

Today's HW and DO NOW

HW - Intro to Science WS

Complete and Review Cornell Notes

DO NOW - You are conducting an experiment to answer the question, "Does water temperature effect the rate at which fish eggs hatch?" Identify what would be the MV, RV and at least 2 controls in this particular experiment.

Possible Answers to today's DO NOW

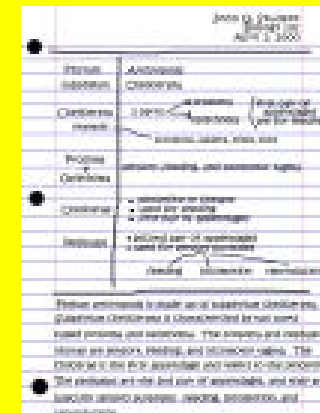
MV - temperature of water

RV - number of fish eggs that hatch

Controls - type of fish, age of fish,
type of water, same time period
given, etc.

The Scientific Method

What is Science?
How are scientific questions answered?
What are Cornell Notes?
How will we use Cornell Notes in this class?



First, Let's Talk About Cornell Notes.

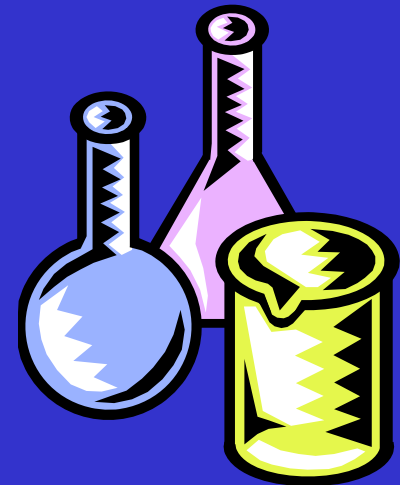
- Why use Cornell Notes?
- How do Cornell Notes help you as a student?
- How should I write Cornell Notes?

The Scientific Method


- What is science?
 - Way of learning about the natural world.
 - Also called **SCIENTIFIC INQUIRY**
- What process of study do scientists use to examine scientific phenomena?
 - The Scientific Method

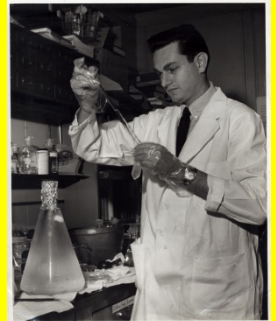
What is SCIENCE?

- A way to answer questions & solve problems
- How we understand the world around us
- A way or process used to investigate what is happening around you
- It provides possible answers



Skills Used By Scientists

- Posing questions 
- Making Observation and Inferences
- Developing Hypothesis
- Designing Experiments
- Making Measurements and Collecting Data
- Interpreting Data
- Drawing Conclusions
- Communicating Results



Scientists Pose Questions

- Scientific inquiry **BEGINS** with a question or a problem.
 - Ex. Does salt affect the time it takes water to boil?
 - Ex. Does a low carb diet help you lose weight faster?
 - What kind of questions could you pose about **television**.

Making Observations and Inferences

- **OBSERVATION:**

- Using one or more of your senses to gather information and collect data.



How do scientists OBSERVE?

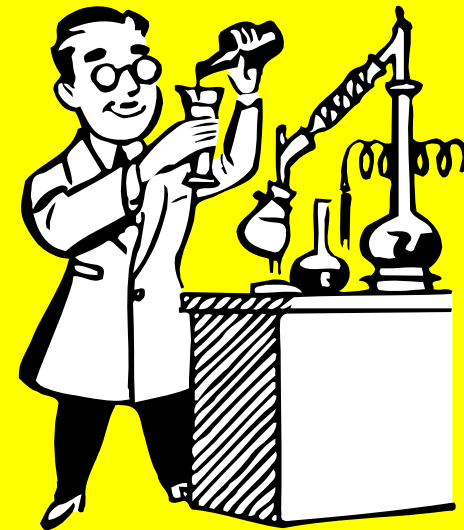
Using the 5 senses:

- Hearing
- Touch
- Smell
- Sight
- Taste



Scientists Observe To Collect Data

- Data:
 - The facts figures and other evidence gathered through observations
 - If numerical, measured in the metric system



Explain how to RECORD DATA

Data Tables

- A way to record results and observations accurately
- Have a descriptive title
- Divided into columns & rows
- Shows the independent variable
- Provides a place to record the dependent variable

Example of a DATA TABLE

Does The Amount of Exercise Effect Total Weight Loss?

Number of minutes of exercise per week (min)	Total weight loss per week (g)
30	
60	
90	
120	
150	

Observations and Data Can Lead To An Inference

- **INFERENCE:**

- Interpretation of an observation that is based on some kind of prior knowledge.

- Ex. A friend who is eating healthier has improved their time in the 100m dash in track. You may infer that a healthy diet would help increase productivity in the body.
 - An inference may not always be right, so it is NOT a fact.



Draw the following Observation Table
in your NOTES:

	OBSERVATIONS OF OBJECT
BEFORE LIGHTING	
DURING LIGHTING	
AFTER LIGHTING	

The Next Step Is To Develop A Hypothesis

- HYPOTHESIS:

- A possible explanation to some observations
- Answer to a scientific question
- MUST BE TESTABLE.
- MUST be written in an If..., then... statement.

