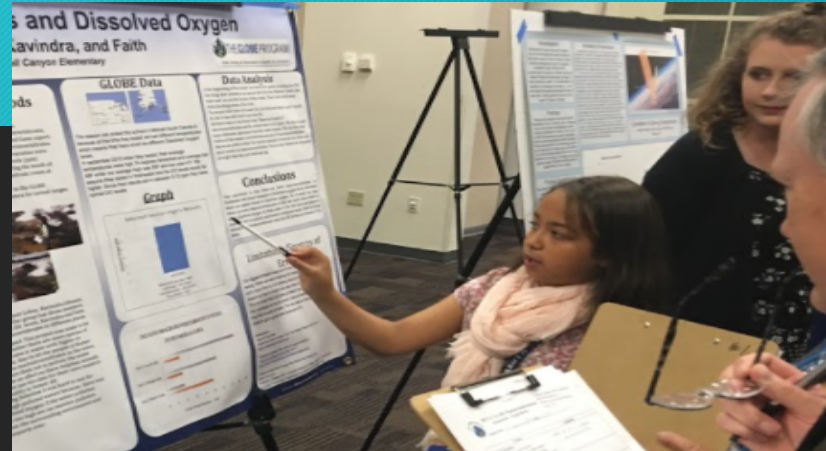


Creating a Science Poster

February 13, 2018



****To ask your questions: click 'Raise Hand' or use the chat window****

Student Research Symposia
Open Office Hours/Webinar

2018 SRS Locations

Region	Location	Dates
Southeast	University of North Carolina, Charlotte, NC	April 19-20
Southwest	Metropolitan State University, Denver, CO	May 4-5
Northeast/Mid-Atlantic	Adam's Mark, Buffalo, NY	May 4-5
Pacific	NASA Ames, Mountain View, CA	May 18-19
Midwest	Wayne State University, Detroit, MI	May 18-19
Northwest	Montana State University, Bozeman, MT	June 1-2

Facilitating Student Research Webinars and Open Office Hours (7- 8pm EST)

Recorded webinars from this and previous years, along with many other related resources, are available from the Teacher Resources section of the SRS website.

Upcoming Webinar:

Monday, March 5 - 7p Eastern - Giving a Poster Presentation
Register ahead: tinyurl.com/y9ljadvq

Resources for Teachers

Teacher Hotline:

Fill out [a short google form](#) and you will be connected with an experienced GLOBE teacher who can discuss your question over a brief phone call.

SRS Teacher Listserv:

- Stay updated on SRS information and deadlines.
- Find out about webinars and events.
- Direct links to new and exciting teaching resources for student research.

Sign-up link on the SRS webpage.

U.S. Regional SRS Webpage:

<https://www.globe.gov/web/united-states-of-america/home/student-research-symposia>

Open for Q&A

Please use the “raise hand” or chat window to ask your questions.

Putting it all Together - The Science Poster

The GLOBE Program



Student Research
Symposium

Tracy Ostrom
GLOBE Partner, UC Berkeley



Components of a Science Poster

- Formatting
- Presenting your story
- Examples

The GLOBE Science Poster


- Title (15 words)
- Abstract (200 words)
- Research Question
- Introduction (claim)
- Research Methods
- Results (evidence)
- Discussion of Results
- Conclusions (reasoning)
- Bibliography

Concise Title of Less Than 15 Words That Summarizes the Study

**School
Logo**

Collaboration Team Names

School Name




Global Learning and Observations to Benefit the Environment

Abstract

Concise (less than 300 words)
Context of research
Research questions
Objectives set
Brief methods description
Results
Conclusions
Recommendations for a way forward
Key words that emphasize key ideas in the paper (3-5 words)

Research Methods

There is a direct link provided between the datasets and research question(s)
Study site: A map and description of the study site. It should mention area of study, climatic characteristics and basic aspects of land cover
Data collection: A description of GLOBE protocols used to answer the research question as well as where and how data was gathered in the field (sampling method: Where, how many samples were measured)
Print screen of data entry in the Web page of GLOBE.
Data analysis: Mention what kind of mathematical calculation was applied to analyze the data
The data presented are sufficient to answer the research question(s)



