



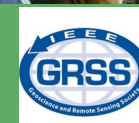
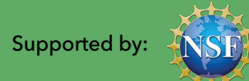
GLOBE Virtual Training

Atmosphere & Biosphere

Tracy Ostrom

July 17, 2020

10 am – 12 pm

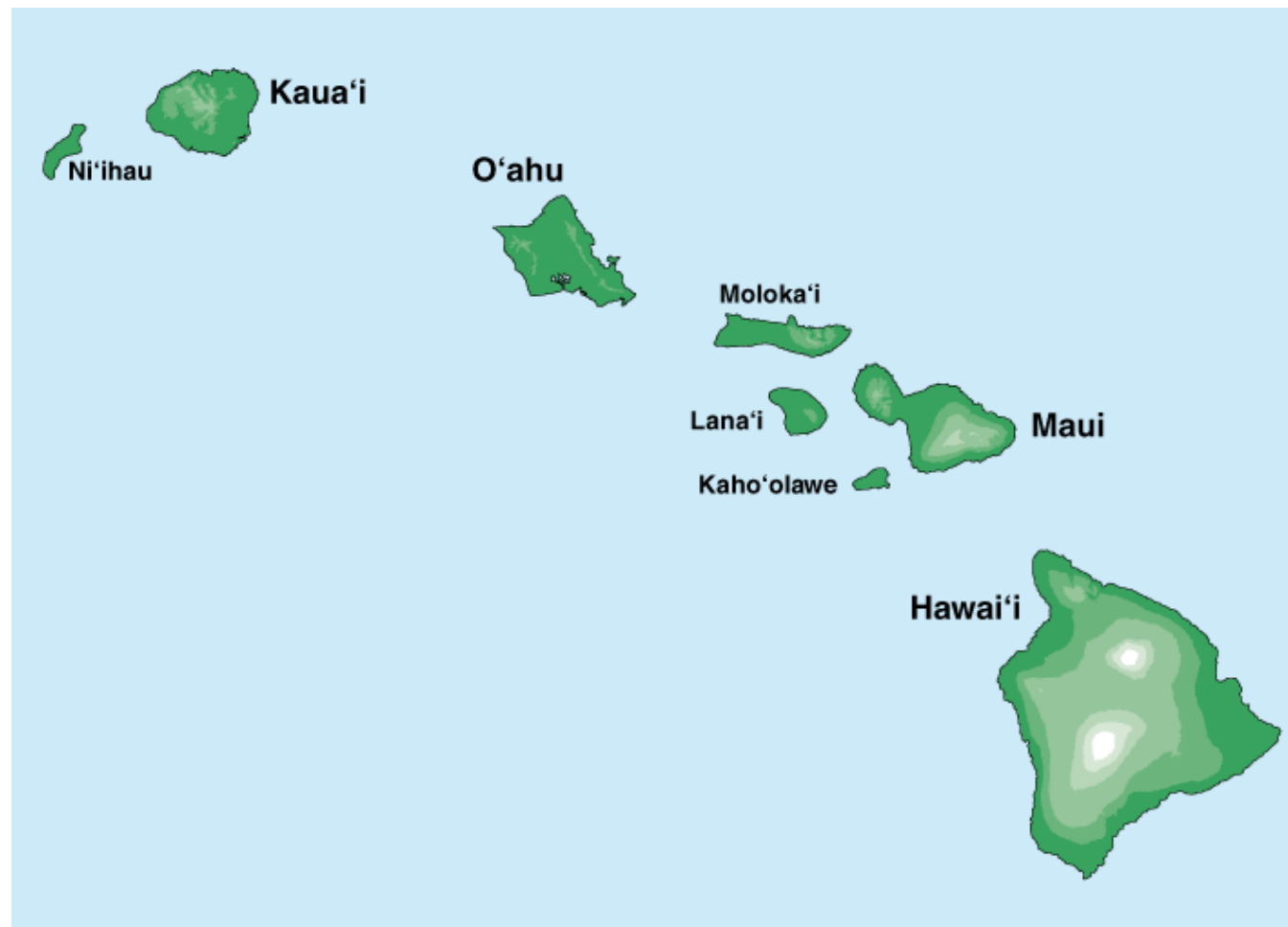




Annotate – Where are You? (Hawaii Teachers)

