Physics Daily Slides Unit 0

Mrs. Lee and Mrs. Wentzloff

Unit 0 Physics Schedule

- Block 1: Half Day Intro
- Block 2: Get to Know You, Observations
- Block 3: Graphing in Google Sheets
- Block 4: Graphing and Sources, CER
- Block 5: CER, Grading Protocols

Block Day 1

Warm Up

Drop in the chat: your first & last name, grade and what physics means to you

Agenda

- Welcome!
- Sign up for Google Classroom

Due Dates

- Remind Sign Up and Survey due Friday

Block Day 2

Warm Up

Drop it in the chat: When you hear the word physics, what do you think of?

Agenda

- Physics Cover Page
- Expectations and Syllabus
- Observation Box

Due Dates

- Remind and Survey due Friday

Get to Know YOU!

Create a GC Cover Page

- Find words and pictures to represent physics (at least 5)
  - What are some topics physics covers?
  - Who are some famous physicists?
  - How do we use physics today?
- 15 minute timer

Class Expectations + Syllabus

Present and Working

- Camera on as much as possible
- Have materials ready
- Be appropriate

Due Dates

- Turn in all work on time
- Be mindful of what is due at the end of class

Ask Questions

- Ask questions during class
- Attend Office Hours if needed

Be Proactive

- If you're confused, ask!
- Embrace this new way of learning

Who am I?

Observation Box- Go to separate slide

Block Day 3

Warm Up

List all parts of a graph and what makes a graph easy to read.

Agenda

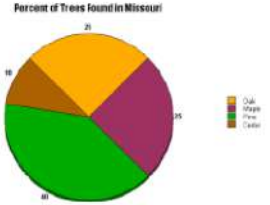
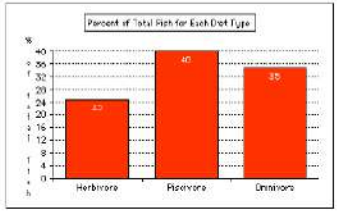
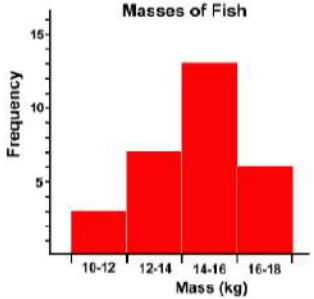
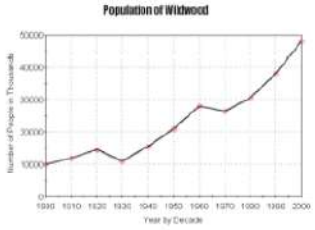
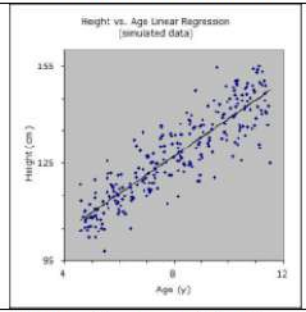
- Quick Review of Graphing
- Graphing on Google Sheets
- Interpreting Graphs
- Independent work time- Graphing in Google Sheets

Due Dates

Graphing Activity Due Wednesday
Curriculum Night Wednesday- Remind your parents and guardians!

What do we need in a graph?

- Title
- X and y axis
- Data
- legend/keys
- scale****
- Trend line

Pie Graphs	Bar Graphs	Histograms	Line Graphs	Scatter Plots
				
• Dependent variable is NOT continuous • Usually presents data as a "part of a whole" or as percentages	• Dependent variable is NOT continuous • There is no order to the categories on the X-axis • Bars typically don't touch • Y-axis is usually a percentage or a frequency (count)	• A specific type of bar graph • Dependent variable must have a natural order that can be grouped into defined "chunks" • Bars must always touch • Y-axis is usually a percentage or a frequency (count)	• Dependent variable IS continuous • Points are plotted using x- and y-components • The points are connected because the observations are NOT independent (the next value depends on the previous value)	• Dependent variable IS continuous • Points are plotted using x- and y-components • The points are NOT connected because the observations are independent (the next value does NOT depend on the previous value) • Uses a best-fit line or curve to show relationship

How do we graph in Google Sheets?

