


All sections marked with a  are considered essential concepts and must be completed to receive full credit on WS.

Conversions Factors			
1 hr = 60 min	1 min = 60 sec	1 ton = 2000 lbs	7 days = 1 week
24 hrs = 1 day	1 kg = 2.2 lbs	1 gal = 3.79 L	264.2 gal = 1 cubic meter
1 mi = 5,280 ft	1 kg = 1000 g	1 lb = 16 oz	20 drops = 1 mL
365 days = 1 yr	52 weeks = 1 yr	2.54 cm = 1 in	1 L = 1000 mL
0.621 mi = 1.00 km	1 yd = 36 inches	1 cc is 1 cm ³	1 mL = 1 cm ³

DIRECTIONS: Solve each problem using dimensional analysis. Every number must have a unit. Work must be shown. Conversion factors are given below

1.) How many miles will a person run during a 10 kilometer race?

$$\frac{10 \text{ km}}{1 \text{ km}} \times \frac{0.621 \text{ mi}}{1 \text{ km}} = 6.21 \text{ mi}$$

2.) The moon is 250,000 miles away. How many feet is it from earth?

$$\frac{250,000 \text{ mi}}{1 \text{ mi}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 1,320,000,000 \text{ ft}$$

3.) A family pool holds 10,000 gallons of water. How many cubic meters is this?

$$\frac{10,000 \text{ gal}}{264.2 \text{ gal}} \times \frac{1 \text{ m}^3}{1 \text{ m}^3} = 37.85 \text{ m}^3$$

4.) The average American student is in class 330 minutes/day. How many hours/day is this?

$$\frac{330 \text{ min}}{1 \text{ day}} \times \frac{1 \text{ hrs}}{60 \text{ min}} = 5.5 \text{ hrs/day}$$

How many seconds is this?

$$\frac{330 \text{ min}}{1 \text{ day}} \times \frac{60 \text{ sec}}{1 \text{ min}} = 19,800 \text{ sec/day}$$

5) How many seconds are there in 1 year?

$$\frac{1 \text{ yr}}{1 \text{ yr}} \times \frac{365 \text{ day}}{1 \text{ day}} \times \frac{24 \text{ hr}}{1 \text{ hr}} \times \frac{60 \text{ min}}{1 \text{ min}} \times \frac{60 \text{ sec}}{1 \text{ min}} = 31,536,000 \text{ sec}$$

6) Lake Michigan holds 1.3×10^{15} gallons of water. How many liters is this?

$$\frac{1.3 \times 10^{15} \text{ gal}}{264.2 \text{ gal}} \times \frac{3.79 \text{ L}}{1 \text{ gal}} = 4.927 \times 10^{15} \text{ L}$$

7) Pepsi puts 355 ml of pop in a can. How many drops is this?

$$\frac{355 \text{ mL}}{1 \text{ mL}} \times \frac{20 \text{ dps}}{1 \text{ mL}} = 71,000 \text{ dps}$$

How many cubic meters is this?

$$\frac{355 \text{ mL}}{1000 \text{ mL}} \times \frac{1 \text{ L}}{3.79 \text{ L}} \times \frac{1 \text{ gal}}{264.2 \text{ gal}} \times \frac{1 \text{ m}^3}{1 \text{ m}^3} = 0.00035 \text{ m}^3$$

Challenge Problem

8) Chicago uses 1.2×10^9 gallons of water /day. How many gallons per second must be pumped from the lake every second to supply the city?

$$\frac{1.2 \times 10^9 \text{ gal}}{1 \text{ day}} \times \frac{1 \text{ day}}{24 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 1.39 \times 10^4 \text{ gal/sec}$$