

GLOBE Mission EARTH

“GLOBE IN 10” Mini-tutorial :

Locate a GLOBE Atmosphere Study Site using Google Earth & Set it Up in GLOBE

— *By Sara Mierzwik*

In this training, you will learn how to:

- Locate a GLOBE Atmosphere Study Site on your school grounds using Google Earth
- Collect the data needed to set it up on GLOBE

The University of Toledo campus is provided as an example. Use these techniques for your own school grounds to locate GLOBE study sites.

But first, a few quick notes



Your School = Your Organization

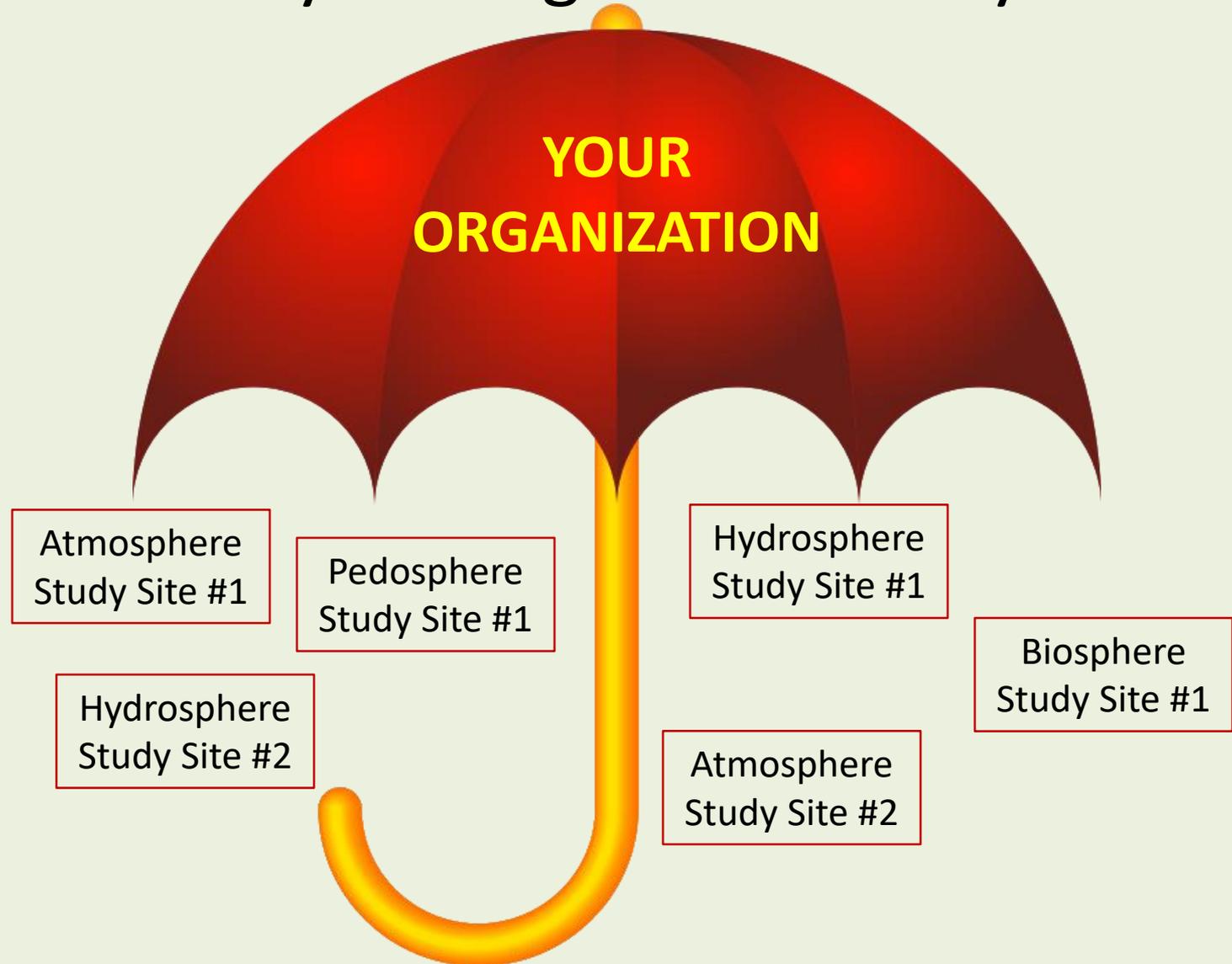
Click on **My Page** to see your GLOBE Member Location and other info

