answer of your choice.
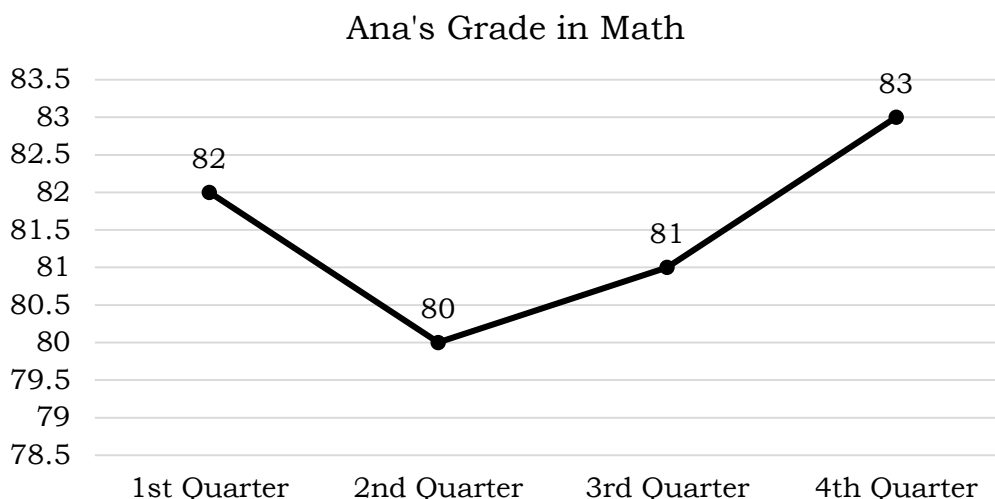
Ana's Grade in Math

1. Why do you think Ana got the highest grade in Mathematics during the fourth quarter?
   a. She studied hard.   b. She didn't study.
   b. She is good in English.   d. She got a new notebook.

2. Why do you think Ana got the lowest grade in the second quarter?
   a. She did not study before taking the test.
   b. She read math books.
   c. She practiced good study habits.
   d. She answered all the items in the test.

3. In what quarter Ana got the highest grade in Math?
   a.   1st   b. 2nd   c. 3rd   d. 4th

4. How many points was the increased of grades in the 3rd to 4th quarters?
   a. There was a 2 points difference.
   b. There was s three points difference.
   c. There was no difference.
   d. Can't be determined.

5. In what quarter did Ana got the lowest grade in Math?
   a. 1st   b. 2nd   c. 3rd   d. 4th

For numbers 6-10, please refer to the graph below.
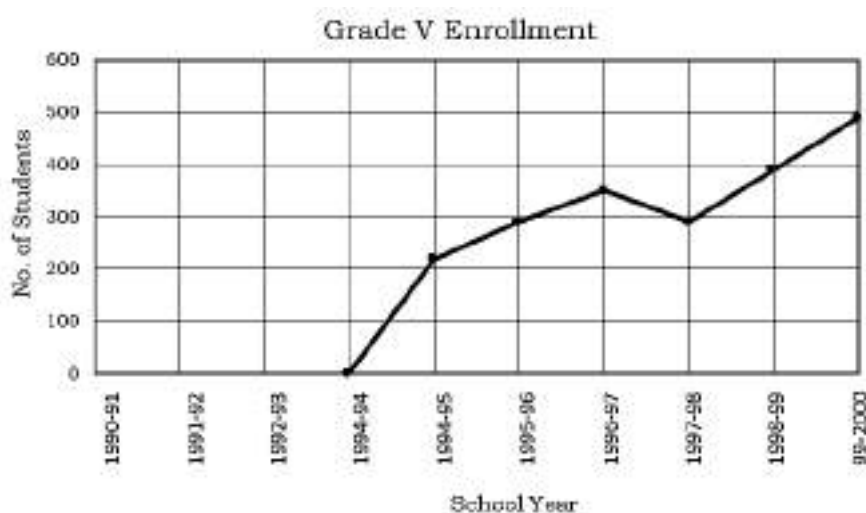
Grade V Enrollment

6. What school year has the lowest enrollment?
   a. 1999-2000   b. 1998-1999
   b. 1995-1996   d. 1993-1994

7. What school year has the highest enrollment?
   a. 1999-2000   b. 1998-1999
   b. 1995-1996   d. 1993-1994

8. How many grade V students enrolled in the year 1996-1997?
   a. 300   b. 400   c. 350   d. 375

9. In what year that the enrollment of grade v students almost 400?
   a. 1999-2000   c. 1998-1999
   b. 1997-1998   d.1993-1994

10. Which of the following is the best reason for the decrease in the enrollment?
    a. transfer to other school   c. applied for work.
    b. did not go to school   d. work in the city

CO_Q4_Mathematics 5_ Module 14

<table>
<tr><td>**Lesson**
1</td><td># Drawing Inferences About the Data Presented in a Line Graph</td></tr>
</table>

In order to draw inferences based on the data presented in a line graph, you need to master knowledge and understanding about line graph and the skills on interpreting data presented in it. In this module, you will learn how to draw inferences based on the data presented in a line graph. Are you ready?

What's In

In the previous lessons, you were able to learn the concept of interpreting data presented in different kinds of line graphs. Recalling, a line graph has a vertical line called the y-axis and a horizontal line called x-axis. In a line graph, a line that goes up means an increase, and a line that goes down means a decrease. The increase and decrease in the graph can be used to determine the change in a quantity over a period of time.

Also, you have learned on how to solve routine and non-routine problems using data presented in a line graph.

Let us refresh your memory and try to answer the data presented below.

Below is a line graph showing Sally's deposit in five months. Read and analyze the graph and answer the questions that follow:

Sally's saving deposits in Five Months
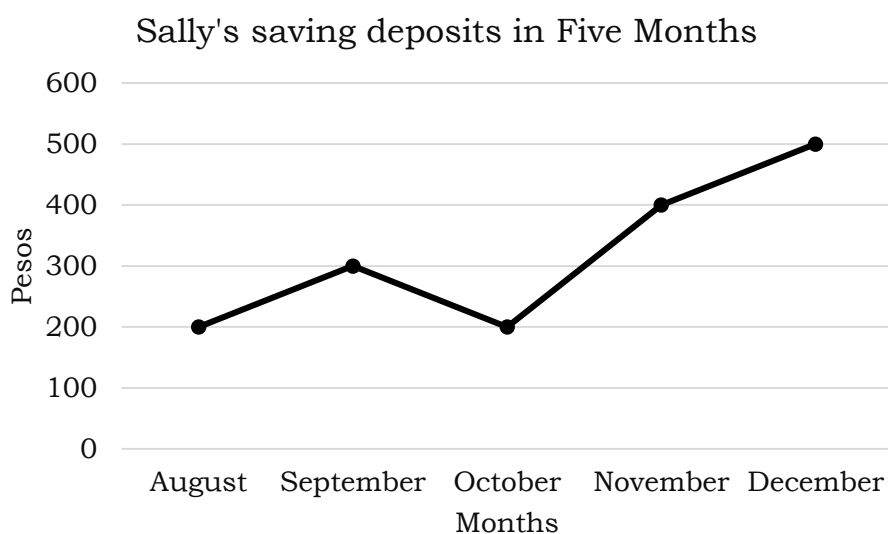
Questions:

1. What is asked? _____
2. What facts are needed to solve the problem? _____
3. What operation will you use? _____
4. What is the number sentence? _____
5. What is the complete answer?   _____

What's New

In this lesson, we will deal with drawing inferences based on the data presented in a line graph.

Do you know that we can draw inferences based on the data presented in a line graph? Drawing inferences based on the data presented in a line graph provides us prior knowledge from reliable data and developed conclusion by integrating them.

Example 1. Study the line graph below and interpret the
data by answering the questions below.
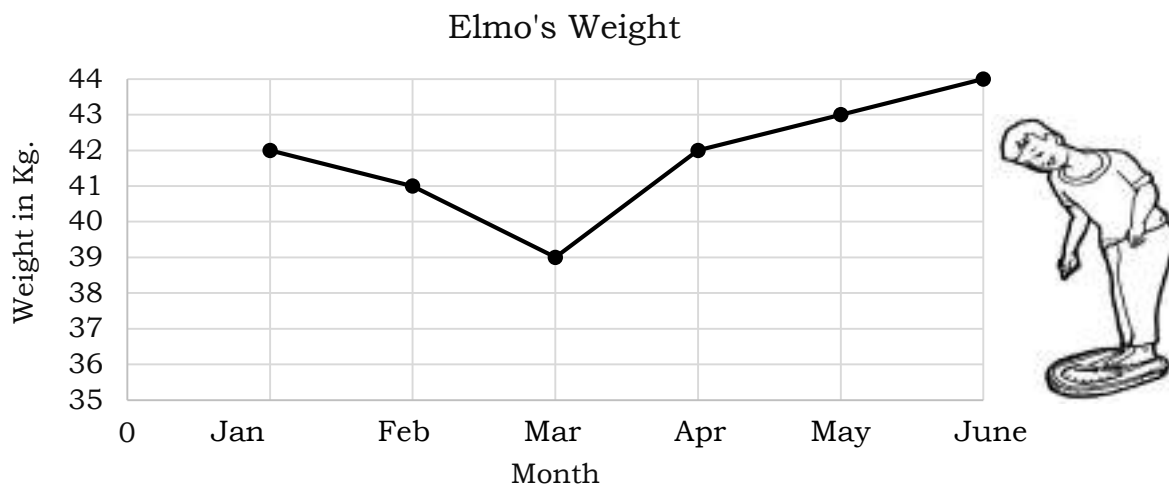
Elmo's Weight

Questions:

1. What does the graph is all about? _____
2. What month Elmo's weight is lowest? _____
3. What month Elmo's weight is highest?_____
4. What is the difference of Elmo's weight on the months of January and March?_____
5. How many kilograms of weight increased of Elmo from March up to May? _____

4   **CO_Q4_Mathematics 5_ Module 14**

What is It

To draw inferences based from the data given in the line graph, it is important to:

- Observe the parts of the graph

     Make sure that you master the parts of the graph and observe if all the parts are presented. (Title, x and y axis, label/data and the legend

- Understand the relationship being illustrated on the graph

     Understand what the given data all about, the scale that show the units used on the line graph, the source wherein information needed are presented, the data being presented in vertical or y axis and horizontal or x axis and what is represented by the legend.

- Make prediction based on the described situation presented by the data on the graph.

     Review first, make sure that all labels are clearly illustrated.
     Calculate an average for the different questions, if appropriate.
     Observe and make inference, something you think is true based on observation or findings on the data presented in a line graph.

     The graph above shows Elmo's weight in 6 months from January to June. How does the line graph help us in drawing inferences about Elmo's weight? Can we make conclusions on the basis of facts and previous knowledge rather than on actual observations?

Based on the presented data, Elmo's highest weight is 44 kg in the month of June and his lowest weight is in the month of March which is 39 kg.

- From the information given and presented in the line graph, it can be inferred that Elmo's weight might increase basing from the trend from March to June. But if Elmo got sick or does not follow proper nutrition, we can infer that for the next month Elmo's weight might decrease.
- Therefore, drawing inferences is making predictions based on the described situation presented by the data on the graph.

Example 2. Study the line graph and answer the questions below.

