

Learning Objective: Students will be able to convert units of length, capacity, and weight/mass between systems (customary and metric).

Warm Up

Create a word problem using the terms
I6 and x and include the word, vicious.

Lesson 5.7

December 7, 2015

Essential Question:

How can you compare lengths between customary and metric systems?

Lesson Objective:

Students will be able to:

convert units of length, capacity, and weight/mass between systems (customary and metric).

Self-Evaluation Scale

Score	Description
4	I can teach other students how to convert units of length, capacity, and weight/mass between systems (customary and metric).
3	I can convert units of length, capacity, and weight/mass between systems (customary and metric).
2	I recognize, but still need help to convert units of length, capacity, and weight/mass between systems (customary and metric).
1	I do not know how to convert units of length, capacity, and weight/mass between systems (customary and metric).

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Activity 1 & 2

Work with a partner on Activity 1, 2, 3 & 4 on page 117 & 118 of your (soft cover) Record and Practice Journal.

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The **U.S. customary system** is a system of measurement that contains units for length, capacity, and weight. The **metric system** is a decimal system of measurement, based on powers of 10, that contains units for length, capacity, and mass.

To convert from one unit of measure to another, multiply by one or more *conversion factors*. A conversion factor can be written using fraction notation.

Key Idea

Conversion Factor

A **conversion factor** is a rate that equals 1.

	<i>Relationship</i>	<i>Conversion Factors</i>
Example	$1 \text{ m} \approx 3.28 \text{ ft}$	$\frac{1 \text{ m}}{3.28 \text{ ft}}$ and $\frac{3.28 \text{ ft}}{1 \text{ m}}$

You can use **unit analysis** to decide which conversion factor will produce the appropriate units.

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1 Converting Units

a. Convert 36 quarts to gallons.

Use a conversion factor.

$$36 \cancel{\text{qt}} \cdot \frac{1 \text{ gal}}{4 \cancel{\text{qt}}} = \frac{36 \cdot 1 \text{ gal}}{4} \\ = 9 \text{ gal}$$

$$1 \text{ gal} = 4 \text{ qt}$$

❖ So, 36 quarts is 9 gallons.

b. Convert 20 centimeters to inches.

Use a conversion factor.

$$20 \cancel{\text{cm}} \cdot \frac{1 \text{ in.}}{2.54 \cancel{\text{cm}}} \approx 7.87 \text{ in.}$$