The screenshot shows the GLOBE Program website interface. At the top, there's a navigation bar with 'Edit Controls' on the left and 'Manage', 'Go to', and a notification badge '61' on the right. The user's name 'Sara Mierzwiak' is displayed with a dropdown menu containing 'My Page', 'My Account', and 'Sign Out'. The main header features the GLOBE logo and 'THE GLOBE PROGRAM' with the tagline 'A Worldwide Science and Education Program'. Below this is a navigation menu with links like 'About', 'Join', 'Get Trained', 'Do GLOBE', 'GLOBE Data', 'Community', 'News & Events', and 'Support'. The main content area shows the user's profile page: 'Home > Community > Sara Mierzwiak > Profile'. The profile includes a photo of Sara Mierzwiak, her name, and a 'Change' link. Her account status is 'GLOBE Member', training status is 'Trained', and user type includes 'Master Trainer', 'Teacher', and 'Trainer'. A bio describes her as a PhD student in Education at the University of Toledo in Ohio, working as a Graduate Research Assistant for Dr. Kevin Czajkowski. It mentions her master's degrees in Geology and Geography, teaching experience at the community college level, and her role as a Hydrogeologist/Project Manager for a consulting company. A bio update timestamp shows 'Edit Date Modified: 03/30/2016'. To the right, there's a 'GLOBE Member Recognition' badge for 2015, indicating '1 YEAR' and '2015'. Below the bio is a 'Student Accounts' section listing 'Michigan Institute of Aviation Technology (MIAT)' with a 'new account' link and 'TrainTheTrainerSchool - Tennessee'. A 'Member Location' section shows 'Michigan Institute of Aviation Technol' and a map interface with 'Map' and 'Satellite' options.

If you need to change your member location/school, contact the GLOBE Community Help Team at <https://www.globe.gov/support/contact>.



You can add as many Study Sites under the umbrella of your Organization as you'd like!



Beginning with geospatial technologies

Using geospatial technologies such as Google Earth is a great way to get students to start thinking spatially, and to get everyone oriented about their school grounds before heading outside.

If Google Earth is not available at your school, try:

- Google Maps (www.maps.google.com),
- Bing Maps* (www.bing.com/maps),
- Other mapping websites, or
- ArcGIS Online (www.arcgis.com).

*Hint: If you use Bing Maps, try using “Bird’s Eye View” for more detailed aerial imagery of your school grounds, and try rotating around, viewing from each direction.



