

Do Now (5 min)

3-17-11

- use the sci method
- Control group (exp)
 - What is the most important thing a scientist can do to make sure that an experiment is fair?
- change 1 var. @ time
- repeatedly

More Details on the Scientific Method:

4 Data Collection, 5 Data Analysis

3-17-11

3-17-11 Agenda

1. Do Now (5 min)
 2. Objectives (3 min)
 3. Sci. Method: Step #4 Data Collection (4 min)
 4. Sci. Method: Step #5 Data Analysis (5 min)
 5. Sci. Method: Step #5 Data Analysis: Methods (4 min)
 6. Sci. Method: Step #5 Data Analysis: Graphing (8 min)
 7. Sci. Method: Step #5 Data Analysis: Graph Details (8 min)
 8. Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)
 9. Sci. Method: Bringing it All Together (30+ min)
-

Objectives (3 min)

- Content (The objectives you'll master today)
- **SWBAT:**
 1. *Explain the purpose of data collection*
 2. *List at and provide an example of at least one data collection method*
 3. *Define data analysis and explain its purpose*
 4. *List at least one method of Data Analysis*
 5. *Explain why graphing is often necessary in data analysis*
 6. *Explain what can be done with a data table to make it more understandable*
 7. *Analyze data and draw a conclusion.*
 8. *List the 5 necessary details on every graph*
 9. *Determine whether or not to use a bar or line graph*
 10. *Design and carry out an experiment*
- Language (How you will master the objectives)
- **By:**
 1. *taking notes on the PowerPoint*
 2. *taking notes on the PowerPoint.*
 3. *taking notes on the PowerPoint.*
 4. *taking notes on the PowerPoint.*
 5. *taking notes on the PowerPoint.*
 6. *taking notes on the PowerPoint.*
 7. *interpreting a graph*
 8. *taking notes on the PowerPoint.*
 9. *applying their notes from class*
 10. *using their knowledge of the scientific method*

Sci. Method: Step #4 Data Collection (3 min)

Objective: SWBAT: *Explain the purpose of data collection by taking notes on the PowerPoint presentation.*

- Step #1: Question (Does weight of an object affect the speed at which it falls?)
- Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)
- Step #3: Experiment
- Step #4: Data Collection

What is the purpose of collecting data?

To keep track of the information you get from the experiment.



Sci. Method: Step #4 Data Collection (1 min)

Objective: SWBAT: *List at and provide an example of least one data collection method by taking notes on the PowerPoint.*

- There are many ways to collect data...
- The most common way to collect data:
 - Data Table...Below is one example of a data table

Trail #	Which Object Hit First
1	Lighter
2	Heavier
3	Heavier
4	Lighter
5	Heavier
6	Heavier
7	Lighter
8	Lighter

Sci. Method: Step #5 Data Analysis (5 min)

Objective: SWBAT: *Define data analysis and explain its purpose by taking notes from the PowerPoint*

- **Data Analysis**: an in-depth examination of your data

to interpret what it means
analysis

What is the purpose of data ~~collection~~ ^{analysis}?

To determine if your hypothesis is true or false! ☺



Sci. Method: Step #5 Data Analysis: Methods (4 min)

Objective: SWBAT: *List at least one method of Data Analysis by taking notes based on the PowerPoint.*

- Data Analysis: an in-depth examination of your data
to interpret what it means
- (for the purpose of determining if your hypothesis is true or false)
- There are also many ways to analyze your data:
 - You can do:
 - -Statistical analysis (using statistics to examine your data)
 - -Logical analysis (using logic to examine your data)

In this class...we will use logical analysis



Sci. Method: Step #5 Data Analysis: Graphing (3 min)

Objective: SWBAT: *Explain why graphing is often necessary in data analysis by taking notes based on the PowerPoint.*

Logical analysis (using logic to examine your data)

Trail #	Which Object Hit First
1	Lighter
2	Heavier
3	Heavier
4	Lighter
5	Heavier
6	Heavier
7	Lighter
8	Lighter

Sometimes, looking at a data table makes it very hard to determine if your hypothesis is true or false...

What could you do to make the information in a data-table more understandable?

Graph it



al analysis (using logic to examine your data)

ich
ect
First
nter
vier
vier
nter
vier
vier
nter
nter

Y

Sometimes, looking at a data table makes it very hard to determine if your hypothesis is true or false...

What could you do to make the information in a data-table more understandable?

