Name _____

Units of Measure

Dear Family,

In this topic, your child is learning how to use and convert units of measure in the customary and metric systems. Here are two activities that you can do together to practice these skills.

_____

Metric Length

Materials centimeter ruler

Have your child measure an object, such as a piece of spaghetti, to the nearest centimeter. Help him or her convert the length to millimeters (multiply by 10) and meters (divide by 100). Repeat the activity measuring the length of other objects.

CENTIMETERS

15 cm = 150 mm = 0.15 m

Measure Hands and Feet

Materials inch ruler, plain paper

Step 1: Have your child trace the outline of one hand and one foot on plain paper.

Step 2: Have your child find the length and width of the hand and foot to the nearest inch, $\frac{1}{2}$ inch, $\frac{1}{4}$ inch, and $\frac{1}{8}$ inch.

Step 3: Challenge your child to take measures of family members' hands and feet, to the nearest inch, $\frac{1}{2}$ inch, $\frac{1}{4}$ inch, and $\frac{1}{8}$ inch.

Reteaching Master

Name

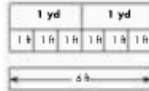# Converting Customary Units of Length

How to change a length measurement from one unit to another:

Converting a length measurement from a smaller unit to a larger unit

6 feet = _____ yards

1 yd			1 yd		
1 ft	1 ft	1 ft	1 ft	1 ft	1 ft

← 6 ft →

Think: If I measure the same length using a larger unit, I will need a smaller number of units.

Operation: Divide.

You know 3 ft = 1 yd.

Find 6 ÷ 3; 6 ft = 2 yd

Converting a length measurement from a larger unit to a smaller unit

2 feet = _____ inches

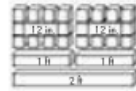**Think:** If I measure the same length using a smaller unit, I will need a larger number of units.

Operation: Multiply.

You know 1 ft = 12 in.

Find 2 × 12; 2 ft = 24 in.

Relationships Among Customary Units of Length			
Inch	Foot	Yard	Mile
12 in. =	1 ft		
36 in. =	3 ft	= 1 yd	
	5,280 ft	= 1,760 yd	= 1 mi

Complete.

1. 5 ft = __60__ in.
2. 3 mi = __15,840__ ft
3. 108 in. = __9__ ft
4. 72 in. = __2__ yd
5. 2 ft 3 in. = __27__ in.
6. 45 in. = __1__ yd __9__ in.

7. Which is the greater length, 2 yards or 5 feet? __2 yards__

8. **Estimation** A creek runs along a distance of 16,300 feet. About how many miles long is the creek? __About 3 miles__

Practice Master

Name

Converting Customary Units of Length

Convert each unit.

1. 12 yd = __432__ in.
2. 30 ft = __10__ yd
3. 75 ft = __900__ in.
4. 10 ft 7 in. = __127__ in.
5. 6 mi = __31,680__ ft
6. 2 mi = __3,520__ yd

Write >, =, or < for each ◯.

7. 64 in. ◯ 5 ft __>__
8. 2 mi ◯ 3,333 yd __>__
9. 36 yd 2 ft ◯ 114 ft 2 in. __<__

The Statue of Liberty was a gift to the United States from the people of France. Some of the dimensions of the statue are shown here.

Measurements of the Statue of Liberty	
Height from base of statue to the torch	151 ft 1 in.
Length of hand	16 ft 5 in.
Length of index finger	8 ft
Length of nose	4 ft 6 in.
Thickness of right arm	12 ft

10. What is the height, from the base of the statue to the torch, in inches? __1,813 inches__

11. What is the thickness of the statue's right arm in yards? __4 yards__

12. Which measure is less than 435 inches?

    A 37 ft   B 36 ft 10 in.   C 12 yd 3 in.   (D) 12 ft 3 in.

