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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 2
Lesson
2

Lesson Exemplar for Mathematics Grade 7
Quarter 2: Lesson 2 (Week 2)
SY 2024-2025

Development Team

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MATHEMATICS / QUARTER 2 / GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners should have knowledge and understanding of conversion of units of measure.
B. Performance Standards	By the end of the quarter, the learners are able to convert units of measure from different systems of measure. (MG)
C. Learning Competencies and Objectives	***The learners convert units of measure within International System of Units (SI) and across different systems of measure.*** 1. The learners identify the different systems of units of measure: traditional or non-standard, English System, and Metric System. 2. The learners measure length, weight, and capacity using non-standard units, English units and Metric units.
D. Content	Systems of Units of Measure
E. Integration	Cultural Integration or Ethnomathematics

II. LEARNING RESOURCES
Learning Resource Portal. (2022, July 5). Self-Learning Module- Quarter 2-Mathematics: Grade 7, Module 1: Approximating Measurement. https://lrmds.deped.gov.ph/detail/21723 Learning Resource Portal. (2022, July 5). Self-Learning Module- Quarter 2-Mathematics: Grade 7, Module 2: Solving Problems Involving Conversion of Units. https://lrmds.deped.gov.ph/detail/21723

III. TEACHING AND LEARNING PROCEDURE		**NOTES TO TEACHERS**
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** **Option 1: Class Discussion** 1. Ask the learners if they have ever measured an object before. The measuring tool and unit of measure they used. 2. Ask the learners what the role of measurement in everyday life is.	**(5 minutes)** Option 1 activity can be done for 5 minutes as a whole class discussion.

	Option 2: "Measurement Scavenger Hunt" Activity (for more engaging activating knowledge activity) Start by explaining the scavenger hunt's purpose, which is to apply measurement skills in real-world scenarios. Briefly review the concepts of measurement, including units (e.g., inches, centimeters, or meters), tools (rulers or tape measures), and the importance of consistency. Then, discuss the importance of accurate measurements in various contexts, such as science (e.g., laboratory, medicine, or pharmacy), construction, and everyday life (e.g., cooking) Explain the scavenger hunt task: students will work in small teams to find objects within the school or classroom to measure. Provide a list of specific objects for them to find and measure. These objects should vary in size and shape (e.g. a door, a window, a textbook, or a pencil). Instruct students to record the measurements in their worksheets. Organize students into teams with 4 to 6 members, ensuring that each team has a ruler or tape measure, worksheet, and pencil. Instruct each team to start their scavenger hunt. Teams should locate the specified objects, measure them accurately, and record the measurements along with the units used (e.g., inches or centimeters). Encourage teams to work collaboratively and discuss their findings as they progress. Reconvene the class and discuss the scavenger hunt. Then, allow each team to share their measurements and any interesting observations or challenges they encountered. Guide the students in analyzing the data collected during the scavenger hunt. Discuss concepts like the range of measurements, comparing objects' sizes, and identifying any patterns or trends. Engage the class in a discussion about the importance of measurement in everyday life. Ask the following questions for discussion: 1. How did the scavenger hunt help you understand the role of measurement in the real world? 2. Why is accurate measurement important in various professions? 3. Can you think of situations where incorrect measurements could lead to problems? Have students reflect on what they learned from the scavenger hunt and how they can apply measurement skills in their daily lives. **2. Feedback (Optional)**	**(20 minutes)** Option 2 activity may be done for 20 to 30 minutes but it can be extended. You may opt to have 5 objects up to 10 objects only. Reduce the number of objects to reduce the time to be spent on this activity.

