

Just in Time Quick Check

Standard of Learning 4.MG.1

Strand: Measurement and Geometry

Standard of Learning 4.MG.1

The student will reason mathematically to solve problems, including those in context, that involve length, weight/mass, and liquid volume using U.S. Customary and metric units.

Students will demonstrate the following Knowledge and Skills:

- a) Determine an appropriate unit of measure to use when measuring:
 - i) length in both U.S. Customary (inch, foot, yard, mile) and metric units (millimeter, centimeter, meter);
 - ii) weight/mass in both U.S. Customary (ounce, pound) and metric units (gram, kilogram); and
 - iii) liquid volume in both U.S. Customary (cup, pint, quart, gallon) and metric units (milliliter, liter).
- b) Estimate and measure:
 - i) length of an object to the nearest U.S. Customary unit ($\frac{1}{2}$ inch, $\frac{1}{4}$ inch, $\frac{1}{8}$ inch, foot, yard) and nearest metric unit (millimeter, centimeter, or meter);
 - ii) weight/mass of an object to the nearest U.S. Customary unit (ounce, pound) and nearest metric unit (gram, kilogram); and
 - iii) liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and nearest metric unit (milliliter, liter).
- c) Compare estimates of length, weight/mass, or liquid volume with the actual measurements.
- d) Given the equivalent measure of one unit, solve problems, including those in context, by determining the equivalent measures within the U.S. Customary system for:
 - i) length (inches and feet, feet and yards, inches and yards);
 - ii) weight/mass (ounces and pounds); and
 - iii) liquid volume (cups, pints, quarts, and gallons).

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 4.NS.3, 3.MG.1

Just in Time Quick Check 4.MG.1

*Note to teacher - Students will need the following materials to complete this quick check: inch ruler, scale, or balance with weights.

1. Use the words in the word bank below to fill in the table with the most appropriate unit of measurement.

Inches	Feet	Yards	Miles	Ounces
Pounds	Cups	Pints	Quarts	Gallons

What is being measured?	Most appropriate unit of measure
Length of a marker	
Length between two cities	
Weight of a feather	
Volume of a can of juice	

2. Use the words in the word bank below to fill in the table with the most appropriate unit of measurement.

Millimeter	Centimeter	Meter	Gram	Kilogram
Milliliter	Liter			

What is being measured?	Most appropriate unit of measure
Length of a house	
Length of a cell phone	
Mass of a chair	
Volume of a bathtub	

3. Look at the balance scale below. The square has a mass of six grams. Estimate the mass of the triangle. Justify your reasoning.



