THE GLOBE PROGRAM

GLOBE Virtual Training

Atmosphere & Biosphere

Tracy Ostrom, Garry Harris, Linda Hayden

July 17, 2020

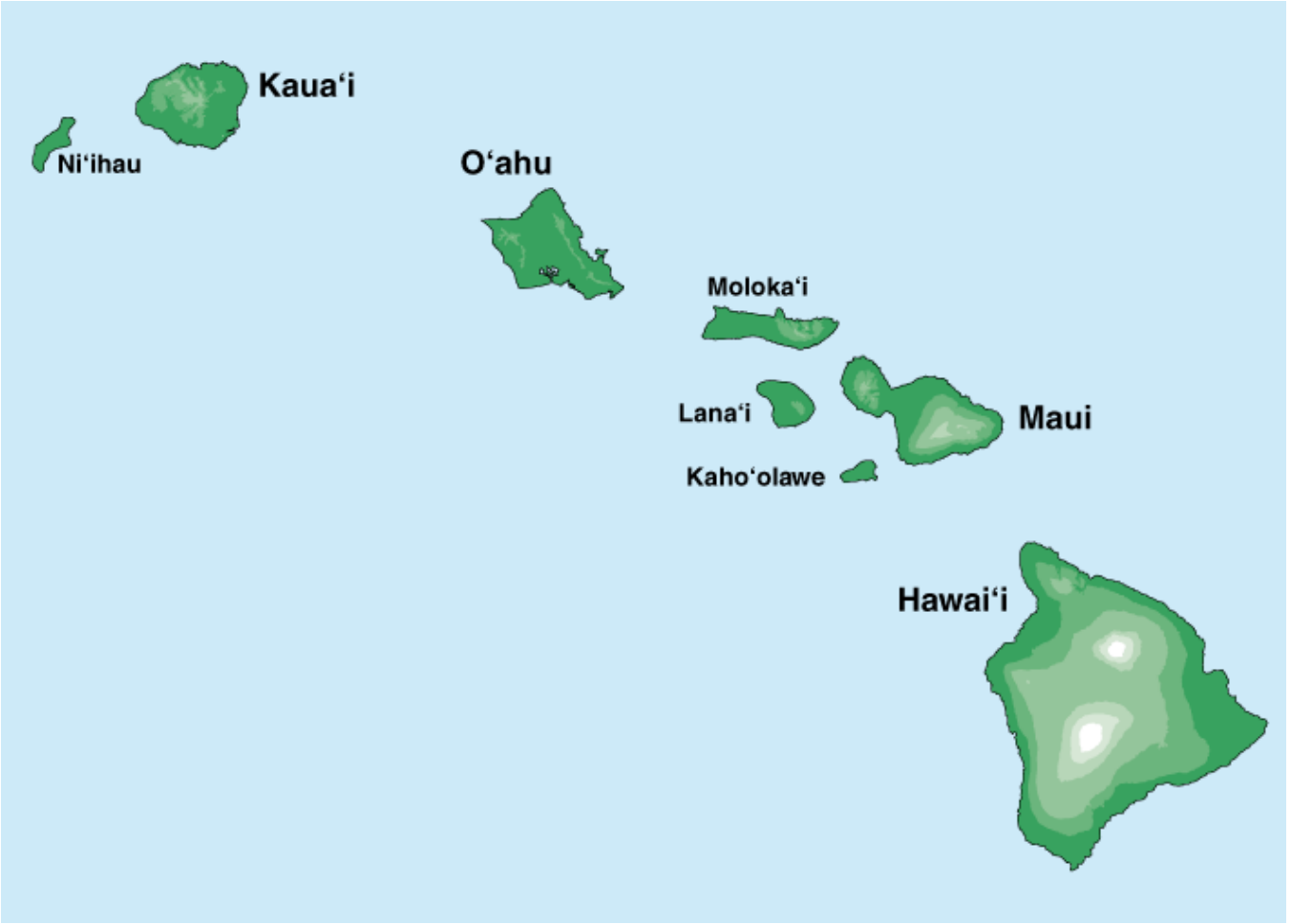
10 am – 12 pm

Sponsored by: NASA Supported by: NSF Implemented by: UCAR

Annotate – Where are You?