Immigrants Admitted in One Country from 2010-2015
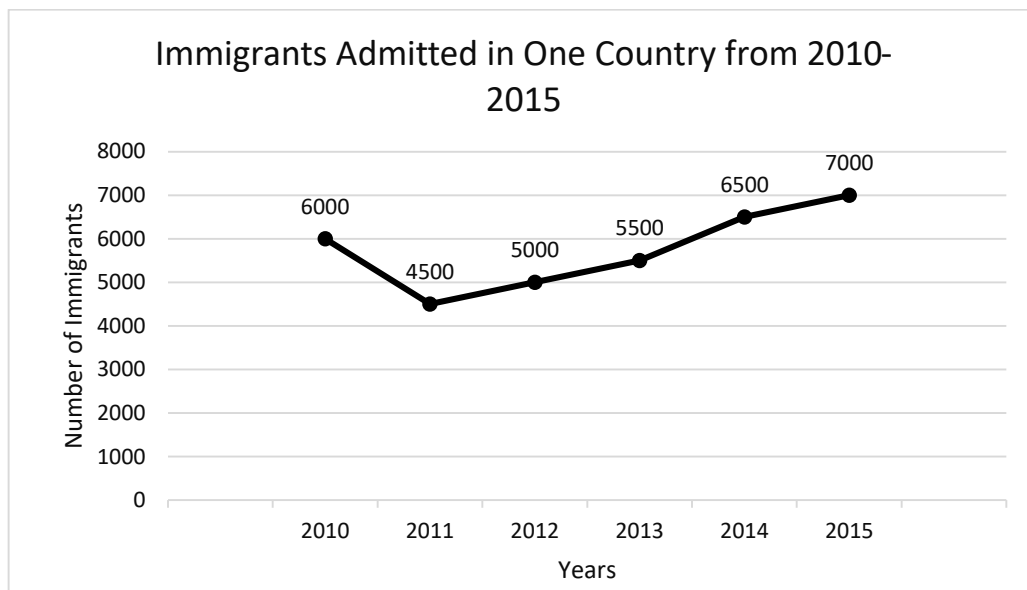
1. Why do you think there is an increasing number of immigrants from 2011-2015?
2. Basing from the trend shown by the graph, will the ~~d~~ number of immigrants decrease in 2016? Why? Why not?
3. What are the probable reasons why some Filipinos want to live permanently in a foreign country?
4. If you want to be an immigrant, what country do you want to live?
5. Do you think our country would progress if some Filipinos went abroad? Why? Why not?

CO_Q4_Mathematics 5_ Module 14

Activity 1: Draw and Infer!

Directions: Draw inferences based on the given data presented in the line
graph.

Monthly Rainfall from January to June
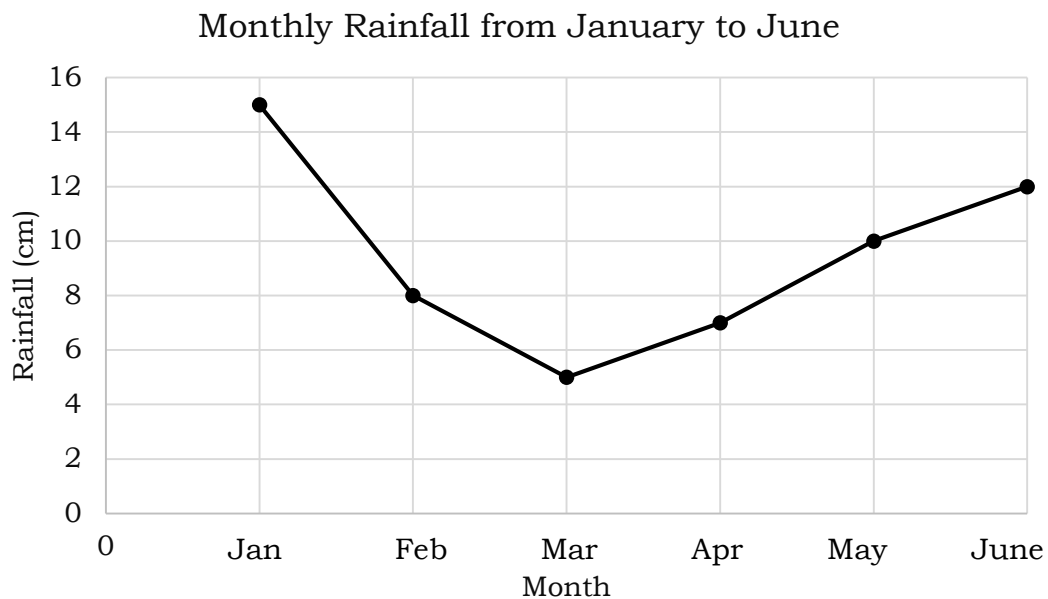
1. In which month was there a recorded 8 cm. of rainfall?
2. What was the highest rainfall observed from January to June?
3. How many cm. of rainfall was measured during the month of June?
4. Considering the trend in the line graph, when is the best time for farmers to plant?
5. What do you think would be the measured depth of rainfall recorded in the month of July?
6. What will happen if the recorded rainfall is too high?

Activity 2: Use Me and Infer!

Directions: The graph is about the common cold and influenza experienced
of every pupil. Use the graph to answer the following questions
below.
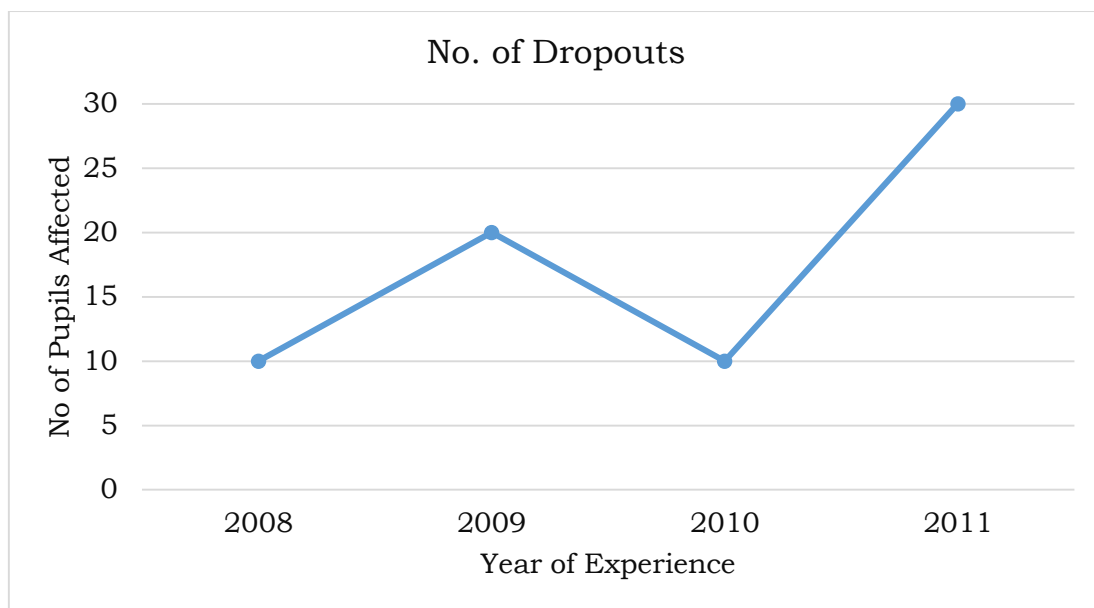
No. of Dropouts

List down the number of dropouts in the corresponding year.

1. 2008 - _____
2. 2009 - _____
3. 2010 - _____
4. 2011 - _____

Activity 3: Double Your Inferences!

Directions: Draw inferences using the data on the double line graph to answer the questions.

John and Paul's Exam Scores

CO_Q4_Mathematics 5_ Module 14
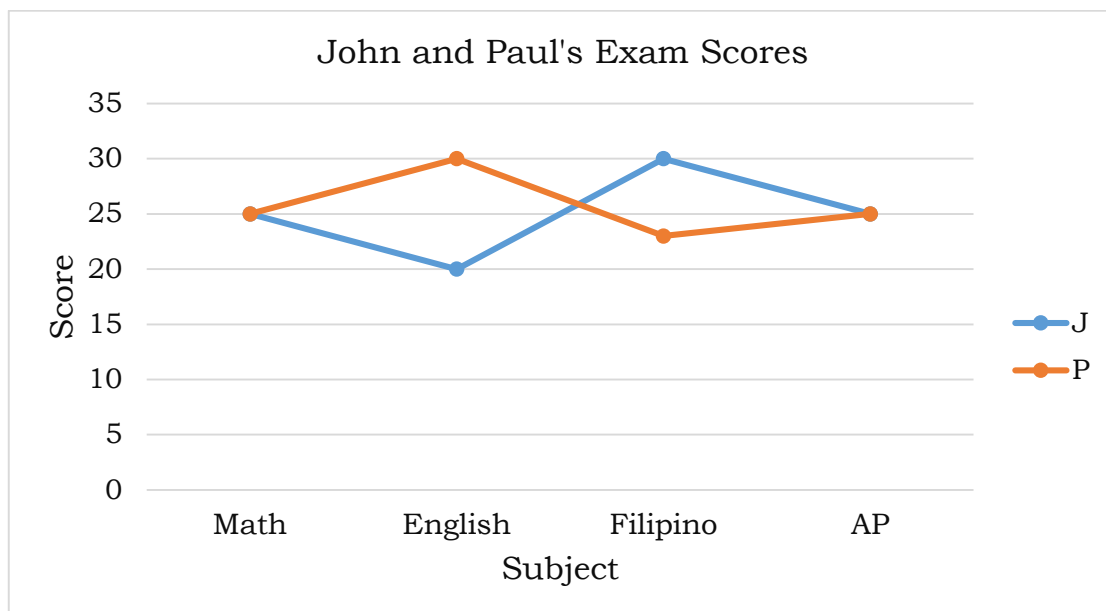
In which subject did both boys get the same score?
1. In which subjects did John get a higher score than Paul?
2. In which subject did Paulo get a higher score than John?
3. What can you infer about the scores of the two boys?
4. Which subject that the two boys got highest and lowest scores?

What I Have Learned

A. Fill in the blanks.

To draw inferences presented in a graph it is important to (1) _____, the parts of the graph. (2) _____ the relationship illustrated on the graph. (3) Make _____ based on the describe situation presented by the (4) _____ on the graph. (5) Observed and make _____, something you think is true.

What I Can Do

Drawing inferences is making a guess, something you think is true based on observations or findings on the data presented in a line graph. Drawing inferences is a helpful tool to practice and develop thinking skills because learning to draw inferences is a skill that develops over time by providing experience with inferential information of things we can see and experience in Mathematics and real-life situations. It can help the learner better assess the situation by understanding the facts and observe regularity in pattern.

Baskets Made During Practice
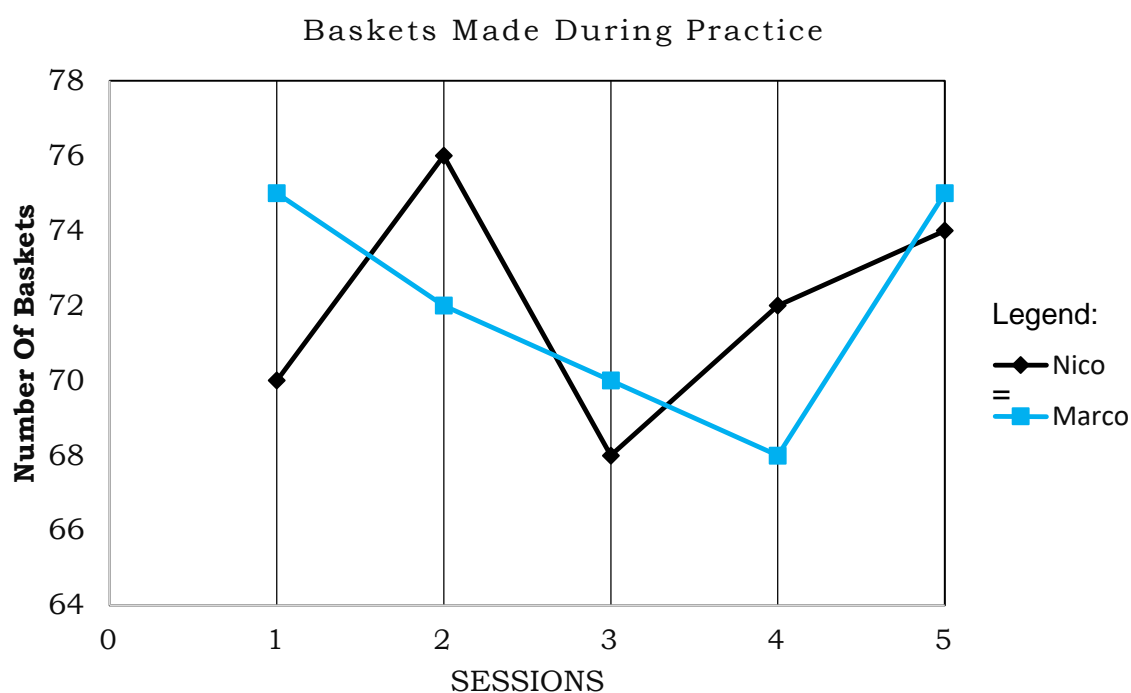
Directions: Study the line graph, then answer the questions below.