1. See assignment on Google Classroom
2. Demo with teacher (Sample #1)
3. Try it yourself with sample data (Sample #2 and #3)
4. Interpreting Graphs Vocabulary
5. Interpret and Graph Data Set #4- due next block

Work on Data Set 1, 2 & 3

Graph Vocab

Look at the words on your student sheet: Peak, rise, soar, fluctuate, decline, drop, climb, increase, stabilize, maximum, minimum, constant, decrease

1. Circle the verbs that mean to go up.
2. Underline the verbs that mean to go down.
3. Put a star next to the verb that means to go up and down.
4. Use an up arrow to indicate the word that means to reach its highest level.
5. Use a down arrow to indicate the word that means to reach its lowest level.
6. Put a triangle next to the word that means to stay the same for a period of time.

Independent and Dependent Variables

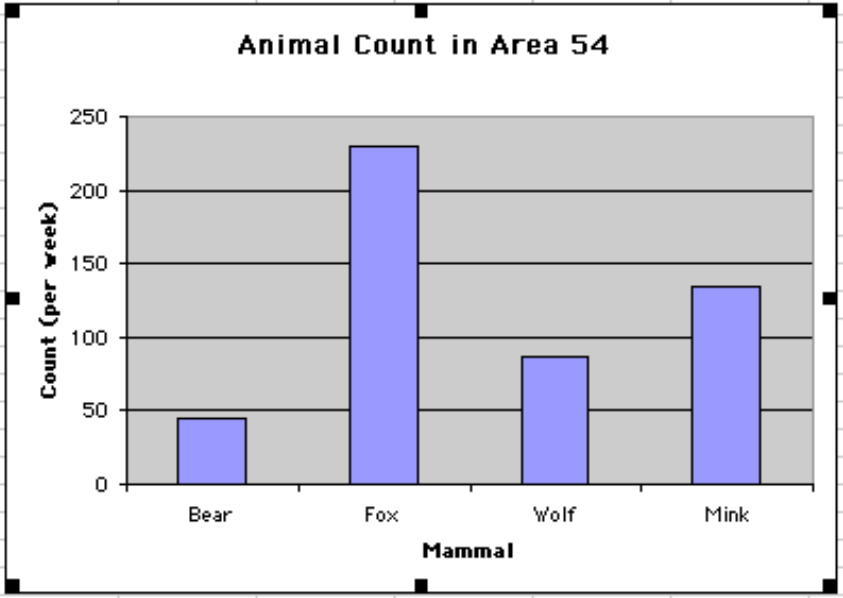
Copy down these important notes!

The x-axis is the **horizontal** axis and the **first column** of a data table. The x-axis is the **independent variable.**

The Y axis is the **vertical** axis and the **second column** of a data table. The y-axis is the **dependent variable.**

1) What is the independent variable in this graph?
2) What is the dependent variable in this graph?

Mammal	Count
Bear	45
Fox	230
Wolf	87
Mink	134

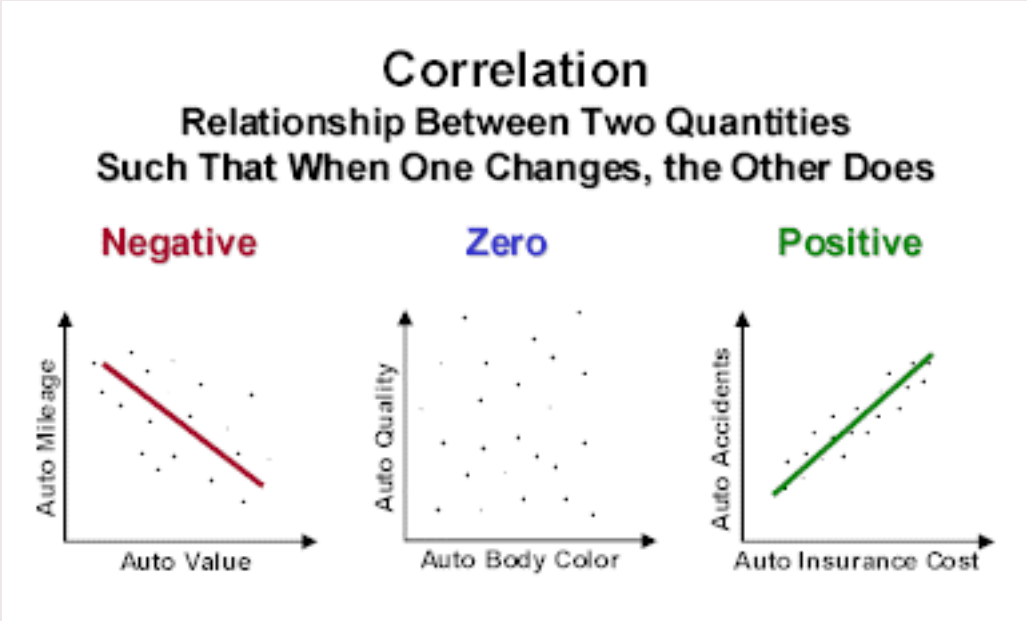


Correlations in Graphs

Read these important notes:

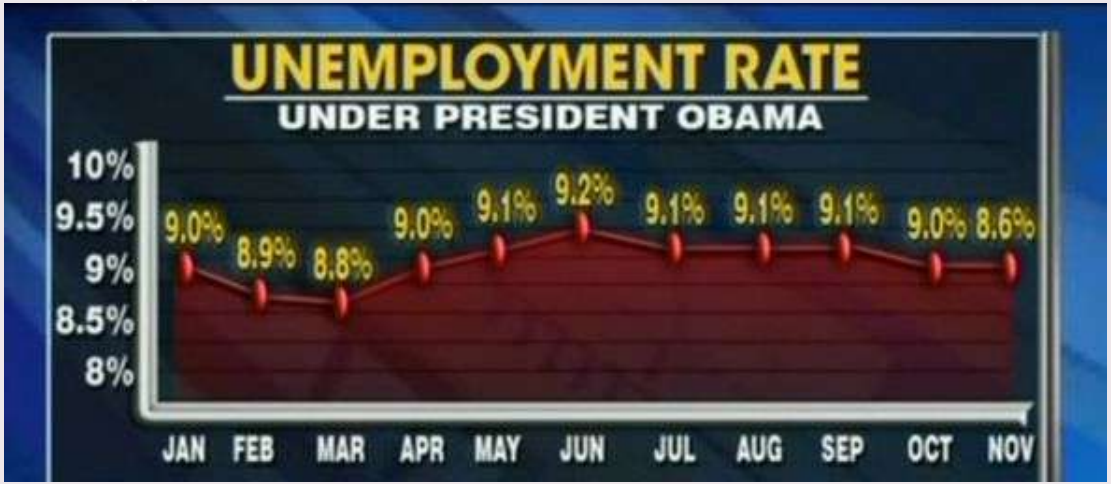
When we see scatter plots, we can determine the **correlation or trend** in the graph.

See the image on the right to determine the type of correlation.



