Welcome! 9/3/14

End

- **Objective:** Students will (1) check progress in Biology by completing Beginning of the Week Check-In; (2) take notes on key vocabulary, and define and identify variables and controls in experiment scenarios.

- **Catalyst:** *Brainstorm: What are 5 requirements of a good experiment?*

- **Homework:**
  - Signed ISN Guidelines #1 DUE Friday
  - Make sure your notebook is UP TO DATE by FRIDAY
    - *If you have a concern with getting the supplies/50 cents, see Mrs. Reigel after class TODAY!*

- **Get all of your handouts from the graded work folder.**

- **You need your NOTEBOOK today!**

- **If you have your 50-cents or your notebook, have it out on your desk.**

Catalyst

- *Brainstorm: What are 5 requirements of a good experiment?*

Beginning of the Week Check-In and Goals

- Remember our SMART goals?
- NO EXCUSES!
- We have things to learn, places to go, and successful people to become!
- Let's CHECK-IN and see how we are doing after 1 week of Biology.

Sample Student

Section: Biology I 4

Q1 Progress Report	Student Information Survey Aug 26, 2013 PTS 13	Unit 0 Diagnostic Pre-test Aug 28, 2013 PTS 10	The Cat's Meow (Observation/Inference Lab) Aug 29, 2013 PTS 10	1.1 What is Science Handout Aug 30, 2013 PTS 10	Inferences and Observations Practice HW Aug 30, 2013 PTS 0	Week 1 Weekly Work Organizer (Green) Aug 30, 2013 PTS 50	Class Supplies (75-cents) for folders Sep 3, 2013 PTS 10	Signed Parent Syllabus Form (yellow) Sep 3, 2013 PTS 10
F 58.4%	12	0	9	0	5	40	0	0

Name: _____ Week: _____ Period: _____ Dates: _____ to _____ Unit: _____

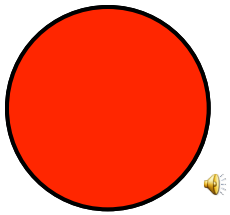
Beginning of the Week Check-In and Goals		
My Current Grade is: _____ *Am I on track to meet my goals? Why or why not?*	*Do I have any missing assignments? If yes, list them below:*	*What are my goals for this week?*

DIRECTIONS:

- Look at the grade sheet for your current grade, fill it in at the top of your Weekly Work Organizer
- Are you on track to meet your goals? Why or why not?
- Do you have any missing assignments? If yes, list them.
  - Assignments highlighted in **yellow** can be completed independently. Extras are in the black bin.
  - Assignments highlighted in **orange** MUST be completed during **lunch or Coach Class.**
  - Assignments that are NOT highlighted, cannot be made-up.
- What are your goals for the week? List 2-3 goals/actions that will help improve/ maintain your grades or behavior.
- REMEMBER: You have one week from today to make up your missing assignments!!

Beginning of the Week Check-In and Goals

10 minutes



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4. What are your goals for the week? List 2-3 goals/ actions that will help improve/maintain your grades or behavior.

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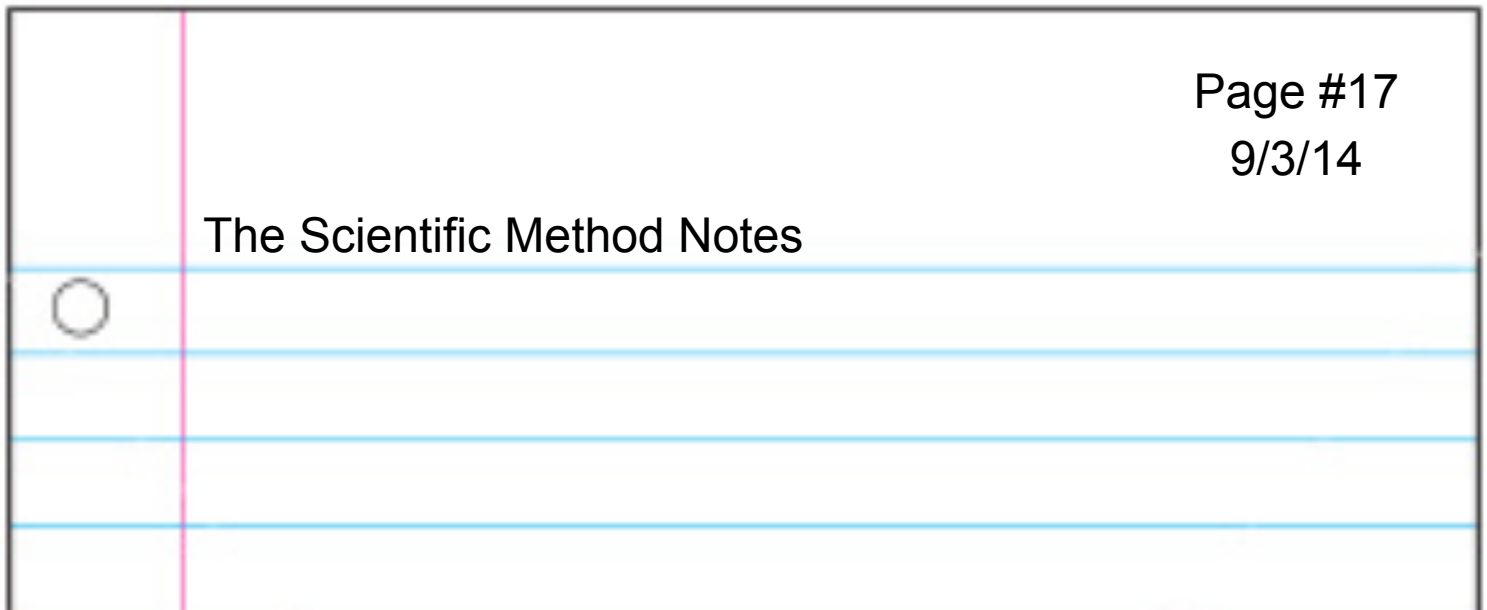
You Can Do It!!