4. What is the length of the pencil below to the nearest $\frac{1}{8}$ inch? _____



5. Use the following information to determine the equivalent measurements.

12 inches = 1 foot

2 feet = _____ inches

5 feet, 3 inches = _____ inches

6. The scale below holds fruit.



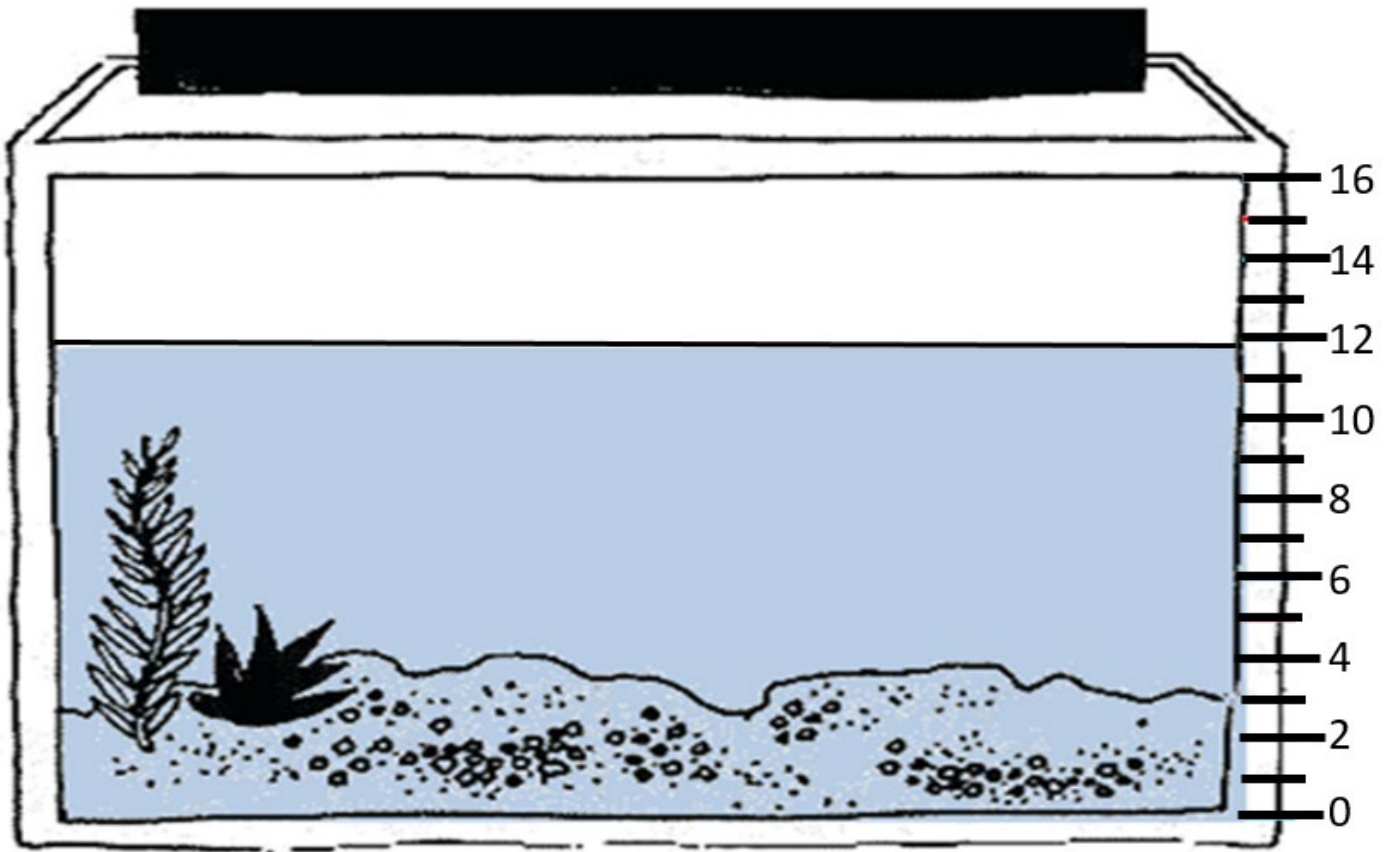
What is the mass, in grams, of the fruit that is shown on the scale? _____

7. Estimate and measure the weight/mass of the objects. Record your estimate and the actual weight/mass in the tables below.

Object	U.S. Customary Ounces/Pounds	
	Estimate	Actual
Calculator		
Book		
Laptop Computer		

Object	Metric System Grams/Kilograms	
	Estimate	Actual
Calculator		
Book		
Laptop Computer		

8. Look at this fish tank. The scale beside the fish tank is in liters. About how many liters of water are in this fish tank?



9. This pot holds 8 quarts of soup. How many cups of soup does the pot hold?

4 cups = 1 quart



10. There are 16 ounces in 1 pound. Using this information, fill in the missing spaces in the chart below.

Ounce(s)	Pound(s)
16	1
	4
128	
	12

4.MG.1 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

*Note to teacher - Students will need the following materials to complete this quick check: inch ruler, scale, or balance with weights.

1. Use the words in the word bank below to fill in the table with the most appropriate unit of measurement.

Inches	Feet	Yards	Miles	Ounces
Pounds	Cups	Pints	Quarts	Gallons

What is being measured?	Most appropriate unit of measure
Length of a marker	
Length between two cities	
Weight of a feather	
Volume of a can of juice	

Some students may have difficulty choosing a unit of measurement for objects because they lack exposure and experience with using them. A common misconception some students may have is to pick the largest or the smallest unit of measure for objects or scenarios that are unfamiliar to them. Teachers may wish to offer students experiences to have visual comparisons and measure "real" examples of each type of measurement to create benchmarks. This can be helpful with correcting the misconception and solidifying understanding.

