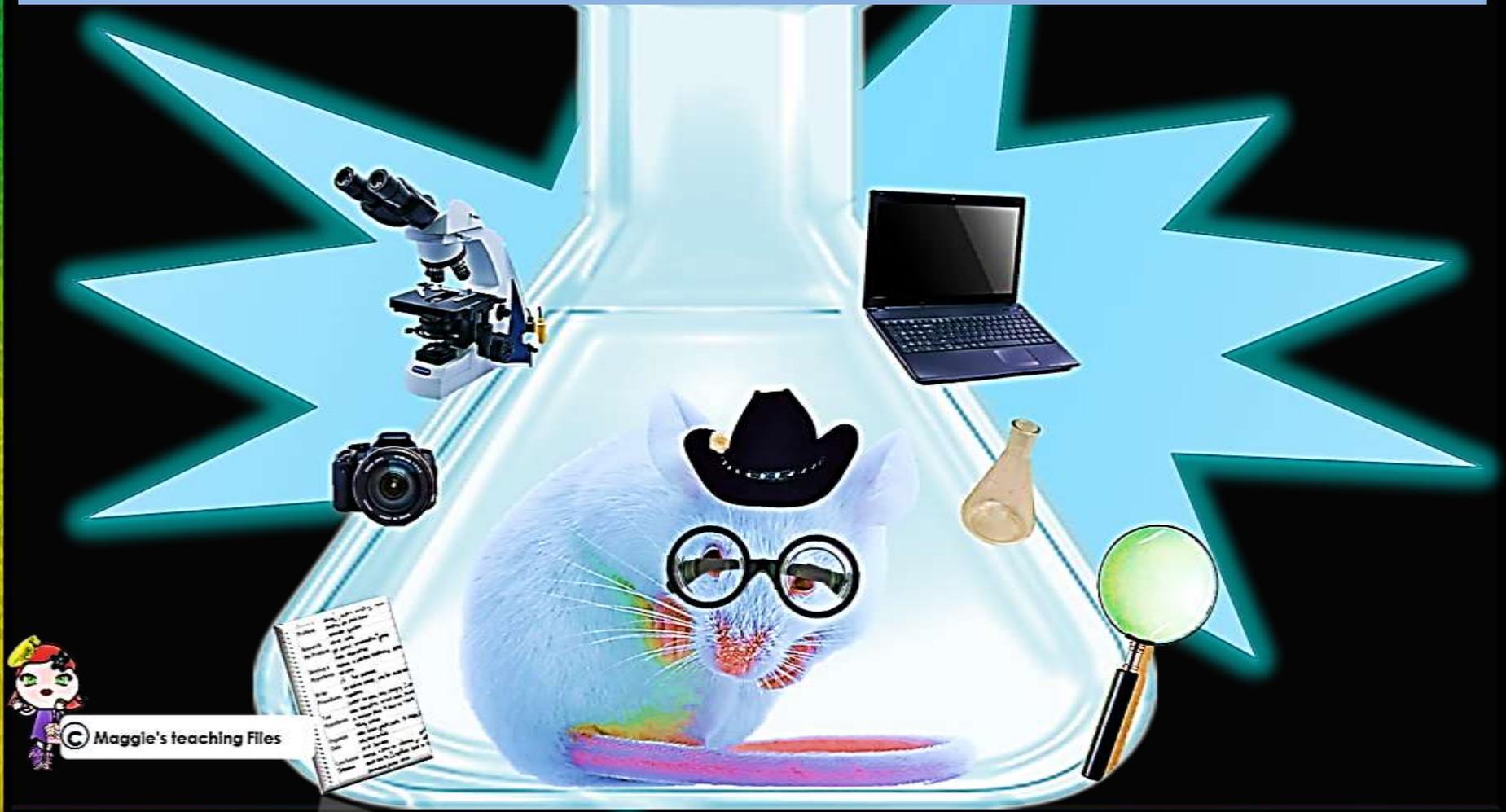


Get the notes sheet from the desk.
Then think-pair- share with a neighbor
about what the scientific method is.



