Dimensional Analysis Worksheet 2

Name: _____   Period _____   Date _____

Use dimensional analysis (the "factor-label" method) to solve the following problems. **Show all steps** needed to convert from starting units to ending units. **Indicate all relationships needed** before setting up and solving the problem. Use any of the following relationships if needed:

1 mile = 1760 yds	16 oz = 1 lb	1 L = 1.057 qts	1 day = 24 hours
1 yd = 3 ft	2000 lbs = 1 ton	4 qts = 1 gal	1 hour = 60 mins
1 ft = 12 in	1 oz = 28.35 g	32 oz = 1 qt	1 min = 60 secs
1 mile = 1.6093 km	1 kg = 2.205 lbs	1 qt = 2 pts	

1. A runner competed in a 5-mile run. How many yards did she run?

2. In the Tour de France, cyclists ride 3,653.6 km in 20 days. How many miles do they go? [Hint: watch for unimportant information!]

3. After a nice meal, perhaps you'd finish it off with a pound (1.00 lb) cake for dessert. What would the name of this cake be in grams?

4. In the US milk is sold by the gallon, while in Denmark it is sold by the liter. How many liters of milk would you need to equal one gallon?

5. If you go to school for 180 days each school year and each school day is 7 hours long, how many hours are spent in school in one school year?

Turn over!

Metric Measurement Conversion

Instructions: Use the prefix conversion chart on page 2 of your reference packet to complete the following metric equalities.

_____ kg = _____ g	_____ cm = _____ m	_____ mm = _____ m	_____ ms = _____ s
_____ km = _____ m	_____ cL = _____ L	_____ mg = _____ g	
_____ kL = _____ L	_____ mg = _____ g	_____ mL = _____ L	_____ Mg = _____ g

Use the prefix conversions chart and dimensional analysis (don't simply "move the decimal point") to convert the measurements below as indicated. You can use scientific notation for very large or small numbers.

1) 40 mL to L

2) 5400 L to kL

3) 85 g to kg

4) 52 mg to g

5) 6300 m to km

6) 2.50 kg to g

7) 18,600 g to kg

8) 544 mL to L

9) 1.92 L to mL

10) 425 cm to m

11) 7870 mL to L

12) 6.42 m to mm

13) 1850 cm to m

14) 11.4 km to m

15) 3 m to mm

16) 25 Mg to g

17) 74 cm to mm*

18) 835 mg to kg*

*two-step conversions

Name: __Answer Key_____ Period _____ Date _____

Use dimensional analysis (the "factor-label" method) to solve the following problems. **Show all steps** needed to convert from starting units to ending units. **Indicate all relationships needed** before setting up and solving the problem. Use any of the following relationships if needed:

1 mile = 1760 yds	16 oz = 1 lb	1 L = 1.06 qts	1 day = 24 hours
1 yd = 3 ft	2000 lbs = 1 ton	4 qts = 1 gal	1 hour = 60 mins
1 ft = 12 in	1 oz = 28.35 g	32 oz = 1 qt	1 min = 60 secs
1 mile = 1.61 km	1 kg = 2.2 lbs	1 qt = 2 pts	

1. A runner competed in a 5-mile run. How many yards did she run?
   Relationship: 1 mile = 1760 yds

   $$5 \text{ miles} \times \frac{1760 \text{ yds}}{1 \text{ mile}} = 8800 \text{ yds}$$

2. In the Tour de France, cyclists ride 3,653.6 km over 20 days. How many miles do they go? [Hint: watch for unimportant information!]
   Relationship: 1 mile = 1.61 km

   $$3653.6 \text{ km} \times \frac{1 \text{ mile}}{1.61 \text{ km}} = 2269.3 \text{ mi}$$

3. After a nice meal, perhaps you'd finish it off with a pound cake for dessert. What would the name of this cake be in grams?
   Relationships: 1 lb = 16 oz; 1 oz = 28.35 g

   $$1 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} \times \frac{28.35 \text{ g}}{1 \text{ oz}} = 453.6 \text{ g} \quad (\text{A "453.6-g cake"})$$

4. In the US milk is sold by the gallon, while in Italy it is sold by the liter. How many liters of milk would you need to equal one gallon?
   Relationships: 1 L = 1.06 qts; 4 qts = 1 gal

   $$1 \text{ gal} \times \frac{4 \text{ qts}}{1 \text{ gal}} \times \frac{1 \text{ L}}{1.06 \text{ qt}} = 3.77 \text{ L}$$

5. If you go to school for 180 days each year and each day is 7 hours long, how many hours are spent in school in one year?
   Information: 1 day = 7 hours (only for school)

   $$\frac{180 \text{ days}}{1 \text{ (school) year}} \times \frac{7 \text{ hrs}}{1 \text{ day}} = \frac{1260 \text{ hrs}}{1 \text{ (school) year}}$$

Turn over!