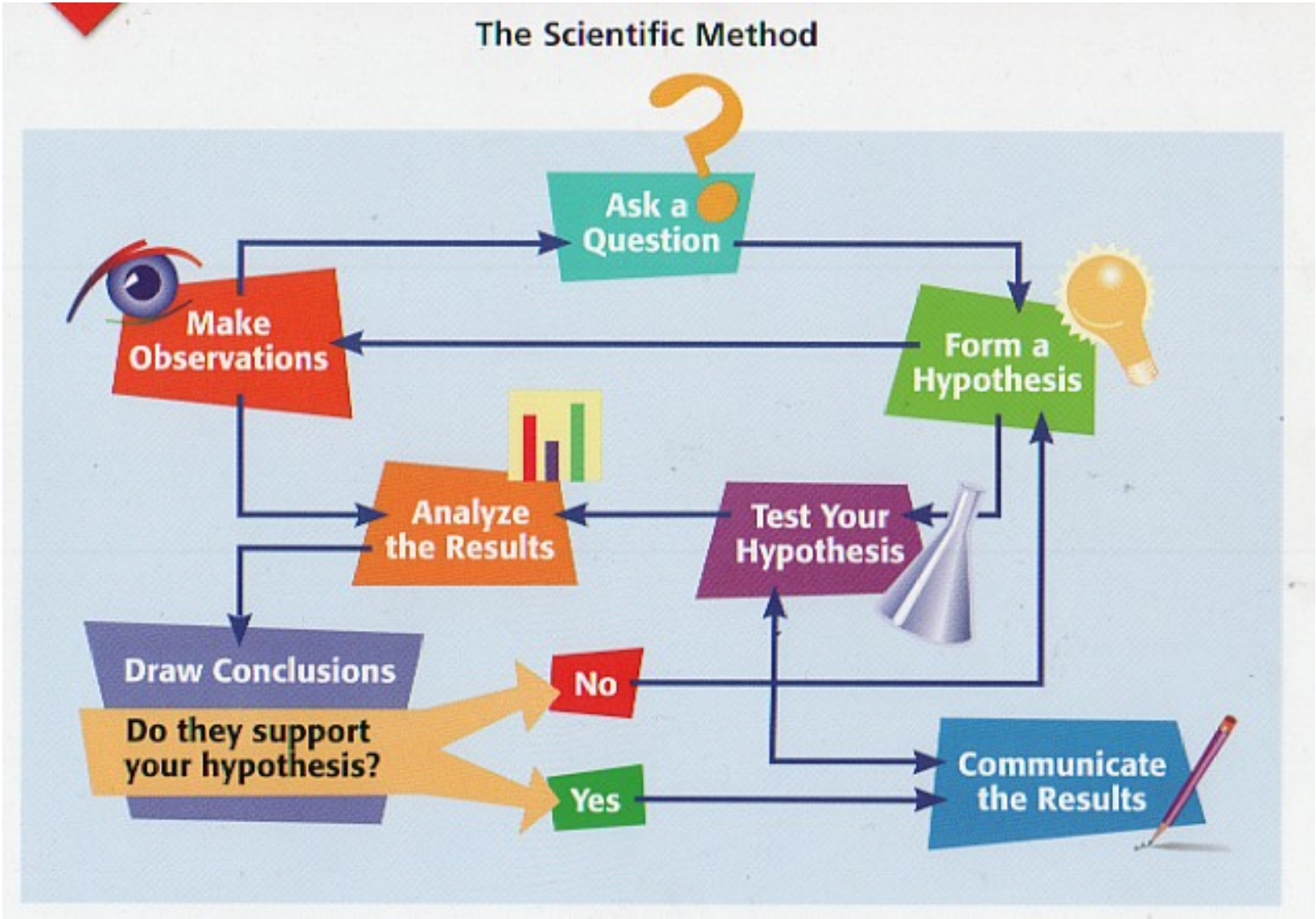
Notes

- Take out your notebook and turn to page #17 (RIGHT side)—if you need more space, use page #19
- Label your paper with the heading below.
- I will model good note-taking on the board.
  - By the end of the semester, I want YOU to be taking **good** notes on your own!