<http://www.shmoop.com/video/chemistry-1-3-making-sense-of-the-scientific-mind>

Scientific Method

A problem solving method that scientists use to test new ideas. Scientists use the steps of the Scientific Method when writing and performing experiments.



the **Scientific Method** *made easy*

An orderly and systematic way to solve a problem

- 1. Problem-** The question you are seeking answer for
- 2. Research -** See what information is already out there
- 3. Hypothesis-** An educated guess to the problem
- 4. Procedure-** A planned way to solve a problem
- 5. Analysis-** Collecting information from Experiment
- 6. Conclusion-** Answer to the problem

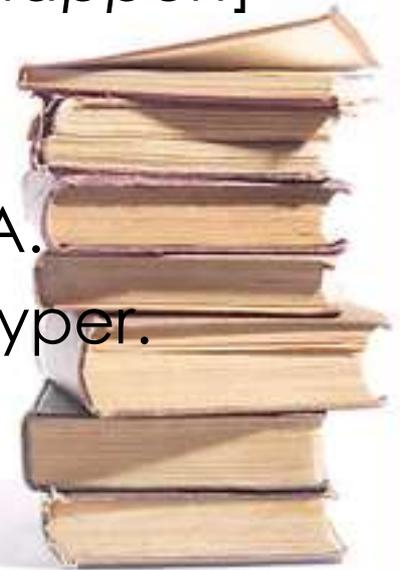
1. Problem/Question

- Ask a question about something observed.
 - Why?
 - How?
 - What?
- Question to be solved.
- Must be about something measurable.

3. Writing a Hypothesis



- Educated guess about how things work.
- Prediction
- Use If, then statements
 - If _____ [*I do this*], then _____ [*this will happen*]
- Focus on one variable only.
 - If I study for a test, then I will get an A.
 - If I eat a lot of sugar, then I will get hyper.



4. Procedure/ Experiment

- Identify Variables – Test only one variable (change only one thing)
 - Use a control or control group (*A group that has nothing done to it. Standard used for comparison in an experiment.*)
- Test your hypothesis with an experiment.
- Record data/results during the experiment

Terms to know

Variable: factors that can change

Independent Variable: the variable the experimenter changes on purpose

Dependent variable: the variable that is measured and responds to the independent variable

Control Group; The group, or experimental subject, which does not receive the I.V. (no changes made)