Instructions:
Complete the following metric equalities.

_1_ kg = _1000_ g	_100_ cm = _1_ m	_1000_ mm = _1_ m	_1000_ ms = _1_ s
_1_ km = _1000_ m	_1000_ mL = _1_ L	_1000_ mg = _1_ g	1 Mg = 10^6 g
1 kL = 1000 L			

Convert the measurements below as indicated. You can use scientific notation for very large or small numbers.

1) 40 mL to L

$$\frac{40\ \cancel{mL}}{1} \cdot \frac{1\ L}{1000\ \cancel{mL}} = 0.040\ L$$

2) 5400 L to kL

$$\frac{5400\ \cancel{L}}{1} \cdot \frac{1\ kL}{1000\ \cancel{L}} = 5.4\ kL$$

3) 85 g to kg

$$\frac{85\ \cancel{g}}{1} \cdot \frac{1\ kg}{1000\ \cancel{g}} = 0.085\ kg$$

4) 52 mg to g

$$\frac{52\ \cancel{mg}}{1} \cdot \frac{1\ g}{1000\ \cancel{mg}} = 0.052\ g$$

5) 6300 m to km

$$\frac{6300\ \cancel{m}}{1} \cdot \frac{1\ km}{1000\ \cancel{m}} = 6.3\ km$$

6) 2.50 kg to g

$$\frac{2.50\ \cancel{kg}}{1} \cdot \frac{1000\ g}{1\ \cancel{kg}} = 2500\ g$$

7) 18,600 g to kg

$$\frac{18,600\ \cancel{g}}{1} \cdot \frac{1\ kg}{1000\ \cancel{g}} = 18.6\ kg$$

8) 544 mL to L

$$\frac{544\ \cancel{mL}}{1} \cdot \frac{1\ L}{1000\ \cancel{mL}} = 0.544\ L$$

9) 1.92 L to mL

$$\frac{1.92\ \cancel{L}}{1} \cdot \frac{1000\ mL}{1\ \cancel{L}} = 1920\ mL$$

10) 425 cm to m

$$\frac{425\ \cancel{cm}}{1} \cdot \frac{1\ m}{100\ \cancel{cm}} = 4.25\ m$$

11) 7870 mL to L

$$\frac{7870\ \cancel{mL}}{1} \cdot \frac{1\ L}{1000\ \cancel{mL}} = 7.87\ L$$

12) 6.42 m to mm

$$\frac{6.42\ \cancel{m}}{1} \cdot \frac{1000\ mm}{1\ \cancel{m}} = 6420\ mm$$

13) 1850 cm to m

$$\frac{1850\ \cancel{cm}}{1} \cdot \frac{1\ m}{100\ \cancel{cm}} = 1.85\ m$$

14) 11.4 km to m

$$\frac{11.4\ \cancel{km}}{1} \cdot \frac{1000\ m}{1\ \cancel{km}} = 11,400\ m$$

15) 3 m to mm

$$\frac{3\ \cancel{m}}{1} \cdot \frac{1000\ mm}{1\ \cancel{m}} = 3000\ mm$$

16) 25 Mg to g

$$\frac{25\ \cancel{Mg}}{1} \cdot \frac{10^6\ g}{1\ \cancel{Mg}} = 2.5 \times 10^7\ g$$

17) 74 cm to mm*

$$\frac{74\ \cancel{cm}}{1} \cdot \frac{1\ \cancel{m}}{100\ \cancel{cm}} \cdot \frac{1000\ mm}{1\ \cancel{m}} = 740\ mm$$

18) 835 mg to kg*

$$\frac{835\ \cancel{mg}}{1} \cdot \frac{1\ \cancel{g}}{1000\ \cancel{mg}} \cdot \frac{1\ kg}{1000\ \cancel{g}} = 8.35 \times 10^{-4}\ kg$$