Locate GLOBE Study Sites using Google Earth

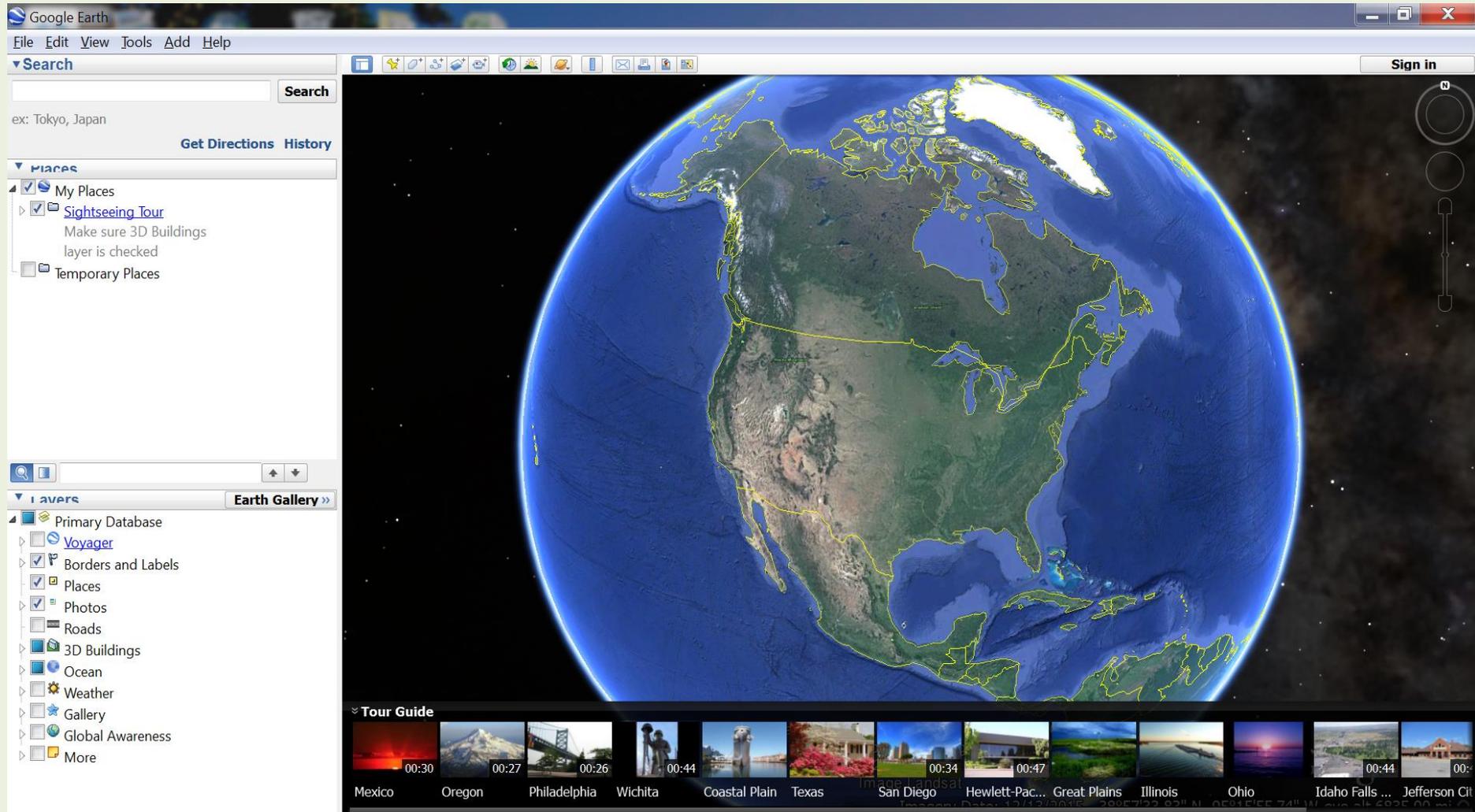
STEPS (summarized)

1. Open Google Earth. If you need to download it, go to:
<https://www.google.com/earth/>
2. Zoom in to your school and then a potential GLOBE study site.
3. Use the **Add** tool to establish a **Placemark**, then give it a name.
4. Right click on that **Placemark** and select **Properties**. Record the **latitude and longitude** of the approximate center of the site.
5. Use the **Ruler** tool to record the size of the site (in meters).
6. Record all of this information in your notebook.
7. Use this information to fill out the GLOBE Site Definition sheet:
<http://www.globe.gov/documents/348614/8c79fb1e-7c89-49c9-ba29-4a1ca05c5191>.

These steps are shown in detail in the following slides.



Start Google Earth



Zoom into the University of Toledo, Ohio

Google Earth

File Edit View Tools Add Help

Search

Search

ex: Tokyo, Japan

Get Directions History

PLACES

- My Places
 - Sightseeing Tour
 - Make sure 3D Buildings layer is checked
 - Temporary Places
 - Glass Bowl Stadium.kmz