From your zoom window:

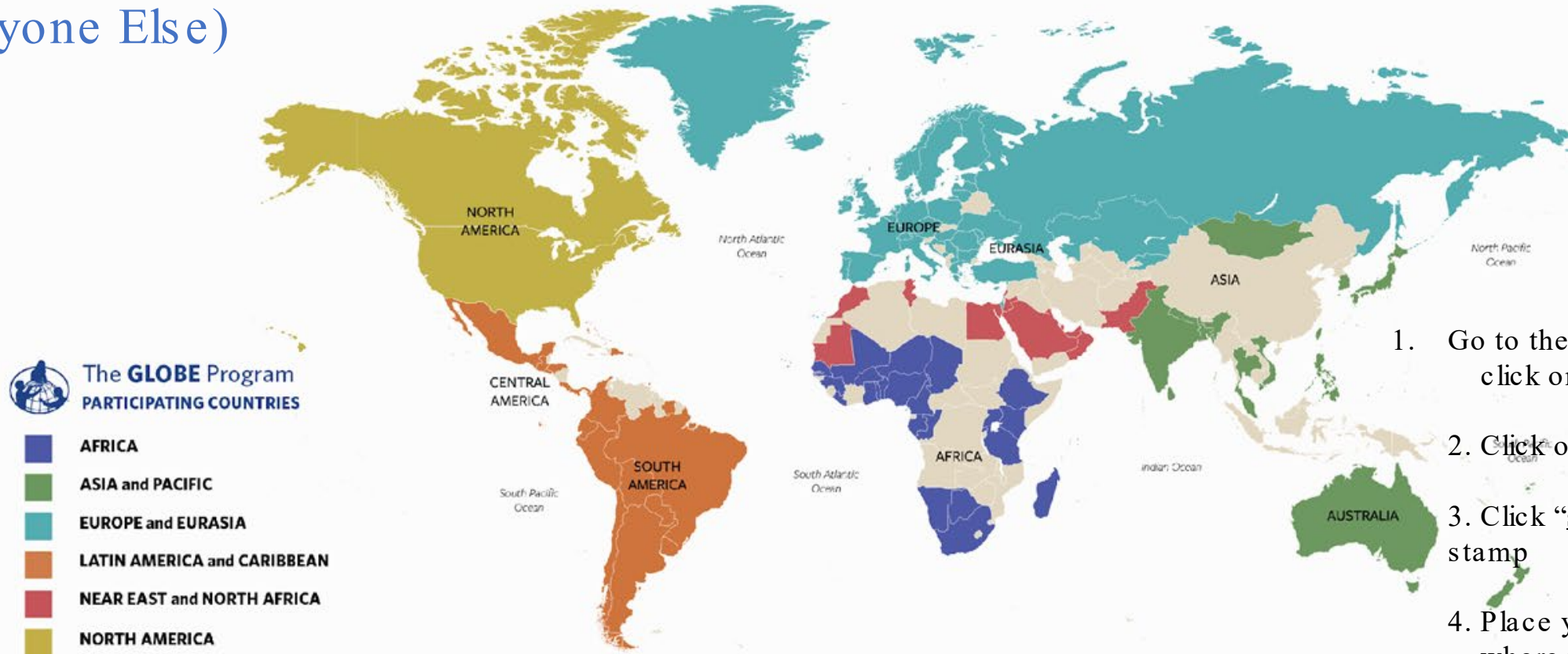
1. Go to the top of zoom and click on “view options”
2. Click on “annotate”
3. Click “stamp” and choose a stamp
4. Place your cursor on the map where you are located and click; your stamp will appear at that spot





Annotate – Where are You?

