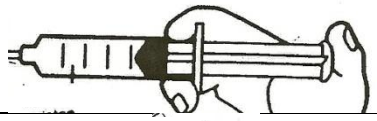
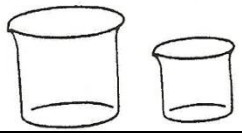
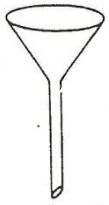
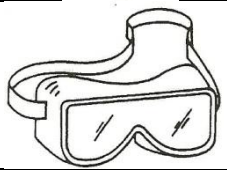
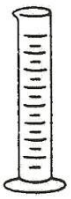
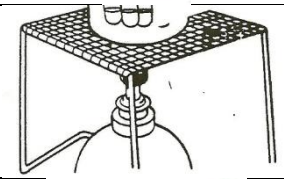
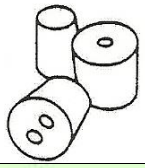
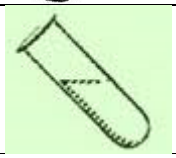
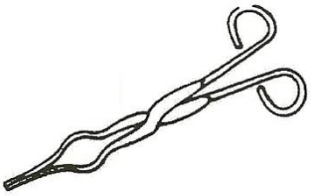
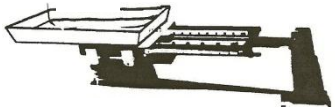
Lab Skills and Safety Vocabulary

1. Pieces of Lab Equipment that you must be familiar with:

Picture of Lab Equipment	Name of the equipment and description of how the lab equipment is used
	**Air Piston:**
	**Alcohol Burner:** used to heat objects / chemicals
	**Beaker:** Used to **hold liquids**; it gives a very INACCURATE measurement of liquids
	**Flask:** Used to hold liquids
	**Funnel:** Used to get liquids/ powders into containers with very small openings.
	**Goggles:** worn when ever working with chemicals or flame to protect the eyes.
	**Graduated Cylinder:** Used to get a very accurate measurement of liquid volume.
	**Heating Stand:** Used when heating objects with an alcohol burner. You place the heating stand above the alcohol burner, and then place the object that you are heating (a beaker or flask) on top of the stand.
	**Meter stick:** Used to measure the length of an object (linear measurement)

	**Microscope:** used to magnify a specimen
	**Rubber Stopper:** used to seal / close a test tube or flask
	**Test tube:** small cylindrical container used to hold liquids; sometimes experiments are conducted in test tubes.
	**Thermometer:** Used to measure temperature. In science we use the Celsius temperature scale.
	**Tongs:** Used to move/ hold hot objects like beakers or test tubes.
	**Triple Beam Balance:** Used to find the mass of an object in grams.

2. **Science:** A way of solving problems; the study of the universe and everything in it. The goal of science is to solve problems and improve quality of life.

3. **Observation**: A detailed description of something that you notice with your 5 senses (sight, sound, smell, touch, and taste).
    - **Quantitative Observations**: Observations involving numbers, for example counting or measuring (these provide the most desirable form of data because they can be analyzed mathematically).
    - **Qualitative Observations**: involve characteristics that cannot be easily counted or measured, such as color, shape, smell, or texture.

4. **Inference**: An explanation for an observation. Inferences involve using thinking and logic to figure out what an observation means. Inferences may be assumptions based on observations and prior knowledge or experience.

5. **Scientific Method**: A set of procedures used by scientists to help them answer a question or solve a problem. The steps of the scientific method that we will use this year are as follows:
    a. Identify the problem

b. Form a hypothesis (a hypothesis is a testable prediction)
c. Gather materials
d. Follow the procedures
e. Results (collect and analyze the data)
f. Make a conclusion (answer the original question based on the data that you collected)

6. Qualities of an object that you can "measure":

a. **Length**: measured with a ruler or a meter stick in metric units (mm, cm, m, etc.)

b. **Mass**: the amount of matter in an object. We use a balance to measure mass in grams.
   - **Matter**: Anything that takes up space and has mass. Matter is made up of atoms.

c. **Weight**: measure of the effect of gravity on an object's mass; the heaviness of an object. We use a scale to measure weight.

d. **Volume**: the amount of space an object or liquid takes up. Measured in milliliters, liters, or cubic units (cm^3, m^3, etc)

e. **Density**: Deals with how tightly packed the molecules in an object are. Density is defined as the amount of matter in a given amount of space.