13. Explain how you can find the number of feet in 40 yards. __There are 3 feet in every yard. In 40 yards, there will be 40 × 3 = 120 feet__

Name _____

Converting Customary Units of Capacity

How to change a capacity measurement from one unit to another

Converting a capacity measurement from a smaller unit to a larger unit	Converting a capacity measurement from a larger unit to a smaller unit
4 pints = _____ quarts	2 gallons = _____ quarts
1 qt 1 qt / 1 pt 1 pt 1 pt 1 pt / 4 pt	1 qt 1 qt 1 qt 1 qt / 1 qt 1 qt 1 qt 1 qt / 1 gal 1 gal / 2 gal
Think: If I measure the same capacity using a larger unit, I will need a smaller number of units.	Think: If I measure the same capacity using a smaller unit, I will need a larger number of units.
Operation: Divide.	Operation: Multiply.
You know 2 pt = 1 qt.	You know 1 gal = 4 qt.
Find 4 ÷ 2; 4 pt = 2 qt	Find 2 × 4; 2 gal = 8 qt

Relationships Among Customary Units of Capacity

Ounce	Cup	Pint	Quart	Gallon
8 fl oz	= 1 c			
	2 c	= 1 pt		
		2 pt	= 1 qt	
			4 qt	= 1 gal

Complete.

1. 16 fl oz = __**2**__ c

2. 8 gal = __**32**__ qt

3. 10 c = __**5**__ pt

4. 6 qt = __**12**__ pt

5. **Estimation** A vat has a capacity of 642 fl oz. Estimate its capacity in cups.

about 80 cups

Name _____

Converting Customary Units of Capacity

Convert each unit.

1. 2 qt = __**4**__ pt

2. 5 c = __**2**__ pt __**1**__ c

3. 3 gal = __**24**__ pt

4. 96 fl oz = __**12**__ c

5. 4 qt = __**16**__ c

6. 9 pt = __**18**__ c

Solve.

7. 5 c 4 fl oz
   − 4 c 3 fl oz

   1 c 1 fl oz

8. 7 gal 2 qt
   + 3 gal 1 qt

   10 gal 3 qt

9. 6 qt 1 pt
   − 2 qt 1 pt

   4 qt

10. **Estimation** Estimate the number of pints in 445 ounces.

Sample answer: about 30 pints

11. If you needed only 1 c of milk, what is your best choice at the grocery store—a quart container, a pint container, or a $\frac{1}{2}$ gal container?

a pint container

12. Which of the following is equivalent to 1 c?

    A 4 fl oz   B 2 pt   Ⓒ 8 fl oz   D 4 qt

13. **Writing to Explain** Explain how you would convert a measurement given in ounces into pints.

I would divide by 16 to get the number of pints.

Name_____

Converting Customary Units of Weight

How to change a weight measurement from one unit to another:

Converting a weight measurement from a smaller unit to a larger unit	Converting a weight measurement from a larger unit to a smaller unit
32 ounces = _____ pounds	3 pounds = _____ ounces

32 oz
16 oz | 16 oz
1 lb | 1 lb

3 lb
1 lb | 1 lb | 1 lb
16 oz | 16 oz | 16 oz

Think: If I measure the same weight using a larger unit, I will need a smaller number of units.

Operation: Divide.

You know 16 oz = 1 lb.

Find 32 ÷ 16; 32 oz = 2 lb

Think: If I measure the same weight using a smaller unit, I will need a larger number of units.

Operation: Multiply.

You know 1 lb = 16 oz.

Find 3 × 16; 3 lb = 48 oz

Relationships Between Customary Units of Weight

Ounce		Pound		Ton
16 oz	=	1 lb		
		2,000 lb	=	1 T

Convert each unit of measurement.

1. 4 T = **8000** lb
2. 5 lb = **80** oz
3. 48 oz = **3** lb
4. 6,000 lb = **3** T

Compare. Use >, <, or =.

5. 3,000 lb **>** 1 T
6. 272 oz **<** 20 lb

7. **Estimation** A candy maker buys a bar of chocolate weighing 162 ounces. About how many pounds does the bar weigh? **About 10 lb**

Name_____

Converting Customary Units of Weight

Convert each unit of measurement.

1. 8 T = **16,000** lb
2. $2\frac{1}{2}$ lb = **40** oz
3. 4,000 lb = **2** T
4. 90 lb = **1,440** oz

Compare. Use >, <, or =.