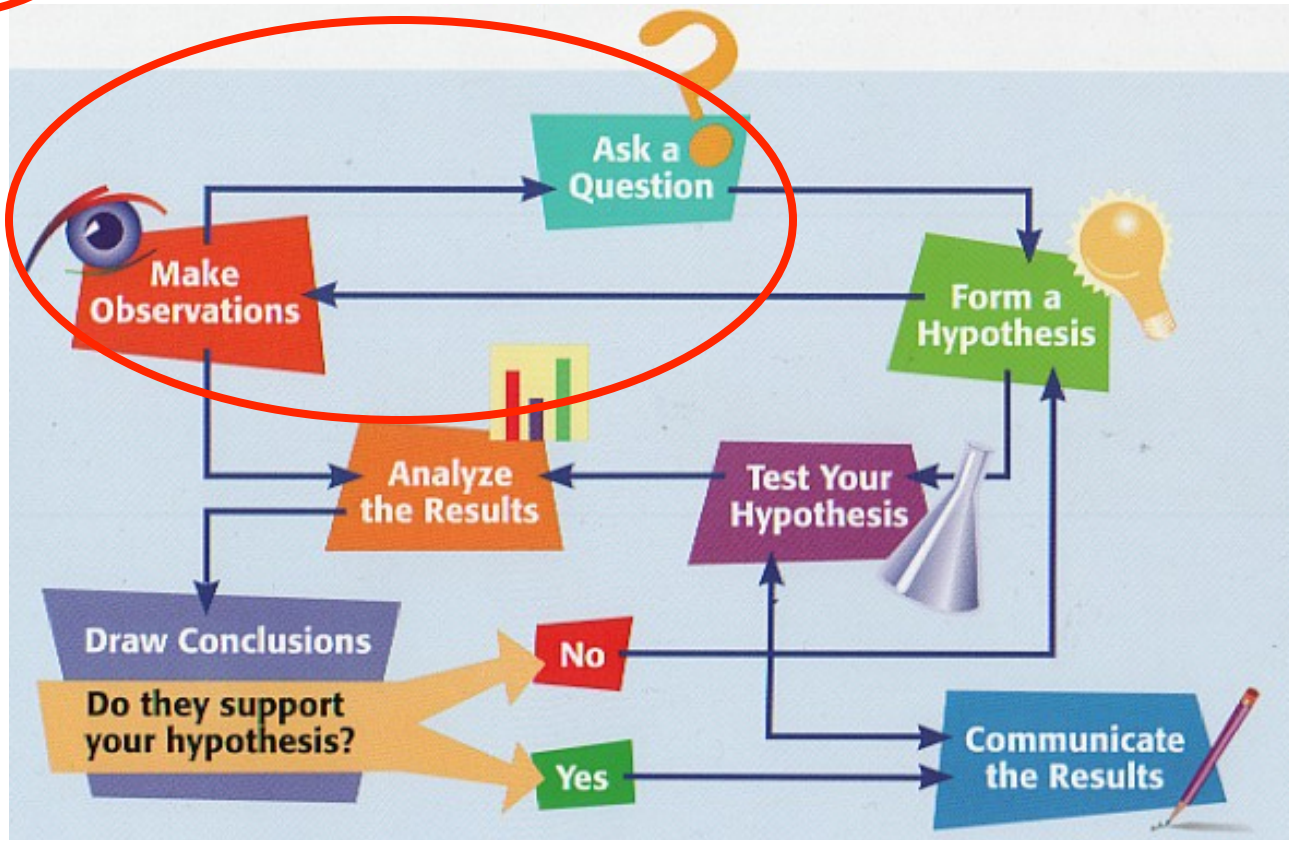


Scientific Method Review

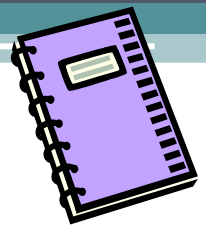
How it really goes…



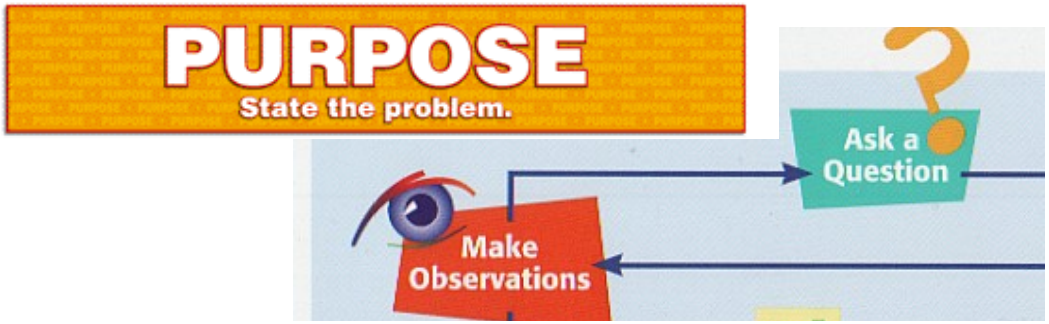
1. Purpose/Scientific Question



RIGHT Side ALERT!!



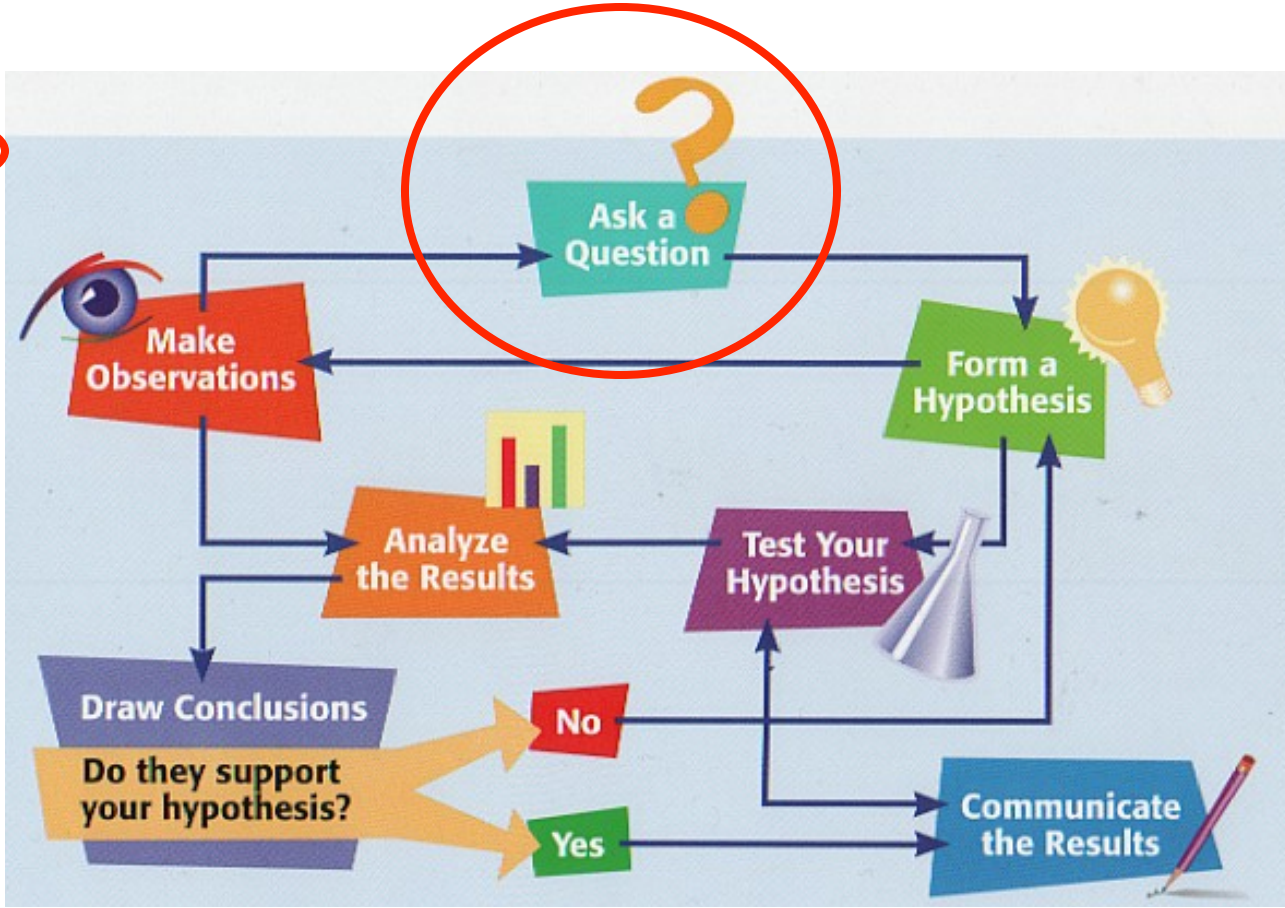
1. Purpose/Scientific Question



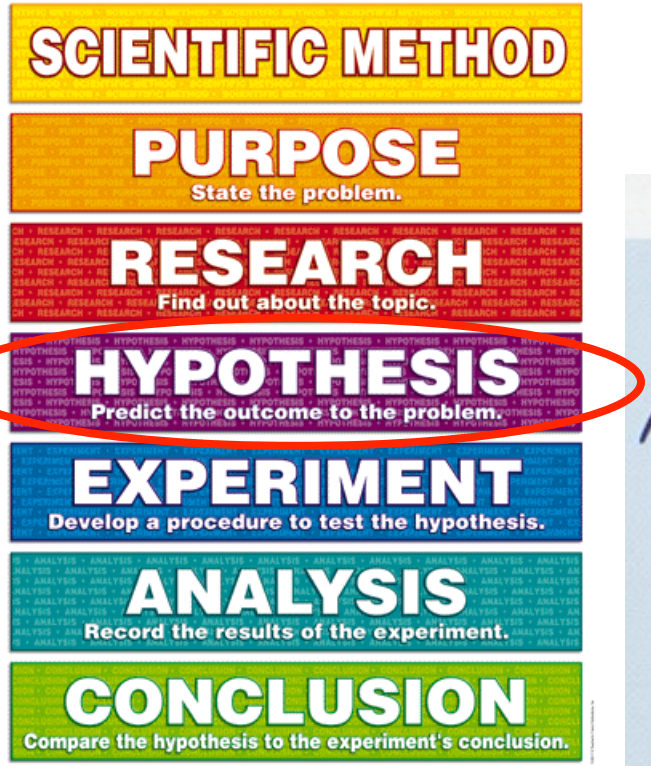
- The purpose is the question you are trying to answer based on your observations
- NEVER starts with "Why"
- Answers the questions "Does," "How," or "What effects"
- Examples:
  - Does the amount of light affect how plants grow?
  - Will eating breakfast increase quiz scores?