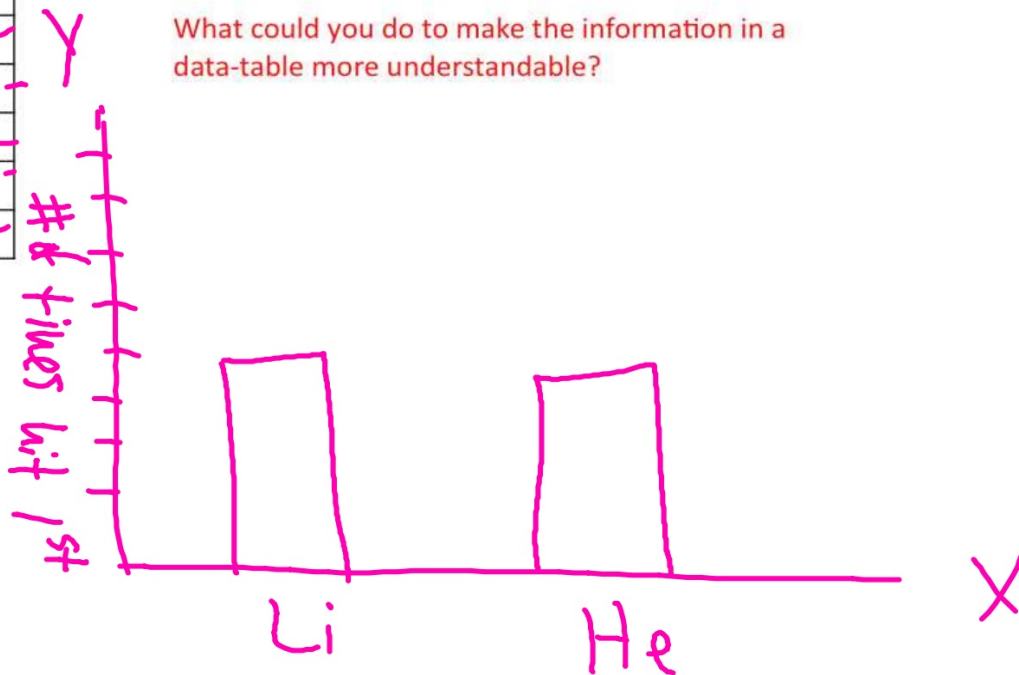


al analysis (using logic to examine your data)

ich
ect
First
ter
vier
vier
ter
vier
vier
ter
ter

Sometimes, looking at a data table makes it very hard to determine if your hypothesis is true or false...

What could you do to make the information in a data-table more understandable?

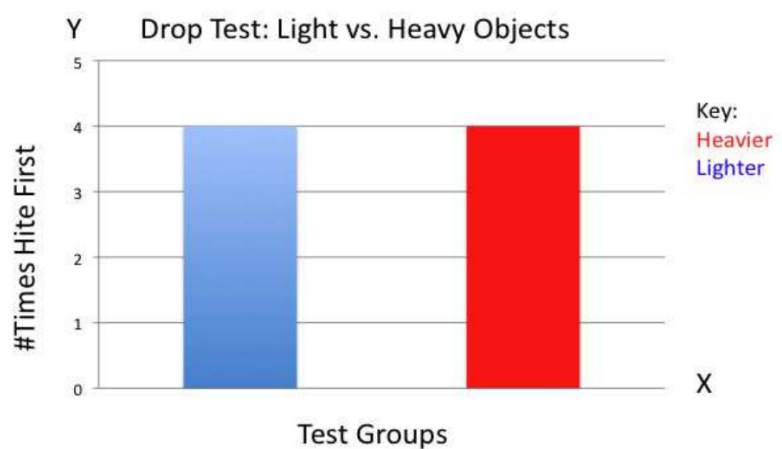


Sci. Method: Step #5 Data Analysis: Graphing (2 min)

Objective: SWBAT: *Explain what can be done with a data table to make it more understandable by taking notes based on the PowerPoint.*

Trail #	Which Object Hit First
1	Lighter
2	Heavier
3	Heavier
4	Lighter
5	Heavier
6	Heavier
7	Lighter
8	Lighter

What could you do to make the information in a data-table more understandable?...**Graph it!**



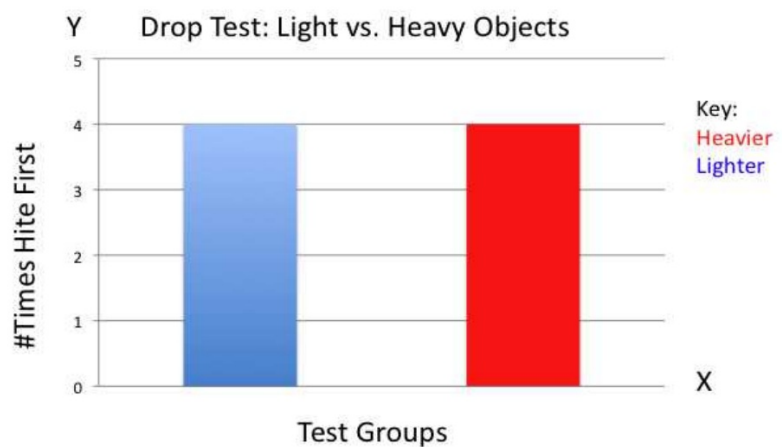
Sci. Method: Step #5 Data Analysis: Conclusions (3 min)

Objective: SWBAT: *Analyze data and draw a conclusion by interpreting a graph.*

The last part of analyzing (examining) the data is **Drawing a Conclusion!**

So, according your data analysis, is our hypothesis true or false?

Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)

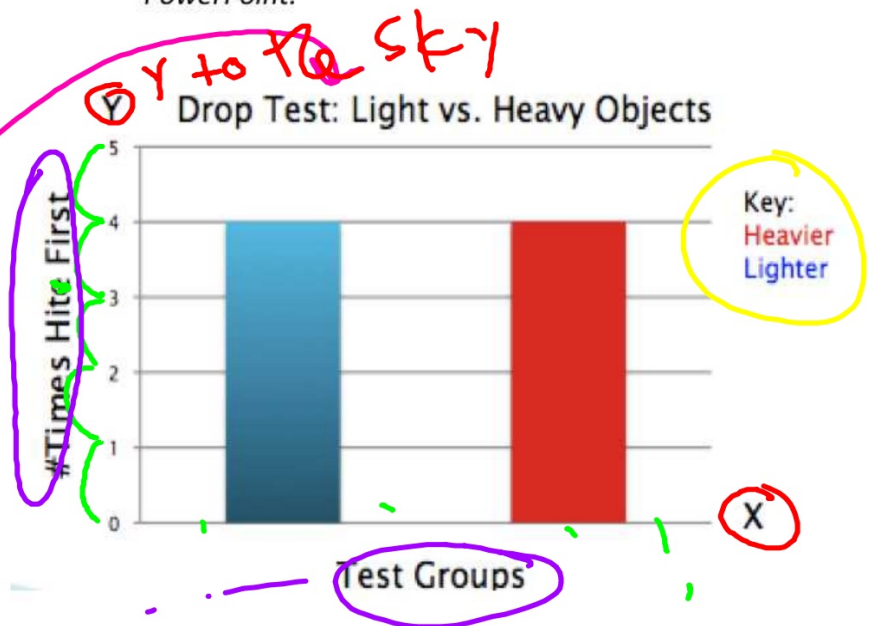


Sci. Method: Step #5 Data Analysis: Graph Details (8 min)

Objective: SWBAT: *List the 5 necessary details on every graph by taking notes based on the PowerPoint.*

5 Necessary Details for All Graphs:

1. Title
2. X/Y Axis
3. Even intervals
4. Axis labels
5. Key



Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)

Objective: SWBAT: Determine whether or not to use a bar or line graph *by taking notes based on the PowerPoint.*

Why didn't we use a line graph?

Use a Line Graph when:

-the data relates to time

Use a Bar Graph when:

-the data does not relate to time

Bar	Line	Number of times a light object hits the ground first vs. a heavier object
-----	------	---



Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)

Objective: SWBAT: Determine whether or not to use a bar or line graph *by taking notes based on the PowerPoint.*

Why didn't we use a line graph?

Use a Line Graph when:

-the data relates to time

Use a Bar Graph when:

-the data does not relate to time

Bar	Line	Number of times a light object hits the ground first vs. a heavier object
Bar	Line	Number of cancer cells in a brain from January to March

time = X

of cancer cells



Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)

Objective: SWBAT: Determine whether or not to use a bar or line graph *by taking notes based on the PowerPoint.*

Why didn't we use a line graph?

Use a Line Graph when:
-the data relates to time

Use a Bar Graph when:
-the data does not relate to time

Bar	Line	Number of times a light object hits the ground first vs. a heavier object
Bar	Line	Number of cancer cells in a brain from January to March
Bar	Line	Boys and Girls born in 2005



Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)

Objective: SWBAT: Determine whether or not to use a bar or line graph *by taking notes based on the PowerPoint.*

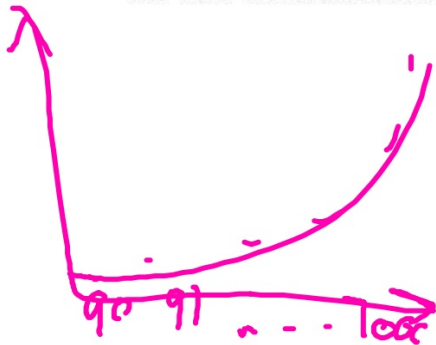
Why didn't we use a line graph?