Layers

Earth Gallery

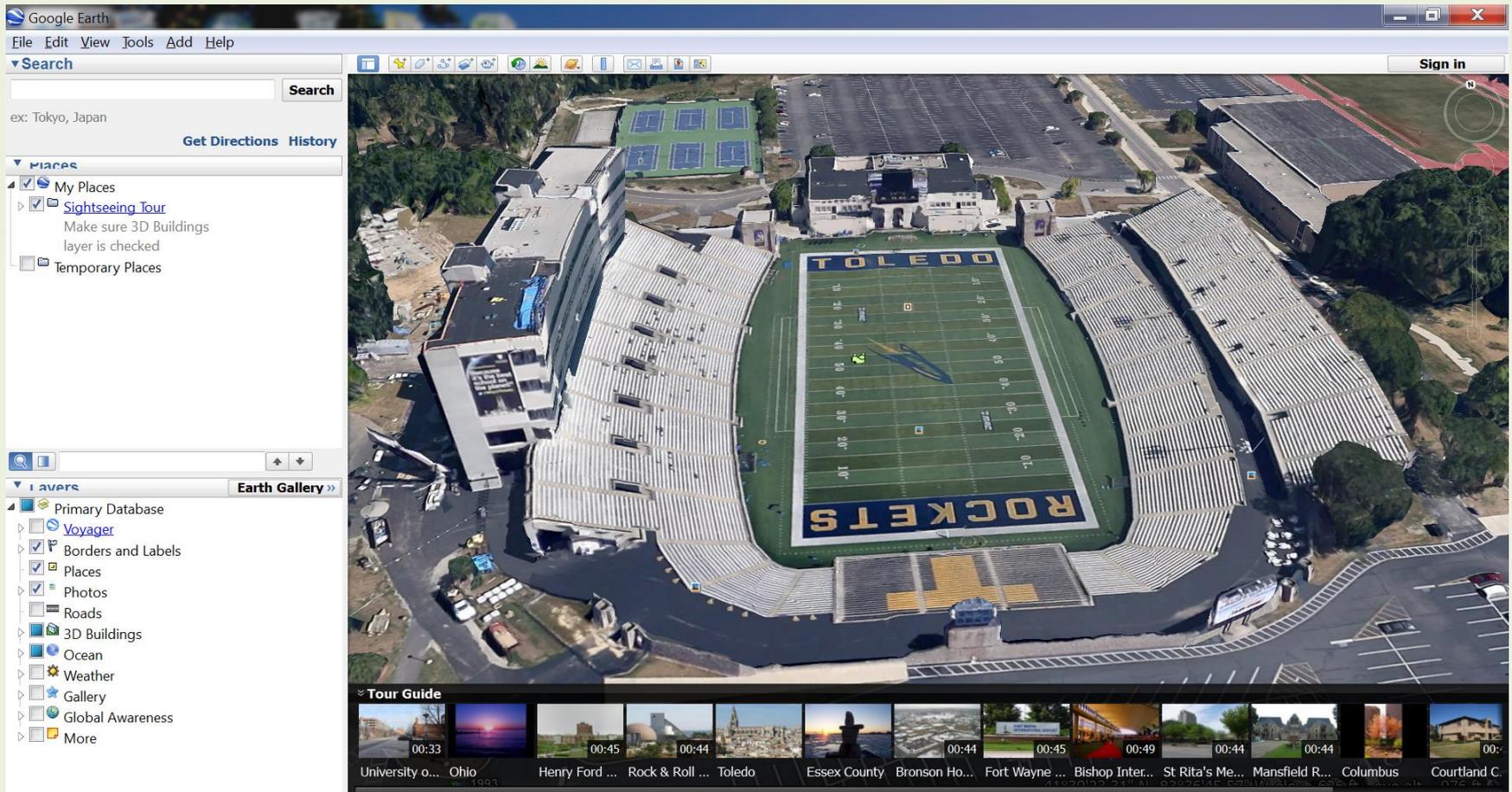
- Primary Database
 - Voyager
 - Borders and Labels
 - Places
 - Photos
 - Roads
 - 3D Buildings
 - Ocean
 - Weather
 - Gallery
 - Global Awareness
 - More

Tour Guide

	00:33		00:45	00:44		00:44	00:45	00:49	00:44	00:44		
The Univers...	University o...	Ohio	Henry Ford ...	Rock & Roll ...	Toledo	Essex County	Bronson Ho...	Fort Wayne ...	Bishop Inter...	St Rita's Me...	Mansfield R...	Columbus



Zoom into the Glass Bowl Stadium.



Discuss with students:

- What types of open, homogenous spaces do you see on campus?
 - Ex. grassy areas, parking lots, forested areas, etc.
- Zoom in and out around campus to inspect different areas.
- What are the best potential locations to establish GLOBE study sites?

