

1 • Matter and Measurement

MATH SKILLS

I assumed that you are coming into this class with various scientific / mathematical skills:

Metric System

- You know the metric system.
- You know the meaning of the metric prefixes, kilo-, centi-, and milli-.
- You know that there are other metric prefixes and can look them up if needed (micro, mega, pico, etc.)
- You can convert one measurement into another (e.g., $0.532 \text{ cg} = \text{_____ mg}$).
- You can convert squared or cubed units (e.g., knowing that $2.54 \text{ cm} = 1 \text{ inch}$, $38.5 \text{ in}^2 = \text{_____ cm}^2$).

Dimensional Analysis & Showing Your Work

- When you convert one unit to another, you can show your work using dimensional analysis or unit analysis.
- You know that good examples of dimensional analysis are changing metric units, converting time units, or using density to convert mass to volume or volume to mass.
- You know that you should always show enough work so that if your answer is incorrect, I can tell where you went wrong.

Scientific Notation

- You can translate regular numbers into scientific notation and numbers written in scientific notation into normal notation.
- You know the distinction between exponential notation and scientific notation.

Skills that we will review as part of Chapter 1 are:

Making Measurements

- You can use a ruler or other measuring device to make a measurement to the correct number of significant figures, i.e. include all of the digits in the measurement that are a significant part of the measurement.
- You can correctly assign a \pm value when making a given measurement.
- You always include a unit on a measurement.
- You know the distinction between a measurement and a defined number (e.g., 12 things in a dozen, pi).
- You can explain the difference between accuracy (how close a measurement is to a true or accepted value) and precision (how close a set of measurements are to each other).

Significant Figures

- You can determine the number of significant figures in a given measurement (i.e., You know whether a “0” in a measurement is significant or not.)
- You can determine the precision in a calculation involving measurements when the measurements are written with the correct number of significant figures.
- You can determine the precision in a calculation involving measurements when the measurements are written with \pm notation.