Constants: conditions that remain the same in the experiment



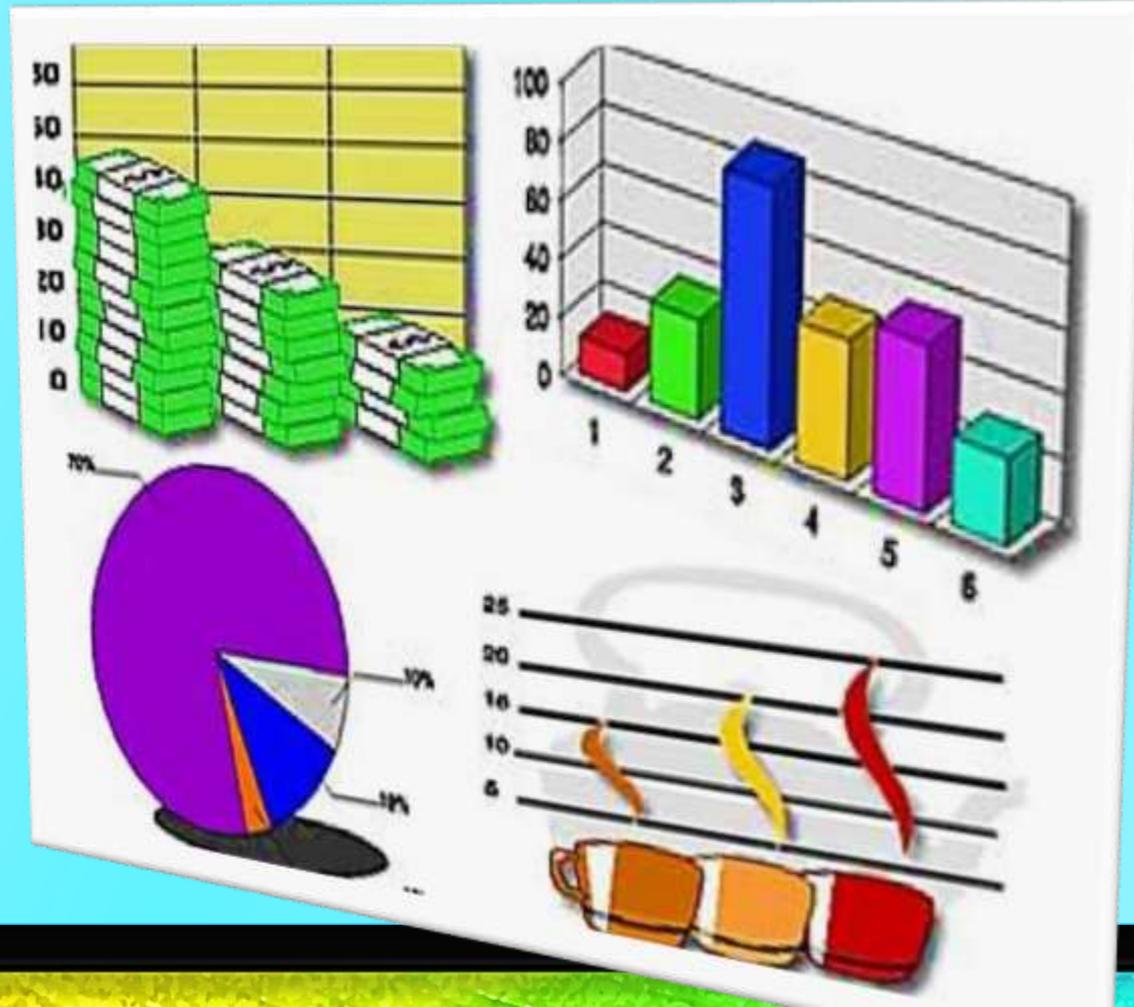
Step 5: Analysis

- Analyze the data collected during the experiment
- Organize/ graph the data
 - Graph the data to look for trends & relationships.



Graphs

Graphs are visuals used to compare data. Graphs show information and relationships between the data. Different types of graphs show different types of information.



6. Conclusion

- What was learned?
- Analyze your data to see if your hypothesis was accepted or rejected.
- Summarize your experiment.
- List why any errors may have occurred / is your data accurate?

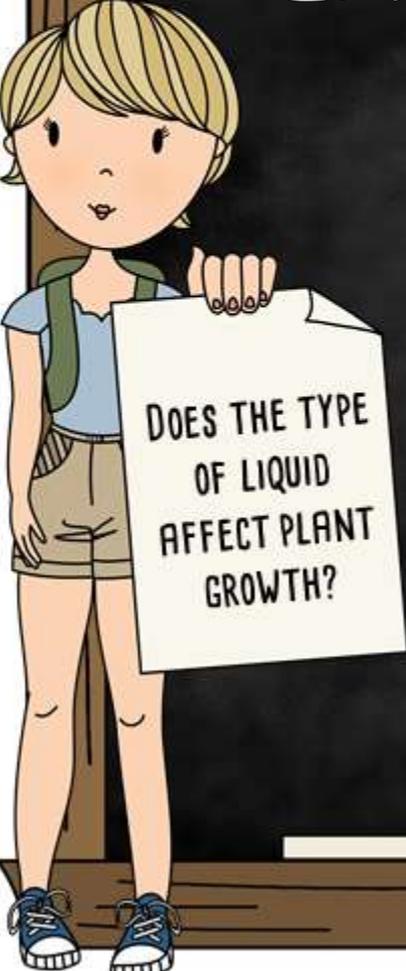
the

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EXPERIMENT/ PROCEDURE

1. Get four plants that are the same exact height. (the type of plant, the soil, amount of sunlight and pot need to be the same.)
2. Label each plant with the type of liquid it will be receiving (coke, water, sprite, and milk)
3. Water each plant everyday with 1 cup of the intended liquid.
4. Each week, measure the height of each plant and record the data. Do this for 6 weeks.

