The Significance of Significant Figures

Significant figures are how we keep track of our numbers in science classes. We always try to measure as perfectly as we can, but we are limited by our own abilities and by our instruments. We strive to make the best measures, and use these measurements in math formulas. The significant figures limit our mathematical answers, we're not allowed to get "more accurate" with a calculator, to somehow measure better by math, nor should we ever give away our exact measures by rounding casually.

There are rules to follow, they are sometimes easy to forget, but you must memorize them. In truth, you will likely lose more points to significant figures than any other one thing in our class. Unless you learn them.

THE RULES for SIGNIFICANT FIGURES

1. Any digit 1 to 9 will always be a significant figure.

2. All zeros between significant figures will be significant.

3. Zeros before significant figures are not significant.

4. Zeros before a "missing" decimal point are not significant, but if the decimal point is included, then the zeros before it are significant.

5. Zeros at the far right of a decimal are significant.

6. Unlimited significant figures happen with Equalities, such as 12 inches = 1 foot, both have unlimited SF because these are not measures, we understand they are equal to the "nth" degree.
   12.00... inches = 1.000… foot with as many zeros (as many SF) as you like.

7. With math, answers must have the same number of significant figures as the LEAST number of SF in the measurements you are calculating with.

8. With Scientific Notation, SF are counted only in the co-efficient portion of the scientific notation.

23 grams has 2 SF 23.5 grams has 3 SF 23.54 grams has 4 SF 23.543 grams has 5 SF	100 grams has 1 SF 1,000 grams has 1 SF 1,001 cm has 4 SF 1,001,001 inches has 7 SF	100 has 1 SF 100. has 3 SF 90 has 1 SF 90. has 2 SF
0.005 kJ has 1 SF 0.4 grams has 1 SF 1.005 has 4 SF 0.000000000001 has just 1 SF	12.00 inches has 4 SF 9.0000000 grams has 8 SF 1.00 g/cm^3 has 3 SF	Equalities have unlimited SF, meaning when you use them in a conversion, they do not limit your answer. Equalities include: 12 inches = 1 foot
454 grams = 1 pound 22.4 liters of gas = 1 mole of gas with equalities, both have unlimited SF	6.02×10^{23} atoms has 3 SF 3.550×10^{-4} moles has 4 SF 7.75043×10^{12} m has 6 SF	2.5 cm x 5.6788 cm = ? the answer has just 2 SF 4,550 grams divided by 1,255 cm^3 = ? the answer has to have 3 SF