

## Unit Conversions: Printout and turn in the **second page** only.

In Physical Geology Lab you will have to solve many problems that require unit conversions. In fact you will have to be able to do unit conversions at some point in business, education, and most other fields. The following examples show how to approach and solve conversion problems.

1. Always write the problem out with the units. This may seem like overkill for simple problems, but it is a good habit to get into, and when the problems become complex, it is key to solving the problem correctly (and in an understandable way).

**Example:** If you drove 150 miles in 3 hours:  $\frac{150 \text{ mile}}{3 \text{ hours}} = \frac{50 \text{ miles}}{\text{hour}}$  *{This is a rate or velocity, which is given in terms of a unit of time -- per 1 hour here, but could be per second, or per day, or per year.}*

2. When converting from one unit to another, choose an appropriate conversion factor. See the inside **back** cover of the lab manual for common conversion factors.

**Example:** If you were asked to convert 60 miles to kilometers.

The conversion factor that you could use is: 1 mile = 1.6094 km.

Because 1 mile = 1.6094 km, you can write this as (1 mile/1.6094 km) or (1.6094 km/1 mile), **and** because if 1.6094 km = 1 mile, then they must represent equal physical dimensions, just as  $37/37 = 1$ . Multiplying any number by 1 does not change the physical dimension that the number represents.

Now write out the problem (you can see whether the 1 mile or the 1.6094 km goes in the numerator {top} by writing 60 miles divided by 1. You want the miles unit to cancel and you want to be left with km, so the miles part of the conversion factor must go on the bottom):

**Correct:**  $\frac{60 \cancel{\text{ miles}}}{1} \times \frac{1.6094 \text{ km}}{1 \cancel{\text{ mile}}} = 96.6 \text{ km}$

**Incorrect:**  $\frac{60 \text{ miles}}{1} \times \frac{1 \text{ mile}}{1.6094 \text{ km}} = \frac{60 \text{ miles}^2}{1.6094 \text{ km}} = \frac{37.3 \text{ miles}^2}{\text{km}}$  **{wrong}**

## Homework I: Unit Conversions Due at the beginning of your first lab

Name: \_\_\_\_\_

Student I.D. \_\_\_\_\_

Complete the following problems. To get full credit **show ALL work**: 1) write out and cancel units; 2) then use a calculator (if necessary) to do the math.

1. (4 pts) Convert 18 miles into **km**:

2. (4 pts) Convert 18 km into **miles**:

3. (4 pts) Convert 15 km into **cm**:

4. (8 pts) Convert 85 mi/hr into **ft/sec**. (*hint: break the problem into two parts and convert hours to minutes; minutes to seconds*):

5. (10 pts) Convert 120 km/yr into **cm/sec**. (*hint: break the problem into two parts and convert years to days; days to hours; hours to minutes; minutes to seconds*):