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Mathematics

Quarter 3 – Module 1:
Points, Lines, and Angles

SELF-LEARNING MODULE

Mathematics – Grade 7
Quarter 3 – Module 1: Points, Lines, Planes, and Angles
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Mathematics

Quarter 3 – Module 1:
Points, Lines, and Angles

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Introductory Message

For the facilitator:

As a facilitator, you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning at home. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

As a learner, you must learn to become responsible of your own learning. Take time to read, understand, and perform the different activities in the module.

As you go through the different activities of this module be reminded of the following:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *Let Us Try* before moving on to the other activities.
3. Read the instructions carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are done.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone. We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

Let Us Learn

Good day leaners! Today, you are going to learn and discover new concepts and skills in mathematics. To be specific, today you are expected to:

1. represent point, line and plane using concrete and pictorial models **(M7GEIIIa-1);**
2. illustrate subsets of a line **(M7GEIIIa-2);** and
3. classify the different kinds of angles **(M7GEIIIa-3).**

Let Us Try

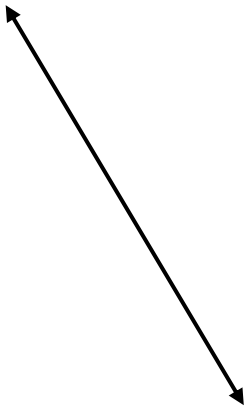
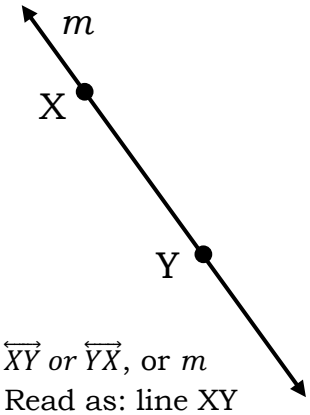
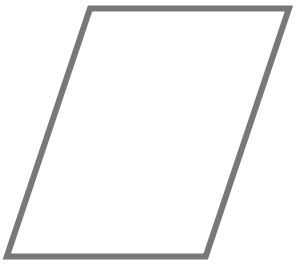
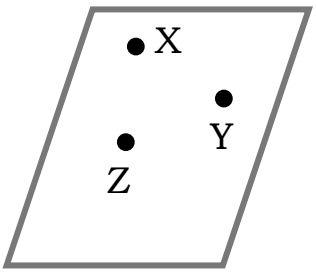
Matching Type. Match the mathematical terms in column A with their most appropriate representation in real-life in Column B.

COLUMN A	COLUMN B
1. line segment	a. vase
2. plane	b. button
3. point	c. box
	d. pencil
	e. can
	g. sheet of paper

Let Us Study

Let us learn new mathematical terms. The table shows the "undefined terms" in geometry.

TERM	ILLUSTRATION	HOW TO NAME	DEFINITION
Point	Dot •	In naming a point, we use capital letters • A Read as: Point A	A **point** is an exact position or location on a plane surface. It has no length, width, or thickness. Also, all of the figures in geometry are made up of points.

Line	Straight mark and has two arrow heads on opposite ends. The arrow heads indicate that it can be extended indefinitely. 	In naming a line, we use two capital letters with a double arrowhead above them or a lower-case letter.  $\overleftrightarrow{XY}$ *or* $\overleftrightarrow{YX}$, or m Read as: line XY line YX line m	Just like the point, a line has no width and thickness, but it has infinite length because a line consists of infinitely many points. Also, two points can determine a line, that is, we can draw a line using two points.
Plane	Slanted four-sided figure 	A plane ca be name using three capital letters formed by three noncollinear points.  Read as: Plane XYZ	A plane is a flat surface that extends infinitely in all directions. It has infinite length and width but has no thickness. A plane is named by three points in the plane that are not on the same line.

ACTIVITY 1. Draw Me!

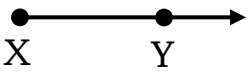
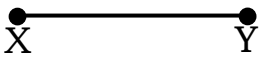
Look at the things in your house. Identify one thing at your house that represents a line, point, and a plane. After you have identified it, draw it on the space provided.