Field Photos (requires release forms)

Site map

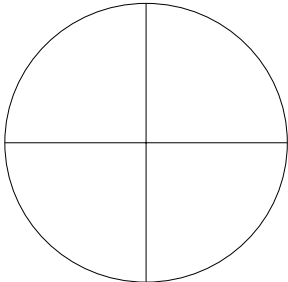
GLOBE BADGES Possible for students to earn up to 3 out of 6 additional badges. Students describe how each badge was earned in their report document

- **Collaboration** All team members are listed, along with clearly defined roles, how these roles support one another, and descriptions of each student's contribution. The descriptions clearly indicate the advantages of the collaboration.
- **Community Impact** The report clearly describes how a local issue led to the research questions and makes connections between local and global impacts.
- **Connecting to a STEM Professional** The report clearly describes collaboration with a STEM professional that enhanced the research methods, contributed to improved precision, and supported more sophisticated analyses and interpretations of results.
- **Interscholastic Connection** The report describes a carefully planned interscholastic or international collaboration that describes rationales for data collection in different regions and the advantages of comparing results.
- **Engineering Solution** The report includes all of the components for level 3, and: Describes the relative priority of the criteria for solving the problem, and Describes tradeoffs considered in designing the solution.
- **Exploring STEM Careers** The report describes how the project is related to a STEM career or profession, including the ways the data gathered, skills gained, and results might be used.

Results

Tables and graphics applying statistical analysis of data to show mean, dispersion or grouping data.
Data support the conclusions
Print screen of GLOBE visualization page

Figure #1



Discussion

interpretation of results
possible sources of error
comparison with similar studies
discuss whether results support the hypothesis or not, and why

Conclusions

Gives a thorough and insightful explanation as to how the conclusion was reached
Put findings in context, why it's important/relevant, impact, with regard to the science
What improvements in methods
What follow-on research/actions to be taken, future protocols that could be added
Impact of working with a project mentor

Bibliography

Materials correctly cited
GLOBE materials used
Sources beyond those provided by GLOBE

Introduction

Description of the problem
State of the science
Importance
Community relevance

*The review of the literature can be a separate document
Thorough (250-500 words)
Citations in text (at least 3-5 references, including at least one primary source in a peer-reviewed journal. Do not include wikis or Q&A sites such as answers.com. Look at The Purdue "OWL" for guidance and resources: owl.english.purdue.edu)*

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Fonts, Colors and Sizes

- Font - Use Sans Serif fonts (no “wings”)
- Avoid Fancy Graphics (shadows, outlines)
- Color: dark on light or light on dark (no reds)
- Use consistent large fonts
 - ✓ Title 80
 - ✓ Headings 40-60
 - ✓ Text 36

Results/Data

- Graphs guide your audience to your conclusions
- Label EACH axis
- Include a legend
- Include a title for tables and figures
- Evaluate your data and decide the best representation of your data: pie chart, plot line, bar graph
- (Tables are ok - but can be hard to follow)

Which Graph Makes Sense?