Warm Up

Write down everything you notice about this graph



Block Day 4

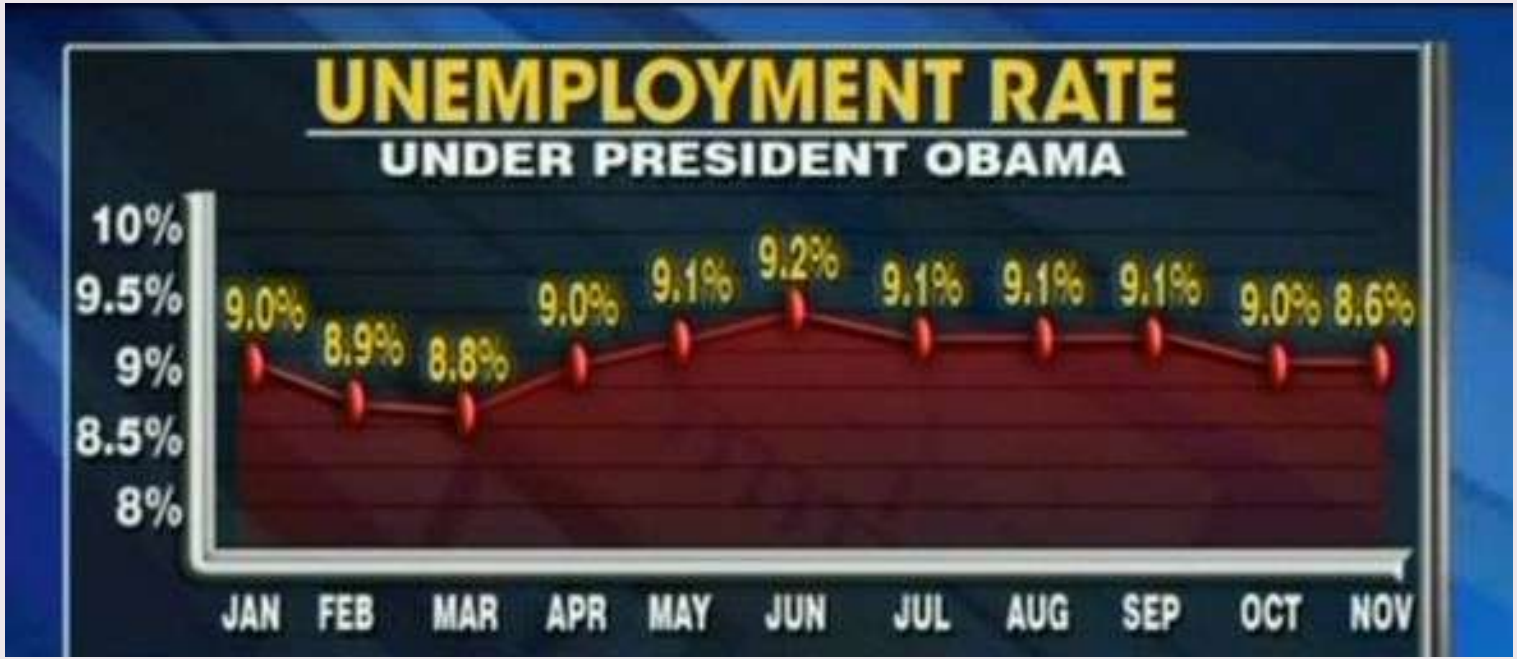
Agenda

- Correlation + Graph Checklist
- Finish up graphing in Google Sheets
- Deceiving Graphs
- **BREAK**
- Science in the Headlines
- Is It Science CER (maybe)
- **Teacher Meetings will start next Monday**

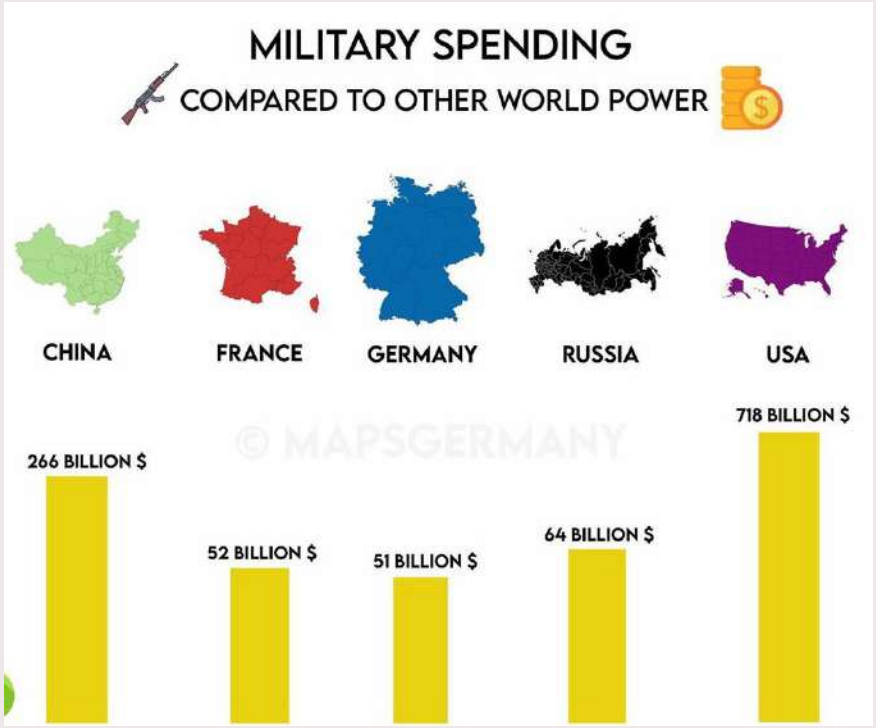
Graph Checklist

- ❑ Labeled Data Table
- ❑ Data in Graph
- ❑ Trendline
- ❑ X and Y Scales
- ❑ X and Y Axes Titles
- ❑ Graph Titles
  - ❑ Y vs. X or your own title
- ❑ 2-3 sentence analysis using vocab and correlations

Create a data table and graph the data in a line graph. What do you notice?



Regraph this!



Why are some graphs deceiving?