$$1 \text{ in.} = 2.54 \text{ cm}$$

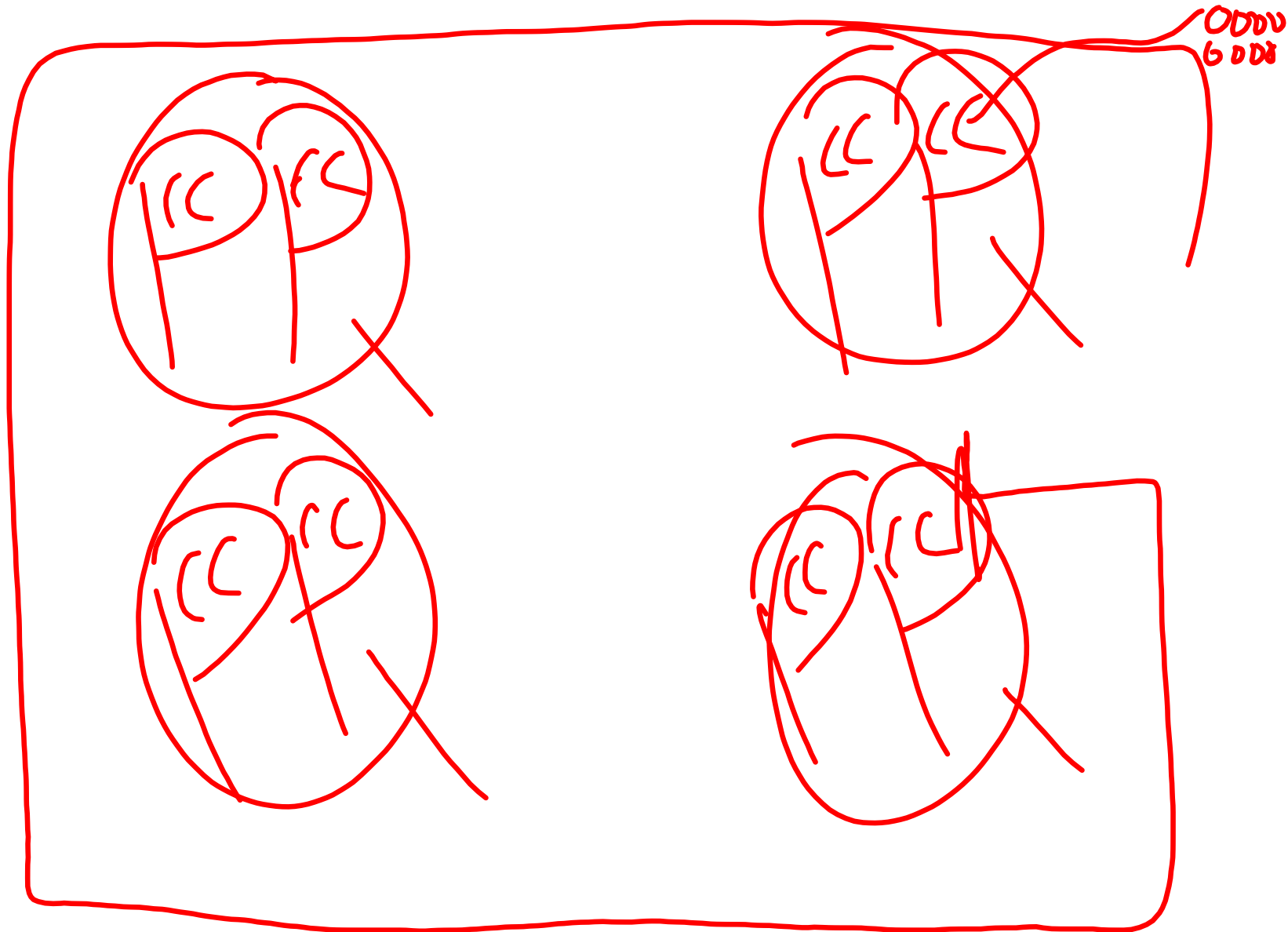
❖ So, 20 centimeters is about 7.87 inches.

$$\frac{9}{36 \cancel{00}} \cdot \frac{1 \cancel{00}}{1 \cancel{00}} = 9 \text{ gal}$$

$$\frac{36 \cancel{00}}{36 \cancel{00}} \cdot \frac{1 \cancel{00}}{4 \cancel{00}} = 9 \text{ gal}$$

$$\frac{22 \cancel{Pt}}{1} \cdot \frac{16 Oz}{1 \cancel{Pt}} = \frac{1Pt}{16 Oz} = \frac{16 Oz}{1Pt}$$

Oz



December 7 & 8, 2015 TPA Lesson 5.7

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$$\frac{3\text{ft}}{1\text{yd}} \quad \frac{1\text{yd}}{3\text{ft}}$$

$$7\cancel{\text{lb}} \cdot \frac{16\text{oz}}{1\cancel{\text{lb}}} = 112\text{oz}$$

$$48\cancel{\text{ft}} \cdot \frac{1\text{yd}}{3\cancel{\text{ft}}}$$

OYO!

$$5\cancel{\text{lb}} \quad \begin{array}{l} 10\text{oz} \\ 1\cancel{\text{lb}} \end{array}$$

Copy and complete the statement. Round to the nearest hundredth if necessary.

