**Unit 1 Study Guide: Introduction and Conversions**      Name:_____

*Show your work.  No work, no credit.*

1) Solve the following problems using the factor-label (dimensional analysis) method:

   *Be sure to memorize the metric prefixes for the test!*

   a)  How many mm are equivalent to 5.3256 m?

   b)  How many km are equivalent to 4.56 m?

   c)  How many µg are equivalent to 0.025 kg?

   d)  If one atmosphere is equivalent to 760 mmHg, how many atmospheres are equal to 132 mmHg?

   e)  If one mole of a substance has a mass of 18.01 g, how many moles of the substance are in 82.5 kg?

2) The literature value of the atomic mass of an isotope of nickel is 57.9 g/mol. If a laboratory experimenter determined the mass to be 59.6 g/mol, what is the percent error?

3) You fill a graduated cylinder to the 10.0 mL mark with water and then add 25.2 g of a metal. The water level covers the metal and the graduated cylinder reads 15.6 mL.

   a)  What is the density of the metal?   What is its identity?

   b)  What volume would 0.120 kg of the metal occupy?

   c)  What mass will 75.3 $cm^3$ of the metal have? (1 $cm^3$ = 1 mL)

4) Fill in the missing information for each unit:

| Unit | Name of unit | Fundamental (F) or Derived (D) | What it measures | Is this an SI unit? |
|------|------|------|------|------|
| m | meter | | length of an object | |
| K | | | | |
| J | | | | |
| g | | | | |
| mol | | | | |
| $cm^3$ | | | | |
| °C | | | | |
| s | | | | |
| L | | | | |

5) Put in scientific notation:
   a) 402,000: _____          b) 0.000301: _____

6) Put in decimal (standard) form:
   a) $3.3 \times 10^{-4}$: _____          b) $6.1 \times 10^{7}$: _____

7) An adult Labrador retriever eats about 3 cups of dry dog food per day. If each cup has a mass of 120 g, how many kg of food will the dog consume in a year?

8) If a chemistry student spends 37.5 minutes per day reviewing and working on chemistry, how much time in days will the student invest over an 85-day semester? (Bonus CHALLENGE: How much time will be spent if reported in days, hours, minutes, and seconds, instead of reporting the value as a decimal?)

9) Science school desks are exactly 4 feet long. Joseph has measured the desks using his ruler multiple times. His measurements were 2.5 feet, 2.6 feet, and 2.5 feet. Are his measurements accurate, precise, both, or neither? Why?
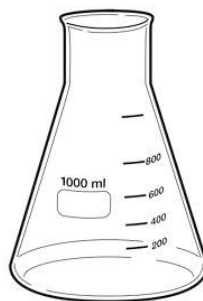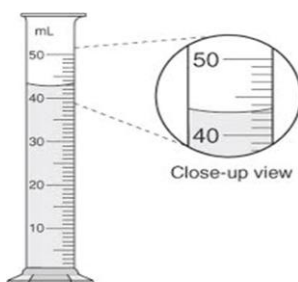
10) Identify the variables - Does getting a good night's sleep affect performance on a test?
    Independent: _____
    Dependent: _____
    Controlled: _____

11)



Identify the lab equipment.
a)_____     b)_____     c)_____     d)_____

What are appropriate uses for each piece of glassware?
a)  _____     b)  _____

c)  _____     d)  _____