Headlines and Science

“Beards are Covered in Poop: Study”

“How Nail Polish Makes You Fat”

The *Huffington Post* was hardly the only media outlet to report on this “study.” Essentially, a local TV station got a few guys to let them swab their beards, they sent the swabs to a lab, and the lab found several of the beards contained the same kind of bacteria that’s often found in bathrooms. This isn’t a peer-reviewed study with significant sample size or a clear methodology—and it didn’t actually find beards contained poop! In reality, everything is covered in bacteria and that bacteria is essential to our health.

KTRH News RadioNumerous women's health and fashion publications and mainstream news sites reported on a study from Duke University and the Environmental Working Group which found when a small sample of women applied nail polish to their fingernails, they had higher levels of a chemical (triphenyl phosphate or TPHP) in their urine. The study didn't look at what health effects TPHP might have on these women, just that it was present in their bodies after painting their nails.

While TPHP has been linked to health problems when given to animals in high doses, no studies have shown the chemical causes negative health effects in humans. The new Duke study certainly doesn't suggest that nail polish is linked to weight gain.

Read, write down date and what the article explained

- Source 1 (A-G)
- Source 2 (H-N)
- Source 3 (O-Z)

Warm Up

Read this article (also in the chat) answer the following questions:

- When was this published?
- What was the main point of the article?
- What do you know about this source (you may need to look it up)?
- Do you think this source is bias? Why or why not?

Block Day 5 9/14 & 9/15 Agenda

- Warm Up
- Break Out Room Norms
- Gaiter Exploration in Break Out Rooms
- Fake Science vs. Changing Science
- Is it Science CER Intro
- Work Time
- **Teacher Meetings- Stay on Zoom**

With your group

- Share what you found (Source 1, 2, 3 in order)
- Create a timeline about the studies and conclusions

How did a fake study make it into a leading science magazine?

Video

A ROUGH GUIDE TO SPOTTING

BAD SCIENCE

1. SENSATIONALISED HEADLINES

Aa

Headlines of articles are commonly designed to entice viewers into clicking on and reading the article. At best, they over-simplify the findings of research. At worst, they sensationalise and misrepresent them.

2. MISINTERPRETED RESULTS

News articles sometimes distort or misinterpret the findings of research for the sake of a good story, intentionally or otherwise. If possible, try to read the original research, rather than relying on the article based on it for information.

3. CONFLICT OF INTERESTS

Many companies employ scientists to carry out and publish research - whilst this does not necessarily invalidate research, it should be

7. UNREPRESENTATIVE SAMPLES

In human trials, researchers will try to select individuals that are representative of a larger population. If the sample is different from the population as a whole, then the conclusions may well also be different.

8. NO CONTROL GROUP USED

In clinical trials, results from test subjects should be compared to a 'control group' not given the substance being tested. Groups should also be allocated randomly. In general experiments, a control test should be used where all variables are controlled.

9. NO BLIND TESTING USED

To prevent any bias, subjects should not know if they are in the test or the control group. In double-blind testing, even researchers don't know which

4. CORRELATION & CAUSATION

Be wary of confusion of correlation & causation. Correlation between two variables doesn't automatically mean one causes the other. Global warming has increased since the 1800s, and pirate numbers decreased, but lack of pirates doesn't cause global warming.

5. SPECULATIVE LANGUAGE

Speculations from research are just that - speculation. Be on the look out for words such as 'may', 'could', 'might', and others, as it is unlikely the research provides hard evidence for any conclusions they precede.

6. SAMPLE SIZE TOO SMALL

In trials, the smaller a sample size, the lower the confidence in the results from that sample. Conclusions drawn should be considered with this in mind, though in some cases small samples are unavoidable. It may be cause for suspicion if a large sample was possible but avoided.

