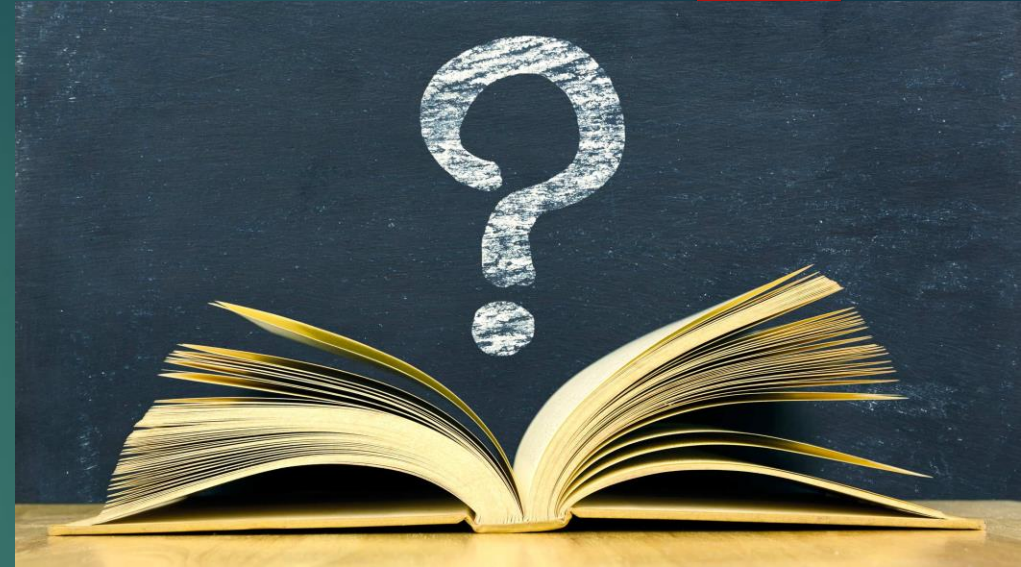




Scientific Method

Question

- ▶ Ask a question about something observable and testable.
- ▶ Usually, the question is driven with an intention/**purpose**, like finding new medicine, or exploring space.