(Everyone Else)



1. Go to the top of zoom and click on “view options”
2. Click on “annotate”
3. Click “stamp” and choose a stamp
4. Place your cursor on the map where you are located and click; your stamp will appear at that spot

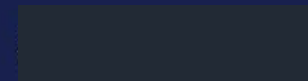




Our Agenda - Atmosphere

- Introductions/Ice breaker
- Review GLOBE Protocols – Atmosphere
 - Air Temperature
 - Surface Temperature
 - Clouds
- Data Entry & Site Set Up
- GLOBE Observer
- Connections
 - UHIE
 - Cloud Challenge
 - Air Quality





Take a Poll

GLOBE stands for:



Sponsored by:



Supported by:



Implemented by:



UCAR



IEEE



What is GLOBE?



globe.gov





GLOBE Investigation Areas

Biosphere

The biosphere includes plant life and land cover.

Geosphere

The geosphere (pedosphere) includes rocks and soil.

Atmosphere

The atmosphere includes the air around the earth and weather.

Hydrosphere

The hydrosphere includes water on Earth, in rivers, lakes, and the ocean.





In Your Breakout Rooms... 5 minutes

Introduce yourself

- school
- grade/subject area
- which sphere are you most interested in/or can identify with/want to learn more about?

How about another poll afterwards?





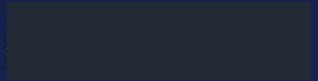
Let's Review the Atmosphere Protocols

Go to: <https://www.menti.com>

Enter Code **14 46 22**

Answer each question.

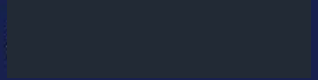




Atmosphere - Tips

- Air temperature
 - ok to use analog thermometers
 - can compare data to digital readings
- Clouds
 - ok to use cloud chart
 - use cloud triangle to teach clouds
 - Practice, practice, practice
- Surface temperature
 - 9 data points/same surface
 - ground condition observations
 - Students love using IRT – **SAFETY FIRST**





Data Entry

Setting up a site

(I'll go first)





Data Entry – your turn

1. Login to GLOBE website
2. Click GLOBE Data
3. Click Data Entry
4. Click Training Data Entry
 - Should see **SCIENCE Data Entry Training Site** at top
 - Click **Add site**
 - Click

THE GLOBE PROGRAM **SCIENCE Data Entry Training Site** Welcome Tracy Ostrom

Data Entry Home / Skyline High School /

Site Definition

Add site type

- Atmosphere**
 - ☐ Atmosphere
 - ☐ Surface Temperature
- Hydrosphere**
 - ☐ Hydrology
- Biosphere**
 - ☐ Land Cover
 - ☐ Greening
 - ☐ Phenological Gardens
 - ☐ Liliacs
 - ☐ Carbon Cycle
- Pedosphere**
 - ☐ Frost Tube
 - ☐ Soil Characterization
 - ☐ Soil Moisture and Temperature
- Photos** +

Site Name * Indicates a field is required

Coordinates


Latitude * Longitude * Elevation * m

☐ North ☐ South ☐ East ☐ West

Source of Coordinates Data *

☐ GPS ☐ Other

Map **Satellite**



Google Map data ©2020 Terms of Use

Comments

Optional

Create Site **Reset**



Sample Data Entry: Integrated Atmosphere 1-Day

1. Time/Date
2. Air Temp: 27.2 C
3. Pressure at sea level 1 mBar
4. Relative Humidity: 53%
5. Precipitation: 0 mm
6. Only isolated low clouds
7. No contrails
8. Clear blue sky

Aerosols ★
New observation Past observations

Clouds ★
New observation Past observations

Multi-Day Soil And Air Temperatures ★
New observation Past observations

Precipitation ★
New observation Past observations

Air Temperature 1-Day ★
New observation Past observations

Integrated Atmosphere (1-Day) ★
New observation Past observations

Multi-Day Soil And Soil Temperatures ★
New observation Past observations

Water Vapor ★
New observation Past observations

Integrated Atmosphere (1-Day) *Creating*

Enter The Date And Time Of The Observation (24hr)

2020-07-08 02:00 ☐ UTC [Get Current UTC Time](#)
☒ Local

Your Local (PDT) time converted to UTC time is 2020-07-08 09:00

Solar Noon:20:13 UTC

!