B. Establishing Lesson Purpose	**1. Lesson Purpose** **Option 1: Whole Class Discussion** **Questions for discussion:** 1. Ask the learners why it is important to know the different units of measurement and when to use them appropriately. 2. Ask the learners why accurate measurement is important in various professions. Tell the learners that for the whole week, they will be learning about the different systems of units of measure and measure objects using these units. **Option 2: "Measure and Build Project"** (for those who wanted to have a more student-centered, engaging, and authentic activity for their learners) Start by discussing the importance of accurate measurements in construction and engineering. Explain that the learners will be working on a "Measure and Build" project where they will create a structure based on specific measurements. Provide a project overview with clear instructions. Using the provided materials, you can ask the learners to design and build a bridge, tower, or house. For example: Design and build a Miniature Bridge. Students sketch their design on the worksheet considering the following: Length: How long will the bridge be in inches or centimeters? Height: How tall should the bridge's arch or supports be? Width: How wide should the bridge be? Arch Design: Will the bridge have an arch or other structural features? Have students practice taking measurements using rulers or tape measures. Teach them how to measure and record dimensions accurately. Emphasize the importance of using consistent units (e.g., inches or centimeters). Distribute the building materials to the learners and instruct them to start building their structures, following their design and using accurate measurements. Encourage the learners to collaborate, problem-solve, and adjust as needed. After completing their structures, each group presents their project to the class, discusses the challenges they faced and how they resolved them, and explains their design choices and how measurements were crucial in the construction.	**(5 minutes)** Option 1 activity can be done for 5 minutes as a whole class discussion. **(30 minutes)** Option 2 activity is for 30 minutes to 45 minutes. The construction part may be given as a homework. If you opt to use Option 2 in 'Activating Prior Knowledge' and Option 2 in 'Establishing Lesson Purpose', the two activities are allotted for Day 1. Encourage students to collaborate within their teams (4 to 6 members), discuss design ideas, and make preliminary measurements based on their designs. During construction, have the learners check their structure's dimensions to ensure accuracy.

	Questions for discussion: 1. How did accurate measurements impact the success of your project? 2. What challenges did you encounter during the construction phase, and how did you overcome them? 3. Why is precision important in real-world construction and engineering projects? **2. Unlocking Content Area Vocabulary** **Non-standard Units of Measure** are informal or customary units that can vary from one person to another or from one region to another.	
C. Developing and Deepening Understanding	**SUB-TOPIC 1: History of Measurement and Non-standard Units of Measure** **1. Explicitation** Measurement is a fundamental aspect of human civilization, and its development has played a crucial role in shaping our understanding of the world. From ancient civilizations to the modern scientific era, the evolution of measurement has been a fascinating journey. The origins of measurement can be traced back to ancient civilizations. In Mesopotamia, Egypt, and the Indus Valley, early humans developed primitive systems of measurement based on body parts or natural objects like grains and stones. Egyptians, for example, used the cubit (the length from the elbow to the tip of the middle finger) for measuring lengths. Non-standard units of measurement, sometimes referred to as informal or customary units, have a rich history in human civilization. These units are unique because they lack the standardized and universally recognized measurements found in systems like the Metric and English systems. Instead, non-standard units often reflect the ingenuity and adaptability of people throughout time. They are based on everyday objects, body parts, or localized traditions, making them both fascinating and challenging when it comes to precise measurement. Non-standard units of measure can vary from one person to another or from one region to another. These unconventional units continue to influence our daily lives and how we understand the world. **2. Worked Example** 1. Cubit: used by various ancient civilizations, the cubit was based on the length of a person's forearm from the elbow to the tip of the middle finger. It was commonly used to measure lengths in construction and architecture.	**(20 minutes)** Note: (Day 2 will begin here, if Option 2 activities are given to learners in the previous day. Manage your time allotment for each task so that you will be able to finish the remaining tasks for the next three days). Show images or visual aids of historical tools, such as the Egyptian cubit rod or the Babylonian ruler made of wood or stone. Explain that they were used for various measurements, including length, area, and volume.

	2. Span: The span was typically the width of a person's hand, measured from the tip of the thumb to the tip of the little finger. It was used for measuring cloth, as the width was easily visualized by the human hand. 3. Foot: The foot, as the name suggests, was originally based on the length of a person's foot. It was a common unit for measuring shorter lengths in everyday life and construction. 4. Fathom: Used by sailors, a fathom equaled the span of a person's outstretched arms, typically about six feet. It was used to measure the depth of water and depth in nautical contexts. In the Philippines, like many other parts of the world, non-standard units of measure have been used traditionally for various purposes. Here are a few examples of non-standard units that were historically used or are still occasionally referenced informally: 1. *Kaban* or Cavan: The *kaban* is a traditional unit of dry measure used for rice. It represents a traditional volume of rice grain, often equivalent to 50 kilograms. While it is not standardized and varies by region, it is a common reference for rice trade. 2. Dipper or *Tabo*: In rural areas, people might use a dipper as an informal unit of measuring liquids. It is often used for transferring water or other liquids and is not precisely standardized. 3. *Tumpok*: This refers to a stack or pile of items, such as firewood, bananas, or coconuts. While not a precise measurement, it is commonly used in daily life for selling and trading goods. 4. Step: In some areas, people use the step as an informal unit of length. For example, they might say that a location is "two steps away" to give a rough idea of distance.	
	3. Lesson Activity Activity 1: Non-Standard Units of Measure Introduce the idea of traditional or non-standard units of measure used in different cultures worldwide. Show some examples from various cultures to pique students' interest. Ask students if they are aware of any local traditional units of measure used in their community or culture. Discuss any units they may know, and if possible, invite community members to share their knowledge. If traditional units are known, provide students with the opportunity to learn and practice using them in the classroom. After measuring, discuss the challenges and	**(20 minutes)** Divide the class into small groups with 3 to 5 members and provide each group with a list of common classroom objects (e.g. books, desks, chairs). Ask each group to identify and use traditional or non-standard units to measure the objects

