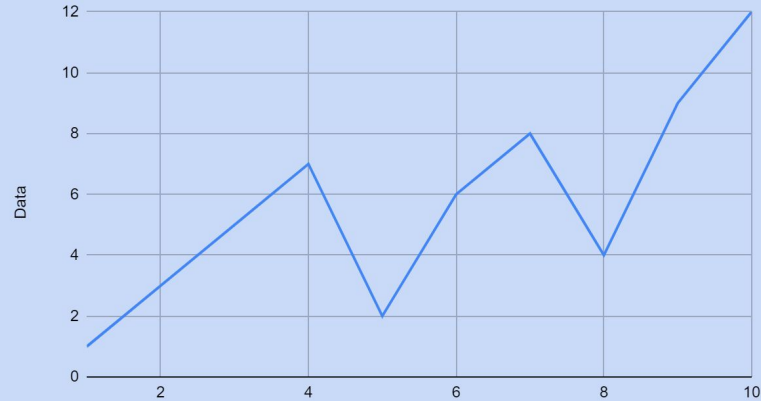


**POLAR
TREC**

www.polar-trec.com

Graph Analysis

Graphing Data



Polar Trec 2019
Denise Hardoy



Credits

Denise Hardoy created this resource after spending five weeks embedded with Dr. Anne Todgham's team studying the effects of climate change on Antarctic fishes in 2019. This lesson addresses one of the most difficult aspects of science for students- making sense of data.



Learning Goals

Students will write an analysis of given graphs

Success Criteria:

I can write an analysis paragraph of a graph that includes both variables, high and low points, patterns and trends, as well as anomalies in the data.

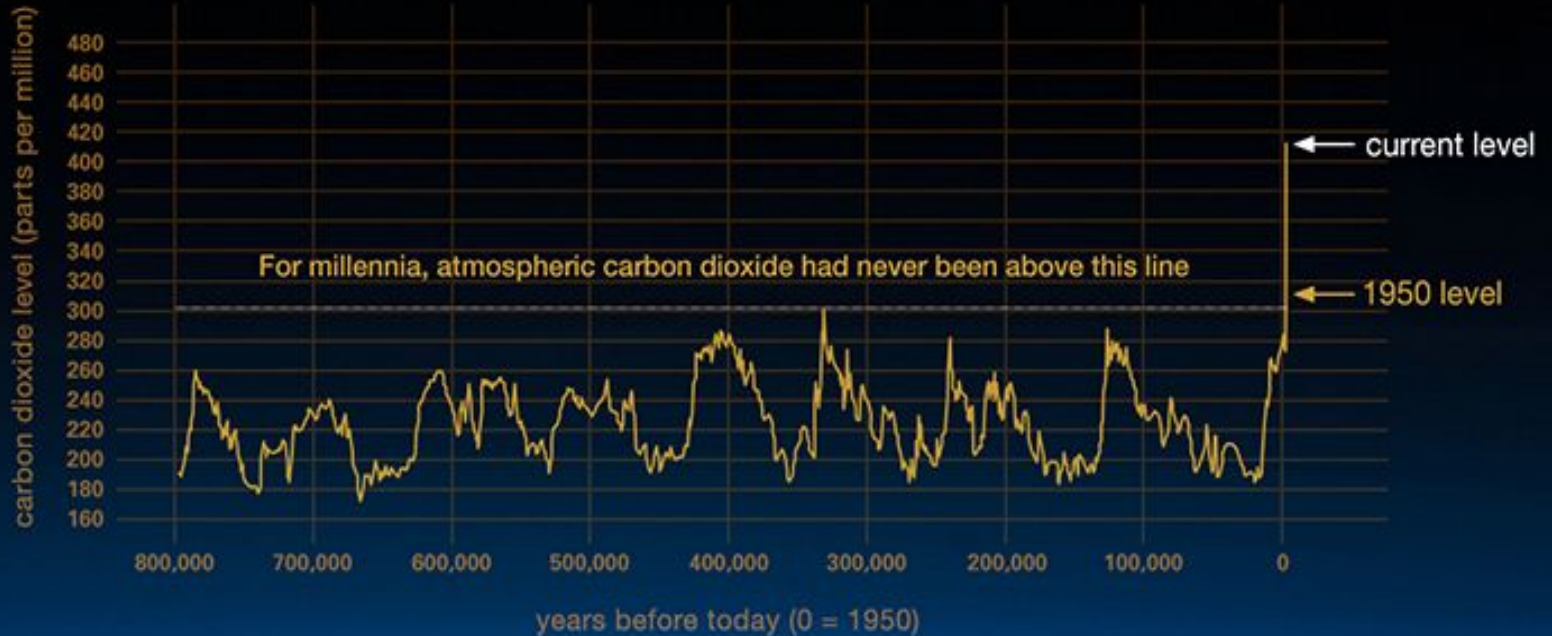
NGSS Standards

Builds towards:

- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- Focus on SEP 4:
Analyzing and Interpreting Data

Anchor Phenomenon: What do You Notice? What do You Wonder?