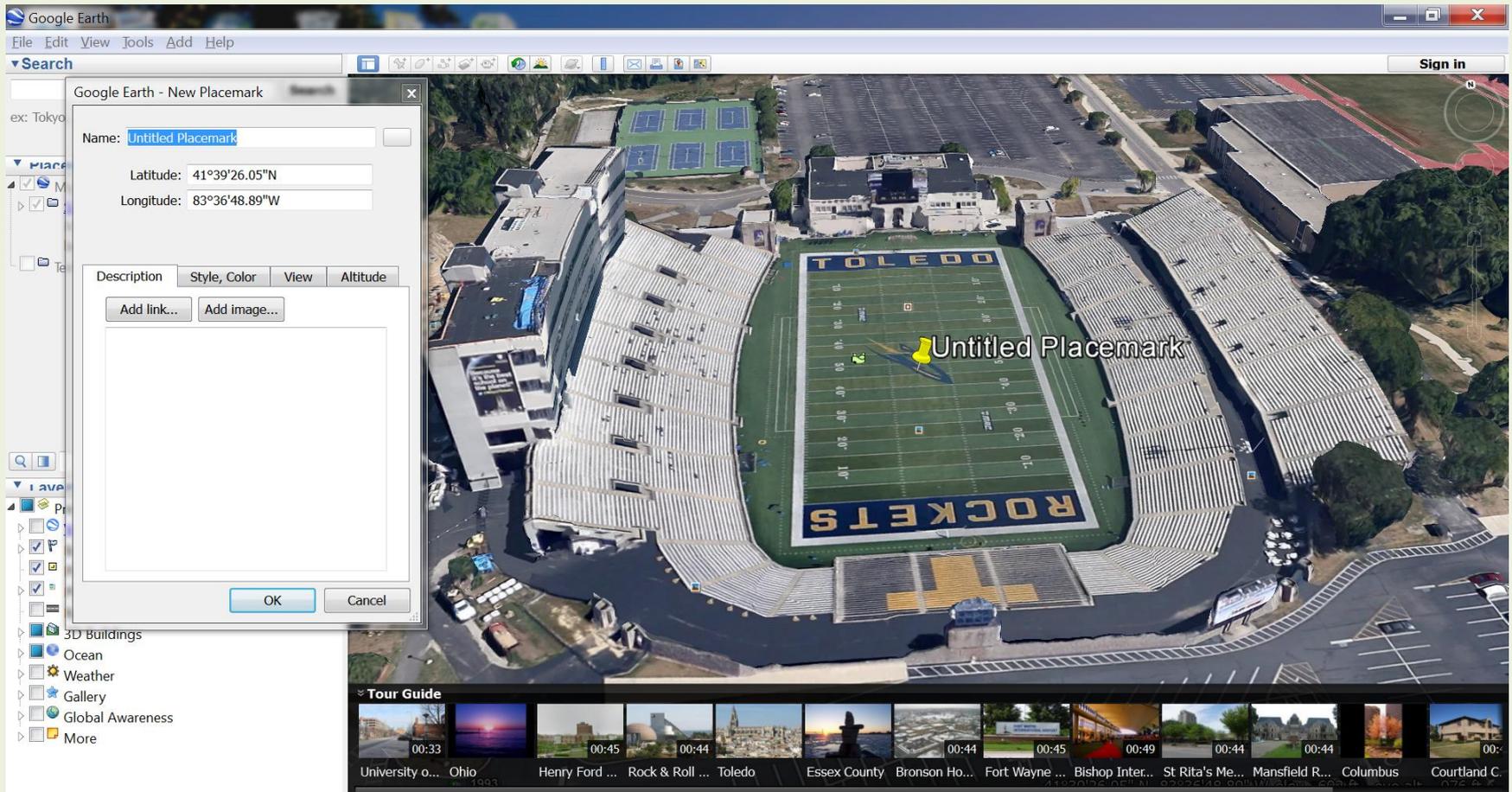


Choose your site(s):

