**Percent Error** (Percent Deviation, Relative Error)

Accuracy

When scientists need to compare the results of two different measurements, the absolute   
difference between the values is of very little use.  The magnitude of error of being off by   
10 cm depends on whether you are measuring the length of a piece of paper or the distance from New Orleans to Houston.  To express the magnitude of the error (or deviation) between two measurements scientists invariably use percent error .

If you are comparing your value to an accepted value, you first subtract the two values so   
that the difference you get is a positive number.  This is called taking the *absolute value   
of the difference*.  Then you divide this result (the difference) by the accepted value to   
get a fraction, and then multiply by 100% to get the percent error.

So,     % error =   | your result - accepted value |    x  100 %   
                                          accepted value

Several points should be noted when using this equation to obtain a percent error.

1) When you subtract note how many significant figures remain after the subtraction, and   
express your final answer to no more than that number of digits.

2) Notice that the error is a positive number if the experimental value is too high, and is a negative number if the experimental value is too low.

Example:  A student measures the volume of a 2.50 liter container to be 2.38 liters.   
What is the percent error in the student's measurement?

Ans.      % error = (2.38 liters - 2.50 liters)  x   100%   
                                  2.50 liters

                       =  (.12 liters)     x    100%   
                            2.50 liters

                        =  .048     x   100%

                        =  4.8% error   
    
(Note only two sig figs left in the answer after the subtraction)

Ex. You guess that there are 90 jelly beans in a jar when in actuality there are 130 jelly beans. What is the percent error?

% error = (90 – 130) x 100 = -40 x 100= - 30.8 or -31%

130 130