

Science Fair

Gathering, Analyzing, and Presenting Data



Gathering Data - 3 Trials

- Set up your experiment according to your procedure
 - Conduct 3 trials in exactly the same way

Your data needs to be *reliable*

In other words - your data should be pretty consistent if you conduct your experiment the same way each time.

Recording Data

- Set up a table to record your data before you start your experiment.
- Include your manipulated variable (the variable you are changing)
- Include your responding variable (the variable you are measuring)

Example Table

- Hypothesis - Diet Coke and Mentos will make a geyser shoot higher than orange soda and Mentos or root beer and Mentos

	Height of Geyser		
Type of Soda	Trial 1	Trial 2	Trial 3
Diet Coke			
Orange			
Root Beer			

Example Table

Notice the variables

Responding variable (what your are measuring) goes on the top of the table.

	Height of	Geyser	
Type of Soda	Trial 1	Trial 2	Trial 3
Diet Coke			
Orange			
Root Beer			

Manipulated variable (what you are changing) goes on the side.

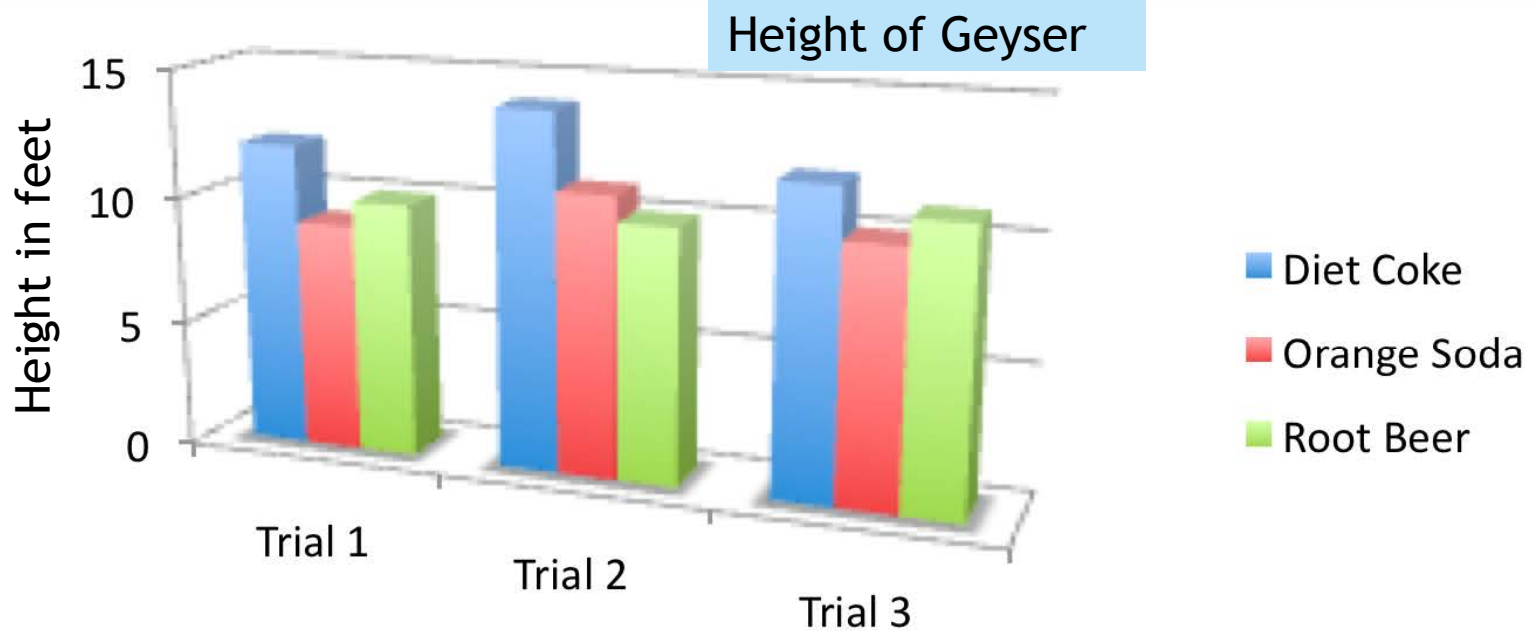
Displaying Data

- Include your data table on your science fair board
- In some cases there are better ways than just a table to show your data
 - A graph (line, bar, etc.) can give the audience a clearer, quicker picture of the results of your experiment

	Height of		Geyser	
	Trial 1	Trial 2	Trial 3	
Diet Coke	13 ft.	14 ft.	12 ft.	
Orange Soda	9 ft.	11 ft.	10 ft.	
Root Beer	10 ft.	10 ft.	11 ft.	

Displaying Data

- The graph gives a quicker picture of the results of your experiment - You can clearly tell that Diet Coke produced the highest geyser
(Be sure to label your units of measure)



Displaying Data 5th and 6th grade

- You will need to add another column to your table
 - Mean (average) for the responding variable

Height of Geyser				
	Trial 1	Trial 2	Trial 3	Mean
Diet Coke	13ft	14 ft	12ft	13ft
Orange	9 ft	11ft	10ft	
Root Beer	10 ft			

Displaying Data 5th and 6th Grade

Example - Finding the Mean

- Find the sum of Trial 1, 2, and 3 for Diet Coke
 - Divide the sum by 3 (the number of trials)
 - The quotient (answer to the division problem) is the mean
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- $13\text{ft} + 14\text{ ft.} + 12\text{ ft.} = 39\text{ ft.}$
 - $39\text{ft} \div 3 = 13\text{ft.}$
 - So the mean is 13 ft.

Displaying Data 5th and 6th grade

- Now find the mean for the orange soda
- Find the mean for the root beer

- Record your results
- Include the mean on any graph and/or data display included on your science fair board

Analyzing Data

- Once you have recorded your data you need to analyze your data - in other words examine and evaluate your data
 - Can you find any patterns?
 - Did you prove your hypothesis correct?
 - Did you prove your hypothesis incorrect?
 - Remember - Don't change your hypothesis to fit your results

Analyzing Data - Unexpected Results

- What if you get unexpected results?
 - Sometimes an experiment doesn't show any patterns or doesn't prove your hypothesis correct or incorrect.

Don't throw your experiment out!!!

This happens to scientists sometimes, too.

What do you do when this situation happens?

Analyzing Data - Unexpected Results

- First of all, don't panic
 - Accurately record the results you have
- When you analyze your data - look for things that might have affected your results
- Write your hypothesis and tell your audience that your results were *inconclusive* - in other words you were not able to prove or disprove your hypothesis with the data you collected

Remember

- Look for patterns that prove or disprove your hypothesis
- Display your data in a way that is easy for your audience to understand
- If your results don't prove your hypothesis - don't change your hypothesis
- If you can't prove or disprove your hypothesis - don't panic - just state that your results are inconclusive. Then display your results for your audience.