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 curser on the map where you are located and click; your stamp will appear at that spot



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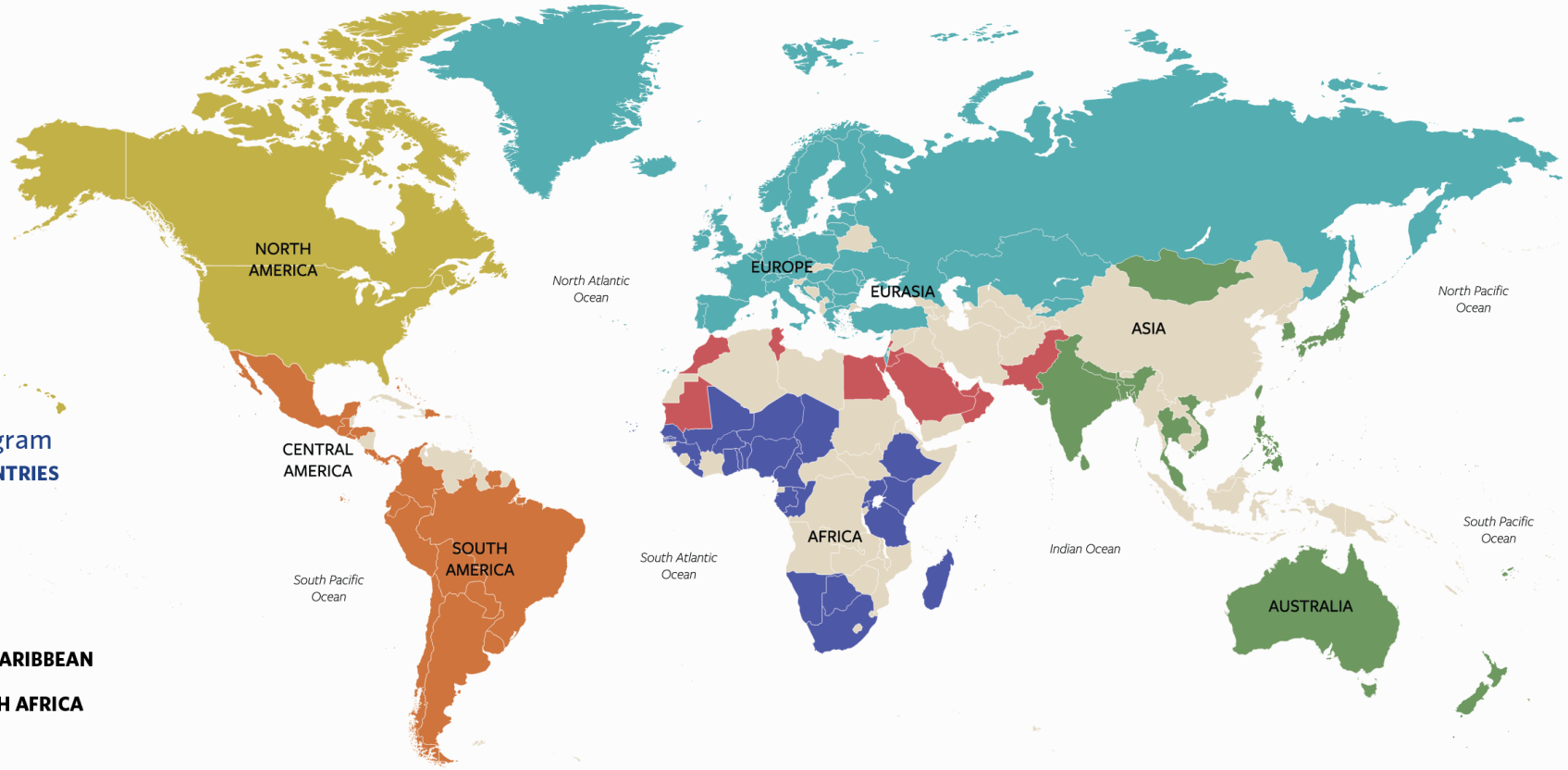


The **GLOBE** Program
PARTICIPATING COUNTRIES

- **AFRICA**
- **ASIA and PACIFIC**
- **EUROPE and EURASIA**
- **LATIN AMERICA and CARIBBEAN**
- **NEAR EAST and NORTH AFRICA**
- **NORTH AMERICA**

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:

a. Global and Latitude Observations to Benefit Everyone
b. Glad to Live On Beautiful Earth
c. Good Living Observations to Benefit Education
d. Global Learning and Observations to Benefit the Environment

What is GLOBE?

globe.gov

GLOBE Investigation Areas

Biosphere

The biosphere includes plant life and land cover.

Atmosphere

The atmosphere includes the air around the earth and weather.

