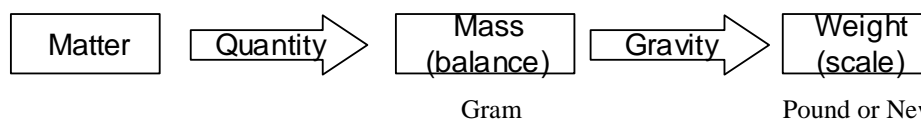


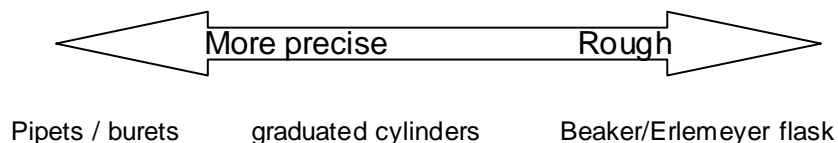
Lab 1: Mass, Volume and Temperature determinations in the laboratory.

Mass: Amount of material, remains constant from place to place. Mass is measured with a balance, usually in units of gram. Weight is affected by gravity and is measured with a scale in units of Newtons or pounds.

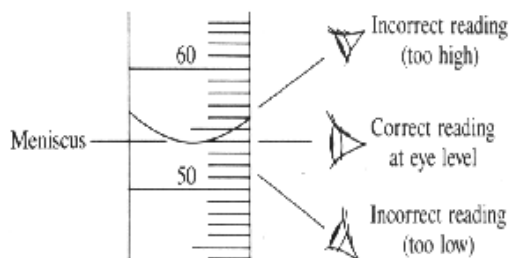


- If a procedure asks for 5.00g, measure to 100th's. Record exact amount taken, but do not waste time attempting to get exactly 5.00 grams.
- Mass objects at room temperature (RT). Hot air rises. This creates an artificially lighter recording because the heated air “lifts” the substance on the balance pan.
- Mass by Difference: Do not mass a substance directly on the pan, but rather in the container that will hold the substance. First place container on the pan, record, then add substance to the container, record. The difference is the mass of the substance. Reason: the 0.00g reference start point is difficult to obtain.
- Use same balance throughout the entire experiment.

Volume: Try this; pour a liquid from a tall, slender container into a wide, broad vessel. Does the volume of liquid change? I certainly hope not. The amount of three-dimensional space taken up by a substance is the volume. Volume changes with the shape of its container. Measuring in the lab:



- Reading the graduated cylinder: The liquid in a graduated cylinder is not level. Rather the liquid (such as polar water) will form a curved surface. This is called a **meniscus**. Read the bottom of the meniscus at eye level.



- Glassware is calibrated to read volumes precisely at 20°C. Volume is affected by temperature.

Temperature: Measures the average kinetic energy (movement) of particles. Measurement:

- Thermometers usually contain hazardous mercury in a glass capillary. Very fragile. Use extra caution when handling the glass thermometers.
- Measure with the bulb suspended in the substance. These are not clinical thermometers and do not require “shaking down.” Readings change instantly, therefore you must record the temperature of the substance while the thermometer is submerged in the liquid.

Lab: Quantitative Observations of a Chemical Reaction (handout)

Prelab discussion:

- Define units to be used. (g, ml, °C, min)
- Lab Write-up details. Handout of template