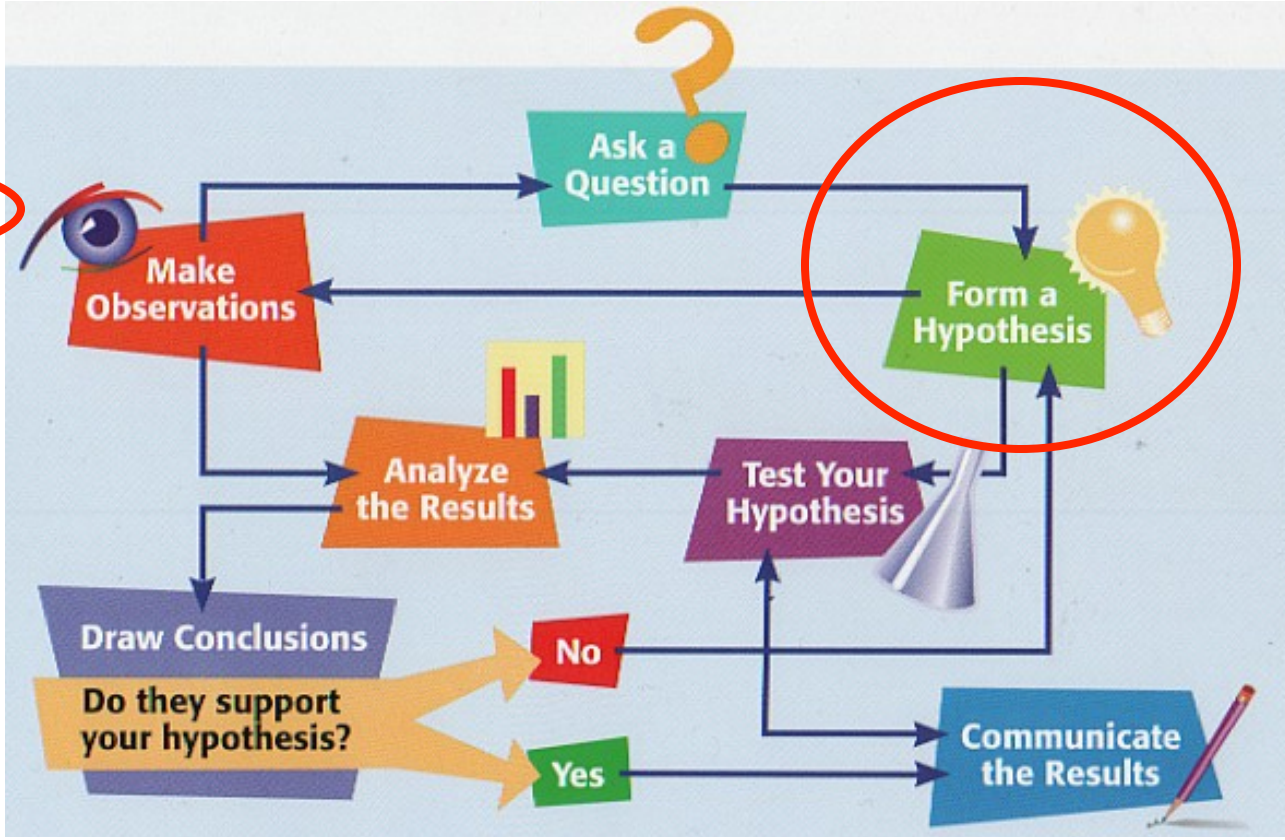
2. Research


SCIENTIFIC METHOD
PURPOSE
RESEARCH
Find out about the topic.
HYPOTHESIS
Predict the outcome to the problem.
EXPERIMENT
Develop a procedure to test the hypothesis.
ANALYSIS
Record the results of the experiment.
CONCLUSION
Compare the hypothesis to the experiment's conclusion.


Ask a Question
Make Observations
Form a Hypothesis
Analyze the Results
Test Your Hypothesis
Draw Conclusions
Do they support your hypothesis?
No
Yes
Communicate the Results

3. Hypothesis





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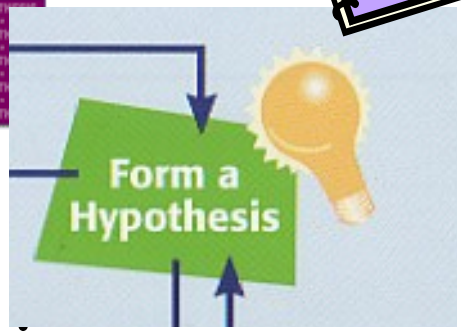
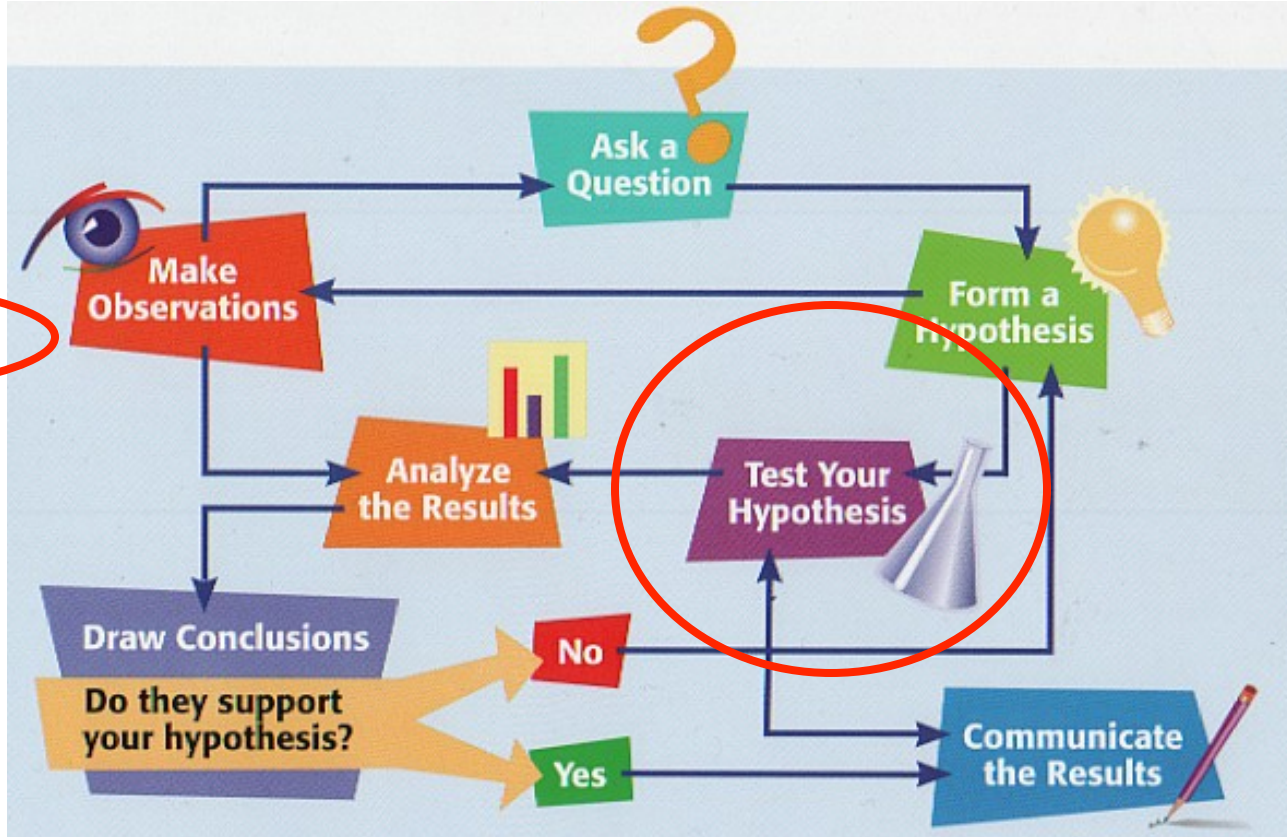