Formula for Density: Density = mass / volume

   - If 2 objects are the same size (have the same volume) the object with more mass has more density.
   - Sample size has no effect on density. For example 10 mL of water has the same density as 100 mL of water. This is because the molecules in both samples of water are packed with the same tightness.

f. **Temperature:** the amount of heat an object contains; we measure temperature in degrees Celsius.
   - **Celsius:** measurement of temperature that we will use in science this year. 0 degrees Celsius is freezing and 100 degrees Celsius is boiling.
   - **Fahrenheit**: measurement of temperature where 32 degrees is freezing and 212 degrees is boiling
   - **Kelvin**: measurement of temperature where 273 degrees is freezing and 373 degrees is boiling. 0 degrees marks absolute zero (the point where objects have no heat at all and their molecules have stopped moving.)

7. **Metric System**: Standard system of measurement used by all scientists. It is based on units of ten. The basic units of the metric system are as follows:
   - **Gram**: basic unit of measurement for mass. 1 standard sized paper clip has a mass of approximately 1 gram.
   - **Liter**: basic unit of measurement for volume in the metric system. Soda can be bought in 1 or 2 liter bottles. (The units for the volume of a solid may be given as cubic centimeters – cm^3. One cubic centimeter is equal to 1 milliliter.)

- **Meter**: basic unit of measurement for length. The distance from the floor to the waist of an average sized adult is approximately 1 meter.

8. **Metric system prefixes**:

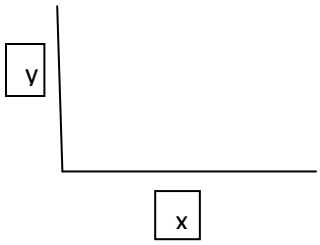
prefix	number equivalent	Description in words
milli	1 / 1000 or .001	There are 1000 millimeters in one meter; a millimeter is 1/1000 of a meter
centi	1 / 100 or .01	There are 100 centimeters in one meter; a centimeter is 1/100 of a meter
deci	1 / 10 or .1	There are 10 decimeters in one meter; a decimeter is 1/10 of a meter
Deka	10	There are 10 meters in a Dekameter
hecto	100	There are 100 meters in hectometer
kilo	1000	There are 1000 meters in a kilometer

9. **Meniscus:** the "dip" in water that you see when you read a graduated cylinder. You always read the measurement in a graduated cylinder from the bottom of the meniscus.

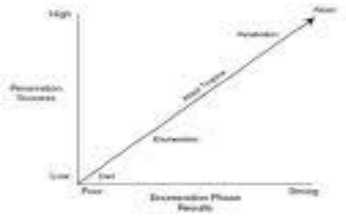
10. **Dependent Variable**: variable that depends on the dependent variable; it is the responding variable in an experiment because it responds to changes in the independent variable. It is always graphed on the y axis. It is frequently the thing that you are measuring in an experiment.

11. **Independent Variable**: the variable that a scientist controls or changes on purpose in an experiment. It is always graphed on the x-axis.

12. **X and Y axes**:



13. **Direct Relationship**: As one variable increases, the other variable also increases. In a direct relationship both variables could also be decreasing. (Both variables must be doing the same thing in a direct relationship.



14. **Indirect Relationship:** As one variable increases, the other variable decreases.

15. **<u>Cyclic Relationship</u>**: Shows a repeating pattern in the data and graph.

16. **<u>No Relationship</u>**: As one variable increases, the other variable remains constant; one variable is not affected by changes in the other variable.