10. 'CHERRY-PICKED' RESULTS

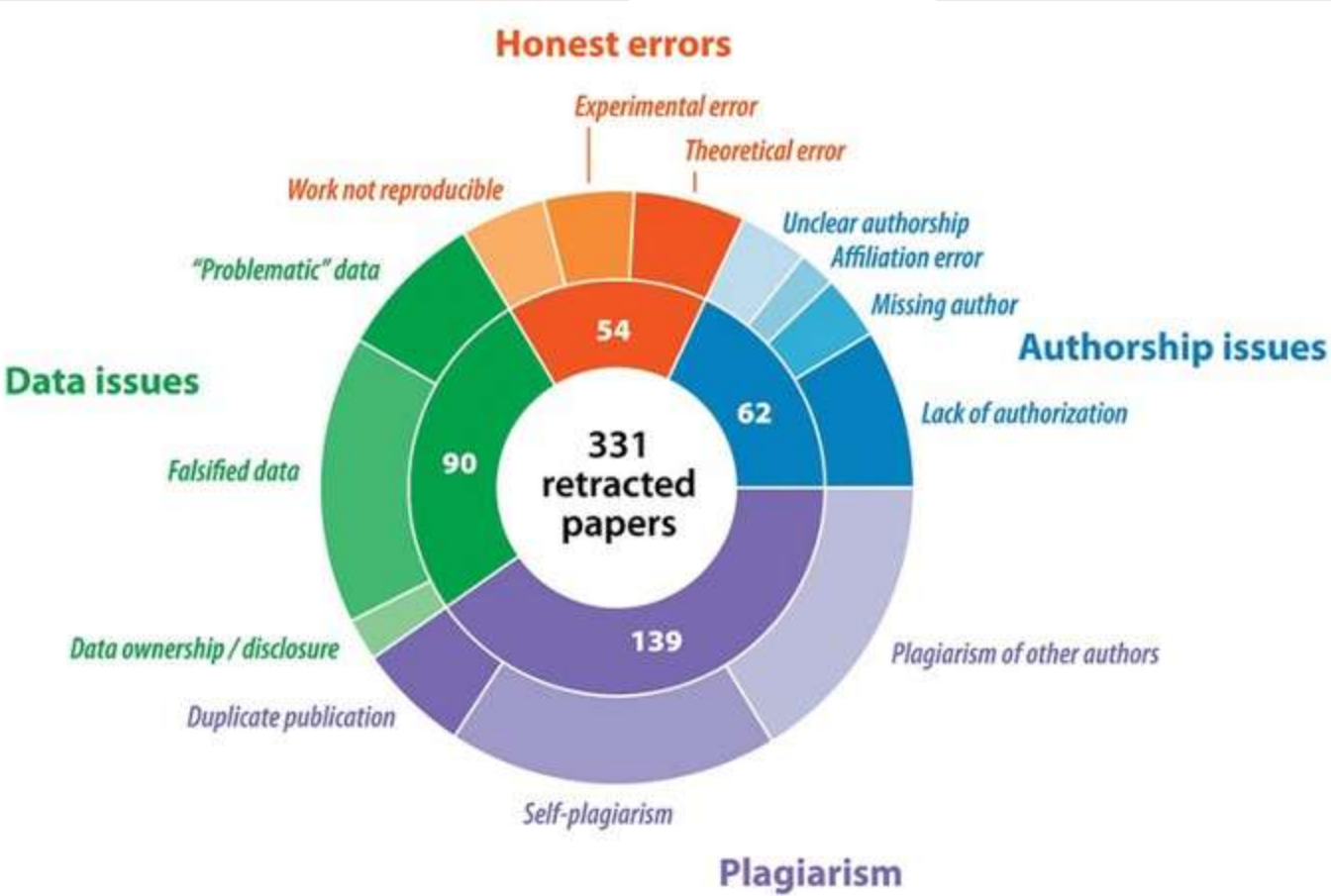
This involves selecting data from experiments which supports the conclusion of the research, whilst ignoring those that do not. If a research paper draws conclusions from a selection of its results, not all, it may be cherry-picking.

11. UNREPLICABLE RESULTS

Results should be replicable by independent research, and tested over a wide range of conditions (where possible) to ensure they are generalisable. Extraordinary claims require extraordinary evidence - that is, much more than one independent study!

12. JOURNALS & CITATIONS

Research published to major journals will have undergone a review process, but can still be flawed, so should still be evaluated with these points in mind. Similarly, large numbers of citations do not always indicate that research is highly regarded.


Honest errors
Experimental error
Theoretical error
Work not reproducible
"Problematic" data
Unclear authorship
Affiliation error
Missing author
Authorship issues
Data issues
54
62
Lack of authorization
331 retracted papers
Falsified data
90
Data ownership / disclosure
139
Plagiarism of other authors
Duplicate publication
Self-plagiarism
Plagiarism

How do we tell something is credible?

Warm Up

- What is a claim in science?
- What is an example of a piece of evidence?

Block Day 6
9/16 & 9/17
Agenda

- Is It Science? Evidence
- Intro CER
- Practice CER
- Is It Science? CER Both Sides

Write down anything you noticed about this video.