🌤️

🌧️

🌊

🌫️

• Use the buttons on the left to select what measurements you want to include in the GLOBE Science Database.

Icon Key

🌡️ Air Temperature 🌡️ Barometric Pressure 🌡️ Relative Humidity 🌧️ Precipitation 🌫️ Clouds

• Click the **Send Data** button when you are finished.

• If you need to reset the form to its original state, click the **Reset** button.

Send Data Cancel

Reset



GLOBE Observer

- Free Download
- Sign up with an email address
- Start being a citizen scientist



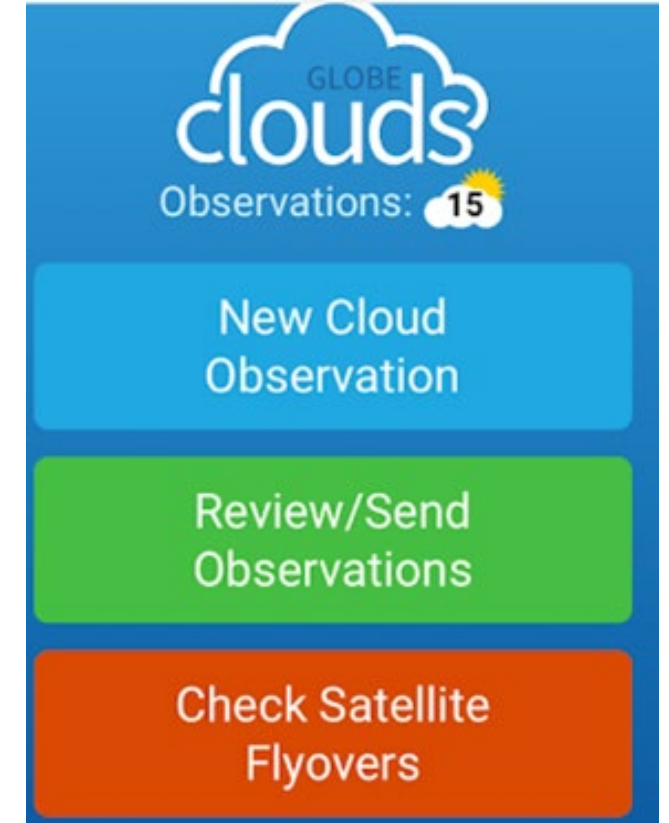
Choose Your Data Collection Tool

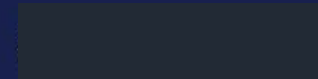




Let's Make a Cloud Observation

- Take a peek out of your nearest window
 - Look up into the sky
 - What do you see?
 - Clouds?
 - Contrails?
 - Cloud height (high, medium, low)
 - Sky color (light blue, blue, dark blue)
 - Sky clarity (unusually clear, clear, hazy)





GLOBE Connections





GLOBE Campaigns

- Urban Heat Island Effect
- Air Quality
- GPM – Global Precipitation Measurement
- El Niño and La Niña
- Tree Height (ICESAT 2)
- GLOBE Mission EARTH
- AREN Project
- Arctic and Earth SIGNS
- NESEC

Get Started...

Learning Activities

Activities to help students learn more about [GLOBE protocols](#) and instruments.

Protocols:

▸ Atmosphere

▸ Biosphere

▸ Earth as a System

▸ Hydrosphere

▸ Pedosphere

Grade Level:

☐ Lower Primary: K-2

☐ Upper Primary: 3-5

☐ Middle: 6-8

☐ Secondary: 9-12

Apply Filter

Clear



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Implemented by: UCAR



IEEE



BREAK— 5 minutes and 35 seconds





Our Agenda - Biosphere

- Making Connections – Atmosphere & Biosphere
- Review GLOBE Protocols – Biosphere
 - Tree Height
 - Green Up/Green Down
- Data Entry & Site Set Up
- GLOBE Observer
- Putting It All Together
 - Research Process
 - SRS/IVSS
 - Guide/Rubric/Poster





Making Connections: Atmosphere and Biosphere

Let's Chat: What connections do you see with these two spheres?