- A **testable** prediction of why something occurs, based on observations and inferences
- "**If** ____[I do this, IV]___ , **then** _[this, DV]_ will happen"
  - Examples: I observed that the lights are bright. A testable hypothesis could be: "**If** I turn off the lights, **then** the room will be darker.

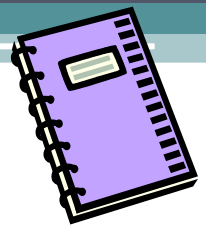
4a. Design an Experiment



KEY Experiment Vocabulary

- Variable—something that changes
- Constant—something that stays the same
- Control—something we don't change
- Group—set of something being tested

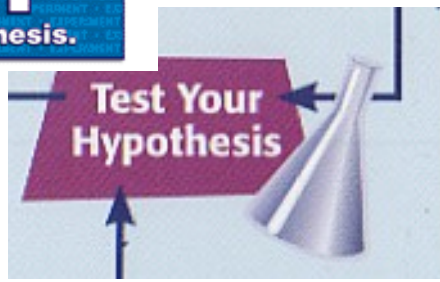
4a. Designing an Experiment



Controlled experiments need 5 parts:

- **Independent Variable** = what the scientist changes.
- **Dependent Variable** = what the scientist measures or observes.
- **Constants**= what we keep the same.
- **Control Group** = the "normal" group; used for comparison.
- **Experimental Group** = the group that has been changed.

4a. Experiment Examples



Mrs. Reigel wants to know if students who eat candy during a quiz do better than students who don't. She divides the class in half. One half gets candy during the quiz and the other half does not. After the quiz, she looks at the grades to see which group did better.

Independent Variable?

Dependent Variable?

Constants?

Control Group?

Experimental Group?

LEFT SIDE!!!! Record your samples on page #16

Pause and Practice!

- Let's practice identifying the **independent** and **dependent** variables
- We will try one together, then you will have 10 minutes to work in your groups and identify the rest of the variables.
  - Independent Variable—what the scientist changes or chooses
  - Dependent Variable—what the scientist measures or observes

10 minutes

LEFT SIDE!!!! Record on page #16

#1

Variables Practice

Directions: Identify the independent variable, dependent variable, and control group for each experiment. Then, create a hypothesis for the experiment being described.

1. Kiara wanted to test how the amount of plant food (Miracle Gro) affected plant height. Here are her experimental groups:
   - Group 1: 2 grams of Miracle Gro
   - Group 2: 4 grams of Miracle Gro
   - Group 3: 6 grams of Miracle Gro
   - Group 4: 0 grams of Miracle Gro

#1

IV (Cause)	DV (Effect)	Control Group

Hypothesis	If…	Then I predict…

Your Turn!

10 minutes

 # 2. Sheldon wanted to test whether different dishwashing liquids clean dishes better. He tested the following groups:

- Group 1: 5 mL of Cascade
- Group 2: 5 mL of Palmolive
- Group 3: 5 mL of water

 # 3. A student wanted to test how water affects the ability of metal to rust. She tested the following groups:

- Group 1: 5 mL of water on metal
- Group 2: 10 mL of water on metal
- Group 3: 15 mL of water on metal
- Group 4: 0 mL of water on metal