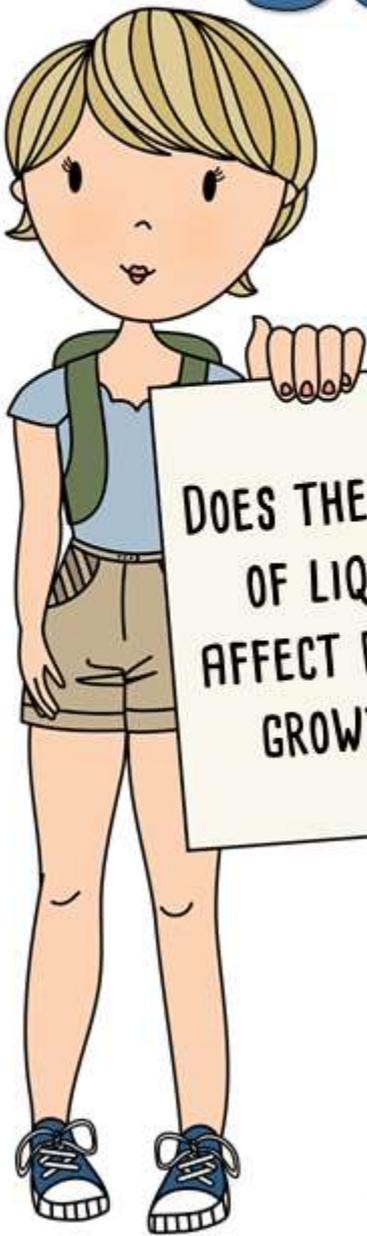


DOES THE TYPE
OF LIQUID
AFFECT PLANT
GROWTH?

the

Scientific Method

made easy



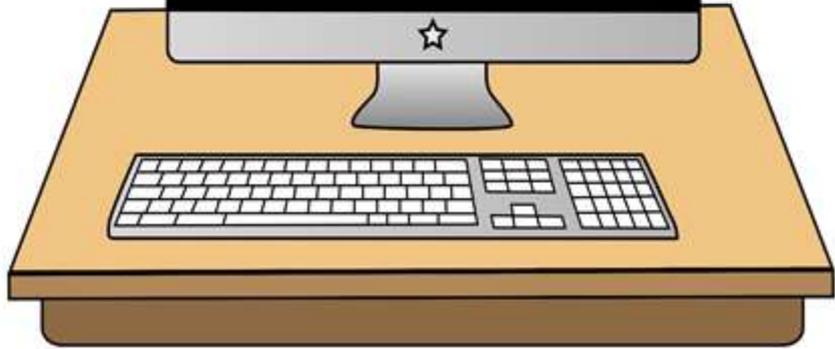
DOES THE TYPE
OF LIQUID
AFFECT PLANT
GROWTH?

Constants
type of plant, soil,
amount of sunlight and
amount of liquid

Independent variable
Type of liquid
(water, coke milk, sprite)

Dependent Variable
Plant Growth (Height)

Control
Plant with water



**Problem: Do students prefer at lunch
cheese pizza or peperoni pizza?**



I see a lot of students eating cheese pizza at lunch everyday.



After making my observations by asking the students what kind of snack they liked and seeing what they ate at lunch, my hypothesis is that these students prefer cheese pizza to peperoni pizza.



EXPERIMENT

Materials

- 20 6th graders
- 20 7th graders
- 20 8th graders
- 60 mini- slices of cheese pizza (each one the same size)
- 60 mini-slices of peperoni pizza (each one the same size)
- 60 cups of water