Geosphere

The geosphere (pedosphere) includes rocks and soil.

Hydrosphere

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

Let's Review the Atmosphere Protocols

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

Enter Code **83 66 46**

I will put you into 2 breakout rooms.
Work as a team to 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

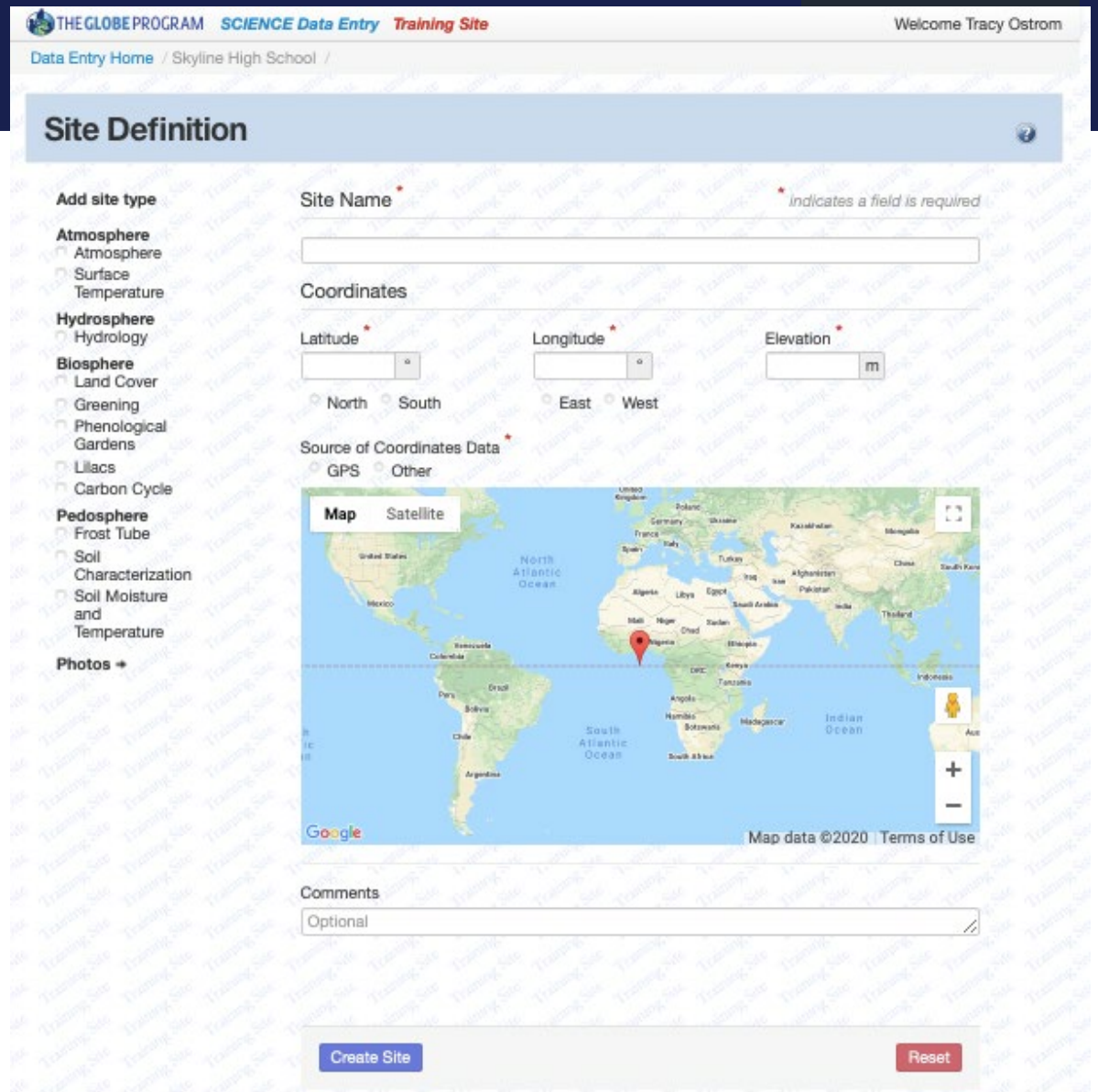
Data Entry

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 your school
   - Click Add site



