(Right- input)

Name
Date
Period

Scientific Method Notes

- A logical way to solve problems!!

Thinking like a scientist...

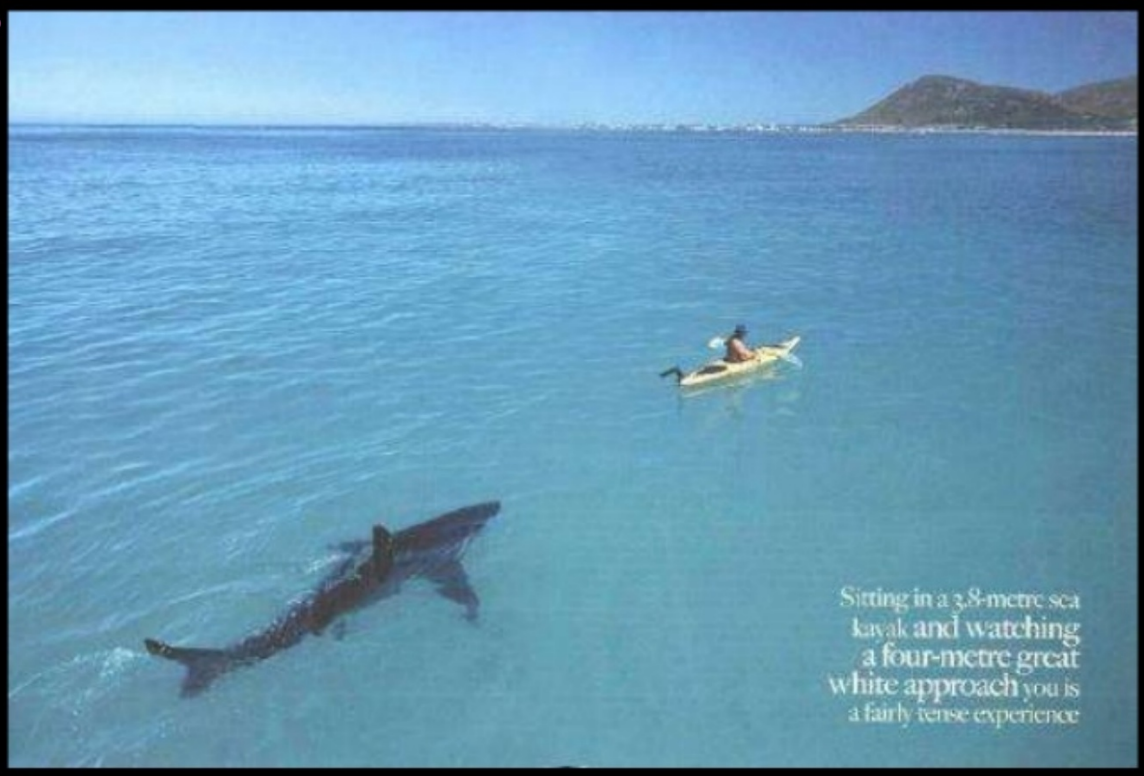
Starts with making *observations* about your world...

1.

1. Write 1 observations.


2.
2. Write 1 observations

3.