#__

IV (Cause)	DV (Effect)	Control Group

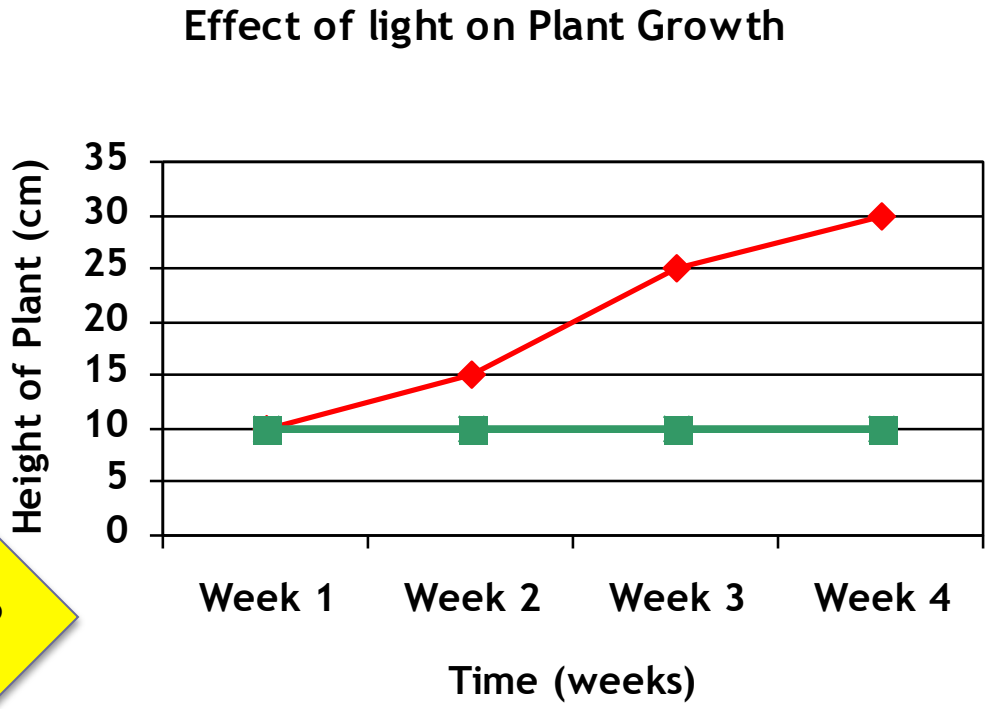
Hypothesis	If…	Then I predict…

4b. Collect Data

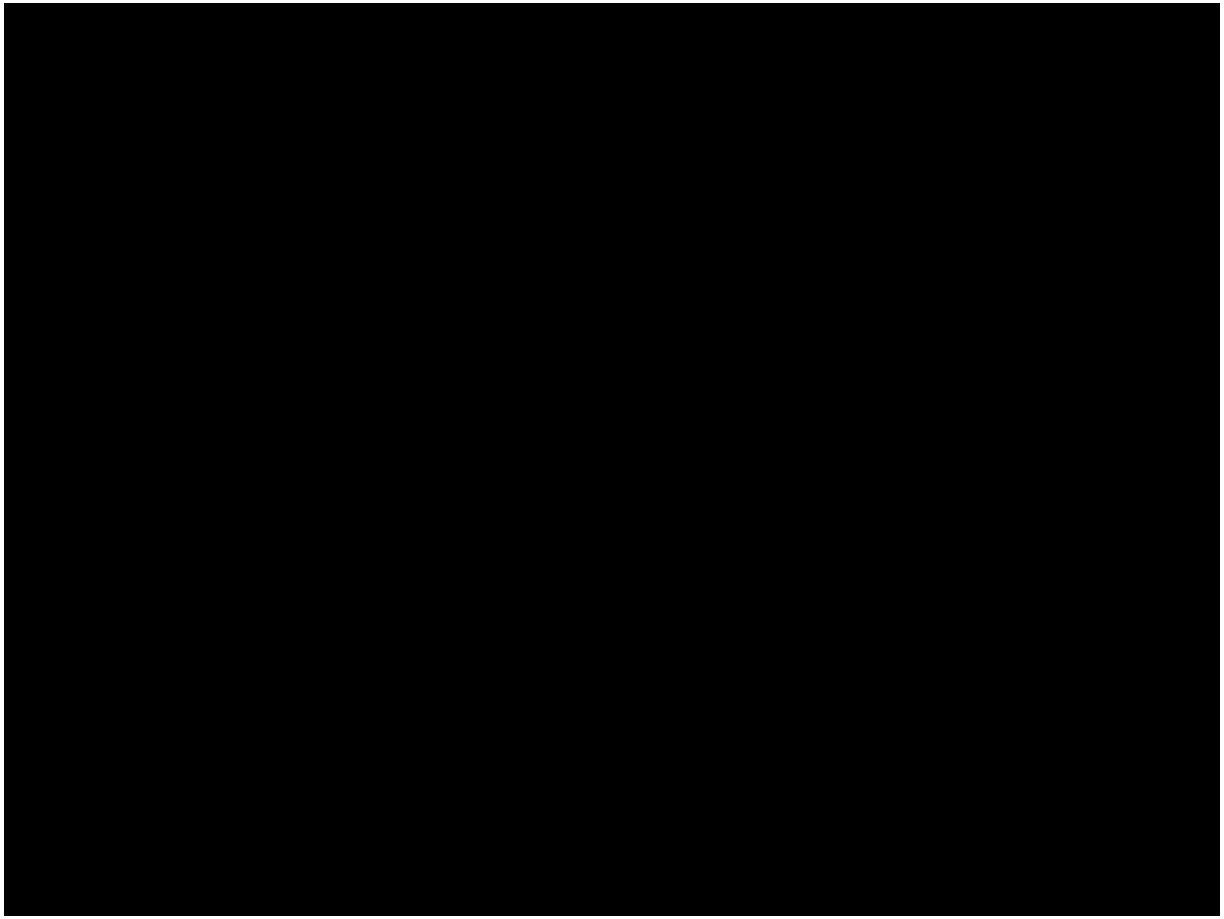
- This is where you take the time to measure your dependent variable and make a data table or graph

	Week 1	Week 2	Week 3	Week 4
Plant (light)	10 cm	15 cm	25 cm	30 cm
Plant (no light)	10 cm	10 cm	10 cm	10 cm

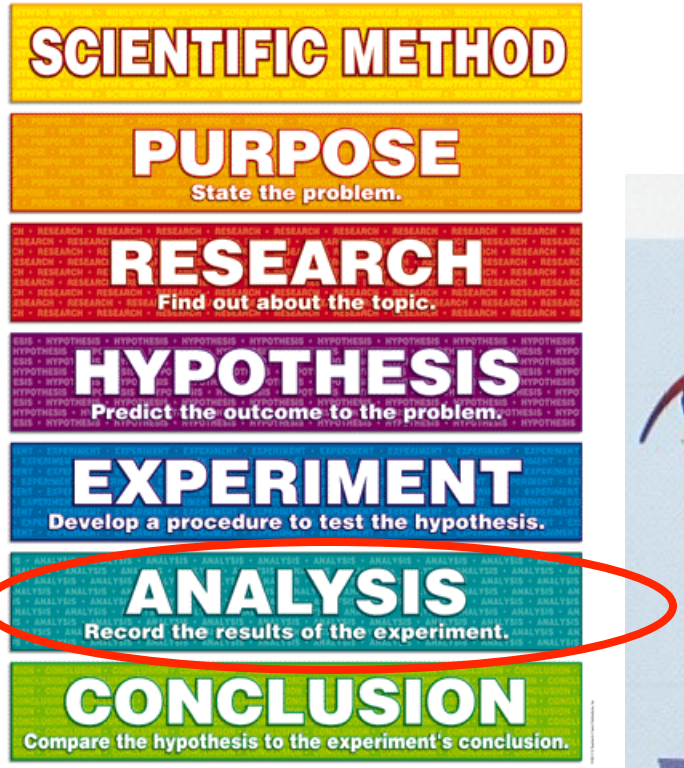
Can we identify IV? DV?