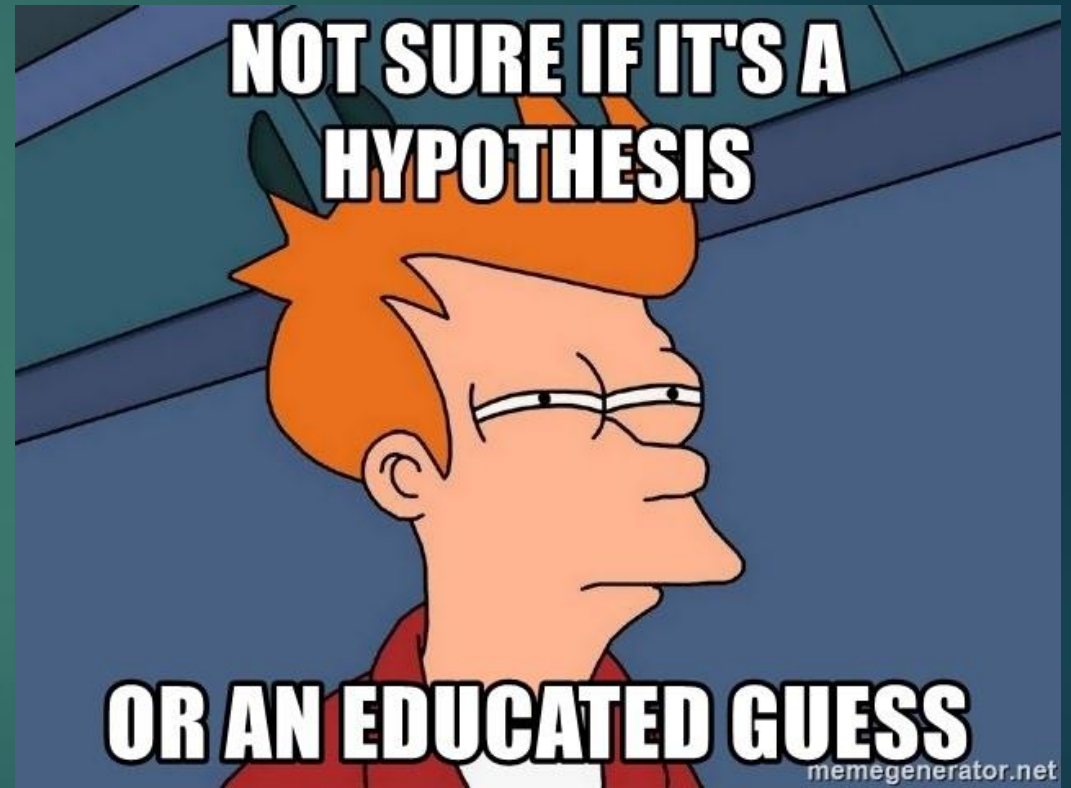
JUST OBSERVING



CARRY ON

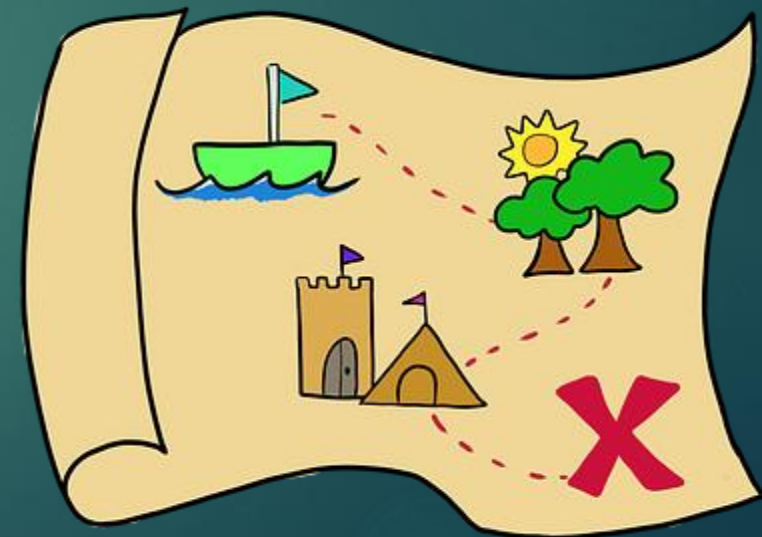
Research and Hypothesis

- ▶ Do some research on the observation (this way we ask new questions, not already answered ones).
- ▶ Make a hypothesis; a guess on what will happen. State it like a statement that will happen.



Procedure

- ▶ Come up with a procedure for an experiment.
- ▶ The goal is to gain results that will help support the hypothesis.
- ▶ **If you do not find results to support the hypothesis, the hypothesis is off.**
- ▶ If the procedure did not work as planned, you can redesign the procedure and try again
- ▶ **Remember to include safety precautions**



Procedure - Trials

- ▶ If you sit outside the school and see 1 red car drive by, is it ok to say you proved all cars in Maple Ridge are red?
- ▶ Three trials is the **absolute minimum**, but usually other scientists and general public want far more
- ▶ You also need to make sure you do a trial where you change nothing, to compare your actual results to (called a control)

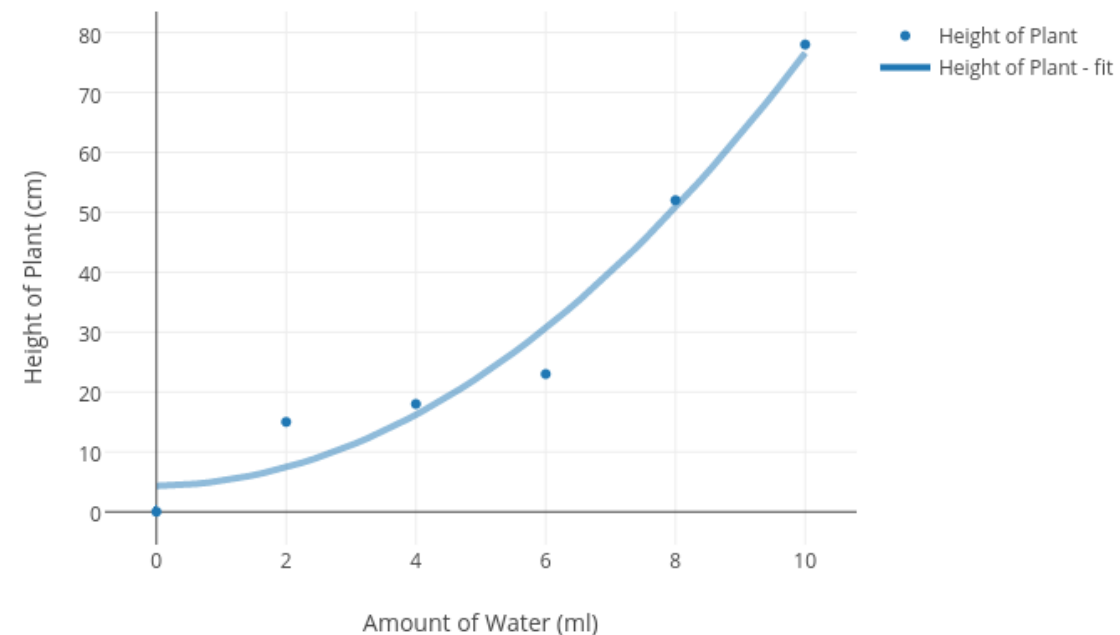


Procedure - Variables

- ▶ What is the **independent variable**? (the aspect being changed)
- ▶ What is the **dependent variable**? (the aspect that changes because of the independent variable. This is what is measured)
- ▶ What are the **control variables**? (everything relevant to the experiment that is kept the same)
 - ▶ Examples:
Changing water amount given to a plant, measuring the differences in height, keeping sunlight, soil, time of year, person measuring, temperature... the same



Height of plants with different amounts of water.