Let's Review the Biosphere Protocols

Go to: <https://www.menti.com>

Enter Code 61 97 70

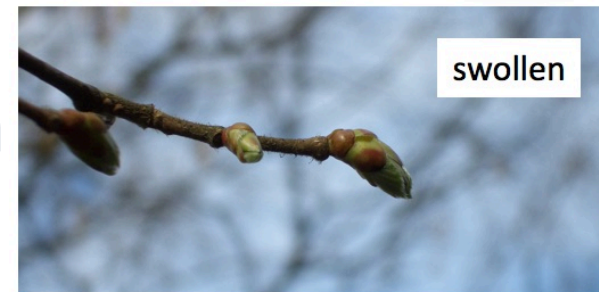
Answer each question.





Biosphere - Tips

- Tree Height
 - Make a clinometer activity
 - Compare different types of clinometer for the same object
 - try measuring different types of trees
 - A “tree” has to be at least 5 meters tall
 - Replication - repeat 3 times
 - ?45 degrees or tangent table?
- Green Up/Green Down
 - ok to use local plants/trees/home
 - Easily combined with other protocols
 - Ok to look at pictures
 - 4 buds – south side
 - 3 leaves + end
 - need a color chart



Measure leaf length





Data Entry – biosphere site

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Source of Coordinates Data *

☐ GPS ☐ Other

Map **Satellite**



Google Map data ©2020 Terms of Use

Comments

Optional

Create Site **Reset**





GLOBE Observer

- Free Download
- Sign up with an email address
- Start being a citizen scientist



Choose Your Data Collection Tool





Putting It All Together – Project Based Learning

- International Virtual Student Symposium (IVSS)
- Student Research Symposium (SRS)
 - Funding to attend
 - Open to all GLOBE students
 - Held regionally in the spring every year (Hawaii, California and Nevada)
 - SRS Guide for teachers
 - Project Rubric
 - Template for poster presentations





SRS Planning Guide

TIMELINE SRS:

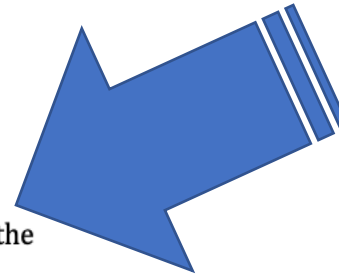
Count backwards from your region's SRS date for a suggested timeline for completing a GLOBE student research project. Find the dates for each regional SRS [here](#). For support on each step of the research process see the [SRS Science Practices Pages](#).

12-15 weeks prior to SRS:

- Student groups assigned
- Research question developed by/assigned to student groups

10-11 weeks prior to SRS: *The Research Question and Revision of Research Question*

- Three types of Research Questions:
 - **Descriptive.** When a study is designed primarily to describe what is going on or what exists.
 - Describing the characteristics of a variable or phenomenon.
 - Public opinion polls compared to GLOBE data can be used to describe something.



STUDENT OUTCOME: Students will be prepared to present their research at the [GLOBE Student Research Symposium](#) and/ or submit to the [GLOBE International Virtual Science Symposium](#).

TIMELINE SRS:

Count backwards from your region's SRS date for a suggested timeline for completing a GLOBE student research project. Find the dates for each regional SRS [here](#). For support on each step of the research process see the [SRS Science Practices Pages](#).

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- Three types of Research Questions:
 - **Descriptive.** When a study is designed primarily to describe what is going on or what exists.
 - Describing the characteristics of a variable or phenomenon.
 - Public opinion polls compared to GLOBE data can be used to describe something.
 - **Relational.** When a study is designed to look at the relationships between two or more variables.
 - How does ___ and ___ compare?
 - **Causal.** When a study is designed to determine whether one or more variables causes or affects one or more outcome variables.
 - What effect does ___ have on ___?
- Write a one sentence HYPOTHESIS that answers your question.