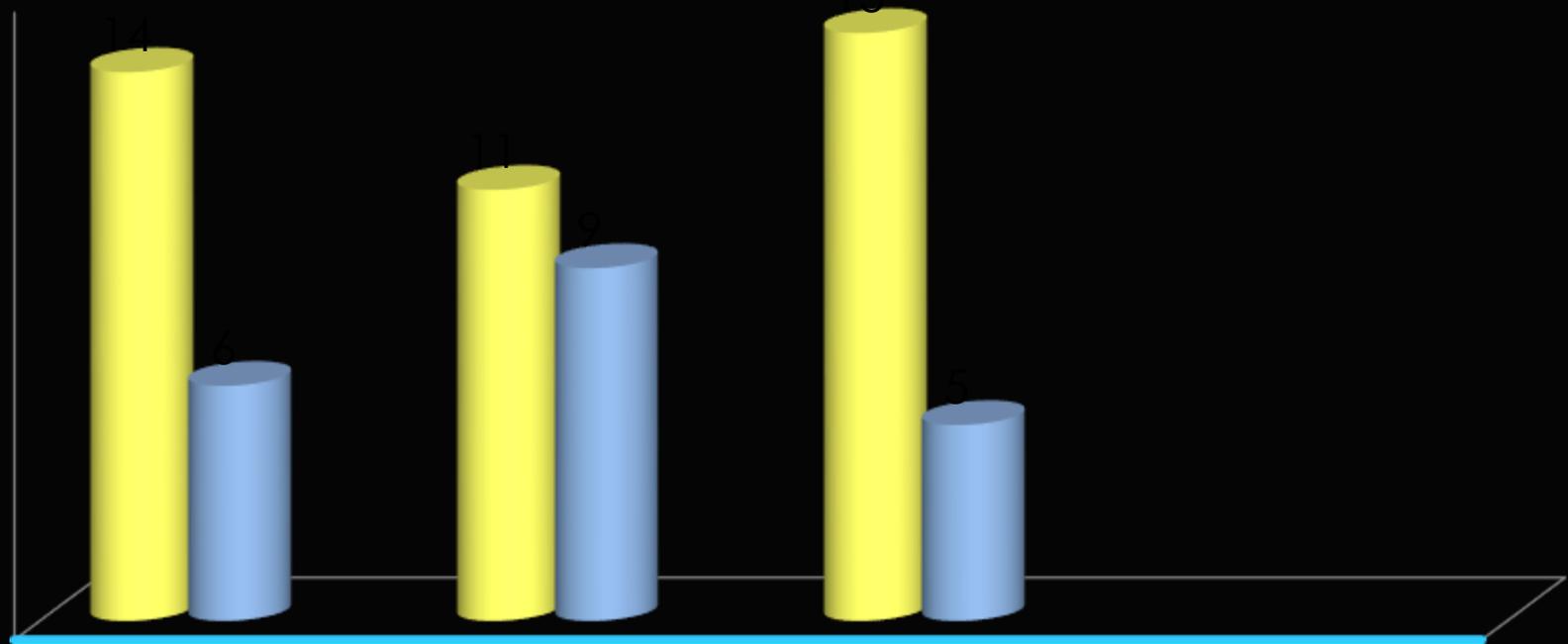
Procedure

- (1) I will choose 20, 6th graders, 20, 7th graders and 20, 8th graders at random.
- (2) Each day for 5 days, I will test 4, 6th graders and lunch, 4, 7th graders and 4, 8th graders until I test all 20.
- (3) Each student will be able to eat one slide of cheese pizza & one slice of peperoni pizza.
- (4) In between eating each slice, they will drink a cup of water
- (5) After they have eaten both slices, they will pick which one they enjoyed better.

My Data Table

- 14 6th graders preferred cheese pizza
- 6 6th graders preferred peperoni pizza
- 11 7th graders preferred cheese pizza
- 9 7th graders preferred peperoni pizza
- 15 8th graders preferred cheese pizza
- 5 8th graders preferred peperoni pizza

What do our students prefer: Cheese pizza or peperoni pizza for lunch?



6 graders

7 graders

8 graders

■ cheese ■ peperoni

My Conclusion

- Based on my results, 40 students preferred cheese pizza, while 20 students preferred peperoni pizza. Therefore, it is my conclusion that students prefer Cheese pizza to peperoni pizza. My hypothesis was correct!