1. How many baskets did each one makes during the third session?
2. Who made more baskets in the fourth session?
3. What is the-average number of baskets the two boys made during the five-day session?
4. How many baskets did each one makes throughout the sessions?
5. Who made more basket between the two?

Assessment

Directions: Study carefully the graph presented below. Draw inferences based on the data presented in a line graph. Write your answer on a separate sheet of paper.

Mona and Lisa 6 Months Allowance
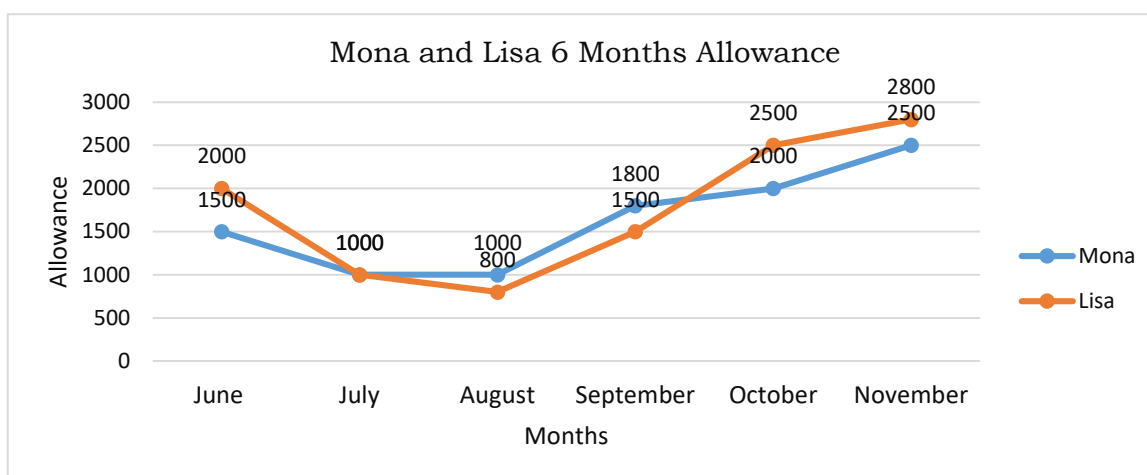
1. How much did Mona received in the month of August?
    A. Php2000   B. Php1 000 C. Php 800   D. Php 500

2. What month did the two girls receive the highest amount of allowance?
    A. June   B. August   C. September   D. November

3. What month has the lowest amount of allowance Liza?
    A. June   B. August   C. September   D. November

4. Who received a higher allowance between the two for 6 months?
    A. Mona   B. Lisa   C. both of them   D. none of them

5. Whose allowance amounted to P9800 for six (6) months?
    A. Liza   B. Liza and Mona   C. Mona   D. neither the two

6. Who received a lesser allowance for 6 months?
    A. Mona   B. Lisa   C. both of them   D. none of them

7. What is the difference of the biggest allowances of both girls?
    A. ₱200   B. ₱100   C. ₱300   D.₱500

8. What month that the two girls recieved the biggest amount of allowance?
    A. June   B. August   C. September   D. November

9. In what month did they both received the same amount of allowance?
    A. June   B. July   C. August   D. September

10. Whose allowance amounted to P10600 for six(6) months?
    A. Liza   B. Liza and Mona   C. Mona   D. neither the two

Additional Activities

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

The line graph shows the amount of fuel left in the car and the distance the car travelled. Study the graph and answer the questions that follows.

Amount of Fuel Left in the Car

A line graph. The vertical axis is labeled "Amount of Gasoline (liter)" with values from 0 to 45 in increments of 5. The horizontal axis is labeled "Distance Travelled (km.)" with values 60, 120, 180, 240. The line connects the points: (60, 40), (120, 30), (180, 20), (240, 10).
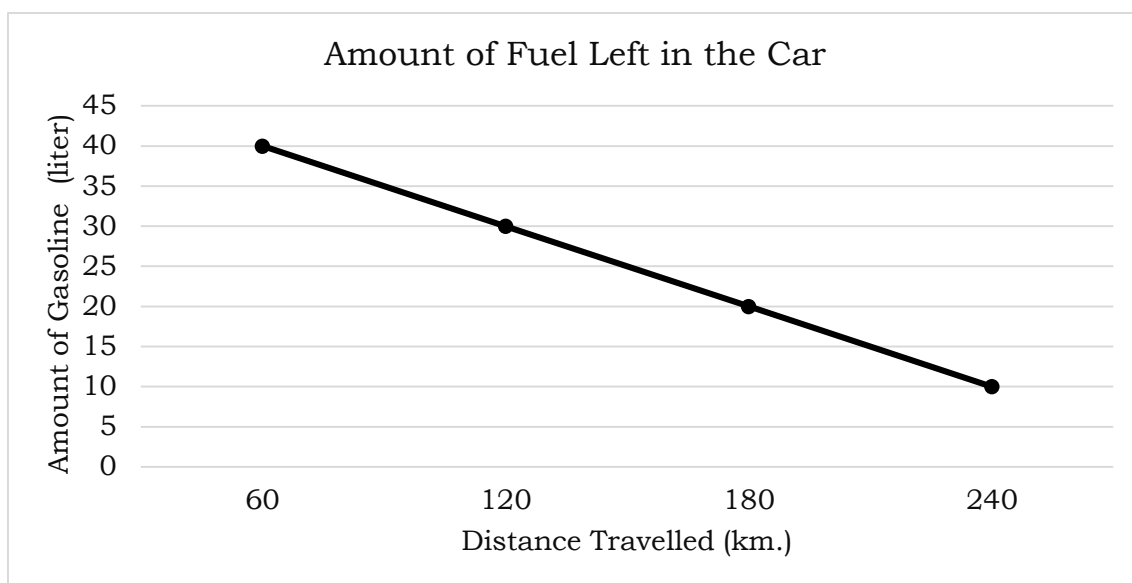
1. How much gasoline does the car have at the start of the journey?
2. How many liters of gasoline was left at the end of the journey?
3. How much gasoline was used for:
   a. first 60 km. travelled?
   b. second 60 km. travelled?
   c. third 60 km. travelled?
   d. fourth 60 km. travelled? (delete)
4. Study the answers you obtained in no. 3. What can you say about the amount of gasoline used in relation to the distance travelled?

Answer Key

Additional Activities
1. 40
2. 10
3. a. 40
   b. 30
   c. 20
   d. 10
4. An interval of 10

Assessment
1. B
2. D
3. B
4. B
5. C
6. A
7. C
8. D
9. B
10. A

What I Can Do
1. Nico – 68, Marco – 70
2. Marco
3. 72
4. Nico – 360, Marco - 360
5. Both of them

What I Have Learned
1. Observe
2. Understand
3. Prediction
4. Data

What's More
Activity 3: Double Your Infer!
1. AP
2. Math and English
3. Filipino
4. The scores of the boys are just similar when getting its average. Its almost 25
5. English

What's More
Activity 2: Use Me and Infer!
1. 10
2. 20
3. 10
4. 30
5. 10 or 20 (answers may vary)

What's More
Activity 1: Draw and Infer!
1. February
2. January
3. 12 cm.
4. Answer may vary
5. Answer may vary

What's In
1. The total savings of Sally in 5 months
2. The amount of saving Sally deposits by months
3. Addition
4. 200+300+200+400+500=N
5. Php. 1,600

What I Know
1. A
2. C
3. C
4. A
5. B
6. D
7. A
8. C
9. C
10. A

13

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

5

Mathematics

Quarter 4 – Module 15:
Describing Experimental Probability

5

Mathematics
Quarter 4 – Module 15:
Describing Experimental Probability

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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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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 Mathletes! This module was designed and written to help you gain understanding and test your ability in describing experimental probability. We knew that a probability is the mathematics of chance. Probability is used to describe how likely or unlikely it is that something will happen. Probability may be given in fraction, decimal, or percent. The value of probability ranges from 0-1 (0 means the event is impossible to happen, while 1 means the event is certain to happen). Knowing how to describe probability and how to use them in real-life situations is important. In real life, whenever we do an experiment, two things can happen, either the one we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome.

So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to:
- describe experimental probability;
- appreciate the importance of experimental probability.

Before going any further, let us check your understanding about describing experimental probability.

What I Know

Directions: Read carefully each statement below. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. What is the probability that an odd number of dots show up if a die is rolled?
   A) impossible
   B) certain
   C) as likely as unlikely
   D) unlikely

2. A coin is tossed 10 times: A head is recorded 8 times and a tail 2 times. Describe the experimental probability of getting tail.
   A) impossible
   B) certain
   C) likely
   D) unlikely

3. A coin is tossed 60 times. The head appeared 27 times. Describe the experimental probability of getting heads.
   A) impossible
   B) certain
   C) likely
   D) unlikely

4. A bag has 1 blue, 3 green, 2 red, and 2 yellow marbles. What is the probability of drawing 3 green marbles?
   A) impossible
   B) certain
   C) likely
   D) unlikely

5. When 2 coins are flipped, what is the probability of getting at least one head?
   A) impossible
   B) certain
   C) as likely or as unlikely
   D) unlikely

6. You will be late for school tomorrow.
   A) impossible
   B) certain
   C) likely
   D) as likely or as unlikely

7. You will obtain 7 when rolling a regular die.
   A) impossible
   B) certain
   C) likely
   D) unlikely

8. Pulling a red marble from a bag with 10 yellow marbles, 6 red marbles and 1 green marble.
   A) impossible
   B) certain
   C) likely
   D) unlikely

9. The pointer of a spinner numbered 1,2 3,3,3,3,3,6,6, stopping on 3.
   A) impossible
   B) certain
   C) most likely
   D) unlikely

10. Drinking 1 liter of water in 5 seconds.
    A) impossible
    B) certain
    C) likely
    D) unlikely

Lesson 1
Describing Experimental Probability

In order to describe experimental probability, you need to master the skills on reducing fraction to lowest term, changing fraction to percent and vice versa, and changing decimal to percent and vice versa, because these will help you gain understanding the concept of the lesson. In this module, you will learn how to describe experimental probability and discover their relationship with decimals, fractions and percent. Are you ready?

What's In

In the previous lessons, you were able to learn the concept of changing fractions to decimals from decimals to percent.

Note that, to change percent to decimal, write the percent as fraction, then divide the numerator by the denominator. A shorter method is to remove the % symbol, then move two decimal places to the left. To change decimal to percent, multiply the decimal to 100, then affix the % symbol. A shortcut would be moving the decimal point to the right and affixing the % symbol. To change from fraction to percent, change into decimal first by dividing the numerator by the denominator, move the decimal point two places to the right, then affix the percent symbol.

Let us refresh your memory and try to answer the following exercises below by changing fractions to decimals and to percent.

		Decimal	Percent
1.	1/2	_____ ,	_____
2.	9/25	_____ ,	_____
3.	1/4	_____ ,	_____
4.	3/4	_____ ,	_____
5.	3/20	_____ ,	_____

What's New

From the previous lesson, you were taught on how to change fractions to decimals and from decimals to percent. In this lesson, we will deal with describing experimental probability.