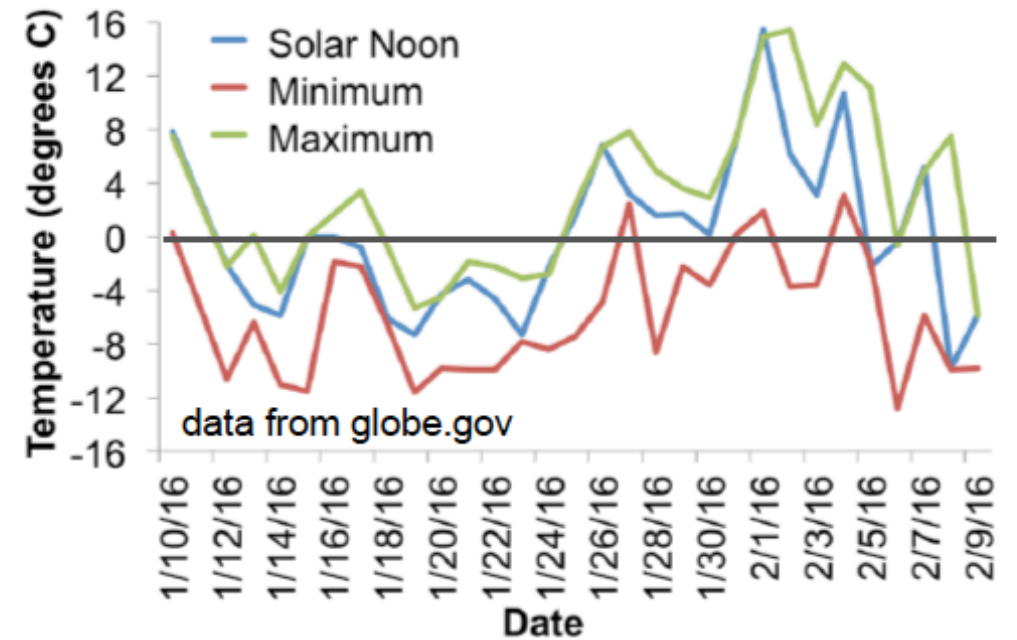
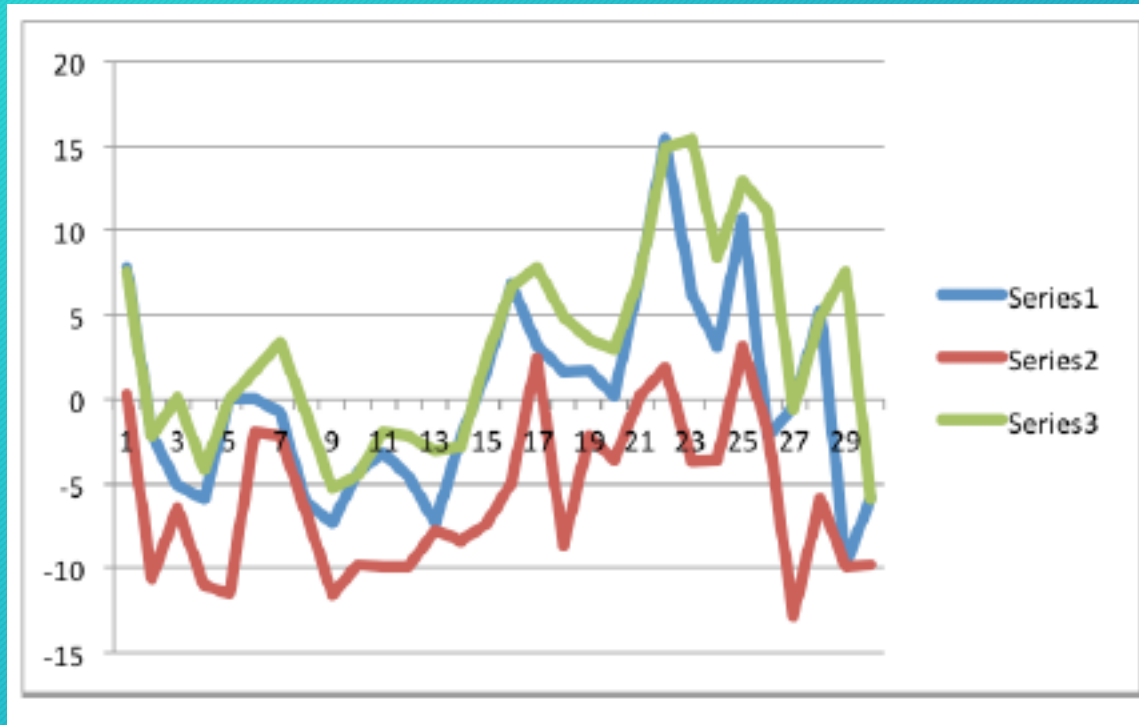


Figure 1. Temperature measurements at Littleton, MA, USA, January 10, 2016 through February 9, 2016.

Which Table Makes Sense?