3. Write 1 observation.

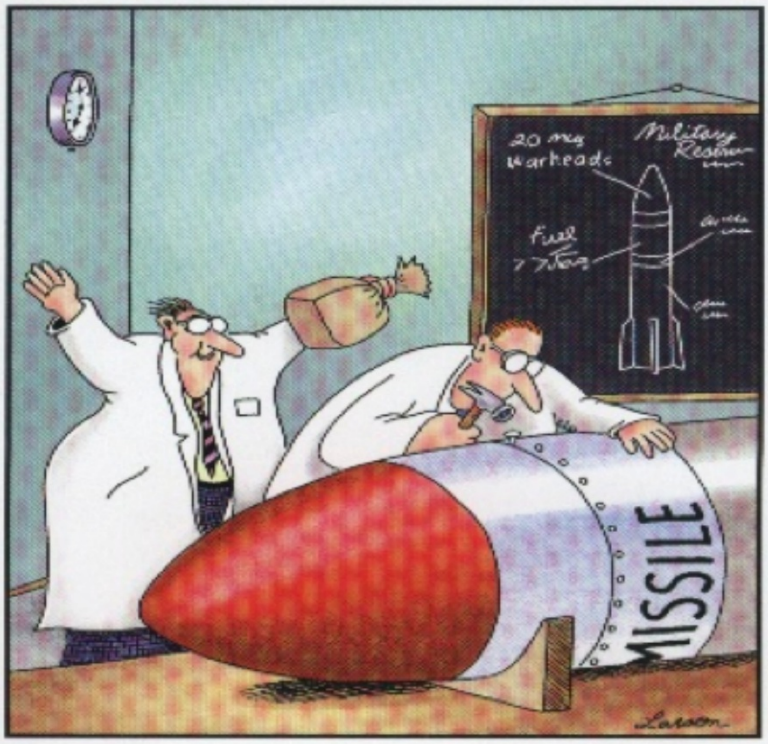
Observations vs. Inferences

Step 1: Observations and research.

- Look for facts, use our 5 senses.

- NOT an inference,which is an opinion based on our facts (conclusion).

Observation vs. Inference



Observation:

Observation:

Inference:

Step 2: Problem Statement

- Ask a question...

- What is the problem we are trying to solve?

- A **problem statement** is a question that compares ***variables***.
  - ***Example***: Does the drop height affect the bounce height of a superball?

- What are Variables?

- A variable is something that changes.
  - There are independent variables and dependent variables.

- Independent:

- the variable that *we change on purpose* in an experiment.

- the variable whose *value we know* before we start an experiment.

***Example*: Does the drop height affect the *bounce height* of a superball?**

We know the drop heights we will use.

- Dependent:

- the variable that changes based on our independent variable.

- the variable we DON'T know before our experiment. *What's being measured or studied?*

***Example*: Does the drop height affect the bounce height of a superball?**

We do not know the bounce heights before we start.

- Constant (control):

- the factor or group that is *purposely* kept the same in an experiment.

- No special treatment.

***Example*: Does the drop height affect the bounce height of a superball?**

The superball does not change during the experiment.


CONTROL
EXPERIMENTAL
Control
A
B

Step 3: Form a Hypothesis

Hypothesis: ***"Educated guess"***

- A scientific explanation for a set of observations.

- The tested statement in your experiment.

"If...then..." statement:

_____

- ***Example*: If a superball is dropped from increasing heights then the bounce heights will also increase because...**

"If...then..."

Step 4: Set Up an Experiment

- Only ONE dependent variable changes at a time

Does the temperature of turtle eggs determine their sex?

Variables that need to stay the same:

_____

_____

_____

4. Record and Analyze Results

<u>Data:</u>

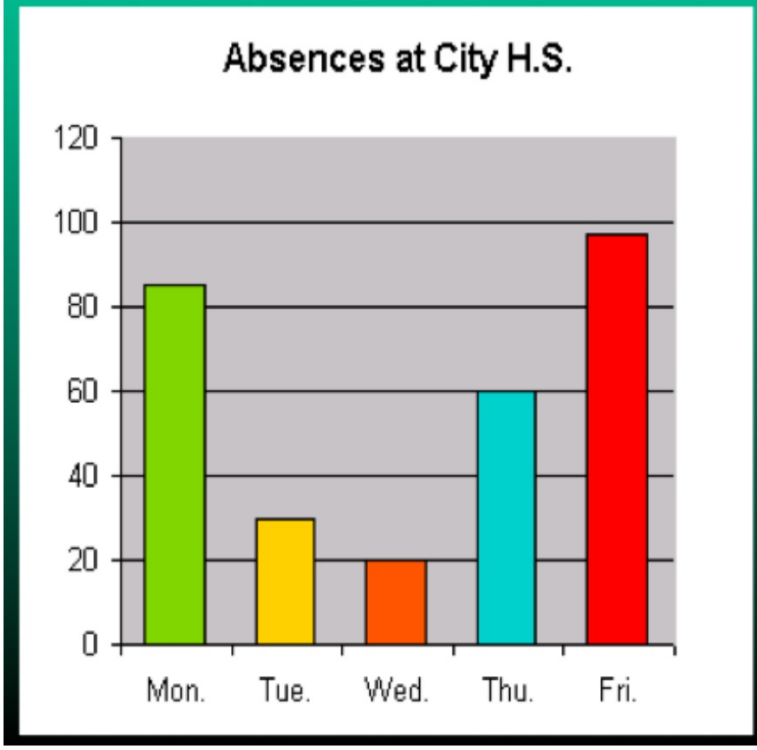
Information gathered from observations. Used to make *inferences*.