Probability is the mathematics of chance. When we do something and we are expecting a result by chance or we are not certain of what the result will be. In probability, we call it an experiment. The uncertain result is called an outcome.

Consider this problem.

There are 100 candies in a jar and 10 of which are bubble gums. What is the probability of getting a bubble gum?

What Is It

Probability is used to describe how likely or unlikely it is that something will happen. Probability may be given in fraction, decimal, or percent. The value of probability ranges from 0-1 (0 means the event is impossible to happen, while 1 means the event is certain to happen).

Probability will help us decide how often something is likely to happen, but it will never help you exactly when the event will happen unless the probability is 0 (it will never happen) or 1 (it will surely happen).

The event is unlikely to happen when its probability is closer to 0, like winning a jackpot in a lottery where you only have a million chance of winning. The most likely to happen an event is, the closer its probability to 1.
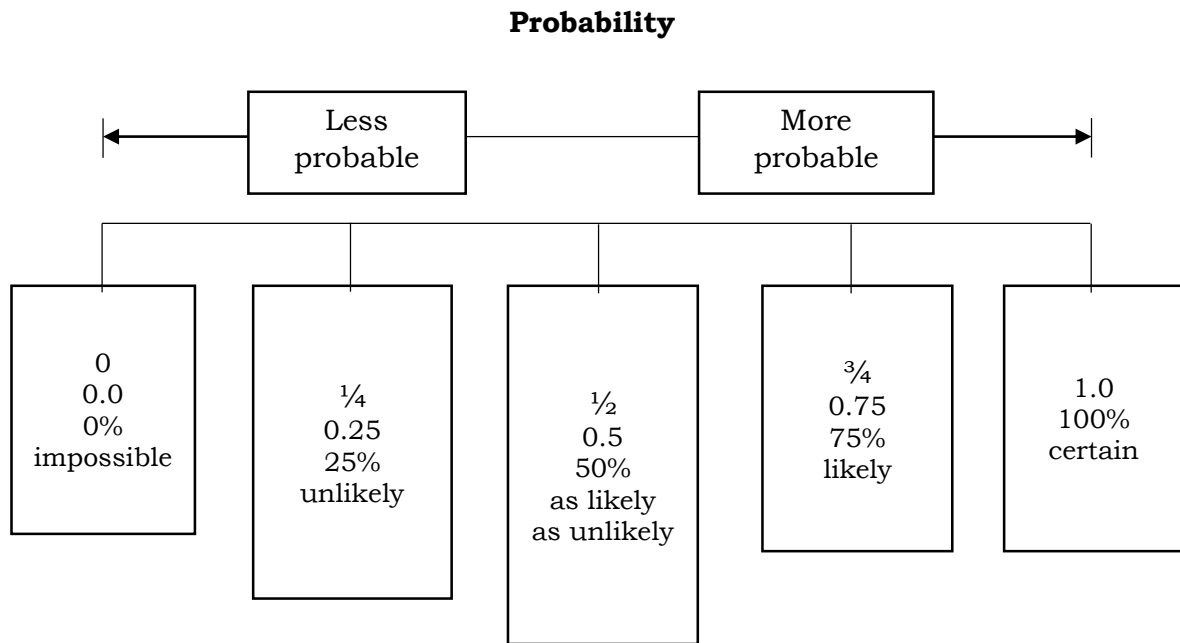
Probability

Example 1

The weather forecaster says that the probability that it will rain today is 75%. Does it mean that there is a great chance that it will rain today?

Let us use the number line to show the probability of an event.
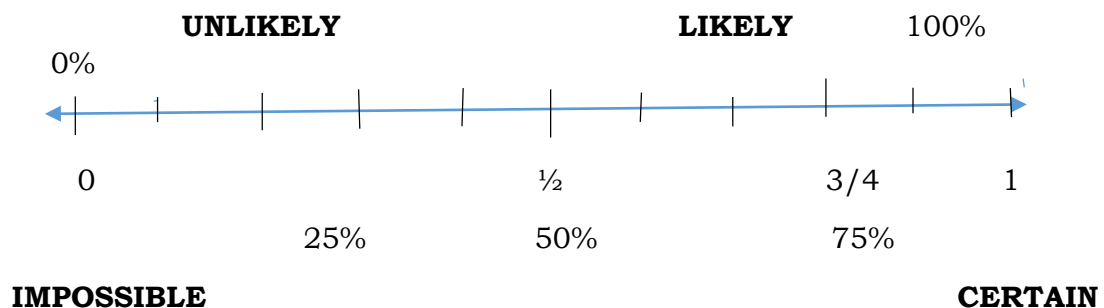
Going back to the problem presented in the "What's New",

By the fundamental counting principle, there are 10 out of 100 possible results or outcomes. Using the formula, we have:

$$P = \frac{favorable\ outcomes}{total\ possible\ outcomes}$$

$$= \frac{10}{100}$$

$$= \frac{1}{10}$$

= 0.1 or 10%

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Therefore, the probability of getting a bubble gum is 1/10 or 10% or it has 10 out of 100 chances of getting a bubble gum.

Example 2

In a deck of 52 well-shuffled playing cards, what is the probability of getting a king?

In the given problem, the total possible outcomes is 52. The favorable outcome is getting a king. In a deck, there are 52 cards, there are four suits and each suit has a king. So, there are four kings. Thus,

$$P = \frac{favorable\ outcomes}{total\ possible\ outcomes}$$

$$= \frac{4}{52}$$

$$= \frac{1}{13}$$

= 0.077 or 7.7%

6

Activity 1

Directions: Look at the spinner below. Write and describe the probability of landing on:

    1. 1
    2. 3 and 5
    3. even number
    4. 7
    5. 2 and4
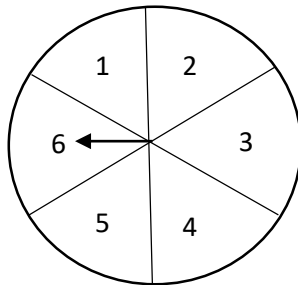
Activity 2

Directions: Describe experimental probability by answering the questions that follow the situation.

    Jimmy and Naomi are rolling a regular 0-5 number cube. Jimmy wins if 0 is rolled. Naomi wins if 1,2,3,4, or 5 is rolled.

    1. Who do you think will win more often?
    2. What fraction of the time do you think Jimmy will win?
    3. What is Naomi's probability of winning?
    4. If they roll the cube 6 times, would you expect Jimmy to win?
    5. Should you be surprised if Jimmy did not win exactly 1 time out of 6 tries?

Activity 3

A dice is rolled. Determine the probability of the following outcomes:
    a. Even numbers
    b. Number less than 5
    c. Number 6

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What I Have Learned

A. Fill in the blanks.

A probability is said to be a mathematics of (1) _____. Probability is used to describe how likely or unlikely it is that something will happen. (2)_____ may be given in fraction, decimal, or percent. The (3) _____ of probability ranges from 0-1 (0 means the event is impossible to happen, while (4) _____ means the event is certain to happen).

Probability will help us decide how often something is likely to happen, but it will never help you exactly when the event will happen unless the probability is (5) _____(it will never happen) or 1 (it will surely happen).

The event is unlikely to happen when its probability is closer to 0, like winning a jackpot in a lottery where you only have a million chance of winning. The most likely to happen an event is, the closer its probability to 1.

What I Can Do

Probability is the mathematics of chance. Probability is used to describe how likely or unlikely it is that something will happen.

Directions: Use 0 (impossible), 1/4(unlikely), ½ (as likely as unlikely), ¾ (most likely) and 1 (certain) to describe each of the following statements. You can use an extra sheet of paper for your solutions.

1. The sports' analyst says that Manny Pacquiao has 75% chance of winning his fight.
2. The weather forecaster says there is 50% chance of rain today.
3. The sun will rise tomorrow.
4. Heavy rains during typhoon.
5. A carabao will climb a tree.

Assessment

Directions: State the probability of each outcome. Write *impossible, unlikely, as likely as unlikely, likely, certain.*

_____1. Without looking, what is the probability that a green pen is drawn from a box of green pen?

_____2. What is the probability that a tomato is drawn from a box of apples and oranges?

_____3. From tossing a coin, what is the probability that the head shows up?

_____4. What is the probability that an odd number of dots show up if a dice is rolled?

_____5. A coin is tossed and showed heads.

_____6. Your house will grow legs and walk.

_____7. A mother gives birth

_____8. A frog will swim in the water.

_____9. You will finish reading this sentence.

_____ 10. What is the probability that an even number of dots show up if a dice is rolled?

Additional Activities

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Directions: The letters of the word **PROBABILITY** are put in a jar. Find the probability of picking the indicated letter or letters. Write in fraction form.

1. P (B) - _____   4. P (all the vowels) - _____

2. P (D) - _____   5. P (all the consonants) - _____

3. P (A) - _____

Answer Key

Assessment

1. Certain
2. Impossible
3. As likely as unlikely
4. As likely as unlikely
5. As likely as unlikely
6. Impossible
7. Certain
8. Certain
9. Certain
10. As likely an unlikely

Additional Activities

1. 2/11
2. 0/11
3. 1/11
4. 4/11
5. 7/11

Activity 3

1. 1/2
2. 2/3
3. 1/6

Activity 2

1. Naomi
2. 1/6
3. 5/6
4. No
5. No

What I Have Learned

1. chance
2. Probability
3. value
4. 1
5. 0

What I can do

1. 3/4
2. ½
3. 1
4. 1
5. 0

Activity 1

1. 1/6
2. 2/6
3. 3/6
4. 3/6
5. 2/6

What's In

1. 0.5 ...... 50%
2. 0.36 ...... 36%
3. 0.25 ...... 25%
4. 0.75 ...... 75%
5. 0.15 ...... 15%

What I Know

1. C   6. D
2. D   7. A
3. D   8. D
4. D   9. C
5. C   10. A

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

Perez, Marjoseph H.,and Donnel P. Placer,Jaime R. Burgos, 2016. *21st Century MATHletes 6 Textbook*. Quezon City: Vibal Group, Inc.

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Mathematics

Quarter 4 – Module 16:
Performing an Experimental Probability and Records Result by Listing

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 16: Performing Experimental Probability and Records Results by
                                    Listing
First Edition, 2020

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Mathematics
Quarter 4 – Module 16:
Performing Experimental
Probability and Records Results
by Listing

Introductory Message

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Thank you.

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What I Need to Know

Good day Mathletes! This module was designed and written to help you gain understanding and test your ability in Performing Experimental Probability and Records Results by Listing!

We knew that an experimental probability is the ratio between the number of times the event occurs and the total number of trials. It is determined by doing an experiment. When dealing with probabilities, it is important to be able to identify all the possible outcomes. In real life, whenever we do an experiment, two things can happen, either the one we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome.

So, what are you waiting for? Stay focused and start-up.

At the end of this module, you are expected to:
- perform experimental probability and record results by listing
- appreciate the importance of performing experimental probability and records results by listing

Before going any further, let us check your understanding about performing experimental probability and records results by listing.

What I Know

Directions: Read carefully each statement below. Express the outcomes of your prediction in fraction. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. What is the chance that you will get a passing score in your 10-item Math quiz?
   - (A) 3
   - (B) 4
   - (C) 5
   - (D) 2

2. What is the probability that a newly born puppy is a girl?
   - (A) 1
   - (B) 2/2
   - (C) 1/2
   - (D) 1/4

3. There are 6 marbles in a bag. One is red; 2 - yellow; and 3 - green. What is the chance of picking yellow marble?

    (A)1/6   (B)3/6   (C)5/6   (D)2/6

4. What is the chance of picking red? Please refer to question number 3.

    (A)2/6   (B)3/6   (C)5/2   (D)1/6

5. What is the chance of picking green?

    (A)3/6   (B)2/6   (C)1   (D)1/6

6. Van has 5 white socks, 4 blue socks and 6 black socks in a drawer. If he pulls one out without looking, what is the probability that he will pull out of black socks?