Use a Line Graph when:

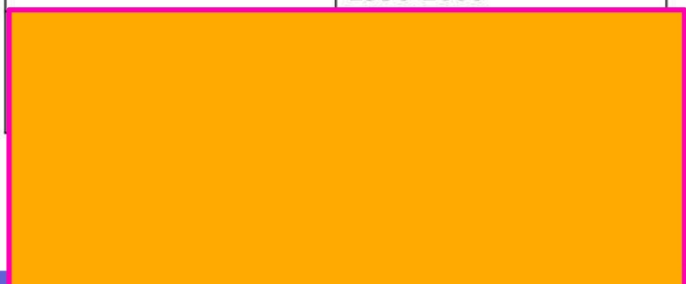
-the data relates to time

Use a Bar Graph when:

-the data does not relate to time



Bar	Line	Number of times a light object hits the ground first vs. a heavier object
Bar	Line	Number of cancer cells in a brain from January to March
Bar	Line	Boys and Girls born in 2005
Bar	Line	Amount of CO ₂ in the atmosphere from 1990-2000



Sci. Method: Step #5 Data Analysis: Choosing the Right Graph (10 min)

Objective: SWBAT: Determine whether or not to use a bar or line graph *by taking notes based on the PowerPoint.*

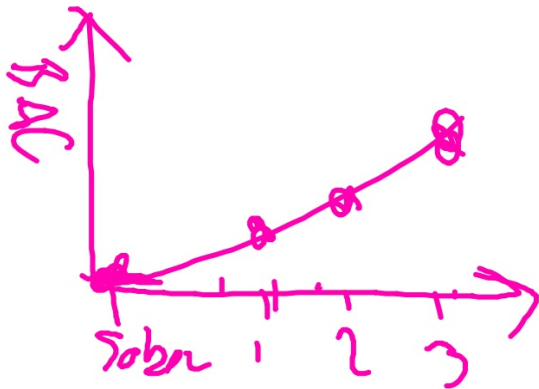
Why didn't we use a line graph?

Use a Line Graph when:

-the data relates to time

Use a Bar Graph when:

-the data does not relate to time



Bar	Line	Number of times a light object hits the ground first vs. a heavier object
Bar	Line	Number of cancer cells in a brain from January to March
Bar	Line	Boys and Girls born in 2005
Bar	Line	Amount of CO ₂ in the atmosphere from 1990-2000
Bar	Line	Blood alcohol concentration from sober to 3 drinks

Time	Heart rate	Temp	Sweat level
0	.		
2			
4			
6	.		
8			
10			
12			

Objective: SWBAT: *Design and carry out an experiment by using their knowledge of the scientific method.*

Name _____ Date _____ Block _____

You will now use your knowledge about the scientific method to design and conduct an experiment. I have completed step #1 for you. You will do the rest.

Step #2: Hypothesis:

Please be very specific, similar to a recipe, when you write your experimental procedures. Remember they should be detailed enough for someone to be able to replicate your experiment!

Step #4: Data Collection:

Please use the space below to record your data. You may use a data table or any other organized method to collect your data.

Step #5: Data Analysis

In this section, you must do two things. First, you must turn the data you collected into a graph. Second, you must write me an explanation of whether or not you proved your hypothesis true and false.

Write your explanation on the lines below.

Closing/**HW** (5 min)

- Did you master the following objectives?

Content (The objectives you'll master today)

SWBAT:

1. *Explain the purpose of data collection*
2. *List at and provide an example of at least one data collection method*
3. *Define data analysis and explain its purpose*
4. *List at least one method of Data Analysis*
5. *Explain why graphing is often necessary in data analysis*
6. *Explain what can be done with a data table to make it more understandable*
7. *Analyze data and draw a conclusion.*
8. *List the 5 necessary details on every graph*
9. *Determine whether or not to use a bar or line graph*
10. *Design and carry out an experiment*

Language (How you will master the objectives)

By:

1. *taking notes on the PowerPoint*
2. *taking notes on the PowerPoint.*
3. *taking notes on the PowerPoint.*
4. *taking notes on the PowerPoint.*
5. *taking notes on the PowerPoint.*
6. *taking notes on the PowerPoint.*
7. *interpreting a graph*
8. *taking notes on the PowerPoint.*
9. *applying their notes from class*
10. *using their knowledge of the scientific method*

Exit Slip (5 min)

- On a separate sheet of paper, write your **NAME, DATE, and BLOCK at the top.**

None today!

Participation Grades (5 min)

- Each day **YOU** will decide the grade you deserve...Though, I reserve the right to change these.
 - Your 5-point daily participation grade is based on CLA's core-values:
 - CLA Students are S.M.A.R.T.
 - S = Self-Controlled
 - M = Motivated
 - A = Accountable
 - R = Respectful
 - T = Timely
 - One point for each core-value
 - (5 points possible each day)
 - What do you deserve today?
-