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

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/illustrativemathematics/water.

- 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.

object	ounces	pounds	grams	kilograms

Station 5

- 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?
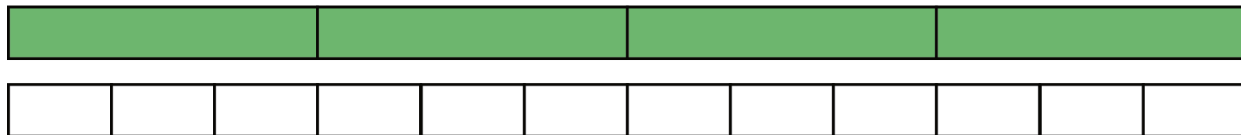
Are you ready for more?

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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