    (A)6/15   (B)5/15   (C)4/15   (D)10

7. A die is marked with the first 6 letters of the alphabet rather than numbers. What are the chances that when the die is rolled a vowel will show up?

    (A)1/6   (B)3/6   (C)1/35   (D)4

8. What is the probability that a 5 or 6 will be showing on top after the number cube is tossed?

    (A)5/6   (B)1/6   (C)1/3   (D)6

9. A bag of candies contains 10 red, 12 blue, 8 green, 6 brown, and 14 yellow candies. If Robert removes one candy from the bag at random what is the probability that it will be blue?

    (A)10/50   (B) 6/50   (C) 8/50   (D)12/50

10. A spinner numbered 1-8 is spun. What is the probability of spinning a factor of 18?

    (A) 4   (B) 2   (C) 3   (D) 1

<table>
<tr><td>**Lesson**
1</td><td># Performing Experimental Probability and Records Results by Listing</td></tr>
</table>

In order to perform experimental probability and records results by listing, you need to master the skills on reducing fraction to lowest term, changing decimal to percent and vice versa and describe experimental probability. Because these will help you gain understanding the concept of the lesson. In this module, you will learn how to perform experimental probability and records results by listing. Are you ready?

What's In

In the previous lessons, you were able to learn the concept of describing experimental probability.

Also, you learned how to perform experimental probability. Note that, by doing a probability experiment, we can determine the number of times an event occur. We use a table and record the outcome of probability experiment. The probability can be approximated as the fraction of the number of times an event occurs by the number of times the experiment was performed.

Note that, a probability is the mathematics of chance. Probability is used to describe how likely or unlikely it is that something will happen. Probability may be given in fraction, decimal, or percent. The value of probability ranges from 0-1 (0 means the event is impossible to happen, while 1 means the event is certain to happen).

Let us refresh your memory and try to answer the following exercises:

Directions: Write **0** for impossible to happen, **1/2** for equally like to happen and **1** for certain to happen.

1. A frog will swim in the water.
2. You will finish reading this sentence.
3. The teacher teaches the pupils.
4. The probability of getting a number more than 6 in tossing a die is 1/6.
5. The cat drives the car.

3

What's New

From the previous lesson, you were taught on how to describe experimental probability. In this lesson, we will deal with performing experimental probability and records results by listing.

Do you know that a probability can be expressed into fraction, decimal or percent form? You will understand this concept as you go along with this module.

Let us study this example:

There are 20 guests in the party, and each have an equal chance to win the prize. Alfred wins only if his card is drawn. What is his chance of winning the prize?

What Is It

Experimental probability is a probability determined from the results of an experiment and also experimental probability is what actually happens when we try it out.

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is a favorable outcome.

An experimental probability is the ratio between the number of times the event occurs and the total number of trials.

$$P = \frac{favorable\ outcomes}{total\ possible\ outcomes}$$

So, the answer to the presented problem above is:

$$\frac{Number\ of\ favorable\ outcomes}{Number\ of\ possible\ outcomes} = \frac{1}{20} = 0.05 = 5\%$$

Therefore, Alfred has $\frac{1}{20}$ or 5% chance to win the prize.

When dealing with probabilities, it is important to identify all the possible outcomes. The following are some of the methods that we can use:

When a cube with letters S, E, N, S, E, and S on its faces is tossed once, there are 6 total outcomes and the possible outcomes of tossing an S, E, and N. We could also say that the probability of tossing each letter is

Probability of tossing an $S = \frac{3 \rightarrow favorable\ outcomes \quad \{S,S,S\}}{6 \rightarrow total\ possible\ outcomes\ \{S,E,N,S.E.S\}}$

Probability of tossing an $E = \frac{2 \rightarrow favorable\ outcomes\ \{E,E\}}{6 \rightarrow total\ possible\ outcomes\ \{S,E,N.S,E,S\}}$

Probability of tossing an $N = \frac{1 \rightarrow favorable\ outcome\ \{N\}}{6 \rightarrow total\ possible\ outcomes\ \{S,E,N,S,E,S\}}$

Listing and Tree Diagrams

To calculate probability, we need to know all the different things that can happen. A sample space is a list of all the possible outcomes of an activity or experiments.

Example 1: Suppose you spin the spinner. Make a sample space for the spin.
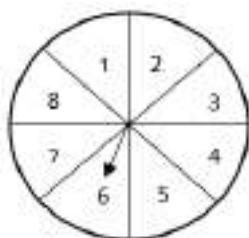
Solution:
The spinner can land on 8 different regions. To make the sample space, list all the possible outcomes of the spin.

Answer: The sample space is: 3, 4, 5, 6, 7, 8, 1, 2

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Example 2: Look at the menu below. How many ways can you order snacks?

.

HAMBUGERS
Regular Burger
Cheeseburger
Pizza burger
BEVERAGES
Juice
Tea

There is more than one way to solve this problem.

Solutions:

LISTING: Use R for regular, C for cheese, P for pizza, J for juice and T for tea.

Outcomes:

a. R, J   b. R, Tc. C, J
b. d. C, T   e. P, J f. P, T

The list shows there are 6 ways to order snacks.

TREE DIAGRAM
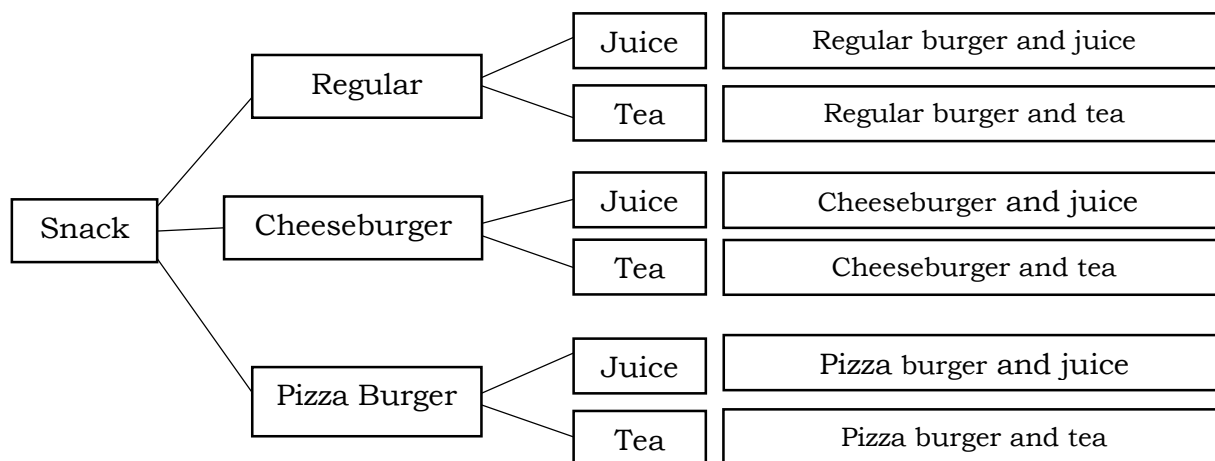
In the diagram, we can see that for each of the three kinds of hamburgers, there are two beverage choices. Thus, 3x2=6, there are six ways to order snacks.

What's More

Activity 1

PICK A COLOR
Materials: a box, 6 marbles, (3 green, 2 blue, 1 red)
Procedure:
   a. Put the marbles in the box. Without looking, draw one marble from the box and record the color in the table below.
   b. Put the marble back in the box. Do more 19 trials. Replace the marble each time after recording the color.
   c. How many times out of 20 did you draw a blue marble? Green marble? And red marble?

color	tally	number
Green Blue Red		

Answer the following questions:
   1. Did you enjoy performing the activity?
   2. Did you follow the procedure in performing the probability experiment?
   3. How did you express the outcomes of your probability experiment?
   4. What did you notice from the results of your probability experiment?

Activity 2

Directions: Express the outcomes of your prediction. Write your answer in your notebook.

   1. Consider the days of the week. What is the chance that you choose a day which begins with letter T? What is the chance that the day you choose has less than 15 letters?
   2. Toss a coin. What is the probability that neither the head nor the tail shows up?
   3. A bag contains 10 marbles - 8 yellow marbles, and 2 black marbles. Rona took a marble and returned it. After 10 trials, a yellow marble was picked 6 times. Find the experimental probability of getting red marble.
   4. If you roll a die, what is the probability that you will get even numbers?

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Activity 3

The table shows the results of a card experiment. Each time a card was picked, it was returned to the bag.

Card Experiment	
Outcome	**Number**
blue	27
green	15
red	8

1. How many trials of picking a card were made?
2. How many times was the blue card picked?
3. What is the experimental probability of picking a red card?
4. If 10 blue cards were in the bag, how many green cards would you predict?

What I Have Learned

By doing probability experiment, we can determine the number of times an event occur. We use a table and record the outcome of the probability experiment.

A. Fill in the blanks.

(1) _____ is a probability determined from the results of an experiment and also experimental probability is what actually happens when we try it out. When we do something and we are expecting a result by (2) _____ or we are not certain of what the result will be, in probability, we call it an (3) _____. The uncertain result is called an (4) _____.

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome.

An *experimental probability* is the (5) _____ between the number of times the event occurs and the total number of trials.

What I Can Do

In real life, whenever we do an experiment, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is *the favorable outcome.*

An *experimental probability* is the ratio between the number of times the event occurs and the total number of trials.

***Directions*:** Read the given situation and describe the experimental probability. The first one is done for you.

Example: A coin is tossed 60 times. A head appeared twenty-seven times. Find the experimental probability of getting heads.

Solution: $\dfrac{number\ of\ times\ the\ event\ occurs\ (heads\ appeared)}{total\ number\ of\ trials} = \dfrac{27}{60} = \dfrac{9}{20}$

Therefore, the experimental probability of getting heads is $\dfrac{9}{20}$

Directions: Read the given situation and record the probability.

Lorraine puts cards with letters of her name into a box. What is the probability that the card she pulls out is /are_____?

a. L? _____
b. O? _____
c. R? _____
d. A? _____
e. I? _____
f. N? _____
g. E? _____

Assessment

Directions: Read carefully each statement below. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

1. Toss a die, what is the probability that you will get 4 on top?
   (A) 1/6   (B) 1/8   (C) 2/6   (D)3/6

2. What is the probability that you can choose a rose from a flower shop selling sunflower, tulips, dahlia?
   (A) 1/2   (B) 0   (C) 1   (D)2

3. Toss a coin. What is the probability that neither the head nor the tail shows up?
   (A) 2/1   (B) 1/3   (C) 1/2   (D)2/2

4. What if there are 3 white ribbons, 4 pink ribbons and 5 red ribbons in your box. What is the chance of choosing a red ribbon?
   (A) 5/12   (B) 3/12   (C) 4/12   (D)1/12

5. What is the chance of choosing a ribbon that is not red?
   (A) 12/12   (B) 5/12   (C) 3/12   (D)7/12

6. If you choose a day at random, what is the probability of choosing Monday?
   (A) 2/7   (B) 1/7   (C) 3/7   (D)7/7

7. What is the probability of choosing a day with only 3 letters?
   (A) 1/7   (B) 2/7   (C) 3/7   (D)0/7

8. In tossing a coin there are two possible outcomes.
   (A) yes   (B)no   (C) maybe   (D) yes/no

9. When the result is what we expected, then it is the favorable outcome.
   (A) no   (B) maybe   (C) yes   (D) yes/no

10. Combination of outcomes can be shown on a tree diagram.
   (A) no   (B) yes   (C) maybe   (D) yes/no

Additional Activities

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Directions: What is the probability that this spinner will land on _____? Write in fraction form.