GLOBE Observer

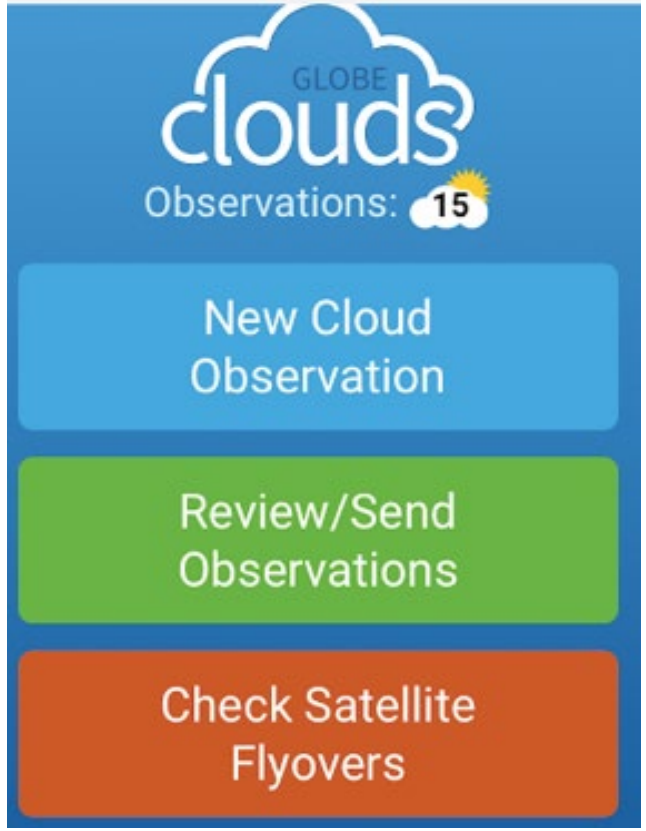
GLOBE Observer

- 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)

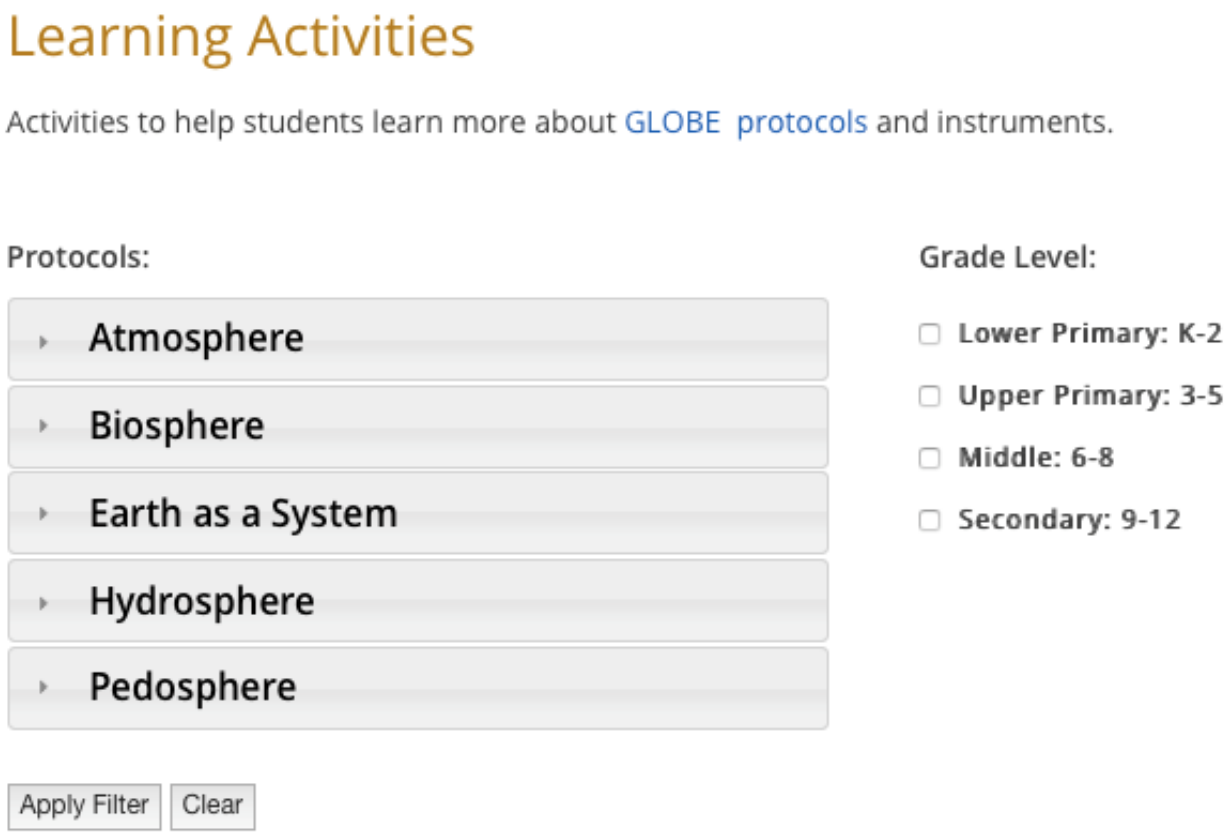


GLOBE Opportunities to Connect

GLOBE Opportunities

- 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…



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

I will put you into 2 breakout rooms.
Work as a team to answer each question.