	advantages of using traditional units compared to standard units. Emphasize the cultural significance of these units. **Questions for discussion:** 1. What traditional units were used? 2. Were there variations in measurements within the group? (This will lead to the discussion about the precision or traditional units compared to standard units. 3. How do traditional units reflect the history and traditions of their community or culture? 4. Are there advantages to using traditional units in specific situations? **DAY 2** **SUB-TOPIC 2: English System of Measurement: Length, Weight, and Capacity** **1. Explicitation** English System of Measurement, also known as the Imperial System, is a historical and culturally significant system of measurement that has been used primarily in the United States and, to a lesser extent, in the United Kingdom. This system is characterized by its unique units for measuring length, weight, and capacity, which can be quite different from the standardized metric system used in many other parts of the world. . **2. Worked Example** Within the English System, we encounter units like inches, feet, pounds, and gallons, each playing a crucial role in various aspects of daily life, from measuring a person's height to weighing groceries or calculating the volume of liquid in a recipe. Understanding this system is essential for practical purposes, especially when navigating everyday tasks in regions where it continues to be the prevailing measurement system. Key units in the English System for length, weight, and capacity. The English System or U.S. System of measurement uses the inch, foot, yard, and mile to measure length. The most common units of weight in the English measurement system are the ounce, the pound, and the ton. Units of capacity are generally used to measure liquids. The number of gallons of gasoline needed to fill a gas tank in a car, the number of cups of water needed in a bread recipe, and the number of quarts of milk sold each day at a supermarket are all examples of using units of capacity	you've provided. Encourage them to collaborate and record their measurements. Use the discussion as an opportunity to emphasize the importance of cultural diversity and the preservation of cultural heritage, especially in the context of measurement. Highlight the idea that different cultures have unique and valuable approaches to measurement. Begin Day 2 with recalling of concepts covered in the previous day. **(15 minutes)**

3. Lesson Activity

Activity 2: English System of Measurement

Create a list of common supermarket products typically found in the Philippines. Include a variety of items that locals are familiar with, such as bags of rice, canned sardines, mangoes, and packs of instant noodles.

Explain to the students that you will have a Supermarket Unit Challenge to familiarize them with English units of measurement for length, weight, and capacity, focusing on products commonly found in local supermarkets.

Instruct the students to discuss and decide whether each product is typically measured in inches, feet, yards, ounces, pounds, fluid ounces, pints, quarts, or gallons. They should write their chosen unit next to each product on the list. Once the groups have completed their lists, gather the class together. Then, each group shares and discusses the reasoning behind their choices.

Questions for discussion:

For Length	For Weight	For capacity
a. Why did your group associate specific products with inches, feet, or yards?	a. What led your group to decide whether each product should be measured in ounces or pounds?	a. How did you determine the capacity units (fluid ounce, cup, pint, quart, gallon) for the products?
b. What features of the products influenced your choices?	b. Did the size or packaging of the products play a role in your decisions?	b. Were there any products where this was particularly challenging?
c. Can you think of other products commonly found in supermarkets that can be measured in inches, feet, or yards?	c. Are there any supermarket items that you believe could be measured in tons? Why or why not?	c. Can you think of other supermarket products or beverages that might be measured in different capacity units?

International System of Units or Metric System

The world thrives on measurement. Whether we're calculating the distance to a destination, the weight of an object, or the volume of a liquid, measurement is an integral part of our daily lives. To ensure that measurements are consistent

(20 minutes)
Create a list based on the common products sold in your local supermarket.