1. ☆

2. ♡

3. ☾

4. ☁

5. ⚡

Answer Key

What I can do

1. L (1/8)
2. O (1/8)
3. R (2/8)
4. A (1/8)
5. I (1/8)
6. N (1/8)
7. E (1/8)

Assessment

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

Additional Activities

1. 2/8 or 1/4
2. 3/8
3. 1/8
4. 2/8 or 1/4
5. 0/8

What I Have Learned

1. Experimental probability
2. chance
3. experiment
4. outcome
5. ratio

Activity 3:

1. 50
2. 27 times
3. 4/25
4. Answer may vary

Activity 2:

1. 2/7, 1
2. ½
3. 0
4. 3/6 or ½

Activity 1:

1-5. Answer may vary

What's More

What's In

1. 1
2. 1
3. 1
4. 0
5. 0

What I Know

1. A
2. C
3. D
4. D
5. A
6. A
7. C
8. C
9. D
10. D

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Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century MATHletes 5 Textbook*. Quezon City: Vibal Group, Inc.

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Mathematics

Quarter 4 – Module 17: Analyzing Data Obtained from Chance Using Experiments

ALTERNATIVE DELIVERY MODE

ADM

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5

Mathematics
Quarter 4 – Module 17:
Analyzing Data Obtained from Chance Using Experiments

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.

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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

Good day Mathletes! This module was designed and written to help you gain understanding and test your ability in analyzing data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20)!

We knew that a probability is a mathematical way of describing how likely it is that something will happen given by favorable outcomes by possible outcomes. A favorable outcome is the outcome of interest or a result we want to happen. An outcome is the result of an experiment. When dealing with probabilities, it is important to be able to identify all the possible outcomes. When the result is what we expected, then it is the favorable outcome. The greater the probability of an event, the more likely it will occur. The smaller the probability of an event, the less likely the probability.

At the end of this module, you are expected to:
- analyze data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20).
- appreciate the importance of analyzing data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20).

Before going any further, let us check your understanding about analyzing data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20).

What I Know

Directions: Analyze and solve the following problems. Write your answers on a separate sheet of paper.
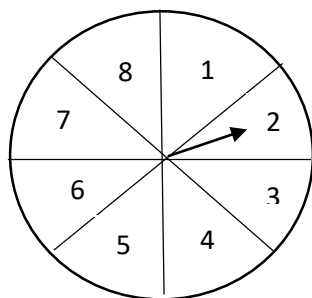
I. Find the probability of the spinner above stopping on each of the given item.

1. An even number
   (A) $\frac{1}{8}$ (B) $\frac{1}{2}$ (C) $\frac{3}{8}$ (D)8

2. A three
   (A) $\frac{2}{8}$ (B) $\frac{1}{2}$ (C) $\frac{1}{8}$ (D)3

3. An odd number
   (A) $\frac{1}{4}$ (B) $\frac{1}{8}$ (C) $\frac{3}{8}$ (D)$\frac{1}{2}$

4. A number less than three
   (A) $\frac{1}{2}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D)3

5. A number less than nine
   (A) $\frac{2}{8}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D)1

II. Each of the 11 letters of the word "MATHEMATICS" is written on a separate card. The cards are placed faced face down and shuffled. A card is chosen at random. What is the probability that it will show each of the following?

1. The letter M
   (A) $\frac{2}{11}$ (B) $\frac{1}{11}$ (C) $\frac{3}{11}$ (D)2

2. A vowel
   (A) $\frac{2}{11}$ (B) $\frac{1}{11}$ (C) $\frac{4}{11}$ (D)11

3. The letter E
   (A) $\frac{2}{11}$ (B) $\frac{1}{11}$ (C) $\frac{11}{11}$ (D) 1

4. The letter T
   (A) $\frac{1}{11}$ (B) $\frac{2}{11}$ (C) $\frac{11}{11}$ (D)8

5. The letter S
   (A) $\frac{1}{11}$ (B) $\frac{2}{11}$ (C) $\frac{11}{11}$ (D)8

2

Lesson 1	Analyzing Data Obtained from Chance Using Experiments Involving Letter Cards (A-Z) and Number Cards (0 to 20)

In order to analyze data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20), you need to master the skills on performing experimental probability, reducing fraction to lowest term, and changing decimal to percent and vice versa because these will help you gain understanding the concept of the lesson. In this module, you will learn how to analyze data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20). Are you ready?

What's In

In the previous lessons, you were able to learn about experimental probability.

Note that, by doing a probability experiment, we can determine that the number of times an event occur. We use a table and record the outcome of probability experiment. The probability can be approximated by the fraction through the number of times an event occurred by number of times the experiment was performed.

Let us refresh your memory and try to answer the following exercises below: The first one is done for you.

Example: If you roll 0-5 number cube, what is the probability that you will roll 7?

The Answer is 0/7.

1. If you roll 0-5 number cube, what is the probability that you will get a number less than 7?
2. From number 1 situation, what is the probability that you will get an even number?
3. From number 1 problem, what is the probability that you will get an odd number?
4. A bag contains 12 apples and 4 oranges. What is the probability of pulling out an apple?
5. In a bag, there are 15 *M and Ms* Chocolate - 4 red, 5 yellow, 3 blue and 3 brown. What is the probability of picking blue *M and Ms*?

What's New

In this lesson, we will deal with concept of analyzing data obtained from chance using experiments involving letter cards (A-Z) and number cards (0 to 20).

When making important decisions in life, do you list down all the possibilities first before you make a choice, or do you quickly make decisions? Go back to your past experiences and see how much your decisions affected your life.

You will understand this concept as you go along with this module.

Let us study this problem:

PICKING A CARD

Find the probability of picking letter B?

J	B	F	D	E	G	H	A
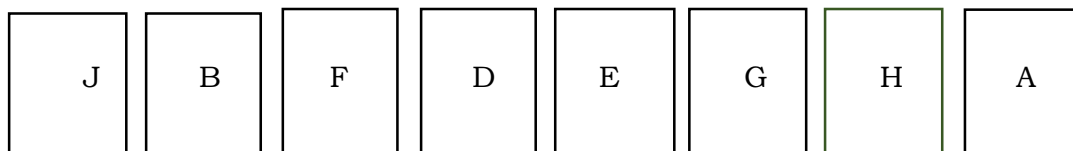
What Is It

A probability is a mathematical way of describing how likely it is that something will happen. An outcome is the result of an experiment. When dealing with probabilities, it is important to identify all the possible outcomes. When the result is what we expected, then it is the favorable outcome. A favorable outcome is the outcome of interest or a result we want to happen. The greater the probability of an event, the more likely it will occur. The smaller the probability of an event, the less likely the probability.

In answering the above problem, we use the formula below:

$$P = \frac{Number\ of\ times\ the\ event\ occured}{Number\ of\ times\ the\ experiment\ was\ performed}$$

$$P = \frac{1}{8}$$

B is 1 out of 8, or 1/8

Answer: B is 1 out of 8, therefore the probability of picking B is 1/8.

Example 2: Read and analyze the given situation.

Alphabet cards of the same size and shape were put in a bag, 3 cards have letter M, 4 cards have letter A, 2 cards have letter T and 1 card has letter H.

1. What is the total number of possible outcomes? **Answer**: 10 Cards

2. What is the probability of picking a:

   a. card with letter M   **Answer**: 3/10
   b. card with letter A   **Answer:** 4/10

Let us use the number line to show the probability of an event.

0%	**UNLIKELY**		**LIKELY**	100%

0		½		1

IMPOSSIBLE   50%   **CERTAIN**
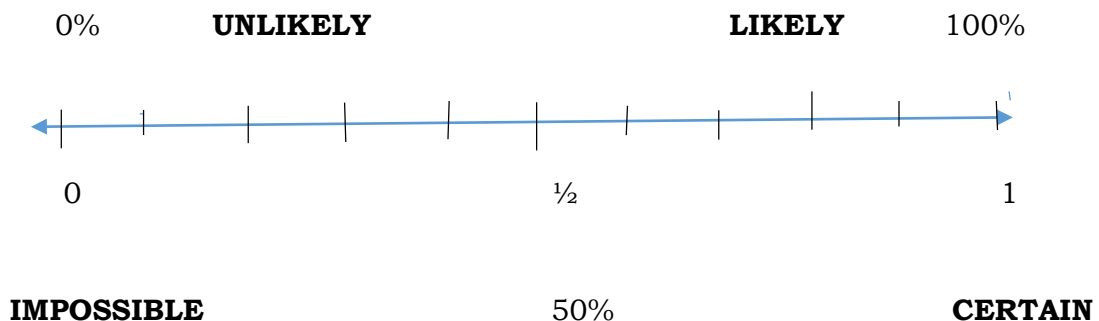
Basing from the number line, we can say that if the probability is less than ½, an event is unlikely to happen. If the probability is more than ½ the event is likely to happen. A probability of 1 means the event will certainly happen and a probability of 0 means it is impossible to happen.

What's More

Activity 1:

Directions: Read and analyze the given situation. Solve for the probability. Alphabet cards of the same size and shape were put in a bag, 3 cards have letter M, 4 cards have letter A, 2 cards have letter T and 1 card has letter H.

1. What is the total number of possible outcomes? _____
2. What is the probability of picking a:
   a. card with letter M   _____
   b. card with letter A   _____
   c. card with letter T   _____
   d. card with letter H   _____
   e. card with a vowel   _____
   f. card with a consonant   _____
   g. card with M or T   _____
   h. card with letter J   _____
   i. card with T or H   _____
   j. card with letter A or T   _____

Activity 2:

Study the cards with letters.

| I | L | O | V | E | M | A | T | H |

One card is drawn from a well-shuffled 9 letter cards. What is the probability of drawing a card having the following letter/s?
   a. L, O, V, E
   b. M, A, T
   c. I
   d. V, E
   e. Y

Activity 3:

Faye rolls two dice 100 times and records the sum of the numbers on the top faces. The results are shown below.

Rolling Two Dice											
Outcome	2	3	4	5	6	7	8	9	10	11	12
No. of times it happened	2	4	6	8	12	14	17	15	11	9	4

1. Which sum occurred least often?
2. Which sum occurred most often?
3. What is the experimental probability of getting a sum less than 5?

What I Have Learned

A. Fill in the blanks.

1. A _____ is a mathematical way of describing how likely it is that something will happen given.
2. A _____ is the outcome of interest or a result we want to happen.
3. An outcome is the result of an _____.
4. When dealing with probabilities, it is important to be able to identify all the _____.
5. When the result is what we expected, then it is the favorable outcome. The greater the probability of an event, the _____ it will occur. The smaller the probability of an event, the less likely the probability.

What I Can Do

When making important decisions in life, do you list down all the possibilities first before you make a choice, or do you quickly make decisions? Go back to your past experiences and see how much your decisions affected your life.

Directions: Analyze the given data from chance. Answer the following questions.

1. These ten names are written on slips of paper and placed in a box. One name is written at random. Find each probability.

Marissa	Segunda	Alfredo	Roy	Ezekiel
Daniel	Laurence	Vincent	Nandy	Maricel

   a. Drawing a name that begins with the letter A
   b. Drawing a name that begins with the letter M
   c. Drawing a name that ends with the letter "I"

2. A spinner is divided into four equal sections numbered 1 through 4. It is spun 100 times. It stopped at section 1 twenty-eight times, section 2 thirty-five times, section 3 twenty-five times and section 4 twelve times.

   a. Find the probability that section 3 will be spun.
   b. Find the probability that section 2 will be spun.

\
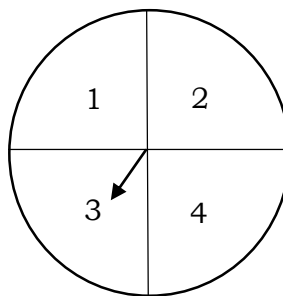
Assessment

Directions: Read and analyze carefully each statement below. Choose the letter that corresponds to the best answer. Write the chosen letter on a separate sheet of paper.