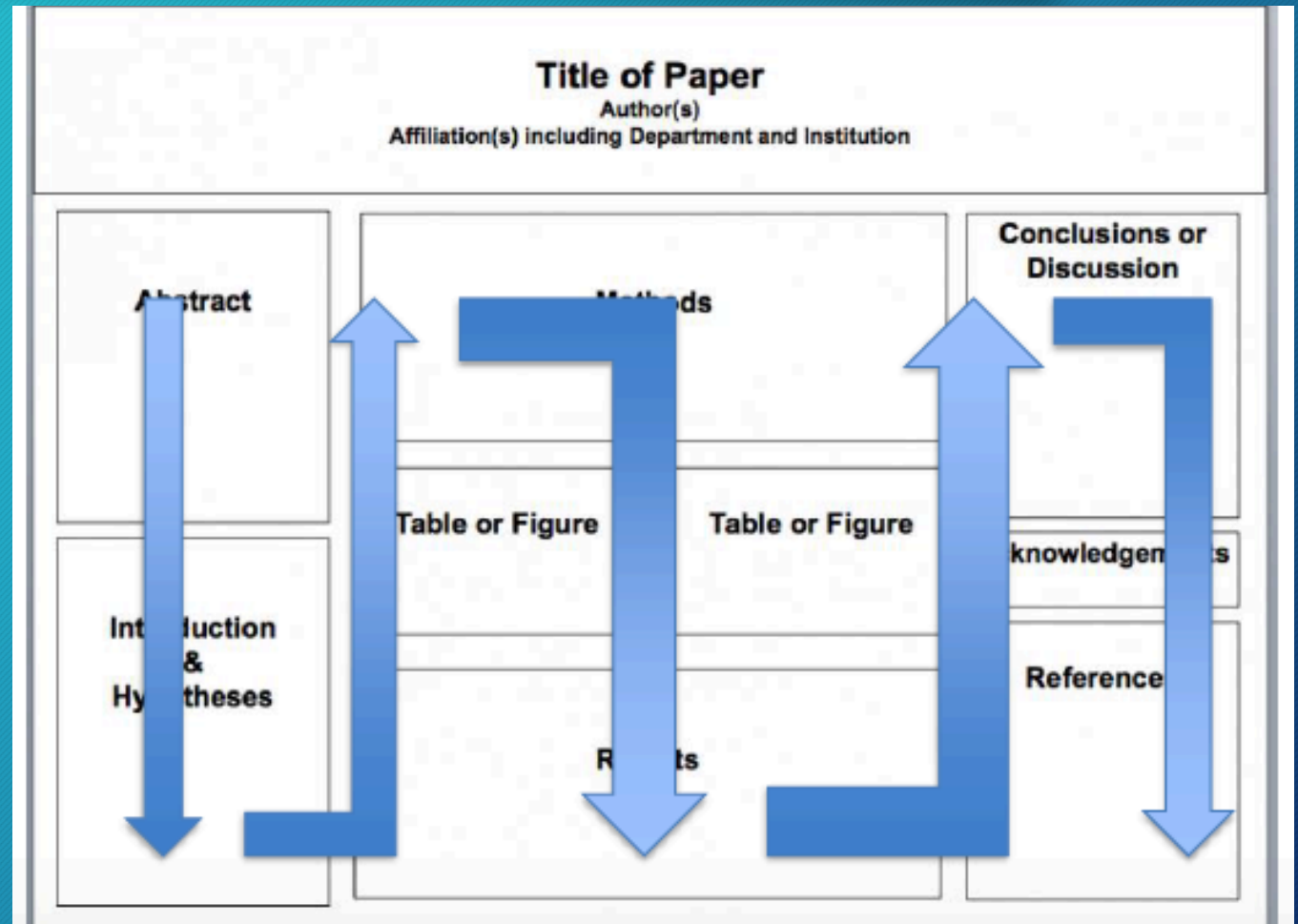
	Rain	Snow	Temperature
1	1.2	4	-28.345
2	2	2.24	-4
3	3.36	3.1	1.2

Table 1. Total rain, snow, and average daily temperature in January 2016.

Classroom	Rain (mm)	Snow (cm)	Temperature (°C)
Barrow, AK	1.2	4.00	-28.3
Littleton, MA	2.0	2.24	-4.0
Portland, OR	3.4	3.10	1.2

Presenting Your Story

- Your poster should tell your story.