Biosphere - Tips

- Tree Height
  - Make a clinometer activity
  - Join the campaign and share data with NASA
  - Compare different types of clinometer for the same object
- Green Up/Green Down
  - ok to use local plants/trees
  - Easily combined with atmosphere protocols

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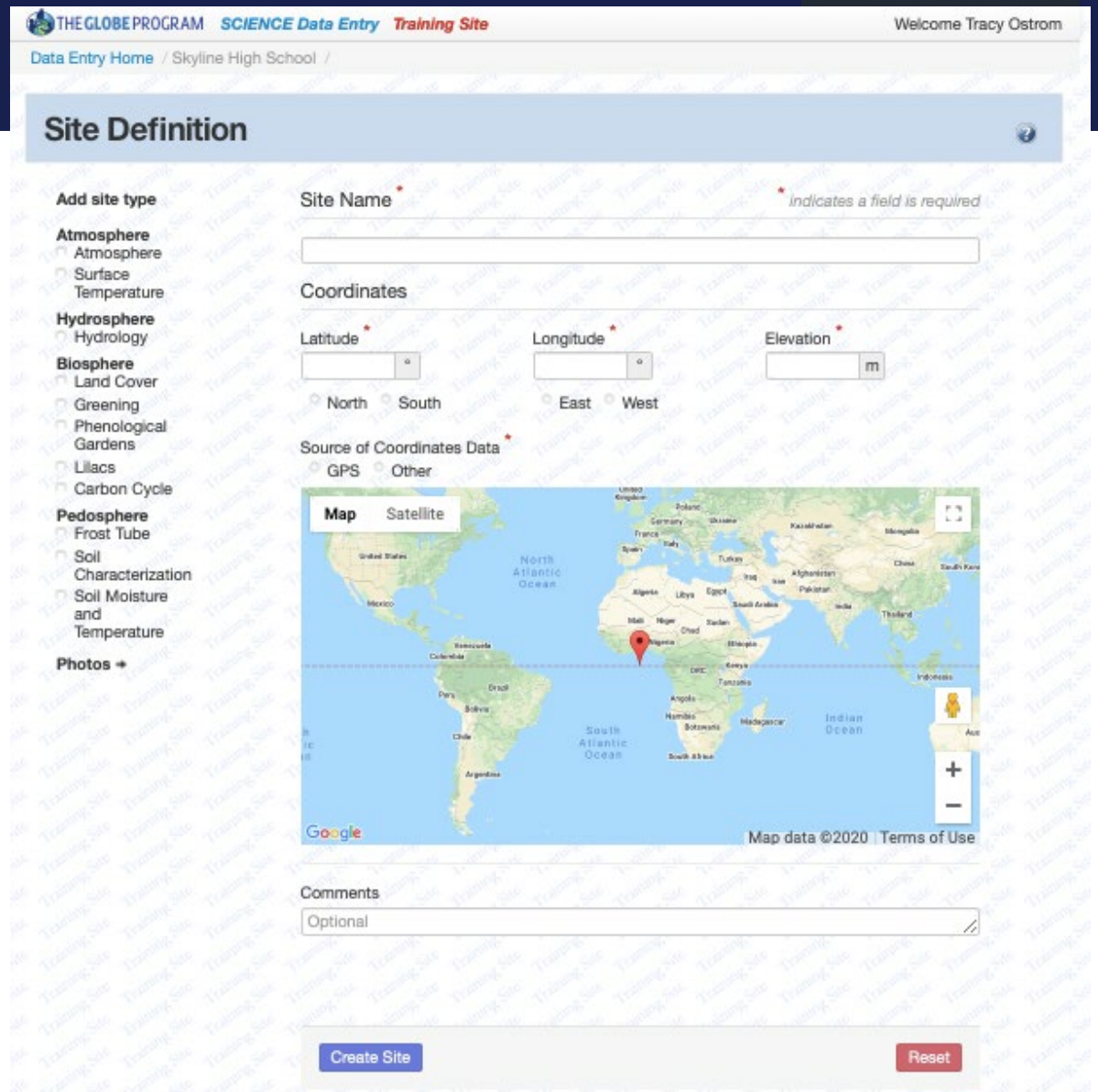

GLOBE Observer

GLOBE Observer

- Free Download
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- 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 (Colorado, New Mexico, Texas)
  - SRS Guide for teachers
  - Project Rubric
  - Template for poster presentations

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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.