Carbon Dioxide levels from Ice Core Samples from 600,000 years ago to Present



What do You Notice? What do You Wonder?

Carbon Dioxide levels from Ice Core Samples from 600,000 years ago to Present



Title of graph
(includes both variables)

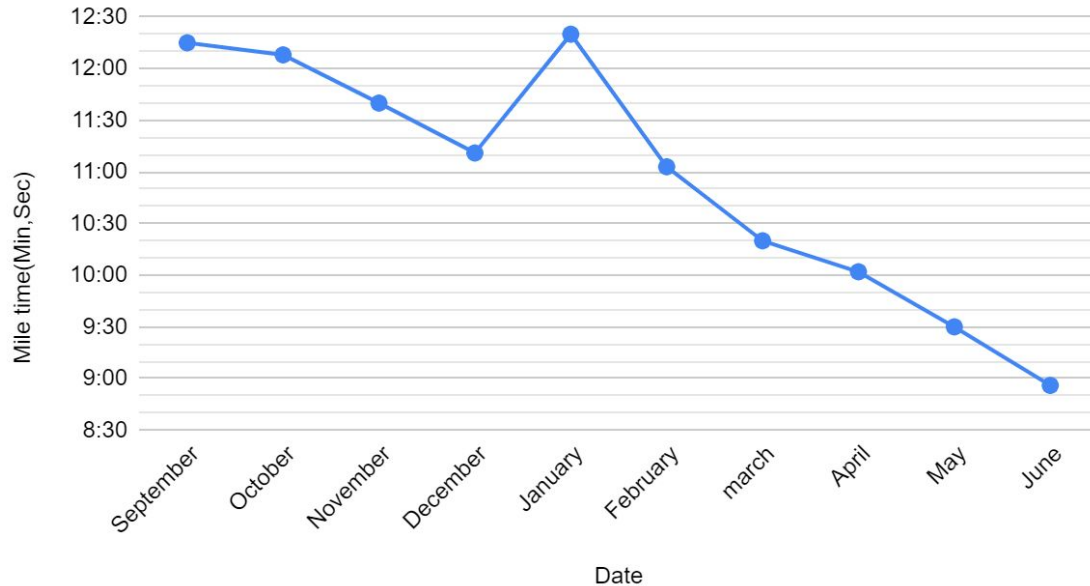
X and Y axis Labels
(Dependent variable is usually the Y axis)

Scale
Units used?

Breakout- Time to try it yourself

Group 1

My Mile Time(Min,Sec) vs. Date for 2019-2020



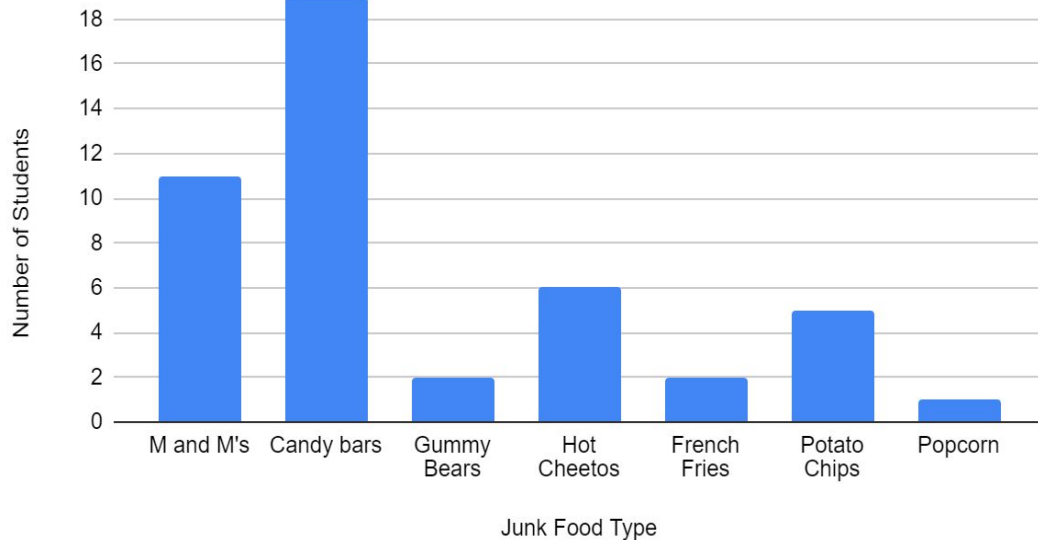
I notice:

I wonder:

Breakout- Time to try it yourself

Group 2

Number of Students vs. Junk Food Preference in Mrs. Smith's classes in March, 2018



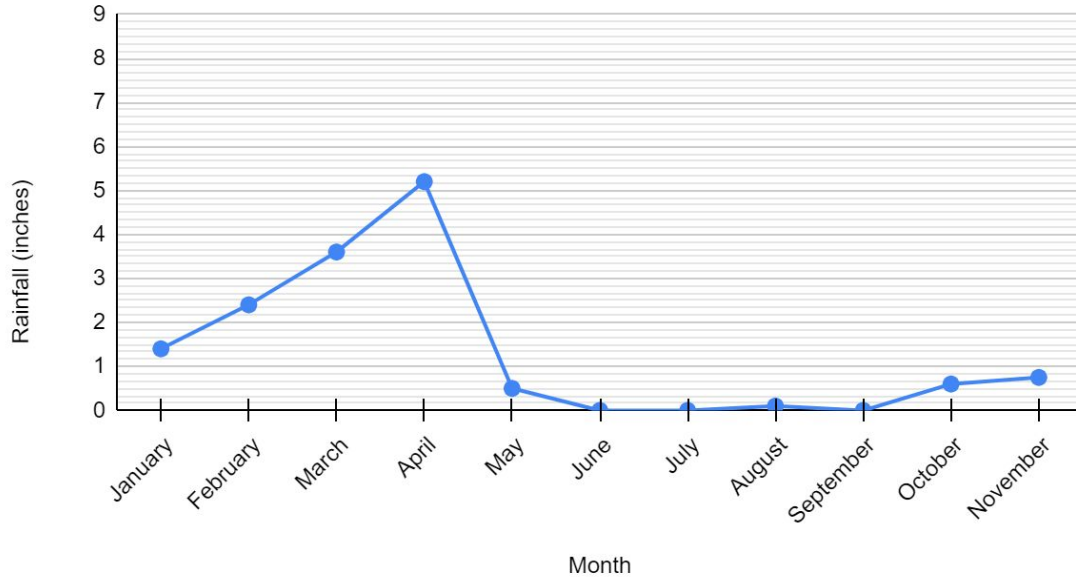
I notice:

I wonder:

Breakout- Time to try it yourself

Group 3

Rainfall (inches) by month 2020 in Lockwood, CA



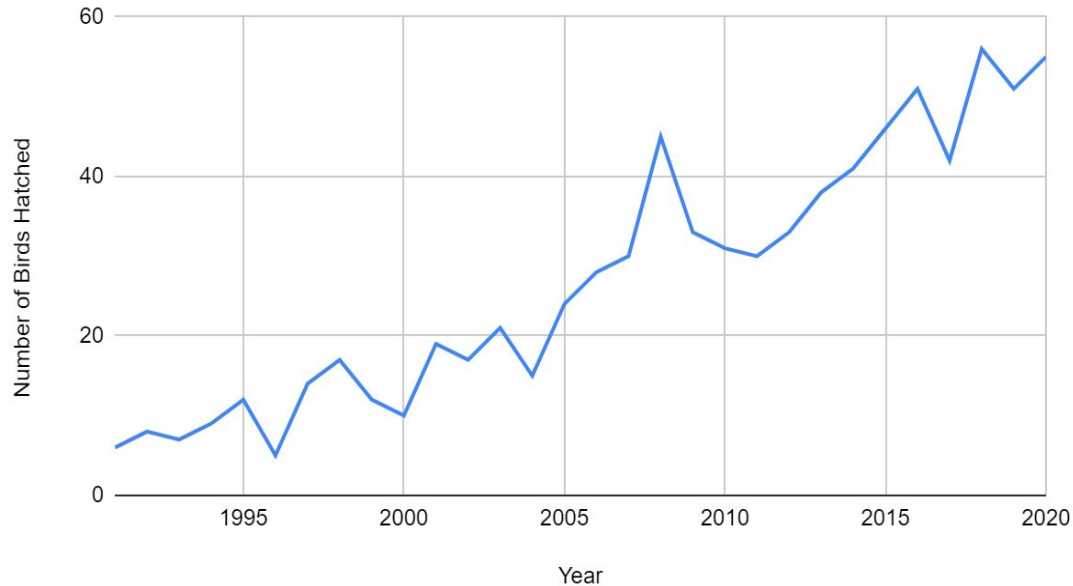
I notice:

I wonder:

Breakout- Time to try it yourself

Group 4

Number of Birds Hatched in Lockwood, Ca from 1991-2020



I notice:

I wonder:

What Did We Notice?

What did we Wonder?