Passive Solar Still Phase II

Bruno Gallegos, Victoria Gomez, Paola Rubi
Jayme Margolin-Sneider, Monica Martinez
Westview Middle School, Longmont Colorado



Abstract

Current technology for GLOBE data collection is not as accurate as it could be. This project aims to improve the accuracy of GLOBE data collection by using a passive solar still. The project was conducted in two phases. Phase I was a pilot study to determine the feasibility of the project. Phase II was the main study. The results of the project show that the passive solar still is a viable method for collecting GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data.

Research Question

The research question for this project is: "How accurate is the GLOBE data collection method compared to a passive solar still?" The project was designed to answer this question by comparing the GLOBE data collection method to a passive solar still. The project was successful in collecting accurate data and the results were consistent with the GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data.

Hypothesis

The accuracy of the GLOBE data collection method will be lower than the accuracy of the passive solar still.

Investigation Plan

The investigation plan for this project is as follows: 1. Determine the accuracy of the GLOBE data collection method. 2. Determine the accuracy of the passive solar still. 3. Compare the accuracy of the GLOBE data collection method to the accuracy of the passive solar still. 4. Analyze the results of the investigation. 5. Draw conclusions from the results of the investigation. The project was successful in collecting accurate data and the results were consistent with the GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data.

Research Methods

The research methods for this project include: 1. Data collection using GLOBE. 2. Data collection using a passive solar still. 3. Comparison of the two methods. 4. Analysis of the results. The project was successful in collecting accurate data and the results were consistent with the GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data.

Field Photos



Left: Collecting data from GLOBE. Middle: Collecting data from the solar still. Right: Comparing the two methods.



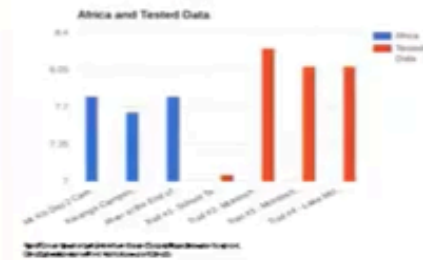
Left: Preparing the solar still. Middle: Collecting data from the solar still. Right: Analyzing the results.

Additional Research

GLOBE BADGES Information

- Global Data Collection:** The GLOBE program is a global network of students who collect and share data on various environmental factors. This project is part of the GLOBE program and aims to improve the accuracy of the data collection process.
- Passive Solar Still:** A passive solar still is a device that uses solar energy to heat water and produce steam. The steam is then condensed and collected as purified water. This project aims to use a passive solar still to collect GLOBE data.
- Accuracy:** The accuracy of the GLOBE data collection method is a key factor in this project. The project aims to compare the accuracy of the GLOBE data collection method to the accuracy of the passive solar still.
- Investigation Plan:** The investigation plan for this project is as follows: 1. Determine the accuracy of the GLOBE data collection method. 2. Determine the accuracy of the passive solar still. 3. Compare the accuracy of the GLOBE data collection method to the accuracy of the passive solar still. 4. Analyze the results of the investigation. 5. Draw conclusions from the results of the investigation.

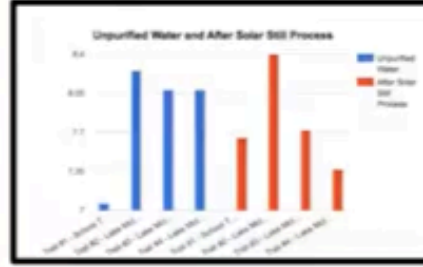
GLOBE Data



The GLOBE data for Africa is compared to the tested data. The GLOBE data is generally lower than the tested data. This is likely due to the accuracy of the GLOBE data collection method. The project aims to improve the accuracy of the GLOBE data collection method by using a passive solar still.

Data Summary

Results



Data Analysis

The data analysis for this project shows that the GLOBE data collection method is less accurate than the passive solar still. The GLOBE data is generally lower than the tested data. This is likely due to the accuracy of the GLOBE data collection method. The project aims to improve the accuracy of the GLOBE data collection method by using a passive solar still.

