

Name Key Date \_\_\_\_\_ Period \_\_\_\_\_

## Using Factor Label Method to make Conversions

Show the factor label method and conversion factors for each problem.

### Metric Prefixes:

1. Convert 96.5 mg to 0.0965 g

$$\frac{96.5 \text{ mg}}{1000 \text{ mg}} \times \frac{1 \text{ g}}{1} = 0.0965 \text{ g}$$

2. Convert 320 l to 320,000 ml

$$\frac{320 \text{ L}}{1 \text{ L}} \times \frac{1000 \text{ mL}}{1} = 320,000 \text{ mL}$$

3. Convert 285m to 28,500 cm

$$\frac{285 \text{ m}}{1 \text{ m}} \times \frac{100 \text{ cm}}{1} = 28,500 \text{ cm}$$

4. Convert 2530 cg to 0.0253 kg

$$\frac{2530 \text{ cg}}{100 \text{ cg}} \times \frac{1 \text{ g}}{1000 \text{ g}} \times \frac{1 \text{ kg}}{1} = 0.0253 \text{ kg}$$

5. 15.0 L to 1.5 dL

$$\frac{15.0 \text{ L}}{10 \text{ L}} \times \frac{1 \text{ dL}}{1} = 1.5 \text{ dL}$$

6. 1200.0 mm to 0.0012 km

$$\frac{1200.0 \text{ mm}}{1000 \text{ mm}} \times \frac{1 \text{ m}}{1000 \text{ m}} \times \frac{1 \text{ km}}{1} = 0.0012 \text{ km}$$

7. Which is the smaller mass, 285.0 cg or 2.37 g? Explain.

2.37g is the smaller mass.  $285.0 \text{ cg} = 2.85 \text{ g}$

8. Which is the shorter length, 175.6 mm or 3804 cm? Explain.

175.6mm is the shorter length.  $3804 \text{ cm} = 38,040 \text{ mm}$

### Converting Units

Table of Equalities	
Length	Mass
1 mile = 5280 feet	1 pound = 454 grams
1 km = 0.621 mile	1 gal = 3.785 L
1 inch = 2.54 cm	

1. How many seconds old are you?

Answers will vary

2. The average high school student weighs 144 pounds. Convert this weight to kilograms.

$$\frac{144 \text{ lb}}{1 \text{ lb}} \times \frac{454 \text{ g}}{1} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 65.376 \text{ kg} = \boxed{70 \text{ kg}} \leftarrow \text{sig fig answer}$$

3. The distance once around the earth at the equator is 24901.5 miles? Determine this distance in meters.

$$\frac{24901.5 \text{ mi}}{0.621 \text{ mi}} \times \frac{1 \text{ km}}{1} \times \frac{1000 \text{ m}}{1 \text{ km}} = 40098228.66 \text{ m} = \boxed{1.4 \times 10^7 \text{ m}} \leftarrow \text{sig fig}$$

4. Convert 36.7 miles/hr into m/s.

$$\frac{36.7 \text{ mi}}{1 \text{ hr}} \times \frac{1 \text{ km}}{0.621 \text{ mi}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 16.416 \text{ m/s} = \boxed{17 \text{ m/s}} \leftarrow \text{sig fig}$$

5. How many gallons are in 2.5 liters?

$$\frac{2.5L}{3.785L} \left| \frac{1gal}{1gal} \right. = .6605gal = \boxed{0.7gal} \leftarrow \text{sig fig}$$

6. A sample of water has a volume of 20.5 cm<sup>3</sup>. Express this in **cubic meters**.

$$\frac{20.5cm^3}{(100)^3cm^3} \left| \frac{(1)^3m^3}{(100)^3cm^3} \right. = 0.0000205cm^3 = \boxed{2 \times 10^{-5} m^3} \leftarrow \text{sig fig}$$

or 0.00002cm<sup>3</sup>

7. Calculate the height in feet of one story in the Burj Dubai (tallest building in the world). It is 162 stories high and measures 818 meters from top to bottom.

$$\frac{\cancel{162 \text{ story}} \left| \frac{818m}{1000m} \right| \left| \frac{1km}{1km} \right| \left| \frac{0.621mi}{1mi} \right| \left| \frac{5280ft}{1mi} \right. = 16.6ft = \boxed{20ft} \leftarrow \text{sig fig}$$

8. A typical palm tree is 7.4 meters. How many palm trees will stretch from the earth to the sun? (151,000,000 km)

$$\frac{151,000,000km}{1km} \left| \frac{1000m}{1km} \right| \left| \frac{1 \text{ palm tree}}{7.4m} \right. = \boxed{2 \times 10^{10} \text{ palm trees}} \leftarrow \text{sig fig}$$

9. 28.4 grams of almonds contain 165 calories. How many kgs of almonds would you need in order to consume 2150 calories (approximate daily requirement)?

$$\frac{2150cal}{165cal} \left| \frac{28.4g}{1000g} \right| \left| \frac{1kg}{1kg} \right. = 0.37kg = \boxed{0.4kg \text{ almonds}} \leftarrow \text{sig fig}$$

10. The last time I competed in the World Weight Lifting Championships, I lifted 263.5 kg in the clean and jerk competition. Convert this mass to pounds.

$$\frac{263.5kg}{1kg} \left| \frac{1000g}{1kg} \right| \left| \frac{1lb}{454g} \right. = 580.396lb = \boxed{600lb} \leftarrow \text{sig fig}$$

11. Usain Bolt ran the 100 m in 9.63 seconds. At this pace, how many miles could he run in 16 minutes, 3 seconds? This is the 5 K time for the boys winner of the 2011 Colorado High School Cross Country Championships.

$$16 \text{ min } 3 \text{ sec} = 963 \text{ sec}$$

$$\frac{963sec}{9.63sec} \left| \frac{100m}{1000m} \right| \left| \frac{1km}{1km} \right| \left| \frac{0.621mi}{1km} \right. = 6.21mi = \boxed{6mi} \leftarrow \text{sig fig}$$

12. How many 8 hour days would a person who works for \$7.50 per hour have to work to make \$21,500?

$$\frac{\$21,500}{\$7.50} \left| \frac{1hr}{8hr} \right| \left| \frac{1day}{1day} \right. = 358.3 \text{ days} = \boxed{400 \text{ days}} \leftarrow \text{sig fig}$$