A. A card was drawn 15 times from a deck of 26 letters cards (from A to Z). The table below shows the table of outcomes from the experiment:

K	L	B	T	U
E	A	T	S	I
N	D	K	F	P

1. What is the experimental probability that a consonant is drawn?
    (A) 11/15   (B) 10/15   (C) 5/15   (D)2/15

2. What is the experimental probability that a vowel is drawn?
    (A) 2/15   (B) 1/15   (C) 4/15   (D)11/15

3. What is the experimental probability that the letter drawn is repeated?
    (A) 2/15   (B) 1/15   (C) 11/15   (D)2/15

4. What is the experimental probability that the letter drawn is X?
    (A) 2/15   (B) 10/15   (C) 3/15   (D)0/15

5. What is the experimental probability that a letter drawn is K?
    (A) 1/15   (B) 2/15   (C) 3/15   (D)4/15

B. Each of the 11 letters of the word "P R O B A B I L I T Y" is written on a separate card. The cards are placed faced face down and shuffled. A card is chosen at random. What is the probability that it will show each of the following?

6. The letter R
    (A) $\frac{1}{11}$ (B) $\frac{2}{11}$ (C) $\frac{3}{11}$ (D)2

7. A vowel
    (A) $\frac{2}{11}$ (B) $\frac{3}{11}$ (C) $\frac{4}{11}$ (D)11

8. The letter B
    (A) $\frac{2}{11}$ (B) $\frac{4}{11}$ (C) $\frac{11}{11}$ (D) 1

9. The letter y

(A) $\frac{1}{11}$ (B) $\frac{2}{11}$ (C) $\frac{11}{11}$ (D)2

10. The letter M

(A) $\frac{0}{11}$ (B) $\frac{2}{11}$ (C) $\frac{4}{11}$ (D)2

Additional Activities

You made it! Finally, you're on the last activity. Answer it all correctly so you could climb at the top and get your trophy.

Directions: Read and analyze the given problem. Solve for the probability.

1. A bag has 1 blue, 3 green, 2 red and 2 yellow marbles. Find the probability of drawing 3 green marbles?

2. A bag has 1 blue, 3 green, 2 red and 2 yellow marbles. Find the probability of drawing 1 blue marbles?

3. A coin is tossed 80 times. The coin landed on heads 46 times and on tails 34 times. Find the probability on landing on tails.

4. If you are picking a number between 1-20, what is the probability that you will pick an even number?

5. If you are picking a number between 1-20, what is the probability that you will pick number which is a multiple of three?

Answer Key

Additional Activities

1. 3/8
2. 1/8
3. 34/80 or 17/40
4. 10/20 or 1/2
5. 6/20 or 3/5

Assessment

1. A	6. A
2. C	7. C
3. A	8. A
4. D	9. A
5. B	10. A

What I Can Do

1. a.1/10   b.1/5   c. 0/10
2. a.1/4   b. 7/20

What's In

1. 5/7
2. 2/7
3. 3/7
4. 3/4
5. 1/5

Activity 3

1. 2
2. 8
3. 3/25

Activity 2:

a. 4/9   b.1/3   c.1/9   d.2/9
e. 0/9

What I Have Learned

1. probability
2. favorable outcome
3. experiment
4. possible outcome
5. more likely

What's More

Activity 1:

1.10
2. a. 3/10   b.2/5   c.1/5   d. 1/10
e. 2/5   f. 3/5   g. 1/2   h. 0.
i. 3/10   j. 3/5

What I Know

I.	II.
1. B	1. A
2. C	2. C
3. D	3. B
4. C	4. B
5. D	5. A

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century MATHletes 5 Textbook*. Quezon City: Vibal Group, Inc.

Perez, Marjoseph H.,and Donnel P. Placer,Jaime R. Burgos, 2016. 21st Century MATHletes 6 Textbook, Quezon City: Vibal Group, Inc.

Teacher's Guide Mathematics 5, K-12 Curriculum

Test Item Bank Mathematics 5

Mathematics
Quarter 4 – Module 18:
Solving Routine and Non-Routine Problems on Experimental Probability

ALTERNATIVE DELIVERY MODE

ADM

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 18: Solving Routine and Non-Routine Problems on Experimental
                                    Probability
First Edition, 2020

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Mathematics
Quarter 4 – Module 18:
Solving Routine and Non-Routine Problems on Experimental Probability

DepED

DEPARTMENT OF EDUCATION

Introductory Message

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Thank you.

What I Need to Know

Good day Mathletes! This module was designed and written to help you gain understanding and test your ability in solving routine and non-routine problems on experimental probability. You have learned that a **routine problem** is a type of problem where there is an immediate solution. A **non-routine problem**, on the other hand, is a problem which requires analysis and insights into known principles of Mathematics. It involves a relatively more challenging problem solving that involves a couple more steps than routine problems.

Probability is the Mathematics of chance. This module will help you understand solving both routine and non-routine probability problems.

At the end of this module, you are expected to:

- solve routine and non-routine problems involving experimental probability. **(M5SP-IVj-18)**

Before going any further, let us check your understanding about solving routine and non-routine problems involving experimental probability.

What I Know

Directions: Read each statement below carefully and solve the given routine and non-routine problems. Write the letter of your choice on a separate sheet of paper.

1. Experimental probability is the ratio between the actual number of times the event occurs and the total number of conducted _____.
   A) trials   B) chance   C) probable   D) experiment

2. A coin is tossed 30 times. A head appeared eighteen times. What is the experimental probability of getting a tail?
   A) $\frac{18}{30}$ B) $\frac{6}{30}$ C) $\frac{3}{5}$ D) $\frac{2}{5}$

3. You were hired as worker who checks cartons of eggs. On a certain day, you checked 15 cartons of eggs. Five of the cartons have at least one cracked egg. What is the experimental probability that a carton of eggs have at least one cracked egg?
   A) $\frac{1}{15}$ B) $\frac{1}{5}$ C) $\frac{1}{3}$ D) $\frac{3}{5}$

4. During a 24-hour period, the ratio of Pinoy pop songs played to Pinoy rap songs played on a radio station is 50:40. What is the experimental probability that the next song played is a Pinoy rap?
   A) $\frac{4}{5}$ B) $\frac{4}{9}$ C) $\frac{5}{9}$ D) $\frac{5}{4}$

For item numbers 5 & 6, please refer to the information given below.

Rollie rolled two dice 80 times and records the sum of the numbers on the top faces. The results are shown.

Rolling Two Dice											
Outcome (Sum)	2	3	4	5	6	7	8	9	10	11	12
Number of Times it Happened	2	3	5	9	11	14	12	9	7	5	3

5. What is the experimental probability of getting a sum less than 5?
   A) $\frac{9}{80}$ B) $\frac{5}{80}$ C) $\frac{1}{8}$ D) $\frac{1}{6}$

6. What is the experimental probability of getting an even-numbered sum?
   A) $\frac{1}{2}$ B) $\frac{1}{8}$ C) $\frac{28}{80}$ D) $\frac{30}{80}$

2   **CO_Q4_Mathematics 5_ Module 18**

7. A spinner has 8 slots numbered 1 to 8. You spinned the spinner 20 times with the following results:

Number on the Spinner	1	2	3	4	5	6	7	8
Number of times it lands on it	3	2	3	3	4	2	2	1

What is the experimental probability of landing on an odd number?

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{3}{5}$ D) $\frac{3}{8}$

For item number 8, please refer to the information given below.

The following bar graph shows how many pets each customer owned before entering Pedro's Pet Store today.
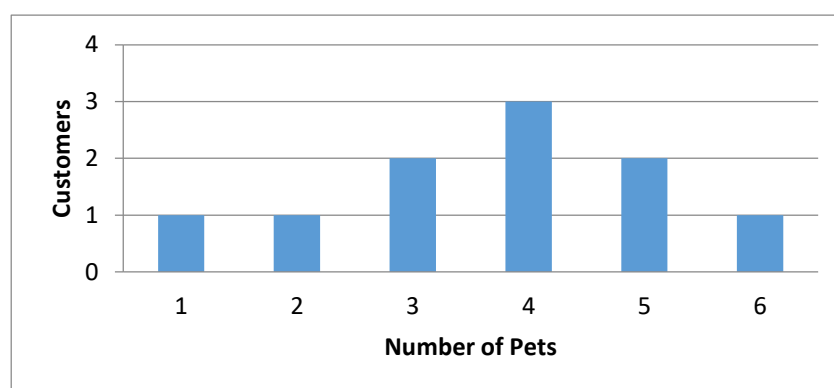
8. Based on this data, what is a reasonable estimate of the probability that the next customer to enter Pedro's Pet Store has exactly 3 pets?

A) $\frac{2}{3}$ B) $\frac{1}{5}$ C) $\frac{3}{10}$ D) $\frac{6}{10}$

9. The given frequency table at the right summarizes last week's bed sales at Rolly's Furniture. Based on this data, what is a reasonable estimate of the probability that the next bed sold is a twin bed?

Size of bed	Number of beds
Twin	33
Double	66
Queen	44
King	22

A) $\frac{1}{5}$ C) $\frac{3}{5}$

B) $\frac{2}{5}$ D) $\frac{4}{5}$

10. In a deck of 52 cards, Mario draws a card 25 times. In the 25 draws, a card in red suit was drawn 10 times. What is the probability that a black suit was drawn?

A) $\frac{10}{25}$ B) $\frac{15}{25}$ C) $\frac{10}{52}$ D) $\frac{15}{52}$

As previously introduced, **probability** is the branch of Mathematics that deals with the likelihood of the occurrence of a given event. Example events include getting a "face" when tossing a coin or getting "1" in tossing a die.

In this module you are going to learn how to solve routine and non-routine problems on experimental probability.

Experimental probability of an event is the ratio of the number of times an event occurs to the number of trials conducted. In order to determine the probability, there is a need for an actual experiment to be conducted.

But before we discuss experimental probability, let us first recall the basic concepts of simple probability.

What's In

As mentioned earlier, Probability is the Mathematics of chance. In real life, whenever we do an experiment with two possible results, two things can happen, either the one that we expect or the one that we do not. When the result is what we expected, then it is the favorable outcome. This is the fundamental concept of **simple probability**.

In simple probability, we compute the probability of a desirable or favorable event by getting the ratio of the favorable outcome to the total possible outcomes. In formula:

Probability of a favorable event = $\frac{number\ of\ favorable\ outcomes}{total\ number\ of\ possible\ outcomes}$

Let us answer the following example to help you better understand the lesson on simple probability.

Consider tossing a coin. In tossing a coin, there are two possible outcomes: head and tail. This means that there are 2 possible outcomes, head and tail only.

Let us say, you want to know the probability of getting a "head". The number of times you get a head is considered to be the favorable outcome. In getting the probability of this event, we use the equation:

Probability of a favorable event = $\frac{number\ of\ favorable\ outcomes}{total\ number\ of\ possible\ outcomes}$

Probability of getting a head = $\frac{number\ of\ head}{total\ number\ of\ possible\ outcomes}$

Probability of getting a head = $\frac{1}{2}$.

The number of **unfavorable outcomes** is the number of outcomes that is not that of what we want to get. In this case, getting a tail is unfavorable if we want to know the probability of getting tails. This means that the probability of unfavorable event is given as follows:

Probability of a unfavorable event = $\frac{number\ of\ unfavorable\ outcomes}{total\ number\ of\ possible\ outcomes}$

In our coin example, the probability of unfavorable event is:

Probability of a unfavorable event = $\frac{number\ of\ unfavorable\ outcomes}{total\ number\ of\ possible\ outcomes}$

Probability of a unfavorable event = $\frac{number\ of\ tails}{total\ number\ of\ possible\ outcomes}$

Probability of a unfavorable event = $\frac{1}{2}$

Notice that since there are only two possibilities, we get equal probabilities for both the favorable and unfavorable events. In symbols:

1 = Probability of getting unfavorable event + Probability of getting favorable event.