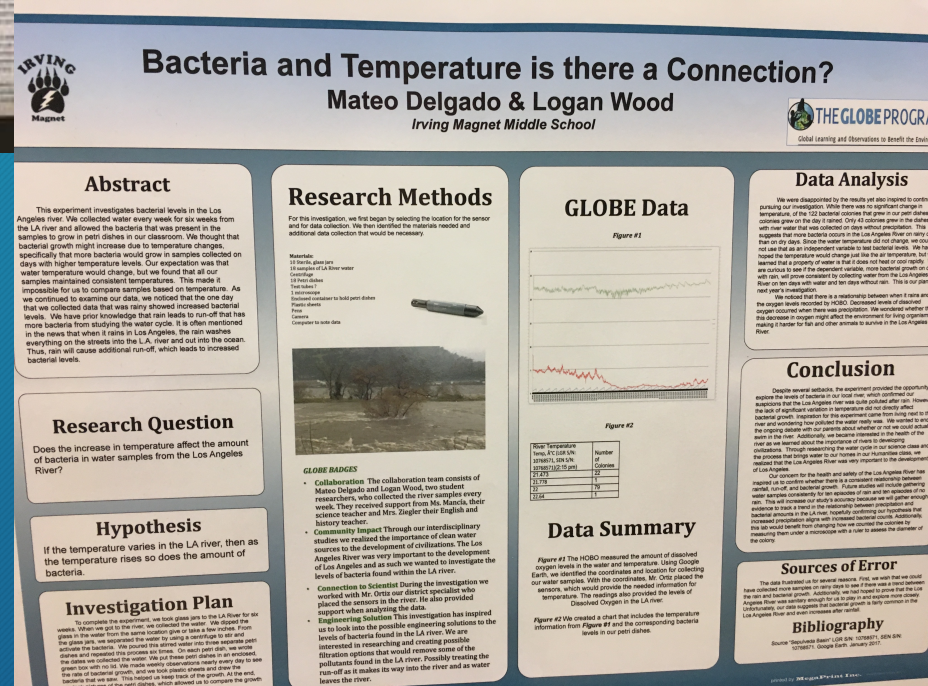
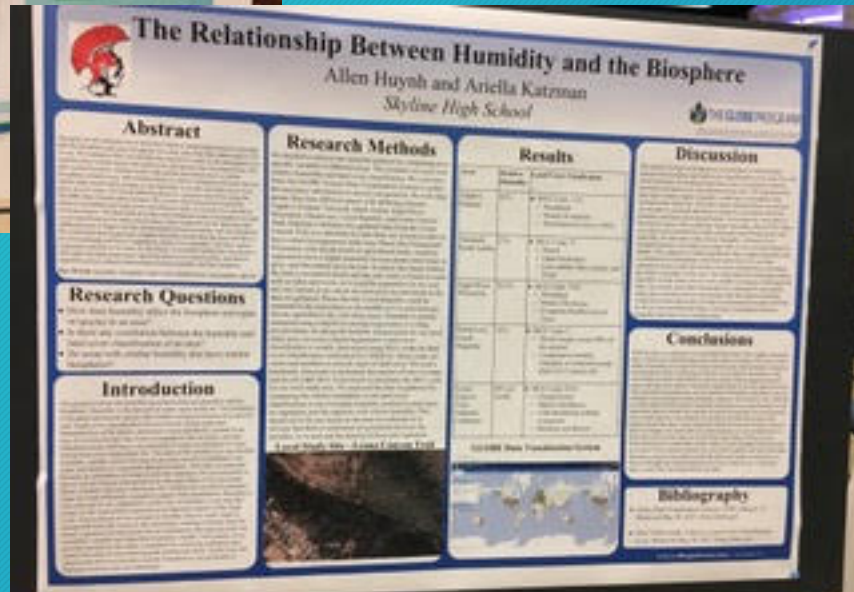