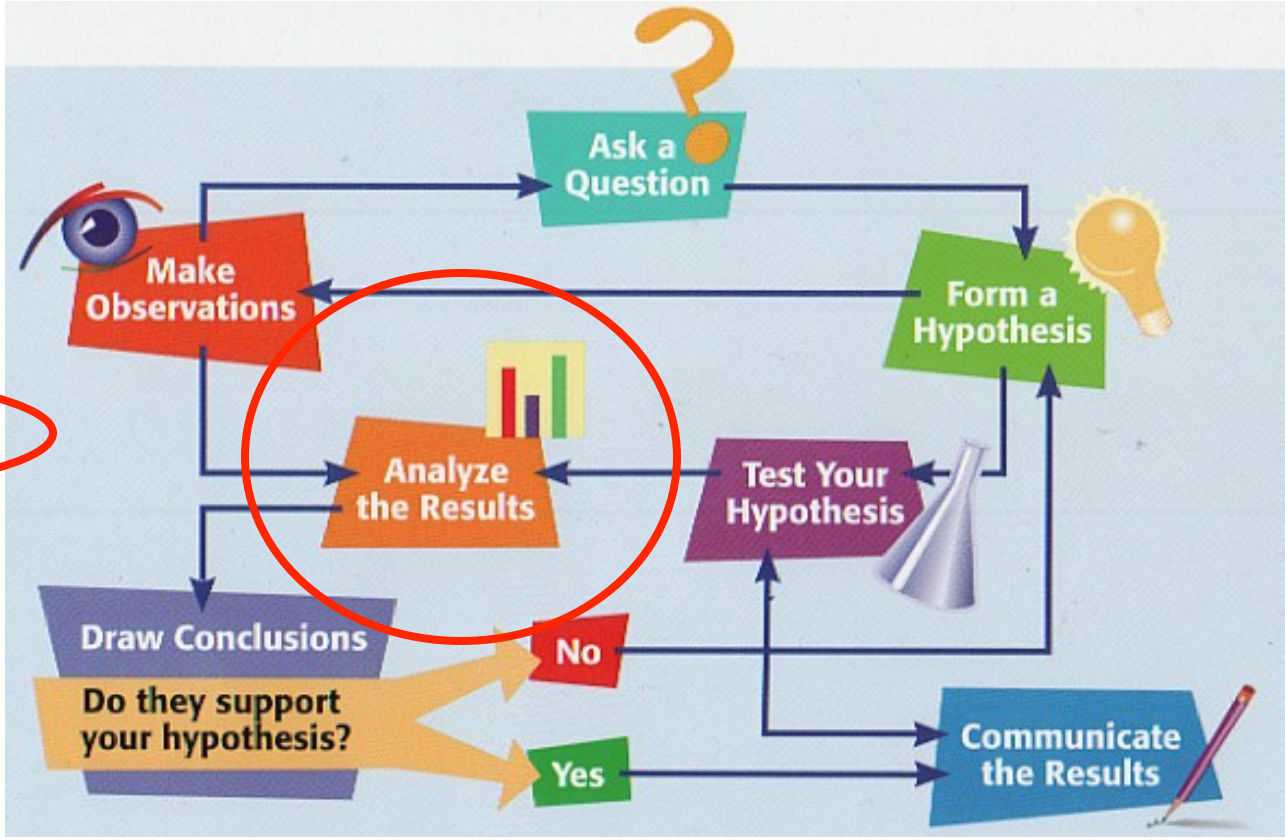


“Cloudy with a Chance of Meatballs”



5. Analyze Results





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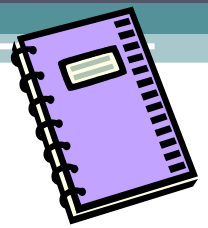
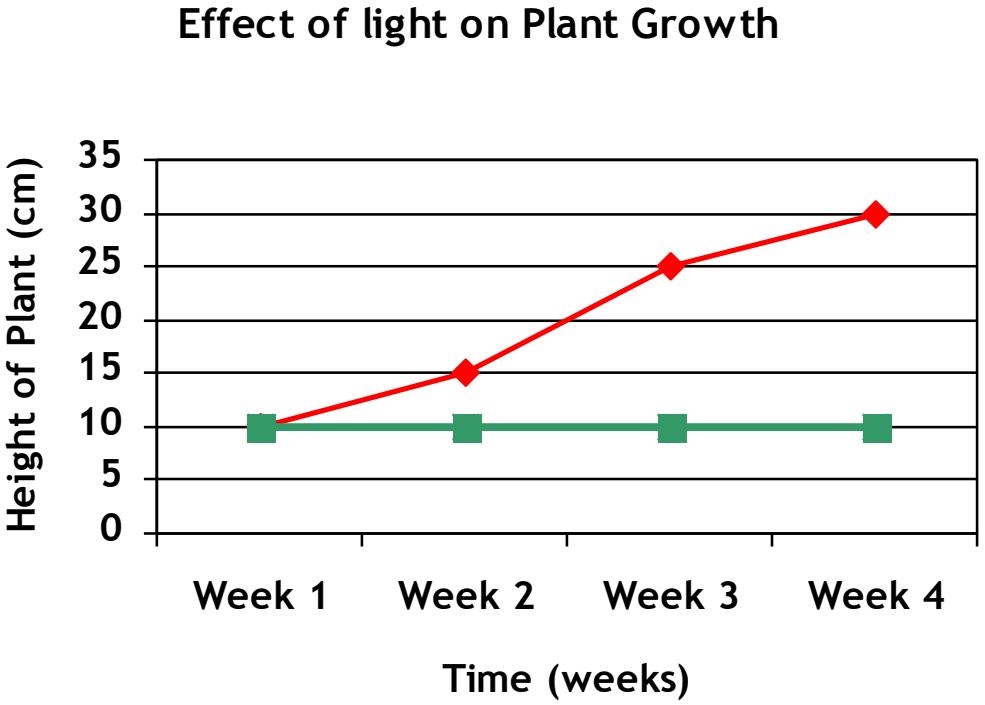
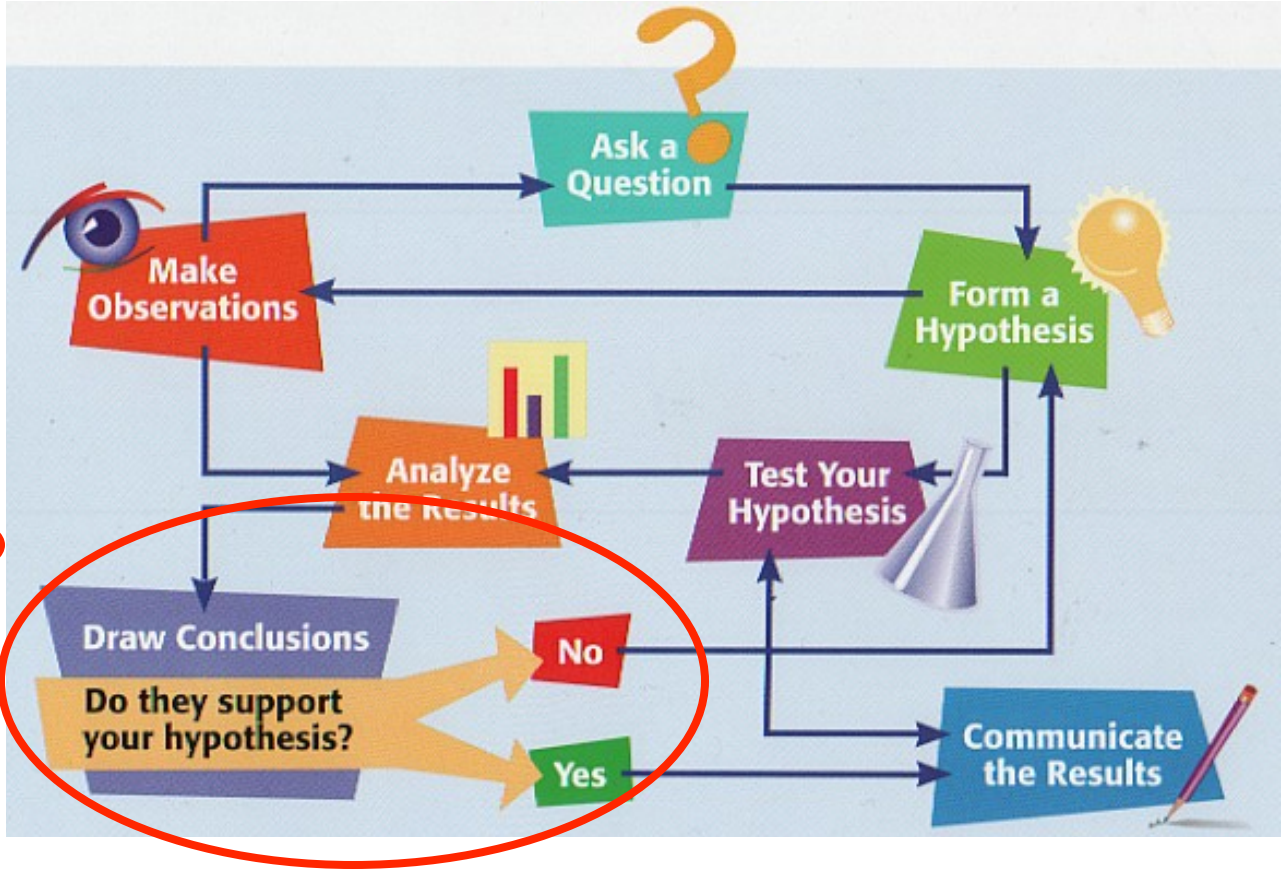