3-10 weeks prior to SRS: *Collect Data*

- Determine equipment need to perform field work.
- Design data collection plan:
 - Determine frequency of data collection.
 - Decide where will data be collected.
 - Identify who will collect data.
 - Identify who will enter data into GLOBE database.
- Data Collection from:
 - Field work from data collection plan
 - GLOBE Visualization Tool
 - NASA Satellite data/ images
 - HoloGLOBE

5 weeks prior to SRS: *Write Introduction*

- Obtain [GLOBE poster template](#) (link downloads a PDF) and SRS reviewer feedback forms (see below).
- Write about the following:





Student Research Project Rubric

Teacher ID:	Student ID(s)		Project Name:		Grade Level:	Date:
Level of Understanding	Novice	Developing	Proficient	Advanced	1 = Novice 2 = Developing 3 = Proficient 4 = Advanced	Comments
Content Knowledge	Demonstrates a very elementary understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a moderate understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a clear understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a clear and deep understanding and integrates and applies basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	1, 2, 3, 4	
Asking Questions	The question cannot be scientifically tested or is beyond the scope of a GLOBE project.	The question is stated unclearly and can only be partially scientifically tested.	The question is stated explicitly with the appropriate focus and can be scientifically tested.	The question contributes to new thinking and is clearly stated and scientifically testable.	1, 2, 3, 4	
Planning Investigations	An elementary investigation plan exists.	A partially complete investigation plan exists, but describes a student-led research process.	A complete investigation plan is present that: (1) Describes a student-led research process AND (2) Lists the steps to complete project.	A clear and complete investigation plan is present that: (1) Describes a student-led research process AND (2) Clearly outlines the steps to complete project AND (3) Describes the collaboration of advantages taken or a combination of GLOBE protocols such that	1, 2, 3, 4	
	The investigation includes	GLOBE protocols are used.	A combination of GLOBE protocols is used.			

Level of Understanding	Novice	Developing	Proficient	Advanced	1 = Novice 2 = Developing 3 = Proficient 4 = Advanced
Content Knowledge	Demonstrates a very elementary understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a moderate understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a clear understanding of basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	Demonstrates a clear and deep understanding and integrates and applies basic scientific concepts and fundamental principles covered in the GLOBE protocol learning objectives.	1, 2, 3, 4

Interpreting Data and Drawing Conclusions	relevant to the report AND Some discussion of the limitations of the methods used is presented.	supported by the data AND A partial discussion of the limitations of the methods used is presented.	how the conclusion was reached AND (2) Describes how the data support the conclusion AND (3) Presents a clear and complete discussion of the limitations of the methods used.	Integrating evidence allows the conclusion was reached, and recommends future research AND (2) Presents a clear, complete and insightful discussion of the limitations of the methods used AND	1, 2, 3, 4	
Communication (Presentation skills) [optional]	Communicates with (1) minimal use of presentation skills, including body posture, language, eye contact, voice and timing AND (2) Uses language that is unsuited to the topic and audience AND (3) Responses to the questions are vague and demonstrate a minimal command of the facts or understanding of the topic.	Communicates with (1) partial use of presentation skills, including body posture, language, eye contact, voice and timing AND (2) Uses language that is at times unsuited to the topic and audience AND (3) Responses to the questions are limited and demonstrate a partial command of the facts or understanding of the topic.	Communicates with a (1) command of presentation skills, including body posture, language, eye contact, voice and timing AND (2) Uses appropriate language that is suited to the topic and audience AND (3) Responses relate to the questions and demonstrate an adequate command of the facts and understanding of the topic.	Communicates with a (1) consistent command of presentation skills, including body posture, language, eye contact, voice and timing that keep the audience engaged AND (2) Uses sophisticated and varied language that is suited to the topic and audience AND (3) Responses to questions are persuasive demonstrating an in-depth understanding of the facts and issues.	1, 2, 3, 4	
Total						



Poster Presentation Template

Abstract

- ☐ Write less than 200 words
 - ☐ Describe the research context and objectives
 - ☐ Ask the research question
 - ☐ Describe the methods, state the results, and draw conclusions
- Our research is about _____ because _____
 - Our research question is _____
 - The GLOBE protocols we used were _____ to test _____
 - The results of our research are _____
 - We conclude that _____