5. 16 lb **>** 16 oz
6. 1,500 lb **<** 2 T
7. 3 T **>** 5,999 lb
8. 1,600 oz **>** 10 lb
9. 19 lb **>** 300 oz
10. 8 oz **=** $\frac{1}{2}$ lb

11. How many ounces of potatoes are in a 5-pound bag of potatoes? **80 oz**

12. Did you know that there is litter in outer space? Humans exploring space have left behind bags of trash, bolts, gloves, and pieces of satellites. There are currently about 4,000,000 pounds of litter in orbit around Earth. About how many tons of space litter is this? **About 2,000 T**

13. Karla bought 2 pounds of red beads, $1\frac{3}{4}$ pounds of green beads, and 10 ounces of string at the craft store. How much do Karla's supplies weigh in all? **4 lb 6 oz**

14. Which of the following is equivalent to $92\frac{1}{2}$ pounds?

   A 1,472 oz   **B 1,480 oz**   C 1,479 oz   D 1,488 oz

15. How much is $3\frac{1}{2}$ pounds written as a combination of whole pounds and whole ounces? Explain how you found your answer.

   3 lb 8 oz; Sample answer: 1 pound equals 16 ounces. Half of 16 oz = 8 oz. Add the 8 oz to 3 lb.
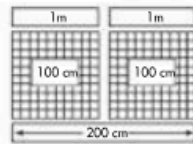
Reteaching Master

Name _____

Converting Metric Units of Length

How to change a length measurement from one metric unit to another:

Converting a length from a smaller to a larger metric unit

200 centimeters = _____ meters

1m	1m
100 cm	100 cm

◄────── 200 cm ──────►

Think: If I measure the same length using a larger unit, I will need a smaller number of units.

Operation: Divide.

You know 100 cm = 1 m.

Find 200 ÷ 100; 200 cm = 2 m

Converting a length from a larger to a smaller metric unit

2 kilometers = _____ meters
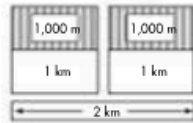
1,000 m	1,000 m
1 km	1 km

◄────── 2 km ──────►

Think: If I measure the same length using a smaller unit, I will need a larger number of units.

Operation: Multiply.

You know 1 km = 1,000 m.

Find 2 × 1,000; 2 km = 2,000 m

Relationships Among Metric Units of Length

Kilometer		Meter	Centimeter	Millimeter
1 km	–	1,000 m		
		1 m	=	100 cm = 1,000 mm
				1 cm = 10 mm

Complete.

1. 80 mm = __8__ cm

2. 234 cm = __2,340__ mm

3. 2 m = __2,000__ mm

4. 14,000 mm = __14__ m

5. Which is shorter, 60 meters or 600 centimeters? **600 cm**

6. Is 3.2 meters equal to 320 millimeters? Explain.
No: 1 m = 1,000 mm; 3.2 m = 3,200 mm

Practice Master

Name _____

Converting Metric Units of Length

Convert each unit.

1. 25 m = __2,500__ cm

2. 345 cm = __3.45__ m

3. 4.5 m = __450__ cm

4. 10 m = __10,000__ mm

5. 987 mm = __98.7__ cm

6. 4,000 mm = __400__ cm

7. 4.2 km = __4,200__ m

8. 3 km = __3,000__ m

9. List three measurements with different units that are equal to 5 meters.
0.005 km; 500 cm; 5,000 mm

Write >, =, or < for each ◯.

10. 12 cm ◯ 98 mm **>**

11. 3 km ◯ 5,000 m **<**

12. 800 cm ◯ 8 m **=**

13. 38.5 mm ◯ 10 cm **<**

14. 9,000 cm ◯ 2 km **<**

15. 1,000,000 mm ◯ 100 m **>**

Mount Saint Helens, a volcano, erupted on May 18, 1980. Before the eruption, Mount St. Helens was 2,950 meters high. After the eruption, it was 2,550 meters high.

