Tuesday September 19th, quiz on Sci method and Metric conversions

Scientific Method

- **Process** used to **find answers** to **questions about the world around us**
- **Several different versions** → different amounts of steps
- All begin by **identifying a problem/question**
- Must be answered **based on observations** of the world around us
- Provide an **organized method** for conducting + analyzing the experiment

Hypothesis → educated guess based on observations and knowledge of a topic
Data → information gathered during experiment
Steps: (**P**urple **H**orses **E**at **E**ggs **A**ll **D**ay, **C**onnerwhy)
Identify the Problem (Purpose) → Use observations you have made to write a question. Determine a cause and effect relationship.
Form a Hypothesis → What you think the outcome of the experiment will be. Predict how one variable will affect another variable.
Create an Experiment → Develop a procedure to test your hypothesis. Step by step procedure; usually list safety first.
Perform an Experiment → Follow the steps in your procedure. Record data + observations.
Analyze the Data → Check for reliability + whether or not your data/observations support your hypothesis. Create graphs, tables, etc.
If NO → **Modify the Experiment** → Rewrite procedure to address flaws in original, perform the experiment again until results are reliable.
If YES → **Communicate the Results (Conclusion)** → Summarize important parts of your experiment + results. Reject/accept your hypothesis based on results.

2 types of observations
Qualitative → descriptive (usually made through the senses)
Quantitative → numeric measurements

Metric Conversion:

- Each unit is some number of powers of ten away from one another

  E.x. → Mega(10 ^ 6) is 6 'steps' away from the base(10 ^ 0)

- The units we must know for the test:

  MEGA(**M**) → 10^6

  KILO(**k**) → 10^3

  HECTO(**h**) → 10^2

  DECA (**da**) → 10^1

  BASE → Your base unit, meters(m), seconds(s); can't be something like cs(centiseconds), or mg(milligrams)

  DECI (d) → 10^{-1}

  CENTI(**c**) → 10^{-2}

  MILLI(**m**) → 10^{-3}

  MICRO(**μ**) → 10^{-6}

- To convert from one unit to another, the trick is to shift the decimal point to the left or right of its current position by the specific power of ten.
- The decimal point is moved to the left or right depending on the unit you are converting to.
  - If the unit you are converting to is greater than the unit you start with, the decimal point is moved to the left.
  - If the unit you are converting to is smaller than the unit you start with, the decimal point is moved to the right

  Tl;dr - Bigger unit, move to the left; Smaller unit, move to the right

  E.g. →

  4.56 ug → hg :

  ug = micrograms

  Micro is 10^{-6} and hecto is 10^2, and the 'distance'(absolute value really) between -6 and 2 is 8, so the decimal place is moved 8 hops 'this time' to the left, giving you 0.0000000456 hg.

  Now to perform the: Does this make sense check.

  Indeed it does; hectograms are much much bigger than micrograms, so the real value will be much much smaller, as the units are much bigger.

  It works the opp. way when converting from a bigger unit to a smaller one.