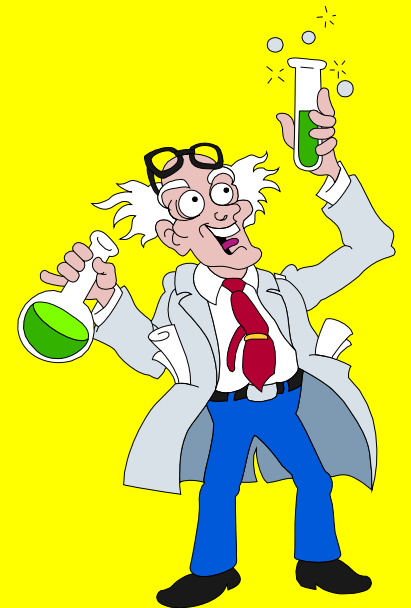


Examples of an Hypothesis

- If sunlight effects the rate of plant growth, **then** the more exposure to sun the higher the plants will grow.
- If bacteria grow in higher temperatures, **then** an increase in temperature will lead to an increase in bacterial growth.
- ******* manipulated variable is the **IF**,
responding variable is the **THEN *****

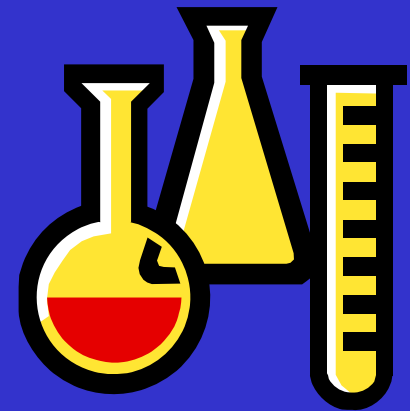
Next, You Design an Experiment

- You need to decide what your **VARIABLES** are.
 - Factors that can change in an experiment



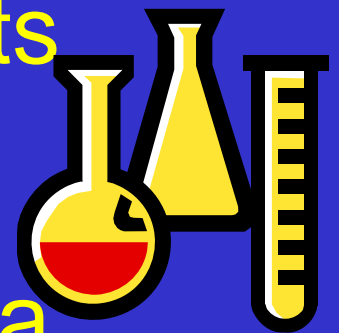
There are 3 TYPES OF VARIABLES

1. Independent (Manipulated) Variable
2. Dependent (Responding) Variable
3. Controlled Variable



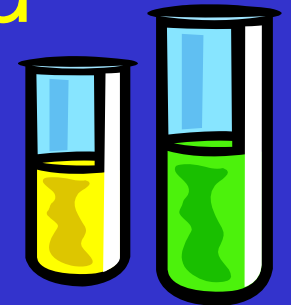
Explanation of the INDEPENDENT (MANIPULATED) VARIABLE

- The variable that can be changed during an experiment
- The variable that the scientists chooses to change
- The variable that may cause a change in the dependent variable



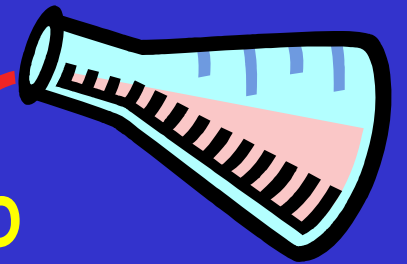
Explanation of the DEPENDENT (RESPONDING) VARIABLE

- The factor that is being measured in an experiment
- The variable that is measured by scientists
- The variable that may change because of the independent variable



Explanation of the CONTROLLED VARIABLE (CONSTANT)

- Variable that stays the same during an experiment
- Variable that is controlled by the scientist
- Variable that is not allowed to change



Make Measurements During Your Experiment

Once you have measured the differences in your responding variables. You have to analyze and interpret your data.



How do you ANALYZE DATA

- Graph the data
- Look for patterns and relations
- Look at the shape of the graph
- Next, you draw a conclusion.



What do scientists do when they DRAW CONCLUSIONS?

- Answer the original question
- State whether or not the hypothesis was supported (it is never "right" or "wrong")
- Pose questions for further research



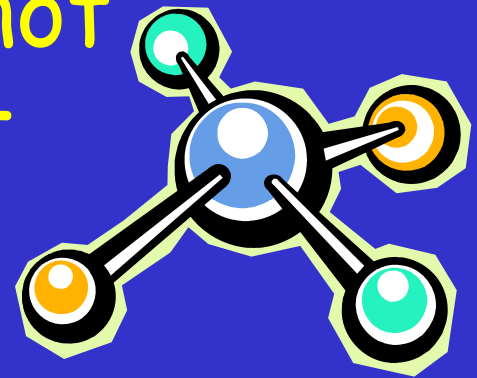
How do scientists **COMMUNICATE** the results of their work?

- Reported in scientific journals
- Science journals
- Presentations to other scientists



Why are REPEATED TRIALS necessary in an experiment?

- To make sure results are valid
- The more trials conducted, the more likely the results are reliable
- To make sure a "fluke" is not considered the true result





Test your observational skills

- How many pots are in the picture?
- Which way is the dog facing?
- What color is the woman on the right wearing?



Test Your Observational Skills

- What color is the screwdriver?
- Is the hammer on the right or the left?
- How many compartments are in the tool box?



Test Your Observational Skills

- How many onion rings are there?
- What color is the rim of the plate?
- Is the bun on or off the burger?



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