Point	**Name of the object:** _____

Line	**Name of the object:** _____
Plane	**Name of the object:** _____

SUBSETS OF A LINE

A line extends indefinitely, that is, it does not have an endpoint. This characteristic of a line enables us to form subsets. The table below, shows the subsets we can form from the line.

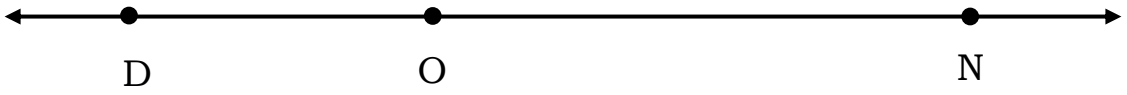
SUBSET OF A LINE	DEFINITION	PICTURE	HOW TO NAME
Ray	A **ray** is a subset of a line that has one endpoint and continues infinitely in one direction.		A ray is named using two capital letters with one arrow head above them. When labeling, always write the endpoint under the side without the arrow. Order matters in naming a ray, always write the endpoint first.  $\overrightarrow{XY}$ Read as: Ray XY
Line Segment	A **line segment** is a subset of a line that has two endpoints. Hence, a line segment has a definite length unlike a line which has indefinite length.		A line segment is named using two capital letters and a line without arrowhead above them. 

			$\overline{XY}$ or $\overline{YX}$ Read as: Line segment XY or Line segment YX

Note: *Observe that there is a difference in naming a line, ray, and line segment. The symbol above them are different.*

Example:

Name all the rays and line segments that can be formed from the line below.

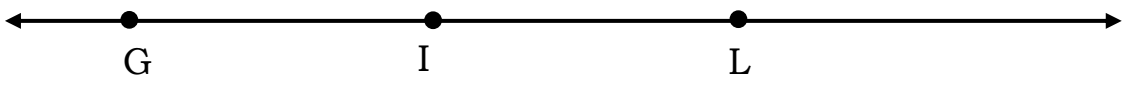


RAYS	LINE SEGMENT
1. $\overrightarrow{ON}$	1. $\overline{DO}$ or $\overline{OD}$
2. $\overrightarrow{OD}$	2. $\overline{DN}$ or $\overline{ND}$
3. $\overrightarrow{NO}$	3. $\overline{ON}$ or $\overline{ON}$
4. $\overrightarrow{ND}$	
5. $\overrightarrow{DO}$	
6. $\overrightarrow{DN}$	

Observe that there are six rays formed from the given line with 3 points. From the given example, $\overrightarrow{DN}$ is a ray since the endpoint is point D and it extends indefinitely to the right. Also, observe that DO is both a ray and a line segment, the only difference is the accent above it. Ray DO is written as $\overrightarrow{DO}$ which means that it has only one endpoint and that is point D. On the other hand, line segment DO is written as $\overline{DO}$ which means that it has two endpoints and those are points D and O. The example above demonstrates that the way you write your answer can vary. Hence, proper notations should be observed at all times.

ACTIVITY 2. Identify Me!

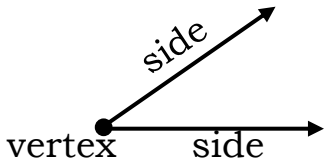
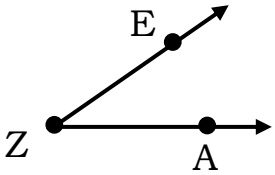
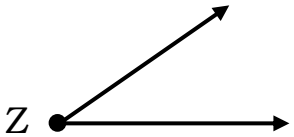
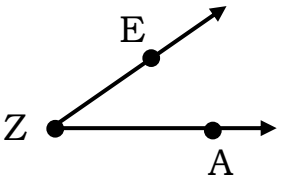
Identify all the rays and line segments formed from the given line below. Write your answers on the table provided. Observe the correct use of notations.

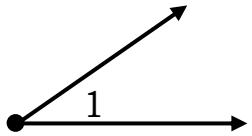


RAYS	LINE SEGMENT
1.	1.
2.	2.
3.	3.
4.	
5.	
6.	

