Math Applications
Section 8.5 Notes
The Metric System and Dimensional Analysis

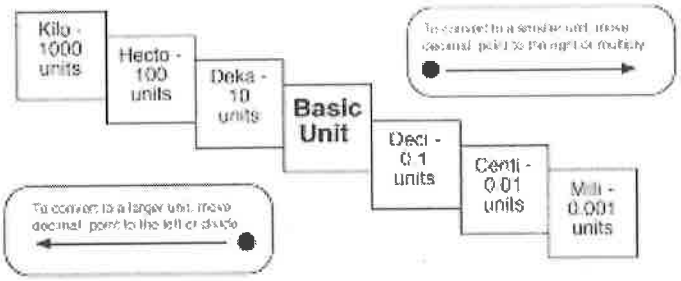
Name: Key

Key Definitions:

United States: Feet, Gallons, Pounds **World:** Meters, Liters, Grams

1. Units of measure in the Metric System are based on powers of 10.

Metric Conversion Chart



2. Dimensional Analysis is used to convert from one system of measurement to another.

LENGTH

Metric		Imperial
1 millimetre [mm]		0.03937 in
1 centimetre [cm]	10 mm	0.3937 in
1 metre [m]	100 cm	1.0936 yd
1 kilometre [km]	1000 m	0.6214 mile

Imperial		Metric
1 inch [in]		2.54 cm
1 foot [ft]	12 in	0.3048 m
1 yard [yd]	3 ft	0.9144 m
1 mile	1760 yd	1.6093 km
1 int nautical mile	2025.4 yd	1.853 km

MASS

Metric		Imperial
1 milligram [mg]		0.0154 grain
1 gram [g]	1,000 mg	0.0353 oz
1 kilogram [kg]	1,000 g	2.2046 lb
1 tonne [t]	1,000 kg	0.9842 ton

Imperial		Metric
1 ounce [oz]	437.5 grain	28.35 g
1 pound [lb]	16 oz	0.4536 kg
1 stone	14 lb	6.3503 kg
1 hundredweight [cwt]	112 lb	50.802 kg
1 long ton (uk)	20 cwt	1.016 t

Practice Problems

Make the indicated conversions.

1. 240 centimeters to dekameters

240. → (.240)

2. 4,300 milliliters to liters

4300. → (4.3)

3. 28 decigrams to milligrams

28.00. → (2,800)

4. 3 kilometers to centimeters

3.00000. → (300,000)

5. 5.6 hectograms to centigrams

5.6000. → (56,000)

6. 7,600 centiliters to liters

7600. → (76)

Use dimensional analysis to make each of the following conversions.

1. 18 meters to feet

$$\frac{18\ m}{1} \cdot \frac{1\ ft}{0.3048\ m} = \boxed{59.06\ ft}$$

2. 3 kilograms to ounces

$$\frac{3\ kg}{1} \cdot \frac{16\ oz}{0.4536\ kg} = \boxed{105.82\ oz}$$

3. 240 ounces to grams

$$\frac{240\ oz}{1} \cdot \frac{1\ gram}{0.0353\ oz} = \boxed{6798.87\ g}$$

4. 2,176 inches to hectometers

$$\frac{2176\ in}{1} \cdot \frac{0.3048\ m}{12\ in} = 55.27\ m = \boxed{0.5527\ hm}$$

5. 2.1 ~~kiloliters~~ meters to ~~gallons~~ miles

$$\frac{2.1\ km}{1} \cdot \frac{0.6214\ mi}{1\ km} = \boxed{1.305\ mi}$$

6. 10,000 ~~deciBtars~~ grams to ~~quarts~~ lbs

$$\frac{10000\ dg}{1} \cdot \frac{2.2046\ lbs}{1000\ g} \cdot \frac{1\ g}{0.1\ dg} = \boxed{220.46\ lbs}$$

7. 176 centimeters to inches

$$\frac{176\ cm}{1} \cdot \frac{1\ in}{2.54\ cm} = \boxed{69.29\ in}$$

8. 3 yards to millimeters

$$\frac{3\ yd}{1} \cdot \frac{0.9144\ m}{1\ yd} = 2.7432\ m = \boxed{2743.2\ mm}$$

9. 4,200 ~~milliliters~~ grams to ~~gallons~~ ounces

$$\frac{4200\ mg}{1} \cdot \frac{0.0353\ oz}{1000\ mg} = \boxed{0.14826\ oz}$$

10. 0.65 tonnes to pounds

$$\frac{0.65\ ton}{1} \cdot \frac{1000\ kg}{0.9842\ ton} \cdot \frac{2.2046\ lbs}{1\ kg} = \boxed{1455.99\ lbs}$$

11. 2.6 feet to decimeters

$$\frac{2.6\ ft}{1} \cdot \frac{0.9144\ m}{3\ ft} \cdot \frac{0.1\ dm}{1\ m} = \boxed{0.0792\ dm}$$

~~12~~. 10 tons to tonnes