Divide the class into small groups or pairs and distribute the list of Philippine supermarket products to each group.

(15 minutes)
If not finished in 15 minutes, continue the discussion the next day.

and universally understood, the scientific community and global industries have adopted a standardized system known as the International System of Units, or SI for short.

The SI system, often referred to as the metric system, is a rational and comprehensive system of measurement that simplifies the complexities of measuring various physical quantities. It is the most widely used system of measurement worldwide, utilized not only in science but also in everyday contexts. Understanding the SI units and the principles behind them is essential for effective communication and cooperation in today's interconnected world.

SI units or metric units for length, weight, and capacity: The basic unit of length in the metric system is the meter. A meter is slightly longer than a yard. It is approximately 39.37 inches long.

In scientific and technical areas, a careful distinction is made between weight and mass. Weight is really a measure of the pull of gravity. The farther from Earth an object gets, the less it weighs. However, mass is a measure of the amount of substance in the object and does not change. The basic unit of mass/weight in the metric system is the gram. The basic unit of capacity is liter. A liter is the capacity or volume of a cube measuring 10 centimeters on each side.

The metric system uses prefixes to indicate what part of the basic unit of measure is being used. For example, in millimeter, the prefix *milli* means "one thousandth" of a meter.

The following are the metric prefixes and their meaning:

a. "milli" means 0.001
b. "centi" means 0.01
c. "deci" means 0.1
d. "deka" means 10
e. "hecto" means 100
f. "kilo" means 1,000

Other units of length, mass/weight, and capacity with prefixes are shown in the following tables:

Metric Units of Length
1 **kilo**meter (km) = 1000 meters (m)
1 **hecto**meter (hm) = 100 m
1 **deka**meter (dam) = 10 m
1 meter (m) = 1 m
1 **deci**meter (dm) = 1/10 m or 0.1 m
1 **centi**meter (cm) = 1/100 m or 0.01 m
1 **milli**meter (mm) = 1/1000 m or 0.001 m

Metric Units of Mass
1 **kilo**gram (kg) = 1000 grams (g)
1 **hecto**gram (hg) = 100 g
1 **deka**gram (dag) = 10 g
1 gram (g) = 1 g
1 **deci**gram (dg) = 1/10 g or 0.1 g
1 **centi**gram (cg) = 1/100 g or 0.01 g
1 **milli**gram (mg) = 1/1000 g or 0.001 g

Metric Units of Capacity
1 **kilo**liter (kl) = 1000 liters (L)
1 **hecto**liter (hl) = 100 L
1 **deka**liter (dal) = 10 L
1 liter (L) = 1 L
1 **deci**liter (dl) = 1/10 L or 0.1 L
1 **centi**liter (cl) = 1/100 L or 0.01 L
1 **milli**liter (ml) = 1/1000 L or 0.001 L

Remind students that while they may not frequently use English units in daily life, the activity introduces them to these units and their associations with common supermarket products.

This exposure helps students develop the ability to compare and contrast units, a skill that is valuable when transitioning to the metric system. Students can identify similarities and differences between English and metric units.

DAY 3

SUB-TOPIC 3: SI System or Metric System

3. Lesson Activity

Set up several measurement stations within the classroom, each equipped with the necessary measuring tools:

- A station with metric rulers or meter sticks for measuring length.
- A station with kitchen scales or balances for measuring mass/weight.
- A station with graduated cylinders for measuring capacity.

Place a variety of everyday objects at each station that students can measure. Ensure that the objects are safe and suitable for measurement in the respective categories (length, mass/weight, or capacity).

Instruct the students to:

- Measure the length of an object using the metric ruler or meterstick. Record the measurement in centimeters and millimeters.
- Measure the mass of an object using the kitchen scale or balance. Record the measurement in grams.
- Measure the volume of a liquid (e.g., water) using the graduated cylinder. Record the measurement in milliliters.

Gather the students together as a class and discuss their findings. Ask each group to share the measurements they took and the objects they measured.