ANGLES

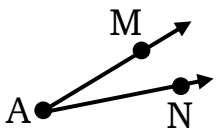
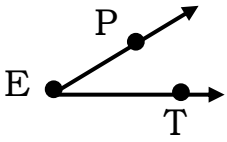
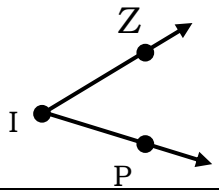
Now that you have learn what are the subsets of a line, we now proceed to the next lesson which is angles. The table below, shows its definition, illustration and how to name an angle.

	DEFINITION	ILLUSTRATION	HOW TO NAME
Angle	An **angle** is formed by two rays that share a common endpoint. This endpoint is called **vertex** and the rays are called the **sides of the angle.** Degree, denoted by °, is a unit used when measuring an angle.	 **Example:**  **Vertex:** Point Z **Sides:** $\overrightarrow{ZE}$ and $\overrightarrow{ZA}$	There are three ways in naming an angle. 1. Naming it by its vertex only.  ∠Z Read as: Angle Z. 2. Naming it by listing three letters, one from each side and the vertex at the middle.  ∠EZA or ∠AZE Read as: Angle EZA or Angle AZE **NOTE:** Observe that the middle letter SHOULD ALWAYS be the VERTEX.

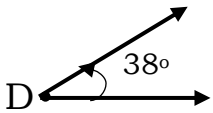
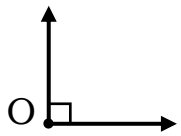
			3. Naming using a number.  ∠1 Read as: Angle 1.

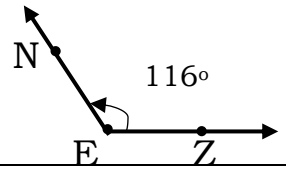
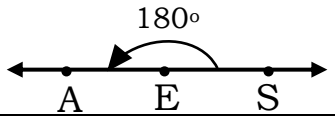
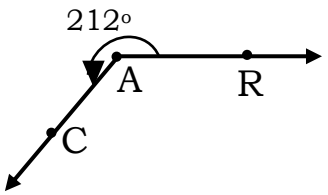
ACTIVITY 3. Name It!

Identify the parts of the given angle. Name the given angle by its vertex and by listing three letters. Remember to use proper notation.

ANGLE	VERTEX	SIDES	NAME
 	1.	1. 2.	1. 2. 3.
 	1.	1. 2.	1. 2. 3.
 	1.	1. 2.	1. 2. 3.

Now that we have defined what an angle is, we will now proceed to the different kinds of angles.

KINDS OF ANGLES ACCORDING TO DEGREE MEASURE	DEFINITION	ILLUSTRATION (Example)
1. Acute Angle	An **acute angle** is an angle whose degree measure is greater than 0^o but less than 90^o.	
2. Right Angle	A **right angle** is an angle whose degree measure is exactly 90^o.	 **Note:** the small square between the sides of ∠O indicates 90^o.

3. Obtuse Angle	An **obtuse angle** is an angle whose degree measure is greater than 90^o but less than 180^o.	
4. Straight Angle	A **straight angle** is an angle whose degree measure is exactly 180^o.	
5. Reflex Angle	A **reflex angle** is an angle whose degree measure is greater than 180^o but less than 360^o.	

ACCORDING TO PAIRS.

1. COMPLEMENTARY ANGLES

When the sum of the measurement of two angles add up to 90^o, then these angles are called **complementary angles.**

2. SUPPLEMENTARY ANGLES

When the sum of the measurement of two angles add up to 180^o, then these angles are called **supplementary angles.**

3. VERTICAL ANGLES

Vertical angles are pair of two non-adjacent angles formed by two intersecting lines.

4. ADJACENT ANGLES

Adjacent angles are two angles that share a common side and a common vertex. Also, adjacent angles do not overlap.

5. LINEAR PAIRS

Linear pairs are adjacent angles and are supplementary. This means that the sum of the measurement of the angles add up to 180^o.