Sponsored by:

Concise Title of Less Than 15 Words That Summarizes the Study

**School
Logo**

Team Members
School Name



Abstract

- ☐ Write less than 200 words
 - ☐ Describe the research context and objectives
 - ☐ Ask the research question
 - ☐ Describe the methods, state the results, and draw conclusions
- Our research is about _____ because _____
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 - The GLOBE protocols we used were _____ to test _____
 - The results of our research are _____
 - We conclude that _____

Question/Hypothesis Asking Questions

- ☐ Write between 250 and 400 words
 - ☐ Ask the research question
 - ☐ State the hypothesis
 - ☐ Discuss the research by answering the following questions
 - ☐ How can the research question be answered with GLOBE data?
 - ☐ Is the question important and of scientific interest?
 - ☐ Does the question address a local or global community issue?
 - ☐ Do the question and the hypothesis show in-depth content knowledge?
 - ☐ How does the research expand on previous investigations?
- Our research question asks _____
 - Our hypothesis is _____
 - We are interested in researching this topic because _____
 - In class we learned _____ and we wanted to find out more about _____

Introduction Content Knowledge

- ☐ Write between 300 and 500 words
 - ☐ State the importance of the research
 - ☐ Review what you know already about this research topic
 - ☐ Describe the environmental or societal issue addressed by the research question
 - ☐ Demonstrate knowledge of facts, scientific concepts, and fundamental principles covered in the GLOBE protocol
 - ☐ Cite research from 3 or more scientific studies, including at least one primary source in a "peer-reviewed" journal
- Researching this topic is important because _____
 - This topic addresses _____ issue because _____
 - For our research we used _____ GLOBE protocols or data to understand how _____



Field Photos (requires release forms)

Research Methods

Planning Investigations

- ☐ Write between 300 and 500 words
 - ☐ Present the investigation plan
 - ☐ Include a map and description of the study site with mention of:
 - (1) the area of study, (2) climatic characteristics, and (3) basic aspects of land cover
 - ☐ Describe the GLOBE protocols and NASA assets used
 - ☐ Describe the process for data collection, including instrument calibration, preparation of materials, and tools and equipment used
 - ☐ Include the planned data collection activities including: (1) how time of day of data collection was selected, (2) how frequently data was collected, and (3) the location of sample collection and measurement
 - ☐ Include a Google Earth map and (if possible) a NASA satellite image
- Our plan for the investigation is _____
 - Our plan will produce data to test _____
 - The study site is located at _____
 - Our study site looks like _____
 - The GLOBE protocols we plan to use are _____
 - We plan to collect _____ data _____ times each day _____ days each week
 - We plan to collect data at _____ time of day

Carrying Out Investigations

- ☐ Write between 300 and 500 words
 - ☐ Identify the GLOBE protocols, data, and NASA assets actually used
 - ☐ Describe the data collection activities that actually happened including
 - ☐ Steps for data collection
 - ☐ When and how often data was collected
 - ☐ Types and amounts of data collected
 - ☐ Locations at the study site where data collection happened
 - ☐ Role each team member played in carrying out the investigation
 - ☐ Describe the procedures for data analysis including mathematical calculations used
 - ☐ Explain how the methods used to carry out the investigation help to answer the research question
- The GLOBE protocols we used were _____
 - When we collected data this happened _____
 - We collected a total of _____ data points for _____
 - We collected a total of _____ data points _____
 - We analyzed the data using _____ procedures
 - Our methods help to answer the research question because _____

Figure #1

Map of Study Site(s)

Results

Analyzing Data

- ☐ Write between 400 and 600 words
 - ☐ State the results
 - ☐ Perform analysis to address the research question
 - ☐ Show patterns and trends in the data using tables, figures, and graphs
- Our results show _____
 - The analysis we conducted addressed the research question because _____
 - As shown in our data table, _____ data was collected and _____ data points were entered into the GLOBE database. (See data table and graph)
 - A summary of our results shows _____
 - According to our data, _____ (this happened)