How do we show our data?

Why Do We Use Graphs?

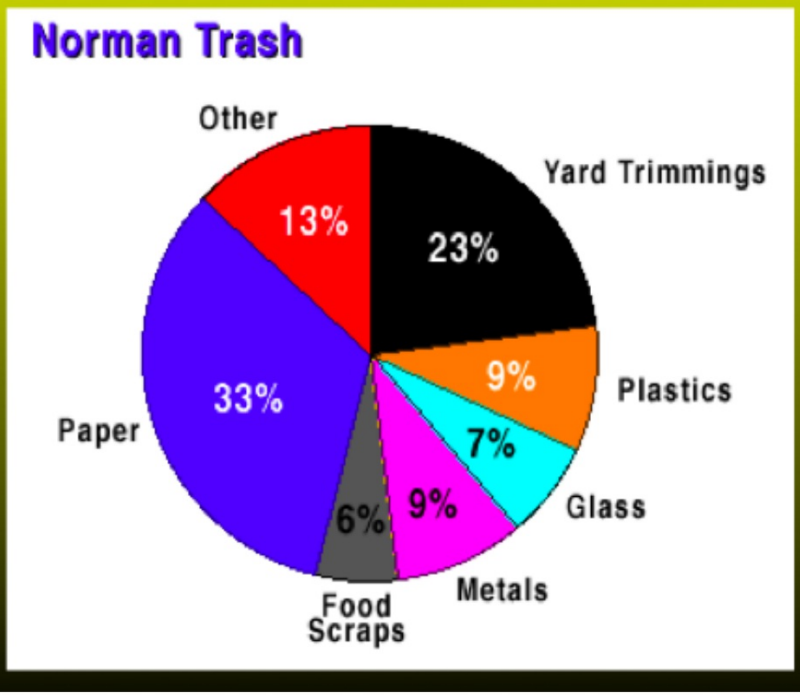
- Graphs help us visualize numerical data.
- There are several different types of graphs:
  - Bar graphs
  - Pie graphs
  - Line graphs

Bar Graphs



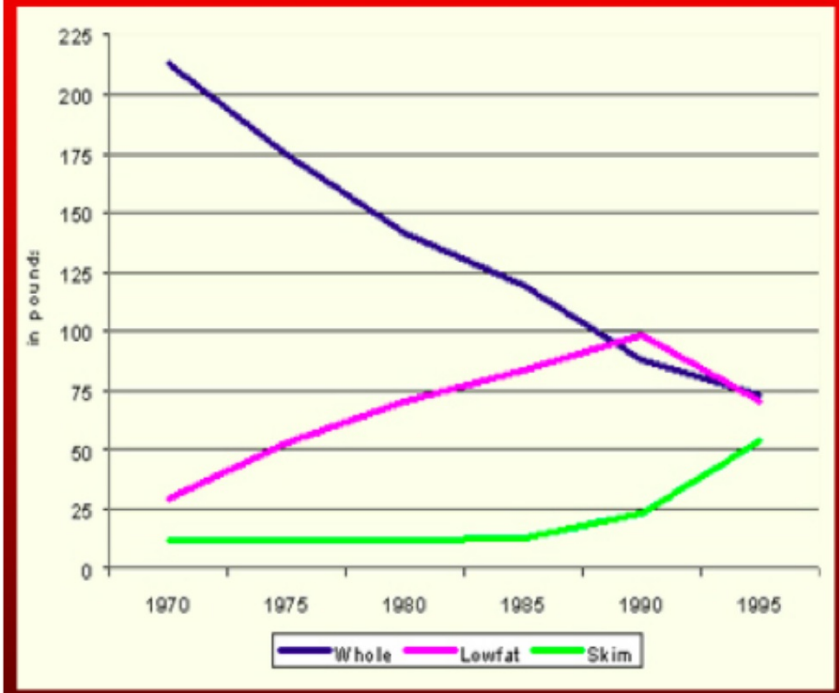
- **Bar graphs are used to show a comparison of multiple objects.**