1. 48 ft = yd

2. 7 lb = oz

3. 5 g = mg

4. 7 mi \approx km

5. 12 qt \approx L

6. 25 kg \approx lb

$$7\cancel{\text{mi}} \cdot \frac{1.6\text{km}}{1\cancel{\text{mi}}} \approx 11.2\text{km}$$

$$12 \cancel{\text{qt}} \cdot \frac{.95\text{L}}{1 \cancel{\text{qt}}} \approx 11.4\text{L}$$

$$\frac{1 \text{ kg}}{2.2 \text{ lb}}$$

$$\frac{1 \text{ lb}}{.45 \text{ kg}}$$

$$25 \text{ kg} \cdot \frac{1 \text{ lb}}{.45 \text{ kg}} \approx 56 \text{ lbs}$$

g dg cg mg

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oz lb kg

2 Comparing Units

Copy and complete the statement using < or >: 25 oz  2 kg.

Convert 25 ounces to kilograms.

1 lb = 16 oz 1 lb ≈ 0.45 kg

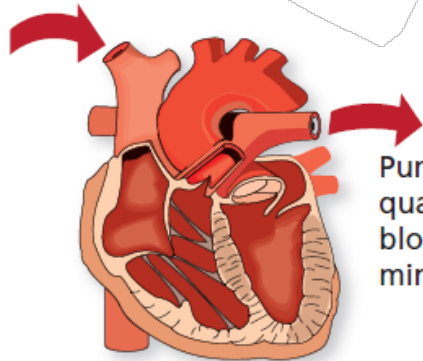
$$25 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} \times \frac{0.45 \text{ kg}}{1 \text{ lb}} = \frac{25 \cdot 1 \cdot 0.45 \text{ kg}}{16 \cdot 1} \approx 0.70 \text{ kg}$$

Because 0.70 kilogram is less than 2 kilograms, 25 oz < 2 kg.

$$25 \cancel{\text{kg}} \cdot \frac{1 \cancel{\text{kg}}}{16 \cancel{\text{kg}}} \cdot \frac{.45 \text{kg}}{1 \cancel{\text{kg}}} \approx \frac{25 \cdot .45 \text{kg}}{16}$$

$$\frac{11.25 \text{kg}}{16} \approx .7 \text{kg}$$

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Pumps 5
quarts of
blood per
minute

3 Converting a Rate: Changing One Unit

How many liters does the human heart pump per minute?

$$\frac{5 \text{ qt}}{1 \text{ min}} \cdot \frac{0.95 \text{ L}}{1 \text{ qt}} \approx \frac{4.75 \text{ L}}{1 \text{ min}}$$

$$1 \text{ qt} \approx 0.95 \text{ L}$$

••• The rate of 5 quarts per minute is about 4.75 liters per minute.

$$\frac{5 \cancel{\text{qt}}}{1 \text{ min}} \cdot \frac{.95\text{L}}{1 \cancel{\text{qt}}} = \frac{4.75\text{L}}{\text{min}}$$

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4 Converting a Speed: Changing Both Units

You are riding on a zip line. Your speed is 15 miles per hour. What is your speed in feet per second?

$$\frac{15 \cancel{\text{mi}}}{1 \cancel{\text{h}}} \left(\frac{5280 \text{ ft}}{1 \cancel{\text{mi}}} \right) \left(\frac{1 \cancel{\text{h}}}{3600 \text{ sec}} \right) = \frac{15 \cdot 5280 \text{ ft}}{3600 \text{ sec}}$$

1 mi = 5280 ft

$= \frac{79,200 \text{ ft}}{3600 \text{ sec}}$

1 h = 3600 sec

$= \frac{22 \text{ ft}}{1 \text{ sec}}$

❖ Your speed is 22 feet per second.

$$\frac{15 \cancel{\text{m}}}{1 \cancel{\text{hr}}} \cdot \frac{5280 \text{ ft}}{1 \cancel{\text{mi}}} \cdot \frac{1 \cancel{\text{hr}}}{3600 \text{ sec}} = \frac{79,200 \text{ ft}}{3600 \text{ sec}}$$

$$\cancel{\text{hr}} \frac{22 \text{ ft}}{1 \text{ sec}}$$

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Assignment

Complete problems:

4, 8, 16, 20, 26, 28, 32, & 34

on pages 236 - 237 in your Big Ideas Text Book.

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Homework

In your Big Ideas Record and Practice Journal
page 124.