- Interpret the data you have collected
  - What does the data show?
  - What can we learn from the table or graph?
  - What is the trend? What does that show?

	Week 1	Week 2	Week 3	Week 4
Plant (light)	10 cm	15 cm	25 cm	30 cm
Plant (no light)	10 cm	10 cm	10 cm	10 cm



6. Draw Conclusions



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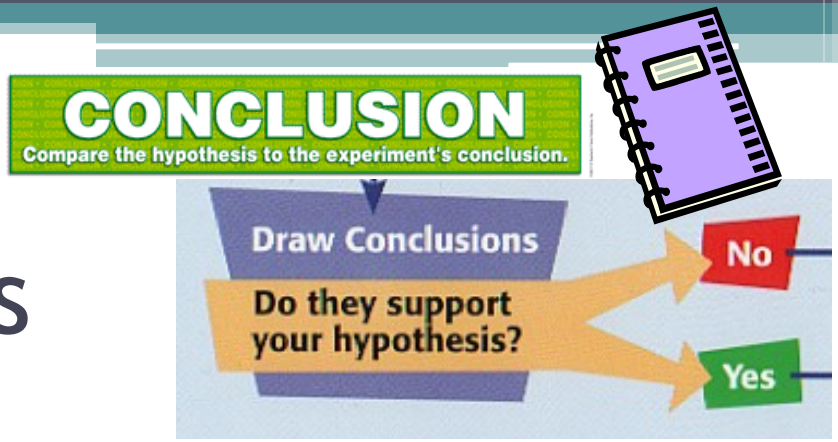
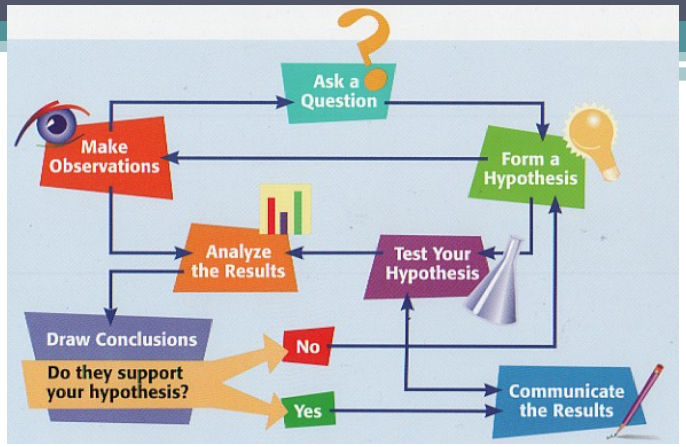


- Based on the data we collected, we can draw a conclusion about whether our hypothesis was correct or needs to be changed
  - Original Hypothesis: IF plants are placed in a room with no sunlight THEN they will not grow
- Does our data Support our hypothesis? How do you know?

Repeat



- Even if we support our hypothesis, we should repeat the experiment
  - Increase accuracy
  - Helps prevent bias
  - Accounts for human error
- If our conclusions do not support our hypothesis, we need to make a new hypothesis and test again!
- We could continue these steps over and over before we publish our findings.

Independent Practice

Jacob, a landscaper, wondered if a particular tree would grow better in the sun or in the shade. Without collecting information or doing much research, Jacob claimed that if he could limit the amount of sunlight the tree was exposed to, then the tree would grow taller. To test this idea, Jacob planted 10 trees in a shady area and 10 trees in an area with a significant amount of sunlight. Over the next several months, Jacob watered and fertilized each tree in the exact same way. He also took measurements of the tree's height and averaged them.

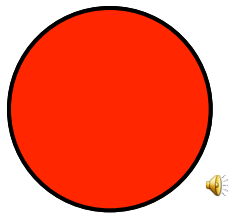
1. **What factor is the independent variable in the experiment? Explain your reasoning.**
2. **What factor is the dependent variable in the experiment? Explain your reasoning.**
3. **Identify two constants in the experiment.**
4. **What is Jacob's hypothesis?**

Notebook Time!

LEFT SIDE!!!! Complete on page #18

- Look inside ISN Guidelines #2 on Page #5.
- Turn to the page titled “Left Side Assignments”
- On page #18… CHOOSE one of the Summarizing assignments to summarize what we talked about today:
  - Acrostic Poem
  - Annotated Drawing
  - CD Cover
  - Cheat sheet
  - News Byte
  - Postcard
  - RERUN Summary

10 minutes



Exit Slip

PLANT GROWTH EXPERIMENT

Day	Average Height (in centimeters)	
	Container A: Water Only	Container B: Water plus Fertilizer
1	2.0	2.0
2	2.2	2.3
3	2.3	2.8
4	2.5	3.2
5	2.6	3.8

- Students tested the effect of fertilizer on plant growth. Plant A received only water. Plant B received water and fertilizer. They observed and recorded the height of the plants for 5 days.

1. What is the **independent variable?**
2. What is the **dependent variable?**
3. Which plant (A or B) is the **control** group?