CER– Claim Evidence Reasoning

CER– Claim Evidence Reasoning

REASONING

Ties together the claim and the evidence

- Shows **how** or **why** the data count as evidence to support the claim.
- Provides the justification for why **this** evidence is important to **this** claim.
- Includes one or more **scientific principles** that are important to the claim and evidence.

CER Helpline

Claim: All kids at Avondale should be able to eat lunch off campus.

Evidence: I don't like cafeteria food. Lots of kids say they want to eat off campus.

Reasoning: I already explained it. I don't like lunch food and kids say they don't like the lunch food.

CER Helpline

Claim: Seniors at Avondale should be able to eat lunch off campus if they are in good standing and are passing all classes.

Evidence:

- 90% of seniors surveyed want to eat lunch off campus.
- 96% of seniors think it should be for seniors only in good standing
- 85% of seniors think it should be for seniors who are passing all of their classes.

Reasoning: The data shows that we need to do this.

CER Helpline

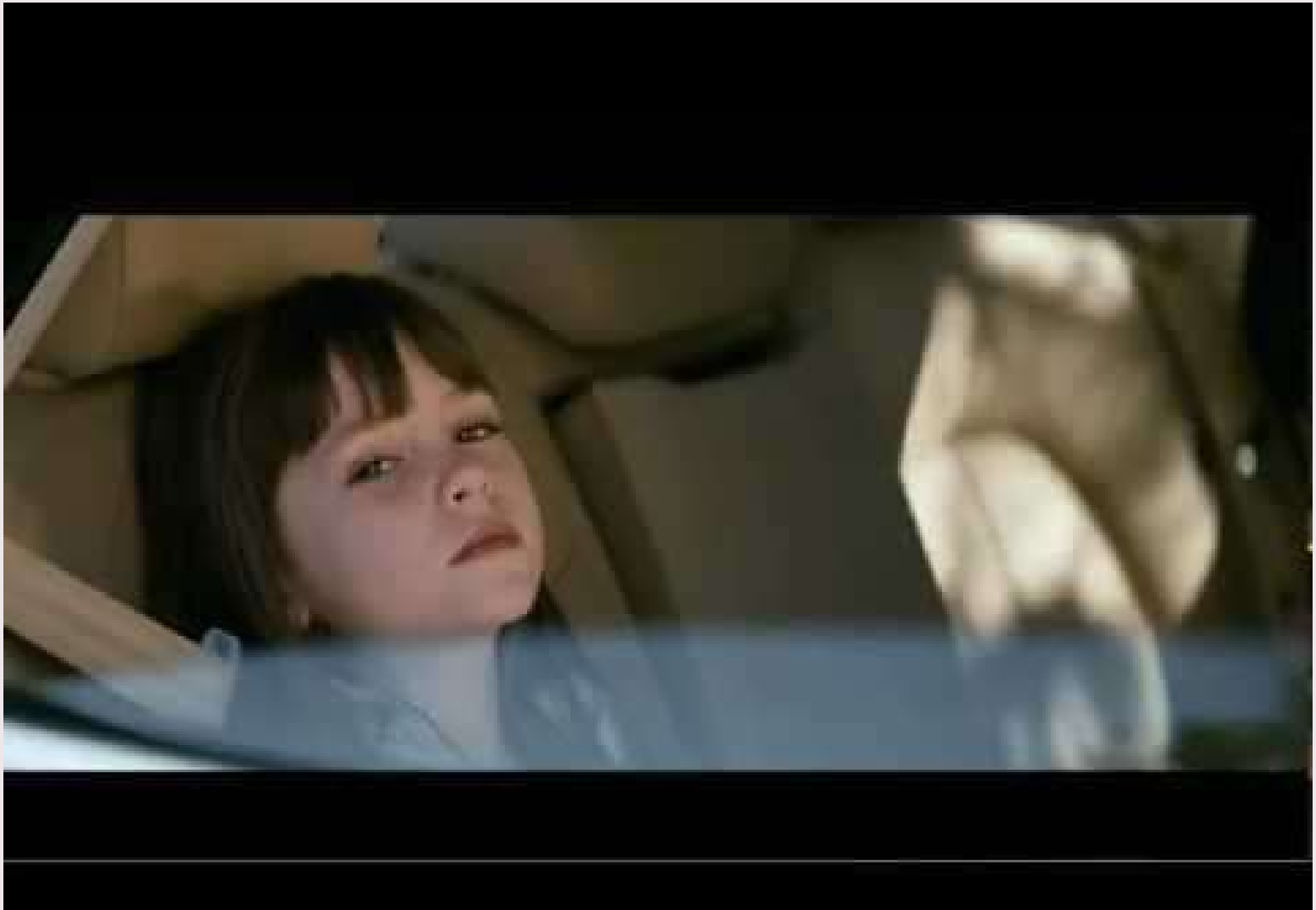
Claim: Seniors at Avondale should be able to eat lunch off campus if they are in good standing and are passing all classes.

