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Unit 3, Lesson 3: Measuring with Different-Sized Units

Let's measure things.

3.1: Width of a Paper

Your teacher will show you two rods. Does it take more green rods or blue rods lined up end to end to measure the width of a piece of printer paper?

3.2: Measurement Stations

m.openup.org/1/6-3-3-2

Station 1

- Each large cube is 1 cubic inch. Count how many cubic inches completely pack the box without gaps.
- Each small cube is 1 cubic centimeter. Each rod is composed of 10 cubic centimeters. Count how many cubic centimeters completely fill the box.

	cubic inches	cubic centimeters
volume of the box		

Station 2

Your teacher showed you a length.

- Use the meter stick to measure the length to the nearest meter.
- Use a ruler to measure the length to the nearest foot.

	meters	feet
length of _____		

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Station 3

If not using real water, open https://vimeo.com/184901230.

- Count how many times you can fill the quart bottle from the gallon jug.
- Count how many times you can fill the liter bottle from the gallon jug.

	quarts	liters
1 gallon of water		

Station 4

If not using a real scale, open http://ggbm.at/eQQVYB7D.

- Select 2–3 different objects to measure on the scale.
- Record the weights in ounces, pounds, grams, and kilograms.

	ounces	pounds	grams	kilograms
object 1				
object 2				
object 3				

Station 5

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- Count how many level teaspoons of salt fill the graduated cylinder to 20 milliliters, 40 milliliters, and 50 milliliters.
- Pour the salt back into the original container.

	milliliters	teaspoons
small amount of salt	20	
medium amount of salt	40	
large amount of salt	50	

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After you finish all five stations, answer these questions with your group.

1. a. Which is larger, a cubic inch or a cubic centimeter?

   b. Did more cubic inches or cubic centimeters fit in the cardboard box? Why?

2. Did it take more feet or meters to measure the indicated length? Why?

3. Which is larger, a quart or a liter? Explain your reasoning.

4. Use the data from Station 4 to put the units of weight and mass in order from smallest to largest. Explain your reasoning.

5. a. About how many teaspoons of salt would it take to fill the graduated cylinder to 100 milliliters?

   b. If you poured 15 teaspoons of salt into an empty graduated cylinder, about how many milliliters would it fill?

   c. How many milliliters per teaspoon are there?

   d. How many teaspoons per milliliter are there?

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Are you ready for more?

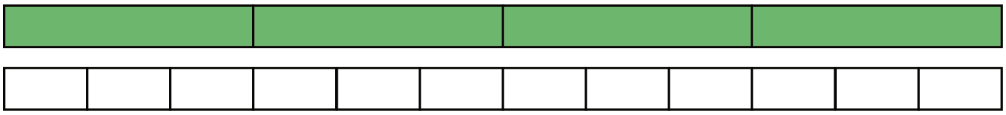
People in the medical field use metric measurements when working with medicine. For example, a doctor might prescribe medication in 10 mg tablets.

Brainstorm a list of reasons why healthcare workers would do this. Organize your thinking so it can be followed by others.

Lesson 3 Summary

The size of the unit we use to measure something affects the measurement.

If we measure the same quantity with different units, it will take more of the smaller unit and fewer of the larger unit to express the measurement. For example, a room that measures 4 yards in length will measure 12 feet.



There are 3 feet in a yard, so one foot is $\frac{1}{3}$ of a yard.

- It takes 3 times as many feet to measure the same length as it does with yards.
- It takes $\frac{1}{3}$ as many yards to measure the same length as it does with feet.

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Unit 3, Lesson 3: Measuring with Different-Sized Units

1. Decide if each is a measurement of length, area, volume, or weight (or mass).

   a. How many centimeters across a handprint

   b. How many square inches of paper needed to wrap a box

   c. How many gallons of water in a fish tank

   d. How many pounds in a bag of potatoes

   e. How many feet across a swimming pool

   f. How many ounces in a bag of grapes

   g. How many liters in a punch bowl

   h. How many square feet of grass in a lawn

   (from Unit 3, Lesson 2)

2. Clare says, "This classroom is 11 meters long. A meter is longer than a yard, so if I measure the length of this classroom in yards, I will get less than 11 yards." Do you agree with Clare? Explain your reasoning.

3. Tyler's height is 57 inches. What could be his height in centimeters? Explain your reasoning.

   A. 22.4
   B. 57
   C. 144.8
   D. 3,551

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4. A large soup pot holds 20 quarts. What could be its volume in liters?

   A. 7.57
   B. 19
   C. 21
   D. 75.7

5. Clare wants to mail a package that weighs $4\frac{1}{2}$ pounds. What could this weight be in kilograms?

   A. 2.04
   B. 4.5
   C. 9.92
   D. 4,500

6. Noah bought 15 baseball cards for $9.00. Assuming each baseball card costs the same amount, answer the following questions.

   a. At this rate, how much will 30 baseball cards cost? Explain your reasoning.

   b. At this rate, how much will 12 baseball cards cost? Explain your reasoning.

   c. Do you think this information would be better represented using a table or a double number line? Explain your reasoning.

   (from Unit 2, Lesson 13)

7. Jada traveled 135 miles in 3 hours. Andre traveled 228 miles in 6 hours. Both Jada and Andre traveled at a constant speed.

   a. How far did Jada travel in 1 hour?

   b. How far did Andre travel in 1 hour?

   c. Who traveled faster? Explain or show your reasoning.

   (from Unit 2, Lesson 9)