16. What is the difference in height of Mount St. Helens before and after the eruption, expressed in meters? **400 m**

17. Before the eruption, how many kilometers high was Mount St. Helens? **2.95 km**

18. Which of the following is equal to 2 meters?

A 200 mm   B 20 cm   C 200 km   (D) 2,000 mm

19. Explain how you would convert 4 m to millimeters.
1 m = 1,000 mm; so 4 m = 4 × 1,000 = 4,000 mm

Name _____
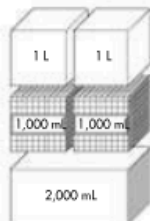
Converting Metric Units of Capacity

How to change a capacity measurement from one metric unit to another:

Converting a capacity from a smaller to a larger metric unit	Converting a capacity from a larger to a smaller metric unit
2,000 milliliters = _____ liters	3 liters = _____ milliliters
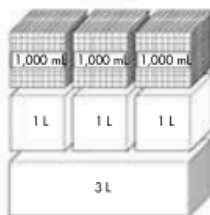
1 L 1 L	1,000 mL 1,000 mL 1,000 mL
1,000 mL 1,000 mL	1 L 1 L 1 L
2,000 mL	3 L

Think: If I measure the same capacity using a larger unit, I will need a smaller number of units.	Think: If I measure the same capacity using a smaller unit, I will need a larger number of units.
Operation: Divide.	Operation: Multiply.
You know 1,000 mL = 1 L.	You know 1 L = 1,000 mL.
Find 2,000 ÷ 1,000; 2,000 mL = 2 L	Find 3 × 1,000; 3 L = 3,000 mL

Relationships Between Metric Units of Capacity		
Liter		Milliliter
1 L	=	1,000 mL

Complete.

1. 6 L = **6,000** mL   2. 4,000 mL = **4** L

3. 8,000 mL = **8** L   4. 91,000 mL = **91** L

Estimation Circle the capacity that is most reasonable for each container.

5. soup bowl
   2 L   or (300 mL)

6. bathtub
   (200 L) or   34,000 mL

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Name _____

Converting Metric Units of Capacity

Convert each unit.

1. 5 L = **5,000** mL   2. 13,000 mL = **13** L

3. 16 L = **16,000** mL   4. 4,000 mL = **4** L

5. 9,000 mL = **9** L   6. 8 L = **8,000** mL

7. You are preparing for a breakfast party and need enough milk for 20 people. Each person will drink about 200 mL of milk. Which is the best estimate of the amount of milk you should prepare: 400 mL or 4 L? Why?

20 × 200 = 4,000 mL, so you need 4 L.

Which capacity is most reasonable for each container?

8. coffee mug   300 mL or 3 L   **300 mL**

9. vase   20 mL or 2 L   **2 L**

10. cleaning bucket   500 mL or 5 L   **5 L**

11. Which of the following is equal to 6,000 mL?

(A) 6 L   B 60 L   C 600 L   D 60,000 L

12. **Writing to Explain** Suppose you have a 100-mL cup, a 300-mL cup, and a 500-mL cup. List two different ways you can measure exactly 1 L.

Answers will vary. You can measure two 500-mL cups, OR, you can measure three 300-mL cups and one 100-mL cup.

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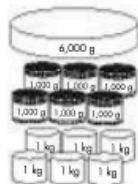
Reteaching Master

Name

Converting Metric Units of Mass

How to convert a mass measurement from one metric unit to another:

Converting a mass from a smaller to a larger metric unit

6,000 grams = _____ kilograms

6,000 g

1,000 g 1,000 g 1,000 g
1,000 g 1,000 g 1,000 g
1 kg 1 kg 1 kg
1 kg 1 kg 1 kg

Think: If I measure the same mass using a larger unit, I will need a smaller number of units.

Operation: Divide.

You know 1,000 g = 1 kg.

Find 6,000 ÷ 1,000; 6,000 g = 6 kg

Converting a mass from a larger to a smaller metric unit

2 grams = _____ milligrams

2 g

1,000 mg 1,000 mg

Think: If I measure the same mass using a smaller unit, I will need a larger number of units.

Operation: Multiply.

You know 1 g = 1,000 mg.