Pie Graphs



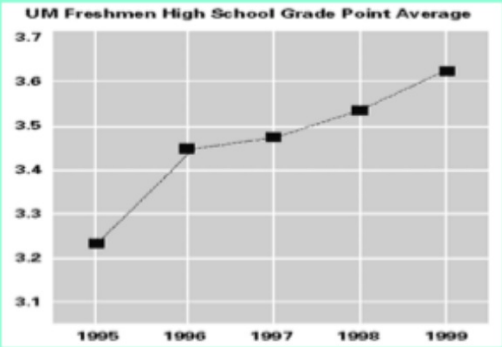
- **Pie graphs are used to compare the parts of a whole.**

Line Graphs

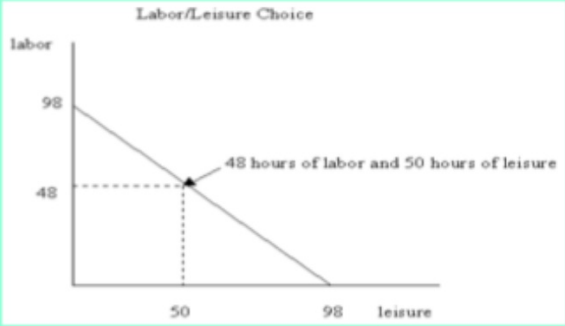


Line graphs are used to show the relationship between variables.

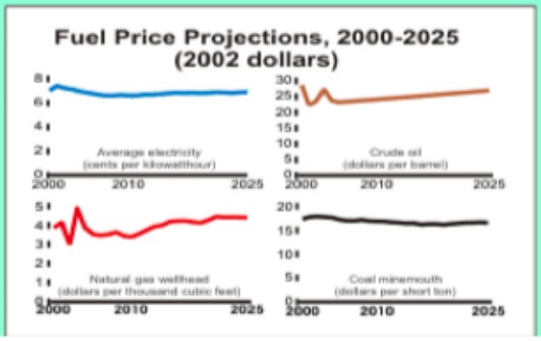
Types of Relationships (between variables)



Direct: as x increases y increases



Indirect: as x increases y decreases



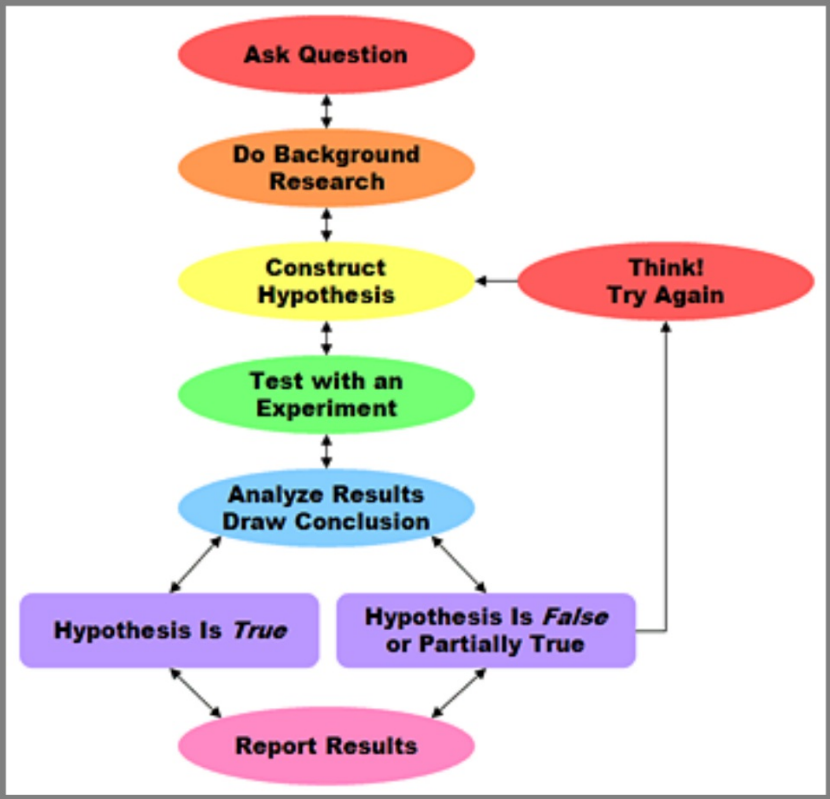
Constant: as x increases y remains the same