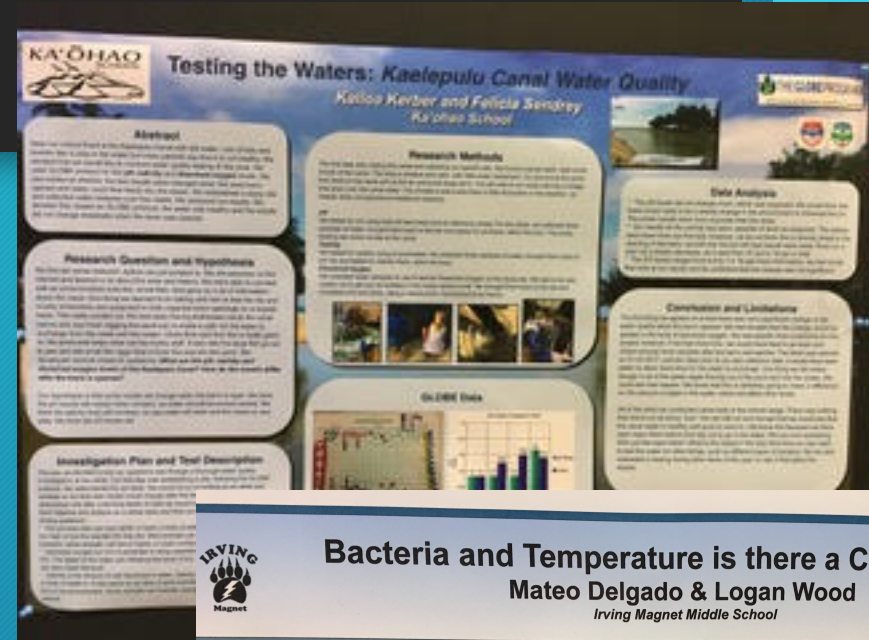
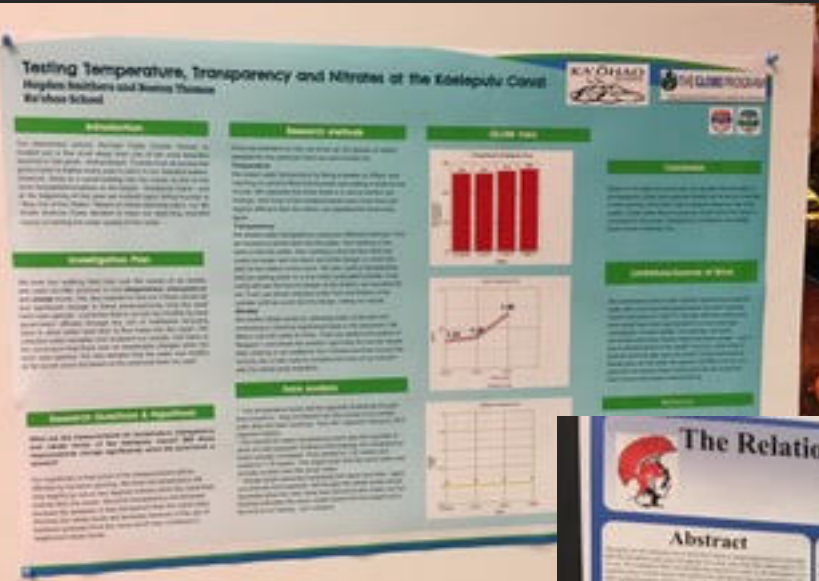
Conclusions