Find 2 × 1,000; 2 g = 2,000 mg

Relationships Between Metric Units of Mass					
Kilogram		Gram			Milligram
1 kg	=	1,000 g			
		1g	–		1,000 mg

Convert each unit of measurement.

1. 72 g = **72,000** mg   2. 8,000 g = **8** kg

3. 2,000,000 mg = **2** kg   4. 2,340 kg = **2,340,000** g

Compare. Use <, >, or =.

5. 4,000 mg **<** 5 g   6. 64 kg **=** 64,000 g

7. 3 kg **>** 40,000 mg   8. 5,000 g **>** 4 kg

Practice Master

Name

Converting Metric Units of Mass

Convert each unit of measurement.

1. 15,000 g = **15** kg   2. 285 kg = **285,000** g

3. 5,000 mg = **5** g   4. 7,000 g = **7** kg

5. 490,000 g = **490** kg   6. 648 g = **648,000** mg

7. Order the following masses from least to greatest:
500 g, 50 kg, 5,000 mg
5,000 mg; 500 g; 50 kg

Compare. Use <, >, or =.

8. 55,000 mg **<** 5 kg   9. 20 g **<** 2 kg

10. 11 g **>** 1,100 mg   11. 4,000 mg **=** 4 g

12. What is the value of x?   40,000 mg = 10x g

A 400   B 40   **C** 4   D 0.4

13. A recipe that serves two people calls for 1,600 milligrams of baking soda. You want to make enough for 10 people. How much baking soda will you need, in grams?
1,600 × 5 = 8,000 mg = 8g

14. You want to convert 1 kilogram to milligrams. You already know that 1 kilogram = 1,000 grams. Explain how knowing that 1 gram = 1,000 milligrams can help you.
Sample answer: 1 kg = 1,000 g and 1 g = 1,000 mg. So, 1 kg = 1,000 g = 1,000,000 mg.

Name _____

Problem Solving:
Multiple-Step Problems

Kyle hiked 10 miles on Saturday. He hiked half as many miles on Sunday. How many total yards did Kyle hike?

1. What am I asked to find?

1. Total yards hiked

2. What is the hidden question?

2. Number of miles hiked on Sunday

3. What is the answer to the hidden question?

3. 5 miles

4. What else do you need to do?

4. Convert from miles to yards

Solve.

Think: to convert from larger units to smaller units, use multiplication.

You know 1 mi = 1,760 yd. How many yd is 10 mi? **17,600 yd**

How many yd is 5 mi? **8,800 yd**

How many yd is 15 mi? **17,600 + 8,800 = 26,400 yd**

So, Kyle hiked a total of **26,400 yd**

1. **Mental Math** Kendra biked 10 kilometers on Monday. She biked twice that many km on Tuesday. How many total meters did she bike? What hidden question do you need to answer? Show your work.

Sample answer: How many km did she bike on Tuesday? She biked a total of 30,000 m. 10 km + 20 km = 30 km; 30 km = 30,000 m.

Name _____

Problem Solving:
Multiple-Step Problems

Answer the hidden question or questions. Then solve.

1. Isabel took 24 minutes to run around the track 6 times. John took 3 minutes to run around the track once. Which student was running faster?

John; Isabel circles the track about once every 4 min; John went around the track in 3 min.

2. Nancy is saving $2 from her allowance every week. Marco is saving $1 the first week, $2 the second week, $3 the third week, and so on. At the end of 10 weeks, who will have saved more money? How much more?

Marco; Marco will have saved $35 more than Nancy ($55 − $20 = $35).

3. For every 3 cans of vegetables purchased, you get 1 free can. Tessie went home with 32 cans of vegetables. How many did she have to pay for?

A 32   (B) 24   C 16   D 8

4. **Writing to Explain** Badal has 120 cm^3 of water. He wants to pour it into a rectangular vase that is 4 cm high, 4 cm wide, and 5 cm long. Can he pour all the water into the vase? Explain.

No; The volume of the vase is 4 × 4 × 5 = 80 cm^3, so he will not be able to pour all the water into the vase.