2. Use the words in the word bank below to fill in the table with the most appropriate unit of measurement.

Millimeter	Centimeter	Meter	Gram	Kilogram
Milliliter	Liter			

What is being measured?	Most appropriate unit of measure
Length of a house	

What is being measured?	Most appropriate unit of measure
Length of a cell phone	
Mass of a chair	
Volume of a bathtub	

Some students may have difficulty choosing a unit of measurement for objects because they lack exposure and experience with using them, especially with metric units. A common misconception some students may have is to pick the largest or the smallest unit of measure for objects or scenarios that are unfamiliar to them. Teachers may wish to offer students experiences to have visual comparisons and measure "real" examples of each type of measurement to create benchmarks. This can be helpful with correcting the misconception and solidifying understanding. It may also be helpful for students to identify similar units in the U.S. Customary system and the metric system (e.g., a meter is close to a yard; a centimeter is close to an inch).

3. Look at the balance scale below. The square has a mass of six grams. Estimate the mass of the triangle. Justify your reasoning.



A common misconception some students have with balance scales is interpreting which object has the heavier mass. This may indicate that the student thinks the higher side has the larger mass. Students would benefit from hands on experiences of using a balance scale and comparing the objects they put on each side. Some students may have difficulty estimating the mass of the triangle if they are unfamiliar with how to use a balance scale. In addition, some students who are able to visually see that the square is heavier, may have difficulty applying that information in order to make an estimate for the mass of the triangle. Teachers may wish to have students practice making estimates and then use balance scales to find the mass of objects. Comparing their estimate to the actual measurement will assist them in refining their estimation skills.

4. What is the length of the pencil below to the nearest $\frac{1}{8}$ inch? _____



Some students may have difficulty measuring the image of the pencil because they are unsure of how to line the ruler up with the edge of the object. A common error some students may make is to place the end of the ruler at the end of the object instead of placing the end of the object at the 0-inch mark when measuring. Teachers may wish to show students different types of rulers and correct placements for accurate measurements. In addition, some students may struggle measuring to the nearest eighth of an inch because many rulers measure to the sixteenth of an inch, or they may struggle with identifying fractional parts on a number line. It may be helpful to show students that rulers are number lines and have students find the fractional length of a line, dot, or mark on the ruler. Students may benefit from exposure to using rulers that are marked with eighths before using rulers that are marked with sixteenths.

5. Use the following information to determine the equivalent measurements.

12 inches = 1 foot

2 feet = _____ inches

5 feet, 3 inches = _____ inches

Some students may have difficulty finding the relationship between units provided. This may prevent students from applying the pattern or rule necessary to fill in the blanks. Teachers may wish to provide experiences with manipulatives to help students see the relationship between the unit measurement and how it shrinks and grows multiplicatively. Additionally, some students may have difficulty because the singular form of “foot” changes to “feet” in its plural form.

Some students may be able to determine that there are 24 inches in two feet but have difficulty determining how many inches are in 5 feet, 3 inches. It may be helpful for students to draw a diagram, such as the one below. This will allow them to see that the total length is 5×12 inches plus an additional 3 inches.

1 foot	1 foot	1 foot	1 foot	1 foot	3 in.
12 inches	12 inches	12 inches	12 inches	12 inches	3 inches

6. The scale below holds fruit.



What is the mass, in grams, of the fruit that is shown on the scale? _____

Some students may have difficulty reading this scale because it is in grams instead of pounds and ounces. Teachers may wish to expose students to many different types of scales for ounces, pounds, grams, and kilograms so that they are able to explore how they are marked, enabling them to accurately determine the weight/mass of an object(s) placed on a scale.

7. Estimate and measure the weight/mass of the objects. Record your estimate and the actual weight/mass in the tables below.