 What's New

From the previous lesson, you were taught on how to solve simple probability. This time, we will talk about experimental probability. As initially presented, an **experimental probability** is the ratio between the number of times an event occurs and the total number of trials made. It is determined by doing an experiment.

Let us consider an example:

It is Trick or Treat season and Maria wore her Halloween costume and went around their subdivision to collect sweets. She also wanted to know about the probability of getting 5 different kinds of treats by collecting 100 of them. She went home with 100 pieces of sweet treats in her basket. She collected 10 bubble gums, 20 mint candies, 35 strawberry candies, 25 gummy bears, and 10 coffee candies. What is the probability that she got coffee candies?

To solve this, we have:

Probability of an event = $\frac{number\ of\ times\ an\ event\ occurs}{total\ number\ of\ trials}$

Probability (getting coffee candies) = $\frac{10}{100} = \frac{1}{10}$

From the sample problem above, we can say that the probability that Maria got coffee candies in the trick or treat is $\frac{10}{100}$. So we can write the probability in simplest form to be $\frac{1}{10}$.

Let us study another example.

Mario and Jose were playing a coin and a die. Mario tossed a coin while Jose rolled a die simultaneously for 6 times. The outcomes are given in the table below:

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9
Coin	H	H	T	T	H	T	H	T	H
Die	2	5	3	1	5	3	3	4	6

Based on the outcomes, they wanted to find the probability of getting a tail and a three together.

Can you help Mario and Jose on this?

6   **CO_Q4_Mathematics 5_ Module 18**

The given problem in the previous section asks about determining the probability based on the outcome of the trials. Such is called experimental probability.

Experimental probability is the type of probability that is based on the **actual conduct of an experiment**. An **experiment** is the process of generating observations from a controlled set up. In the context of probability, it is the process of generating observations of events such as the number of times a "1" appears when a die is tossed.

Experimental probability is determined by getting the ratio between the number of times an event occurs and the total number of trials made.

In formula, we have

Experimental probability = $\frac{number\ of\ times\ an\ event\ occurs}{total\ number\ of\ trials}$

Now, that you know what experimental probability is, you can already help Mario and Jose.

Going back to the problem,

A coin is tossed and a die is rolled simultaneously for 6 times. The outcomes are given in the table below.

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9
Coin	H	H	T	T	H	T	H	T	H
Die	2	5	3	1	5	3	3	4	6

The following are steps to find the experimental probability of getting a tail and a three together.

Step 1

Understand:
- *Know what is asked:* The probability of getting a tail and a three.
- *Know the given facts:* 2 tail and a three out of 9 trials. These two outcomes are shown in trials 3 and 6.

Step 2

Plan: There are 9 trials. Two of the trials are tail and three

Use the formula, and then substitute.

- $P(E) = \dfrac{\text{number of times the event occurs}}{\text{total number of trials}}$

  where E refers to the event

Step 3

Solve:
- The probability of getting a tail and a three is $= \dfrac{2}{9}$

Step 4

Check and Look Back:
- Since there are 9 trials and the tail and a three occurs 2 times, the probability of getting tail and a three is $= \dfrac{2}{9}$

Let's take another example.

> **A bag contains 14 red marbles, 6 yellow marbles, and 10 blue marbles. Ana took a marble and returned it. After 20 trials, blue marble was picked 7 times. Find the experimental probability of getting a blue marble.**

Solution:

$$P \text{ (blue marble)} = \frac{\text{number of times the blue marble was picked}}{\text{total number of trials}} = \frac{7}{20}$$

Therefore, the experimental probability of getting a blue marble is $\dfrac{7}{20}$.

![ABC blocks icon] ***What's More***

Activity 1:

Directions: Read each problem and then solve. Write your answer on a separate sheet of paper.

Two dice are rolled twelve times and the total number of dots are added up. Here are the outcomes of the sum:

Outcomes (Sum)	4	7	12	9	8	2	4	6	5	3	10	7

1. What is the experimental probability that the sum is greater than 5?
2. What is the experimental probability that the faces with 5 and 6 dots appear?
3. What is the experimental probability that the sum is an even number?
4. What is the experimental probability that the sum is an odd number?
5. What is the experimental probability that the sum is 4?

Activity 2:

Directions: Read each problem and then solve. Follow the steps. Write your answer on a separate sheet of paper.

The table below shows the results of a card experiment. Each time a card was picked, it was returned to the bag.

Card Experiment	
Outcome	**Number**
Black	22
White	18
Blue	10

Answer the following questions relevant to the experiment:
1. How many trials of picking a card were made?
2. How many times was blue card picked?
3. What is the experimental probability of picking a black card?

Activity 3:

Directions: Determine the experimental probability. Write your answer on a separate sheet of paper.

Rock, Paper, Scissor Game
1. In 31 tries Eli beat Janine 11 times. What is the probability that Janine won?
2. In 60 tries, May won 20 times. What is the probability that May won?
3. In 40 tries, Ryan won over Ghie 10 times. What is the probability that Ghie won?

What I Have Learned

Directions: Fill in the blanks. Write your answer on a separate sheet of paper.

(1)_____ is the mathematics of chance. It is the field in mathematics that deals with (2) _____.

(3) An _____ is an activity when something is done and results are expected by chances. The uncertain result is called an (4) _____.

(5) An _____ is the ratio between the number of times the event occurs and the total number of trials.

What I Can Do

When making important decisions in life, do you list down all the possibilities first before you make a choice, or do you quickly make decisions? In real life, whenever we do an experiment, at least two things can happen, either the one we expect or the one that we do not. When the result is what we expected, then it is a favorable outcome. An outcome is the result of an experiment.

Directions: Perform the experiment, record your data in a table. Write your answer on a separate sheet of paper.

Experiment: Coin Flip

Flip a coin 20 times and record the results using the table below. Answer the questions that follow.

Trials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outcome																				

1) Which is more likely to appear in the majority, head or tail?
2) What is the experimental probability of getting heads?
3) How about tails?

Assessment

Directions: Read each statement below carefully and solve the given routine and non-routine problems. Write the letter of your choice on a separate sheet of paper.

1. _____ is the ratio between the number of times the event occurs and the total number of trials.
   A) Experimental Probability
   B) Theoretical Probability
   C) Simple Probability
   D) Experiment

2. A coin is tossed 20 times. A tail appeared twelve times. What is the experimental probability of getting a head?
   A) $\frac{12}{20}$ B) $\frac{4}{20}$ C) $\frac{3}{5}$ D) $\frac{2}{5}$

3. In a deck of 52 cards, Mario draws a card 18 times. In 18 draws a card in black suit was drawn 6 times. What is the probability that a red suit was drawn?
   A) $\frac{6}{18}$ B) $\frac{10}{18}$ C) $\frac{12}{18}$ D) $\frac{16}{18}$

4. The given frequency table at the right summarizes last week's bed sales at Khim's Furniture. Based on this data, what is a reasonable estimate of the probability that the next bed sold is a Queen bed?

Size of bed	Number of beds
Twin	30
Double	60
Queen	40
King	20

   A) $\frac{1}{15}$ C) $\frac{3}{15}$
   B) $\frac{2}{15}$ D) $\frac{4}{15}$

5. You are hired as worker that checks cartons of eggs. On a certain day, you check 20 cartons of eggs. Four of the cartons have at least one cracked egg. What is the experimental probability that a carton of eggs has at least one cracked egg?
   A) $\frac{1}{15}$ B) $\frac{1}{5}$ C) $\frac{1}{3}$ D) $\frac{3}{5}$

6. During a 24-hour period, the ratio of Pinoy pop songs played to Pinoy rap songs played on a radio station is 30:40. What is the experimental probability that the next song played is a Pinoy pop?
   A) $\frac{4}{5}$ B) $\frac{4}{7}$ C) $\frac{3}{7}$ D) $\frac{3}{4}$

7. In a spinner containing 6 slots numbered 1 to 6. You spin the spinner 15 times with the following results:

Number on the Spinner	1	2	3	4	5	6
Number of times it lands on it	3	2	3	2	4	1

What is the probability of landing on an even number?

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{5}$ D) $\frac{3}{5}$

For item numbers 8 & 9, please refer to the information given below.

Eric rolls two dice 60 times and records the sum of the numbers on the top faces. The results are shown.

Rolling Two Dice											
Outcome (Sum)	2	3	4	5	6	7	8	9	10	11	12
Number of Times it Happened	2	3	5	6	8	10	9	7	5	3	2

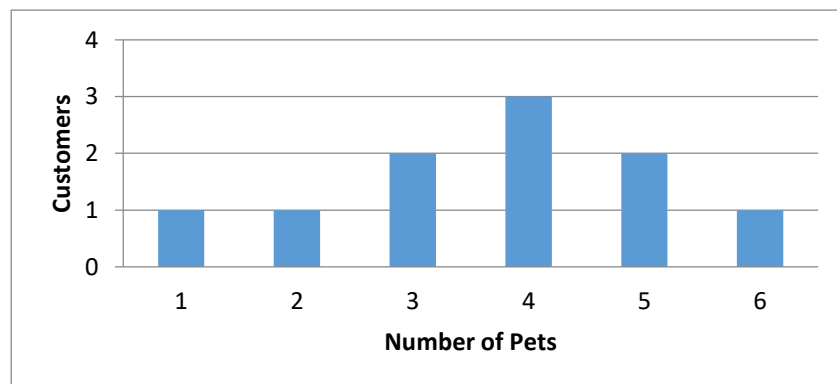8. What is the probability of getting a sum less than 6?

A) $\frac{24}{60}$ B) $\frac{2}{5}$ C) $\frac{16}{50}$ D) $\frac{4}{15}$

9. What is the experimental probability of getting an odd-numbered sum?

A) $\frac{1}{2}$ B) $\frac{1}{5}$ C) $\frac{29}{60}$ D) $\frac{31}{60}$

For item number 10, please refer to the given below.

The following bar graph shows how many pets each customer owned before entering Marc's Pet Store today.

10. Based on this data, what is a reasonable estimate of the probability that the next customer to enter Marc's Pet Store has exactly 4 pets?

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{3}{10}$

Additional Activities

Directions: Solve this problem. Write your answer on a separate sheet of paper.

1. Two dice were tossed 50 times and a sum of 6 appeared 15 times. What is the probability that the sum that is not six appeared?

2. The following table shows the length (in days) of each of the Santos family vacations.

Length of Vacation	6	2	1	5	3	3

Based on this data, what is a reasonable estimate of the probability that the next Santos family vacation lasts less than 4 days?

Mario is choosing which shirt to wear on a day. He has 5 white shirts, 7 green shirts, and 3 black shirts. What is the probability that he will **NOT** choose a green shirt?

Answer Key

What I Can Do

Experiment: Coin Flip

- The outcome would be different in every student

What I Have Learned

1. Probability
2. chances
3. experiment
4. outcome
5. experimental probability

Assessment

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

Additional Activities

1. $\frac{7}{35}$ or $\frac{10}{50}$
2. $\frac{2}{3}$ or $\frac{4}{6}$
3. $\frac{8}{15}$

What I Know

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

What's More

Activity 1

1. $\frac{7}{12}$
2. $\frac{1}{12}$
3. $\frac{7}{12}$
4. $\frac{5}{12}$
5. $\frac{2}{12}$ or $\frac{1}{6}$

What's More

Activity 2

1. 50
2. 10
3. $\frac{22}{50}$ or $\frac{11}{25}$

Activity 3

1. $\frac{31}{20}$
2. $\frac{20}{60}$ or $\frac{1}{3}$
3. $\frac{30}{40}$ or $\frac{3}{4}$

References

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Northcutt, Ellen (Ed.). 2000. *Pre-GED Mathematics*. USA: Steck-Vaughn Company