5. Draw Conclusions

- Evaluate hypothesis.

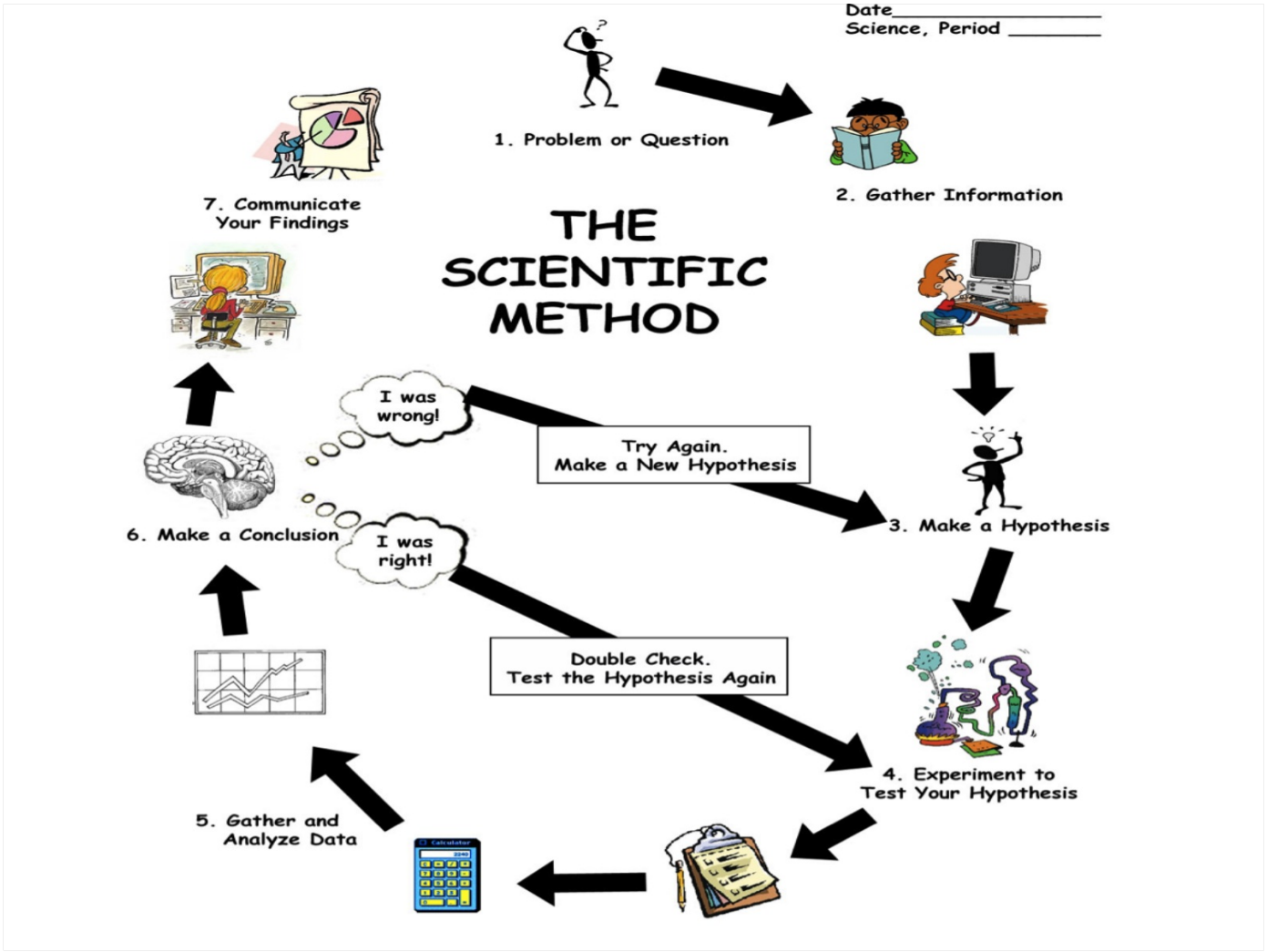
- State whether your data supports or rejects your hypothesis.