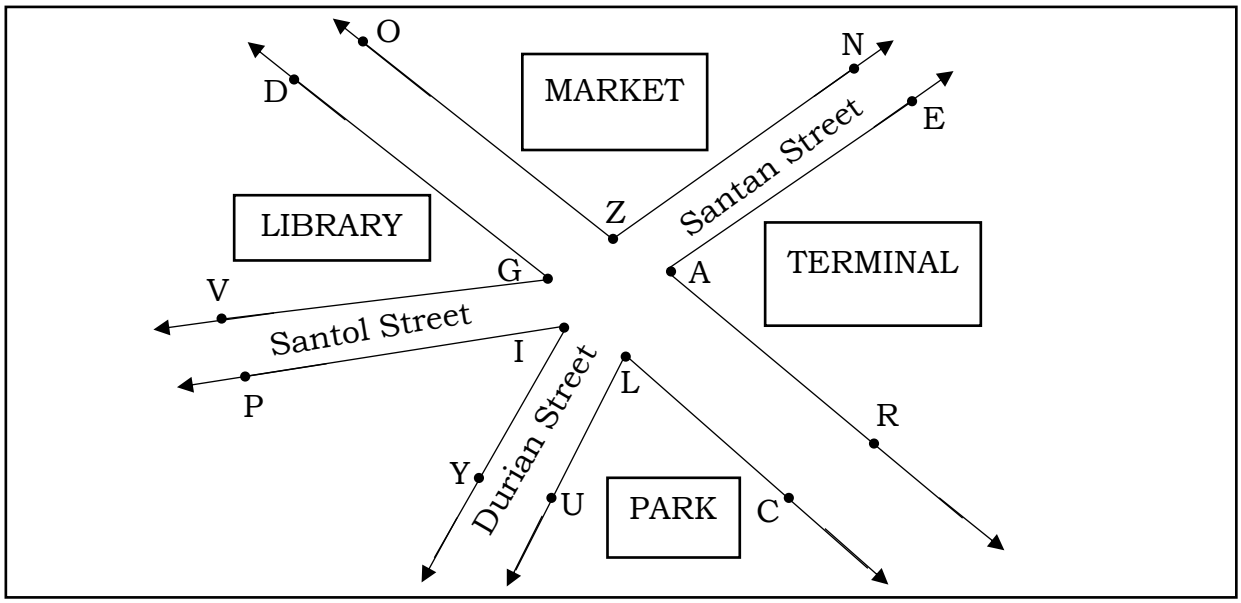
Let Us Practice

I. Identify the following geometric terms. Write your answers on the space provided before the number.

_____ 1. It has an infinite length but does not have a width and thickness.
_____ 2. It has an infinite length and width but does not have thickness.
_____ 3. It is an angle that measures exactly 90^o.
_____ 4. It is formed by two rays that have a common endpoint.
_____ 5. It is a subset of a line that has two endpoints.
_____ 6. It is an angle that measures greater than 90^o but less than 180^o.
_____ 7. It tells an exact location in a plane. It has no width, length, or thickness.
_____ 8. It is a subset of a line that has one endpoint and extends infinitely in one direction.
_____ 9. It is an angle that measures exactly 180^o
_____ 10. It is an angle that measures greater than 180^o but less than 360^o.

Let Us Practice More

Below is a map. Study the map and answer the questions that follow. Read each question carefully and remember to use proper notation in writing your answers.



I. Identification. Name all the rays, line segments, and angles found in the map. In naming the angles use only its vertex. Remember to use proper notation.

Ray	Line Segment	Angle
1.	1.	1.

2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	
7.	7.	
8	8	
9.	9.	
10.	10.	

II. Analyze the map then answer the following questions. Write the answer provided before each number. Remember to use proper notation.

_____ 1. What is the name of the angle to which the library is located? (Use listing by three letters)

_____ 2. What are the rays that forms Santol Street?

_____ 3. What angle is the terminal located? (Use vertex)

_____ 4. What line segments form Durian Street?

_____ 5. What rays form the Santan Street?

Let Us Remember

Let us summarize the terms you have encountered in this module:

1. A point is represented by a dot. It has no width, length, or thickness.
2. A line has a length but does not have width or thickness.
3. A plane has an infinite length and width but does not have thickness.
4. A ray is a subset of a line that has one endpoint and extends infinitely in one direction.
5. A line segment is a subset of a line that has two endpoints.
6. An angle is formed by two rays that share an endpoint.
7. An acute angle is an angle whose measure is greater than 0° but less than 90°.
8. A right angle is an angle whose measure is exactly 90°.
9. An obtuse angle is an angle whose measure is greater than 90° but less than 180°.
10. A straight angle is an angle whose measure is exactly 180°.
11. A reflex angle is an angle whose measure is greater than 180° but less than 360°.
12. Complementary angles are pair of angles whose sum is equal to 90°.
13. Supplementary angles are pair of angles whose sum is equal to 180°.
14. Vertical angles are pair of two non-adjacent angles formed by two intersecting lines.
15. Adjacent angles are two angles that share a common side and a common vertex. Also, adjacent angles do not overlap.
16. Linear pairs are adjacent angles and are supplementary. This means that the sum of the measurement of the angles add up to 180^o.

Let Us Assess

Choose the letter that best answers the question. Write your answer on the space provided before each number.

_____ 1. What is the pictorial representation of a point?
a. dot b. slanted four-sided figure c. straight mark d. paper

_____ 2. Which of the following is NOT a characteristic of a plane?
a. width b. length c. thickness d. flat surface

_____ 3. What type of angle has a measurement of 89.9°?
a. obtuse b. acute c. right d. straight

_____ 4. How does line being named?
a. using one point b. using two points
c. using three noncollinear points d. using the vertex

_____ 5. What type of angle has a measurement of 90.1°?
a. obtuse b. acute c. right d. straight

_____ 6. What type of angle has measurement of 90°?
a. straight b. reflex c. acute d. right

_____ 7. What type of angle measures 267.5°?
a. right b. obtuse c. reflex d. straight

_____ 8. What do you call the relationship formed by two angles if their measurement adds up to 90°?
a. Supplementary Angles b. Complementary Angles
b. Congruent Angles d. Vertical Angles

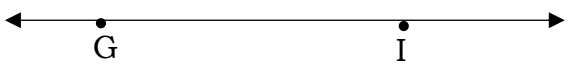
_____ 9. What do you call the relationship formed by two angles if their measurement adds up to 180°?
a. Supplementary Angles b. Complementary Angles
b. Congruent Angles d. Vertical Angles

_____ 10. What do you call the angles that share a common side and a common vertex and does not overlap?
a. Adjacent Lines b. Vertical Angles
c. Linear Pair d. Adjacent Angles

_____ 11. What do you call the angles that are formed by intersecting lines and are non-adjacent?
a. Perpendicular Lines b. Adjacent Angles
c. Vertical Angles c. Linear Pair

_____ 12. What do you call the angles that are adjacent and are supplementary?
a. Complementary Angles b. Vertical Angles
c. Linear Pair d. Adjacent Angles

_____ 13. Dona was asked to name the figure below.



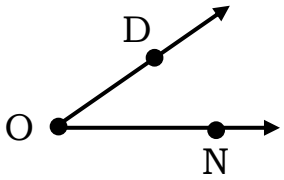
Her answer was $\overleftrightarrow{IG}$. Was her answer correct? Why or why not?

a. No, her answer was incorrect. She interchanged the letters in naming the line.

b. No, her answer was incorrect. She incorrectly used the two arrowheads above the name.

c. Yes, her answer was correct. The arrangement of the letters does not matter in naming a line.
d. There is insufficient information.

_____ 14. Gil named the given angle ∠ODN. Was his answer correct? Why or why not?



a. Yes, his answer was correct. The arrangement of the letters does not matter.
b. No, his answer was incorrect. The middle letter should have been point O.
c. No, his answer was incorrect. O and N should be interchanged.
d. Yes, his answer was correct. There is right way in naming an angle.

_____ 15. Earl was asked if an angle that measures of 89.99º is a right angle. He answered yes and reasoned out that 89.99° can be rounded up to be 90°. Thus, classifying it as a right angle. Was his answer correct? Why or why not?

a. Yes, because 89.99° can be rounded up to be 90°.
b. No, because an angle has a fix measurement, hence an angle with 89.99° is an acute angle.
c. Maybe.
d. There is insufficient information.

Let Us Enhance

Perform the given task below. READ all the instructions first before performing the task. Rubric is given for your guidance.

1. In you answer sheet, draw a point and name it G.
2. From point G, draw a line with a measurement of 3 inches and name the second endpoint, I.
3. From point I, draw another line by extending the previously drawn line. Make sure that the measurement of this extended line is 2 inches and name the endpoint, L.