Figure #2

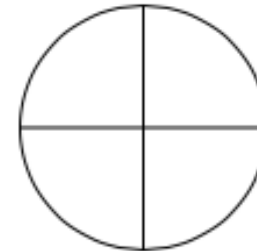
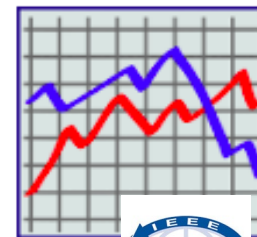


Figure #3



Discussion

Interpreting Data

- ☐ Illustrate the most important results
 - ☐ Discuss the what the results mean
 - ☐ Explain the importance, relevance, and impact of the research
 - ☐ Compare results with similar studies
 - ☐ Discuss how and why the results help answer the research question
 - ☐ Answer the research question
 - ☐ Support or refute the hypothesis
 - ☐ Interpret the uncertainties and limitations of the research process including possible sources of error
- The most important results are _____
 - The results mean that _____
 - The data are important to science and our community because _____
 - Comparing our results to similar studies by other researchers reveals _____
 - The results (do or do not) help answer the research question because _____
 - The results (do or do not) support our hypothesis because _____
 - We had problems collecting and recording data because _____
 - We had problems analyzing data because _____
 - Uncertainties and limitations in our research process means _____

Conclusions

Drawing Conclusions & Next Steps

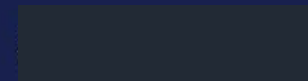
- ☐ State conclusions
 - ☐ Support conclusions with interpretations of the results
 - ☐ Explain how conclusions were reached
 - ☐ Discuss implications for future research including improvements in the methods and recommendations for follow-up research
- Our conclusion is (or is not) supported by the results because _____
 - Improvements in our research can be _____
 - We appreciated doing this research for GLOBE and NASA because _____

Bibliography

References

- Cite the GLOBE website and any other literature (Use our citation guide for help)
- List GLOBE protocols and NASA assets used
- Provide a list of references for your project





Student Research Projects





Let's Use Padlet:

How Do You See Using GLOBE
With Your Students?

go to:

<https://padlet.com/tostrom2/rkicqn0x1kwp6zwb>





Let's Reflect

What do you want to see more/less of
for tomorrow's webinar?

Where/How can we support you
tomorrow?

<https://padlet.com/tostrom2/rkicqn0x1kwp6zwb> (last column)






NEXT STEPS

1. Attend Webinar #2 tomorrow where we will discuss **hydrosphere** and **pedosphere** protocols,

2. Email Tracy (tostrom@berkeley.edu) screenshots of your protocol training assessments for atmosphere and biosphere

3. Email your t-shirt size to Ryan (rperroy@hawaii.edu)

4. Complete the sphere introductions and protocols for hydrosphere and pedosphere

 **GREEN UP-GREEN DOWN - Tree and Shrub Green-Up**

Learn how to select and define a Tree and Shrub Green-Up protocol study site and get a step by step introduction of the protocol. After completing this module, you'll know how to explain what phenology is to your students and why monitoring green-up is scientifically important to our understanding of the changing Earth system. You will know how to collect data in the field, upload data to the GLOBE database, and visualize data using GLOBE's Visualization Site.

[Download Module](#)

[Assessment Test](#)

Test completed 07/17/2020

CLOUDS

Learn how to select and define a GLOBE atmosphere Clouds protocol study site and get a step by step introduction of the protocol. After completing this module, you'll know how to explain what clouds are and how they form; explain why clouds are an important element of the Earth system; explain why cloud observations are important for understanding our changing Earth system; identify a Clouds study site and take observations of the sky; upload data to the GLOBE database; visualize data using GLOBE's Visualization Site and have ideas for questions you can address using cloud observations.

[Download Module](#)

[Assessment Test](#)

Test completed 03/05/2019



THANK YOU



Tracy Ostrom
tostrom@berkeley.edu

For more information visit www.globe.gov



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