The conclusions of this project are that the GLOBE data collection method is less accurate than the passive solar still. The GLOBE data is generally lower than the tested data. This is likely due to the accuracy of the GLOBE data collection method. The project aims to improve the accuracy of the GLOBE data collection method by using a passive solar still.

Limitations/ Sources of Error

The limitations and sources of error for this project include: 1. Accuracy of the GLOBE data collection method. 2. Accuracy of the passive solar still. 3. Comparison of the two methods. 4. Analysis of the results. The project was successful in collecting accurate data and the results were consistent with the GLOBE data. The project was successful in collecting accurate data and the results were consistent with the GLOBE data.

Poster Samples from Pacific SRS



Abstract

This experiment investigates bacterial levels in the Los Angeles river. We collected water every week for six weeks from the LA river and allowed the bacteria that was present in the samples to grow in petri dishes in our classroom. We thought that bacterial growth might increase due to temperature changes, specifically that more bacteria would grow in samples collected on days with higher temperature levels. Our expectation was that water temperature would change, but we found that all our samples maintained consistent temperatures. This made it impossible for us to compare samples based on temperature. As we continued to examine our data, we noticed that one day that we collected data that was rainy showed increased bacterial levels. We have prior knowledge that rain leads to run-off that has more bacteria from studying the water cycle. It is often mentioned in the news that when it rains in Los Angeles, the rain washes everything on the streets into the L.A. river and out into the ocean. Thus, rain will cause additional run-off, which leads to increased bacterial levels.

Research Question

Does the increase in temperature affect the amount of bacteria in water samples from the Los Angeles River?

Hypothesis

If the temperature varies in the LA river, then as the temperature rises so does the amount of bacteria.

Investigation Plan

To complete this experiment, we took samples from the LA River for six weeks. When we got to the river we collected the water. From each sample we poured the water into three separate petri dishes to allow the bacteria to grow. On each petri dish, we added the water we collected from the river. We did three petri dishes for each sample to ensure accuracy. We made sure to label each petri dish with the date and time we collected the water. We made sure to keep the petri dishes in a dark place to prevent the growth of bacteria. We made sure to keep the petri dishes in a dark place to prevent the growth of bacteria. We made sure to keep the petri dishes in a dark place to prevent the growth of bacteria.

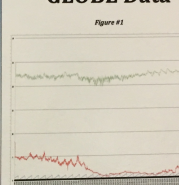
Research Methods

For this investigation, we first began by selecting the location for the sensor and for data collection. We then identified the materials needed and additional data collection that would be necessary.



Water Temperature (°C)	Number of Colonies
17.4	10
17.7	10
17.7	10
17.4	11

GLOBE DATA



Water Temperature (°C)	Number of Colonies
17.4	10
17.7	10
17.7	10
17.4	11

Data Summary

Figure #1 The HOBO measured the amount of dissolved oxygen levels in the water and temperature. Using Google Earth, we identified the coordinates and location for collecting our water samples. With the coordinates, M. Ortiz placed the sensors, which would provide the needed information for temperature. The readings also provided the levels of Dissolved Oxygen in the LA river.

Figure #2 We created a chart that includes the temperature information from Figure #1 and the corresponding bacteria levels in our petri dishes.

Data Analysis

We were disappointed by the results yet also happy to compare our data to other groups. While there was no significant change in temperature, the GLOBE sensors that grew in our petri dishes showed growth in the days it rained. Only one petri dish showed growth that was bacteria from the Los Angeles River. We thought that bacterial growth might increase due to temperature changes, specifically that more bacteria would grow in samples collected on days with higher temperature levels. Our expectation was that water temperature would change, but we found that all our samples maintained consistent temperatures. This made it impossible for us to compare samples based on temperature. As we continued to examine our data, we noticed that one day that we collected data that was rainy showed increased bacterial levels. We have prior knowledge that rain leads to run-off that has more bacteria from studying the water cycle. It is often mentioned in the news that when it rains in Los Angeles, the rain washes everything on the streets into the L.A. river and out into the ocean. Thus, rain will cause additional run-off, which leads to increased bacterial levels.

Conclusion

Despite several setbacks, the experiment provided the opportunity to explore the relationship between temperature and bacterial growth. The Los Angeles river was quite polluted after our investigation. We noticed that the water was quite polluted and we were not sure if the water was safe to drink. We were not sure if the water was safe to drink. We were not sure if the water was safe to drink. We were not sure if the water was safe to drink.

Sources of Error

The data collected in this experiment was not perfect. There were several sources of error that could have affected the results. One source of error was the location of the sensors. We did not place the sensors in the same location for every sample. Another source of error was the time of day we collected the water. We did not collect the water at the same time for every sample. These errors could have affected the results of the experiment.

Bibliography

Source: "Bacteria and Temperature is there a Connection?" by Mateo Delgado & Logan Wood. Irving Magnet Middle School. 2018. <https://www.globe.gov>

The GLOBE Program



THANK YOU
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