Rubric

10	5	1
The student had completed the task with accurate and correct measurement and labels.	The student had completed the task with correct labels, but the measurements are inaccurate.	The student attempted to answer the problem but did not finish it.

Let Us Reflect

This module had discussed several geometric concepts: point, line, plane and angles. These concepts were the building blocks of geometry as figures were formed using them. There are a lot of real-life application that these were found. Example of which are our pictures or photos. Picture and photos were formed using millions of tiny dots that turned to images. Lines are almost found everywhere. In every corner of your house, you can find a line. Planes and angles are also found in our house and our communities. These concepts though thought as very basic has always been very helpful to each and every one of us.

The table below contains words of encouragement. Look for these words and combine them to form a phrase. If you found a word, cross it out by drawing a line on the word.

X	**T**	**Y**	**P**	**W**	**L**
F	**H**	**G**	**O**	**O**	**D**
K	**C**	**J**	**I**	**R**	**M**
I	**E**	**K**	**L**	**K**	**S**
T	**H**	**E**	**H**	**S**	**A**
B	**H**	**U**	**P**	**V**	**K**

Phrase: _____

Answer Key

Let Us Practice More

I.

RAYS	LINE SEGMENT	ANGLE
1. $\overrightarrow{GV}$	1. $\overline{GV}$	1. ∠ G
2. $\overrightarrow{IP}$	2. $\overline{IP}$	2. ∠ I
3. $\overrightarrow{IY}$	3. $\overline{IY}$	3. ∠ L
4. $\overrightarrow{LU}$	4. $\overline{LU}$	4. ∠ A
5. $\overrightarrow{LC}$	5. $\overline{LC}$	5. ∠ Z
6. $\overrightarrow{AR}$	6. $\overline{AR}$	
7. $\overrightarrow{AE}$	7. $\overline{AE}$	
8. $\overrightarrow{ZN}$	8. $\overline{ZN}$	
9. $\overrightarrow{ZO}$	9. $\overline{ZO}$	
10. $\overrightarrow{GD}$	10. $\overline{GD}$	

II.

1. ∠ DGV or ∠ VGD
2. $\overline{GV}$ and $\overrightarrow{IP}$
3. ∠ A
4. $\overrightarrow{IY}$ and $\overrightarrow{LU}$
5. $\overline{ZN}$ and $\overline{AE}$

Let Us Practice

1. line	6. Obtuse angle
2. plane	7. point
3. right angle	8. ray
4. angle	9. Straight angle
5. line segment	10. Reflex angle

Activity 2

Rays	Line Segment
1. $\overrightarrow{GI}$	1. $\overline{GI}$ or $\overline{IG}$
2. $\overrightarrow{GL}$	2. $\overline{GL}$ or $\overline{LG}$
3. $\overrightarrow{IL}$	3. $\overline{IL}$ or $\overline{LI}$
4. $\overrightarrow{LI}$	
5. $\overrightarrow{LG}$	
6. $\overrightarrow{IG}$	

Activity 3

Vertex	Sides	Name
1. • A or Point A	1. $\overrightarrow{AM}$ 2. $\overrightarrow{AN}$	1. ∠ A 2. ∠ MAN 3. ∠ NAM
2. • E or Point E	1. $\overrightarrow{EP}$ 2. $\overrightarrow{ET}$	1. ∠ E 2. ∠ PET 3. ∠ TEP
3. • I or Point I	1. $\overrightarrow{IZ}$ 2. $\overrightarrow{IP}$	1. ∠ I 2. ∠ ZIP 3. ∠ PIZ

Activity 1

Answers May Vary

Let Us Try

1. d
2. g
3. b

Let Us Assess

1. a
2. c
3. b
4. b
5. a
6. d
7. c
8. b
9. a
10. d
11. c
12. c
13. c
14. b
15. b

Let Us Enhance

X	T	Y	P	W	L
F	H	G	O	Q	D
K	C	J	I	R	M
I	E	K	L	K	S
T	H	E	H	S	A
B	H	U	P	V	K

Phrase: KEEP UP THE GOOD WORK

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