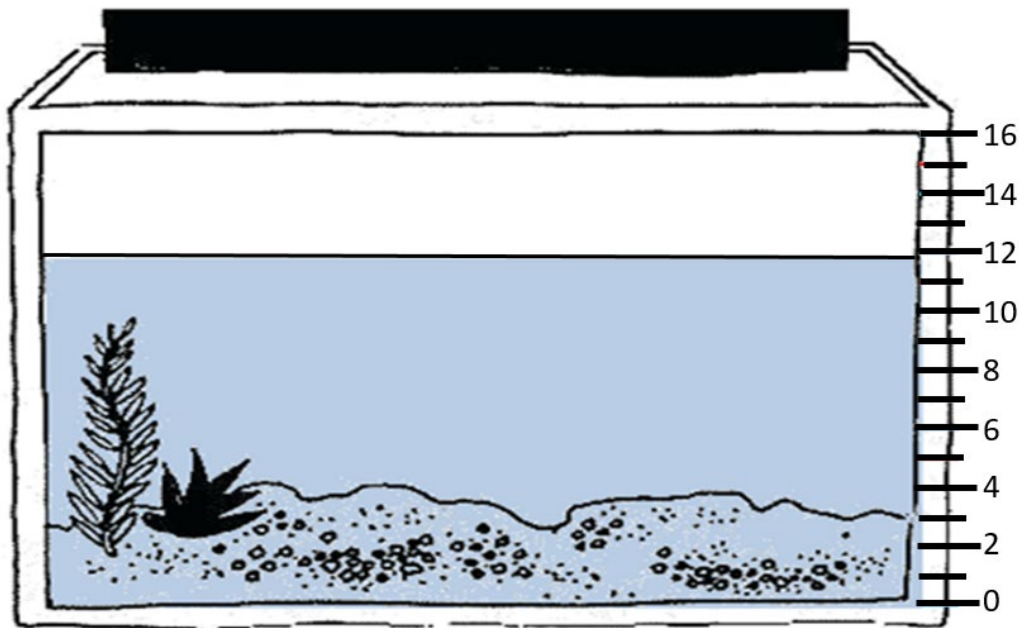
Object	U.S. Customary Ounces/Pounds	U.S. Customary Ounces/Pounds
	Estimate	Actual
Calculator		
Book		
Laptop Computer		

Object	Metric System Grams/Kilograms	Metric System Grams/Kilograms
	Estimate	Actual

Object	Metric System Grams/Kilograms	Metric System Grams/Kilograms
Calculator		
Book		
Laptop Computer		

Some students may have difficulty choosing a reasonable estimate due to lack of exposure. Students need many opportunities to estimate and find the mass/weight of objects to help refine their estimation skills. In addition, students should have practice with using various types of measuring instruments to find the weight/mass of objects.

8. Look at this fish tank. The scale beside the fish tank is in liters. About how many liters of water are in this fish tank?



Students may report that 16 liters of water are contained in the tank since that is the maximum capacity labeled. Students may report that the fish tank holds 11 liters of water since the fill line is slightly below 12. Students would benefit from more experiences measuring liquids in a variety of contexts.

9. This pot holds 8 quarts of soup. How many cups of soup does the pot hold?

4 cups = 1 quart



A common misconception some students may have is to reverse the equivalent relationship between cups and quarts. This may indicate that a student thinks that 8 quarts is equivalent to 2 cups. Teachers may wish to have students practice with equivalency tables (see example below) and have students physically pour liquids to check for accuracy. Teachers may also wish to support students in finding patterns and rules in equivalency tables.

Equivalency Table for Cups and Quarts

# of cups	# of quarts
4	1
8	2
12	3
16	4
20	5
24	6
28	7
32	8

10. There are 16 ounces in 1 pound. Using this information, fill in the missing spaces in the chart below.

Ounce(s)	Pound(s)
16	1
	4
128	
	12

Students may have difficulty completing this chart because the relationship between the units when read left to right moves from the smaller unit (ounces) to the larger unit (pounds). Teachers may wish to provide opportunities to have students explore equivalent relationships with smaller

units to larger units, and vice versa. Additionally, experience with measuring items in ounces and pounds will assist students in understanding the relationship between the two measurements.