I notice:

I wonder:

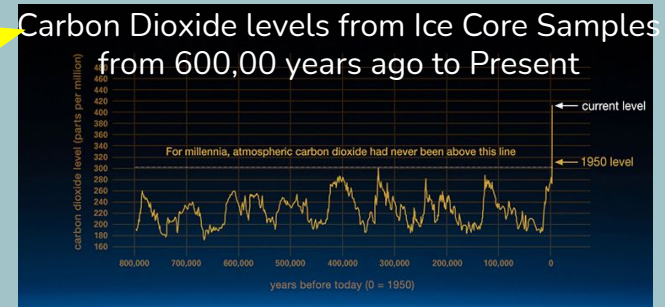
How can we write up a formal analysis paragraph of our graph?

1. Start with the title-
Your first sentence should include the title of the graph.

“This graph shows....(insert title).

Example:

“This graph shows the carbon dioxide levels from ice core samples from 600,000 years ago to the present.”



HLPA

Now you add one sentence for each letter in the HLPA acronym.

H Highest point on graph

L Lowest point on graph

P Patterns and Trends

A Anomalies

Highest point

This sentence describes the highest point you see on the graph. It should state the number and when/where the number was taken from. DO NOT use the words “highest point”. Instead, refer to exactly what it is that is high- miles, seconds, etc.

Example:

“The highest carbon dioxide levels are noticed at the current year.”

Lowest Point

The third sentence describes the lowest data point on the graph. Again, DO NOT use the terminology “Lowest Point.” Use what is low.

Example:

“The least concentration of carbon dioxide was recorded around 680,000 years ago.”

Patterns and Trends

Patterns are repeating cycles that you can identify. They may suggest a correlation between variables. They may also show cyclical changes over time.

Trends are gradual increases or decreased in the value of the data points.

Example:

"I notice a pattern of increased then decrease carbon dioxide every 100, 000 years. Then there is a significant trend of increasing carbon dioxide beginning around 1,000 years ago, with the sharpest rise since 1950."

Anomalies

Anomalies are data points that are significantly different from the rest of the data. They can show errors in data collection, or highlight important events. It is important to think critically about the significance of the anomaly. Often, there are no anomalies, and this should be noted as well.

Example:

“There are no significant anomalies in this data.”

Conclusion

The last sentence should tie all of your ideas together. You need to think critically about the story that the data tells. If part of your experiment, you would explain how the data supports your hypothesis.

A good way to start this sentence would be:

This might mean that.....

Example:

"This might mean that humans have had a significant impact on the overall level of carbon dioxide."

Put it together...

Remember, your analysis is a paragraph, not isolated sentences. Put them all together.

"This graph shows the carbon dioxide levels from ice core samples from 600,000 years ago to the present. The highest carbon dioxide levels are noticed at the current year. The least concentration of carbon dioxide was recorded around 680,000 years ago. I notice a pattern of increased then decrease carbon dioxide every 100, 000 years. Then there is a significant trend of increasing carbon dioxide beginning around 1,000 years ago, with the sharpest rise since 1950. There are no significant anomalies in this data. This might mean that humans have had a significant impact on the overall level of carbon dioxide."

Your Turn!

Return to your group. Write an analysis using what you have learned. Remember..

1. This graph shows.....
2. HLPA
3. This might mean.....

Time to share! Post your analysis on the next few pages!

Group 1

Group 2

Group 3

Group 4

Assessment

Analyze this graph on your own

Rubric

Category	1 Point- Below Standard	2 Points Approaching Standard	3 points Standard met	4 points Standard Exceeded	Totals
Topic Sentence	Missing	Includes only subject	Includes both variables	Accurately includes both variables in the correct format	
H-high points	Missing	Includes, but uses words "high points"	Includes, using correct terminology	Clearly explains using correct terminology	
L- Low points	Missing	Includes, but uses words "Low Point"	Includes, using correct terminology	Clearly explains using correct terminology	
P- Patterns & Trends	Missing	Attempted, but not accurate	Accurate, but not detailed	Accurate detailed explanations	
A- Anomalies	Missing	Attempted, but not accurate	Accurate, but not detailed	Accurate and explained in detail.	
Conclusion	Missing	Includes but does not support , "This might mean.."	This might Mean... included and well supported.	Clear explanation or relevance of analysis	
Totals					

Extension: Now it is time to create!

Try making your own graph. Go to <https://productivityspot.com/line-chart-google-sheets/>

Use Google Sheets to do the work for you!

Category	1 Point- Below Standard	2 Points Approaching Standard	3 points Standard met	4 points Standard Exceeded	Totals
Topic Sentence	Missing	Includes only subject	Includes both variables	Accurately includes both variables in the correct format	
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A- Anomalies	Missing	Attempted, but not accurate	Accurate, but not detailed	Accurate and explained in detail.	
Summary	Missing	Includes but does not support , "This might mean.."	This might Mean... included and well supported.	Clear explanation or relevance of analysis	
Totals					