Sponsored by: NASA Supported by: NSF

GLOBE Research Project Planning Gui

Modified from a document created by GLOBE Mission EARTH.

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:

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- ☐ 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.
    - **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 affect 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 PP*) and SRS reviewer feedback forms (*see below*).
  - Write about the following:

IEEE GRSS

Project Rubric

HS/MS GME 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.	emonstrates a moderate nderstanding of basic cientific concepts and ndamental principles overed in the GLOBE rotocol learning objectives	emonstrates a clear derstanding of basic scientifi ncepts and ndamentalprinciples covered e GLOBE protocol learning jectives.	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.	he question is stated nclearly and can only be artially scientifically tested	e question is stated explicitly h the appropriate focus and n be scientifically tested.	The question contributes to new thinking and is clearly stated and scientifically testable.	1, 2, 3, 4	
				A clear and complete		
			arly define the analysis AND Briefly mentions any certainties or limitations esent in the dataset.	(3) Is scientifically valid AND (4) Clearly discusses any uncertainties or limitations present in the dataset.		
Interpreting Data and Drawing Conclusions	A conclusion is present and relevant to the report. AND Some discussion of the limitations of the methods used is presented.	conclusion is present and upported by the data. AND partial discussion of the mitations of the methods sed is presented.	conclusion is present, pported by the data that Gives a partial explanation w the conclusion was ached. AND Describes how the data pport the conclusion AND Presents a clear and mplete discussion of the itations of the methods used	A thoughtful conclusion is present, supported by the data that (1) Gives a thorough and insightful explanation as to how 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.	ommunicates with) partial use of presentati kills, including body postur nguage, eye contact, voic nd timing AND) Uses language that is a mes unsuited to the topic nd audience AND) Responses to the uestions are limited and emonstrate a partial ommand of the facts or nderstanding of the topic.	mmunicates with a command of presentation lls, including body posture, nguage, eye contact, voice a ning AND Uses appropriate language at is suited to the topic and dience AND Responses relate to the estions and demonstrate an equate command of the facts d 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 precise and persuasive, demonstrating an in-depth understanding of the facts a topic.	1, 2, 3, 4	
Total						

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 fundamentalprinciples 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

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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 conclu
- *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 _____*

Concise Title of Less Than 15 Words That Summarizes the Study

School Logo

Team Members

School Name

THE GLOBE PROGRAM

Global Learning and Observations to Benefit the Environment

Abstract

- ❑ Write less than 200 words
- ❑ Describe the research context and objectives
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- *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

Describes the planning process

- ❑ 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

Describes what actually happened

- ❑ Write between 300 and 500 words
- ❑ Identify the GLOBE protocols, data, and NASA assets actually used
- ❑ Describe 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 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 questions 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. (To data table and graph)*
- *A summary of our results shows _____*
- *According to our data, _____(this happened)*

Figure #2

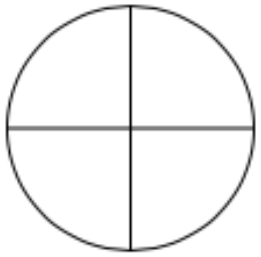
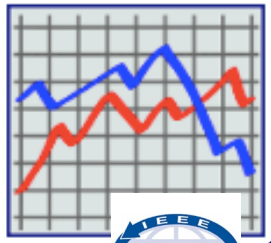


Figure #3



Discussion

Interpreting Data

- ❑ Restate 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 to our research can be _____*
- *We appreciated doing this research for GLOBE and NASA because _____*

Bibliography

References

- Cite the GLOBE website and any other literature

(See ... List C... ...ah and NA... ...sets used)

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MISSION EARTH

IEEE GRSS

IEEE

Student Research Projects

Let's Chat:

How Do You See Using GLOBE

With Your Students?

THANK YOU

Tracy Ostrom
tostrom@berkeley.edu

For more information visit www.globe.gov