Learning check No. 2
FIND SOME ONE WHO

1. Can tell you the steps of the scientific method

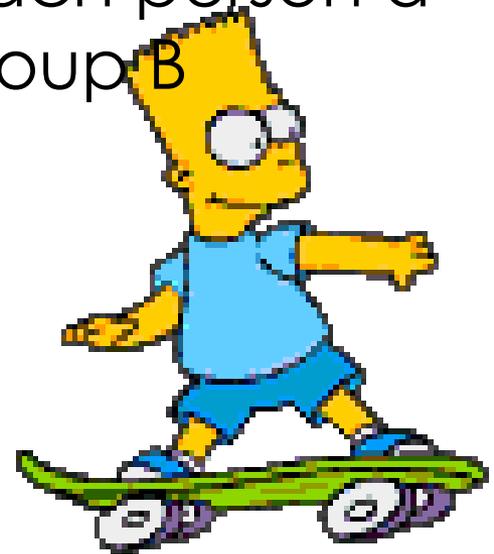
2. Can explain the difference between independent and dependent variables

3. Can define and give an example of a hypothesis

4. Can explain the two kinds of observations.

Let's try a problem...

Bart thinks that drinking a 32 ounce Mountain Dew before you go skateboarding will help you do a higher ollie in the air. He divides 10 of his friends into 2 groups. To group A, he gives each person a 32 ounce Mountain Dew. To group B he gives nothing. Group A's average ollie height was 2 feet, and group B's average ollie height was 1 foot.



What is the problem being solved?

Does mountain Dew make you do higher ollies on a skateboard?



What is the control group?

Group B



What is the independent variable?

Mountain Dew



What is the dependent variable?

Ollie height



Is the sample size big enough?

For a small experiment, yes. For accuracy, however, more participants would be better.



What is the hypothesis?

If you drink Mountain Dew, then you will do higher ollies.



What is his experimental procedure?

He divides 10 friends into 2 groups. Group A get Mountain Dew and Group B does not.



What should Bart's conclusion be?

Mountain Dew does cause you to do higher ollies.



Let's try one more...

***And you in the front
row.....quit eating glue!***



Last problem....

Homer thinks that adding hot sauce to gasoline will make a car go faster. One day, he adds hot sauce to Marge's gasoline tank but no hot sauce to his own tank. They both drive to the same grocery store. It takes Homer 25 minutes to get there and Marge 20 minutes to get there.



What is the problem being solved?

Does hot sauce make a car go faster?



What is the control group?

Homer's car



What is the independent variable?

Hot Sauce



What is the dependent variable?

How long it takes to get to the grocery store.



Is the sample size big enough?

Two cars is definitely not a big enough sample size.



What is the hypothesis?

*IF you add hot sauce to gasoline,
THEN it will make your car go
faster.*



What is his experimental procedure?

Add hot sauce to one car's gasoline tank but not to the other and see who gets to the grocery store first.



What should Homer's conclusion be?

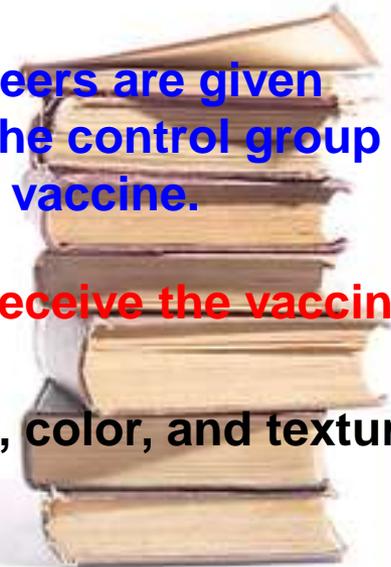
He might conclude that hot sauce does make a car go faster, but his sample size was not big enough to make a conclusion





Example: In order to test the effectiveness of a new vaccine, 50 volunteers are selected and divided into two groups. One group will be the control group and the other will be the experimental group. Both groups are given a pill to take that is identical in size, shape, color and texture.

Even though the volunteers are given identical looking pills, the control group will not actually receive the vaccine.



This group will receive the vaccine.

The size, shape, color, and texture of the pill.

Whether or not the pill contains the vaccine.

Describe the control group.

Describe the experimental group.

What variables are kept constant?

What variable is being changed?