Guide questions for discussion:

For Length Measurement	For Mass Measurement	For Volume Measurement
a. What objects did you measure for length, and what were your measurements in centimeters and millimeters?	a. What objects did you measure for mass, and what were your measurements in grams?	a. What liquid did you measure for volume, and what were your measurements in milliliters?
b. How did the use of metric rulers or meter sticks simplify the process of measuring length?	b. How did the use of kitchen scales or balances simplify the process of measuring mass?	b. How did the use of graduated cylinders simplify the process of measuring volume? What are

Begin Day 3 with recalling of concepts covered in the previous day (or continue your discussion from where you stopped in the previous day).
(35 minutes)

To reduce time, you may place one object to measure for each station. (This is recommended for those who used Option 2 activities in A and B)

Divide the students into small groups with 3 to 5 members and assign each group to one of the measurement stations. Rotate the groups through each station to allow them to explore all three categories of measurements: length, mass/weight, and capacity.
Encourage students to use appropriate metric prefixes when recording their measurements.

Guide a class discussion to reinforce key concepts, such as the use of metric units, the importance of precision, and the role of metric prefixes in scaling measurements.

	What are the advantages of using the metric system for length measurements?	What are the advantages of using the metric system for mass measurements?	the advantages of using the metric system for volume measurements?
	c. Can you identify any patterns or trends in the length measurements of different objects? Were there any objects where you needed to use a specific metric prefix?	c. Did you encounter any objects where the mass measurement was close to a whole number, making it easier to express in grams? Discuss this concept.	c. Can you compare the volume of different liquids or quantities of the same liquid using milliliters as a common unit? How does the metric system help in these comparisons?

D. Making Generalizations

1. Learners' Takeaways

Guide for generalization or summary of the lesson:

Complete the 3-Column Chart. For each column, students should:

a. summarize their understanding of the units; and

b. list and describe various units for length, weight, and capacity.

Non-standard Units	English Units	Metric Units

2. Reflection on Learning

Are there any challenges and misconceptions you encountered while studying the lesson?

(15 minutes)

Allow students to do this activity either individually or collaboratively.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHER
A. Evaluating Learning	**DAY 4** **1. Formative Assessment** A. Multiple-Choice Test 1. What are non-standard units of measurement? a) Units used exclusively in science b) Units based on powers of 10 c) Creative and everyday units not part of the formal system 2. Which of the following is an English unit of length? a) Meter b) Centimeter c) Inch 3. Which metric unit is most commonly used for measuring the mass of a small apple? a) Milligram b) Gram c) Kilogram 4. If you want to measure the volume of a small container of juice, which unit would you choose? a) Fluid ounce b) Milliliter c) Liter 5. How many centimeters are in 1 meter? a) 10 cm b) 100 cm c) 1,000 cm 6. Which metric unit is used for measuring the mass of a human body? a) Milligram b) Gram c) Kilogram 7. Which of the following is a common non-standard unit of length? a) Kilometer b) Footstep c) Yard 8. In the English system, what unit is used to measure the volume of a swimming pool? a) Quart b) Gallon c) Liter 9. If you want to measure the length of a pencil, which unit would you choose? a) Inch b) Millimeter c) Meter	**Answer for A:** 1. c 2. c 3. b 4. b 5. b 6. c 7. b 8. b 9. a 10. c

10. How does the metric system simplify unit conversions compared to the English system?
    a) By using confusing prefixes
    b) By using the same units for length, mass, and volume
    c) By using a base-10 system

B. Short-Answer Questions
1. Provide an example of a non-standard unit of measurement and explain its use.
2. Compare and contrast the metric system and the English system of units, highlighting their key differences.
3. You need to measure the length of a piece of ribbon. Explain why using millimeters might be more precise than using centimeters.

Rubric for Short-Answer Questions:

Excellent (3 points)	**Good (2 points)**	**Limited (1 point)**	**Poor (0 point)**
The response is clear and complete, and it demonstrates a deep understanding of the topic. It includes accurate and relevant information.	The response is somewhat clear and demonstrates a basic understanding of the topic. It includes some accurate and relevant information but may lack depth or detail.	The response is unclear or lacks essential information, demonstrating a limited understanding of the topic.	The response is incorrect, irrelevant, or incoherent.

2. Homework (Optional)

The teacher may give homework to master the lesson.

B. Teacher's Remarks	*Note observation on any of the following areas:*	**Effective Practices**	**Problems Encountered**	The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies,
	strategies explored			

	materials used			materials used, learner engagement, and other related stuff. Teachers may also suggest ways to improve the different activities explored/lesson exemplar.
	learner engagement/ interaction			
	others			
C. Teacher's Reflection	*Reflection guide or prompt can be on:* • *principles behind the teaching* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* • *students* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* • *ways forward* *What could I have done differently?* *What can I explore in the next lesson?*			Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.