#1: OBSERVATION

- To witness using the 5 senses (hearing, tasting, touching, smelling, sight)
- Using an instrument to extend powers of observation
  - Ex- taking measurments (data)

#2A: INFERENCE

- To interpret, predict or guess based on what you observe.

#2B: Fact vs. Theory

- **FACT-** An observable and measureable account, accepted and known to be true

- **THEORY-**
  - An explanation of how a natural process occurs that has been supported by observations over a long period of time.
  - Accepted to be true, but can be changed or replaced as new data and discoveries arise.

#3: Steps of the SCIENTIFIC METHOD

1. **Problem** .....(a question)
2. **Hypothesis** .....(your prediction)
3. **Materials** ..... (what you need)
4. **Procedure** .....(step by step plan)
5. **Observation**...(measurement, data, graph)
6. **Conclusion** .....(what you discover)
7. **Error** .....(where mistakes and outside factors effected results)

"**P**lease **H**elp **M**y **P**oor **O**ld **C**at **E**rnie"

#4: INDEPENDENT Variable

- The "I" change variable
- **MANIPULATED** variable
- What was changed before the experiment starts

#5: DEPENDENT Variable

- **MEASURED** change in experiment
- What you OBSERVE
- Collect DATA on
- Responds / reacts to the Independent Variable

#6: Control Group vs. Experimental Group

- The EXPERIMENTAL Group gets the Independent Variable. Can have multiple experimental groups

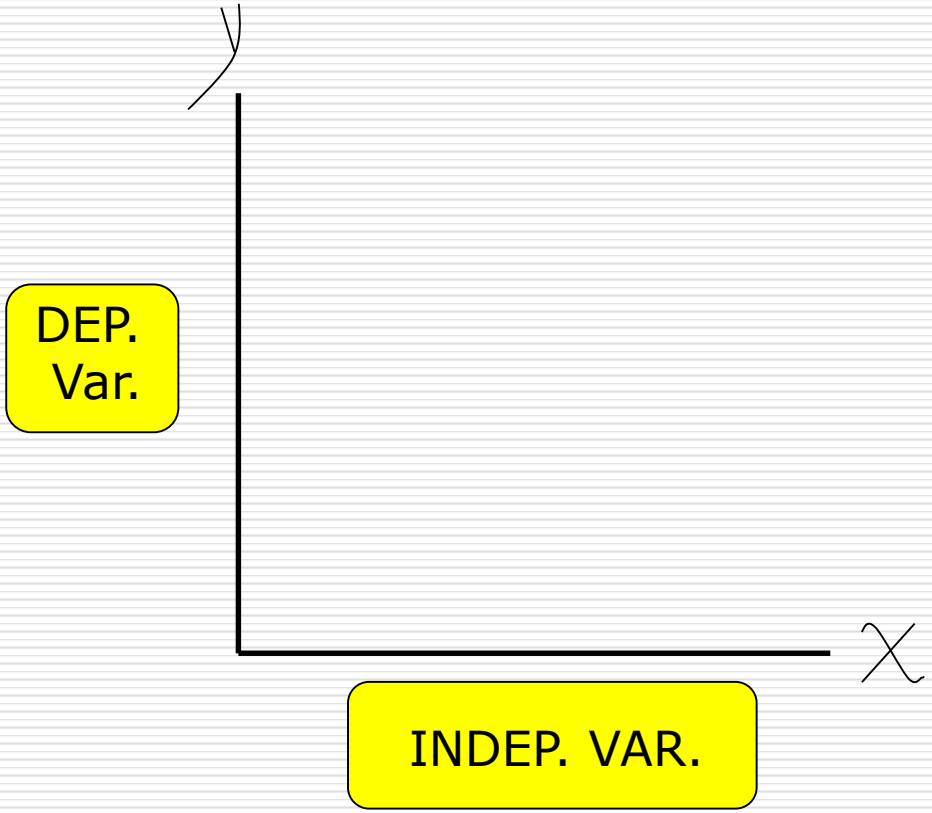
- **CONTROL** group is exactly the **same *minus*** *the* ***independent variable***

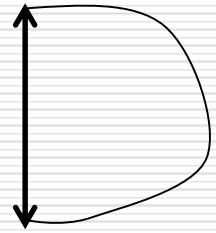
- You compare the results of the experimental group to the control group.

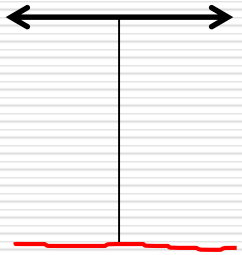
#6B: CONSTANTS

- Variables that are "controlled"
  - Conditions kept equal
  - ***All factors*** through all test groups and parameters of the experiment must be *kept the* ***SAME***
    - AKA:
      - "**control factors**" or
      - "**controlled variables**"

#6C: Graphing Variables







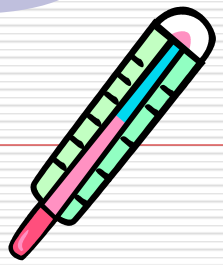
#7: Tools of Measurment

- Length: Ruler (cm)

- Volume: Graduated Cylinder (ml or cc)

- Mass: Triple Beam Balance

- Temperature: Thermometer



#8: MASS

- The amount of MATTER (**atoms and molecules**) in a substance.
- Measured in Grams (g)
- Mass is not Weight!
  - Weight is mass x gravity
  - An object has a downward force or weight due to it's mass and gravity
- Instrument -***TRIPLE BEAM BALANCE***

#9: VOLUME

- The amount of SPACE an object takes up
- Measured in cm^3 or ml
- Regular solid = LxWxH
- Irregular solids = water displacement method

#10: DENSITY

- **Amount of Mass per Volume**
- **# of grams (g) in a ml or cm^3 or cc**
- **D = M/V**
- **Units:**
  - **g/cc**
  - **g/ml**
  - **g/cm^3**

#10B: Density Facts

- Density never changes for a pure substance
  - It is a PROPERTY of matter
    - Ex- Aluminum is 2.7 g/cc
    - If you cut it in half each piece is still 2.7 g/cc
- Water is 1.0 g/cc
    - Greater then will sink
    - Less then will float

#11: Latitude and Longitude

- Latitude
  - Measures N and S of EQUATOR (0^o)
  - Lines are PARALLEL
  - Goes up to 90^o North and South
  - Divides Earth into Northern / Southern Hemisphere
- Longitude
  - Measures E – W of PRIME MERIDIAN (0^o)
  - Lines meet at the poles
  - 180^o (international date line) highest
  - Divides Earth into Eastern /Western Hemisphere

#11b: Topographic Maps

- Each line represents an **ELEVATION** or height above sea-level.
- Lines CLOSE = STEEP gradient
- The amount each line goes up is the **CONTOUR INTERVAL**
- Ex:BALD HILL
  - Contour Interval 100ft