Evidence:

- 90% of seniors surveyed want to eat lunch off campus.
- 96% of seniors think it should be for seniors only in good standing
- 85% of seniors think it should be for seniors who are passing all of their classes.

Reasoning: The vast majority of AHS seniors want to eat off campus. To make this more of an incentive for students, all students going off campus must be in good standing. This would also make admin more likely to approve as well.

Question: What did the dog do to the cat in the video? Practice CER.



Practice CER
Compare Your Partner

- Write CERs for Is it Science from both perspectives using the template on GC (pro and against)

Is it Science? Both Sides

Warm Up

Why Scientists Believe There May Be Extra-Terrestrial Life Floating in the Atmosphere of Venus- Read this article

- Create a claim from the scientists article
- Find 3 pieces of evidence from the article
- Is the headline sensationalized? Does is accurately depict what they discovered?

9/18 & 9/21

Agenda

- Warm Up
- Is It Science? CER Explanation + Finish Up
- Share with your partner
- Rate Yourself
- Turn in Revised CERs by end of class

Breakout Rooms (2–3 Students)

- Choose 1 side of your topic you don’t agree with
- Share your screen and walk your partner through your CER

#4: Argumentation (Claim, Evidence, Reasoning) I can observe a phenomenon and create a claim, provide evidence and show my reasoning.

Rubric Criteria	4	3	2	1	0
Claim: *What Do You Know?* **A statement or conclusion that answers the original question/problem**	The claim is clear and specific while relating to the question presented in class	The claim is clear but does not relate to the question presented in class	The claim is unclear, does not relate to the question presented in class	Does not make a claim or makes an inaccurate claim or claim is not related to the question presented in class	No claim
Evidence: *How Do You Know That?* **Scientific data from the lab that supports the claim. The data needs to be appropriate and sufficient to support the claim**	The evidence is detailed and persuasive Includes: all necessary qualitative data and/or quantitative data that supports the claim	Evidence may be missing a few details but is still persuasive. Missing some necessary qualitative and/ or quantitative data that supports the claim	Provides related but insufficient evidence to support the claim. May include some unrelated evidence that does not support the claim. Includes some reasoning instead of evidence.	Only provides unrelated evidence (Evidence that does not support the claim) **OR** only provides reasoning and no evidence from data	No evidence provided
Reasoning: *Why Does Your Evidence Support Your Claim?* **A justification that connects the evidence to the claim. It shows why or how the data counts as evidence by using appropriate and sufficient scientific principles**	Explanations and organization of reasoning strongly enhance the communication of evidence. The reasoning is based on clear and sound scientific principles. Fully explains ***why or how*** the data supports the claim The reasoning is from a reputable source if sources were used	Provides accurate and complete reasoning that links evidence to claim. The reasoning is sound but may not elaborate on evidence adequately - explains ***why or how*** data supports the claim but fails to demonstrate a complete understanding The reasoning is from a reliable source if sources were used	Provides reasoning that links claim and evidence. Repeats the evidence. The reasoning is sound but may not elaborate on evidence adequately - starting to explain ***why or how*** the data supports the claim is from a questionable source if sources were used	Only provides reasoning that does not link evidence to claim Does not explain ***why or how*** the data supports the claim The reasoning is not from a reliable source if sources were used	Does not provide reasoning

Phenomenon: Link here

- Show map: https://earthquake.usgs.gov/static/lfs/data/dyfi/pdfs-us/DYFIus_cumul-2017.pdf
- Write down what they notice
- Small Groups (3-4 students)- write down patterns they see
- Make a class list
- Actual intensity scale https://www.usgs.gov/natural-hazards/earthquake-hazards/science/modified-mercalli-intensity-scale?qt-science_center_objects=0#qt-science_center_objects
- Phenomenon Driving Questions as class