Results

- ▶ Do the experiment!
- ▶ Remember your safety rules
- ▶ Record your results. All numbers (quantitative) are normally recorded in a **data table**
 - ▶ Data tables have a title, the trial number on the side, and what you changed in each trial.
- ▶ You also want to include any non-number observations (qualitative)

Salt Concentration (%)	Transmittance (%T)			
	Trial #1	Trial #2	Trial #3	Trial #4
0	77.23	74.50	64.88	75.27
3	85.23	92.82	78.91	60.71
6	88.39	100.05	73.66	66.51
9	80.71	100.05	68.29	64.91
12	82.66	117.18	71.01	56.91
15	72.55	115.40	65.72	66.03

Analysis

- ▶ Think and write about what your data shows about the topic of study
- ▶ Report any "weird" things you saw/heard/recorded/smelled.
..
- ▶ Do the analysis



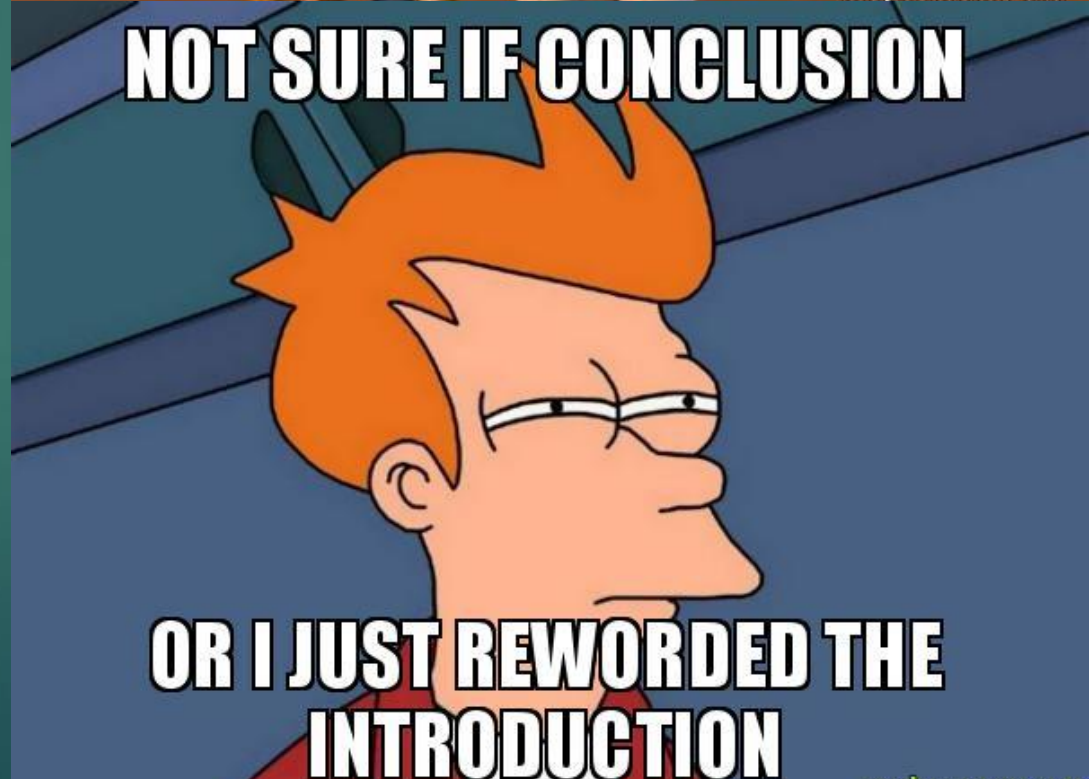
Conclusion

- ▶ In a paragraph (or multiple paragraphs), talk about the experiment outcome
 - ▶ was your hypothesis supported?
 - ▶ Why do you think it worked or did not work?
 - ▶ Was there anything unexpected and how did it happen?
 - ▶ Would you change anything if you could do the experiment again?

STATE THE CONCLUSION



NOT SURE IF CONCLUSION



OR I JUST REWORDED THE INTRODUCTION

Communicate and Ask New Questions!

- ▶ Find ways to communicate your findings to the scientific community for others to build off of
 - ▶ Posters
 - ▶ Science Journals
 - ▶ Meetings
 - ▶ News
- ▶ Ask new questions that arise from your findings