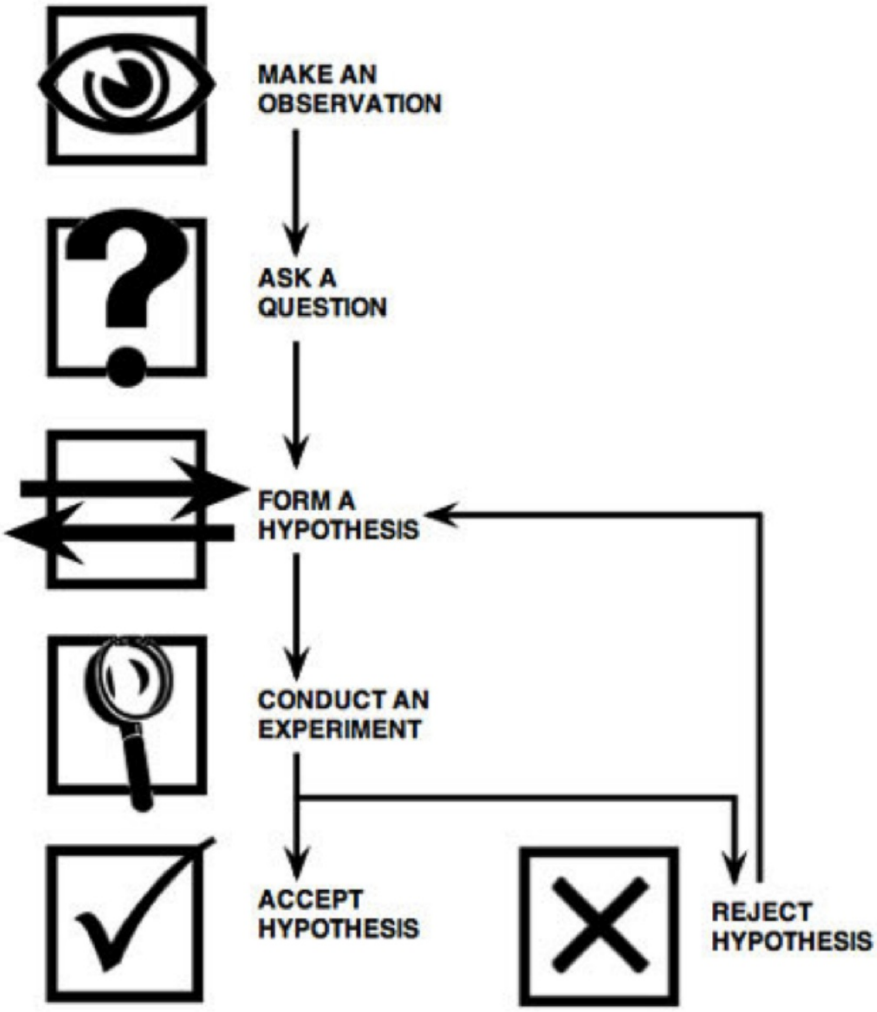
Science is not Linear



Date_____
Science, Period _____

THE SCIENTIFIC METHOD




MAKE AN OBSERVATION
ASK A QUESTION
FORM A HYPOTHESIS
CONDUCT AN EXPERIMENT
ACCEPT HYPOTHESIS
REJECT HYPOTHESIS