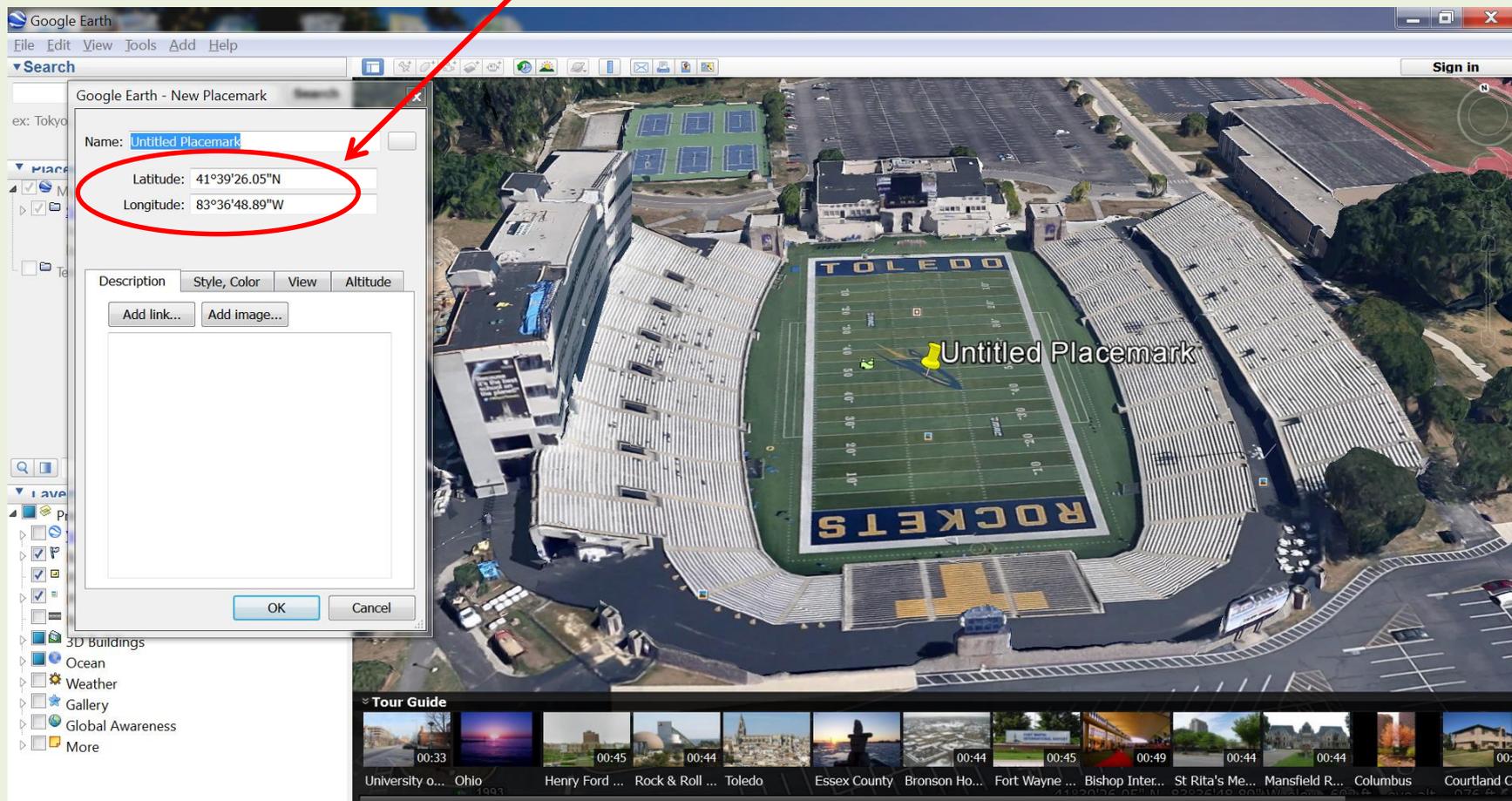
- For an Atmosphere Study Site, choose a large, open, homogenous area.
 - Ex. a grassy field
 - Ex. an asphalt parking lot
- It's best (but not required) that the area is at least 30m by 30m.
- 90m by 90m is ideal for a Surface Temperature site.
- Plan to place your rain gauge and instrument shelter in the middle of a large, grassy field (if possible).



Use the toolbar at the top to **Add a Placemark**, then give it a name.



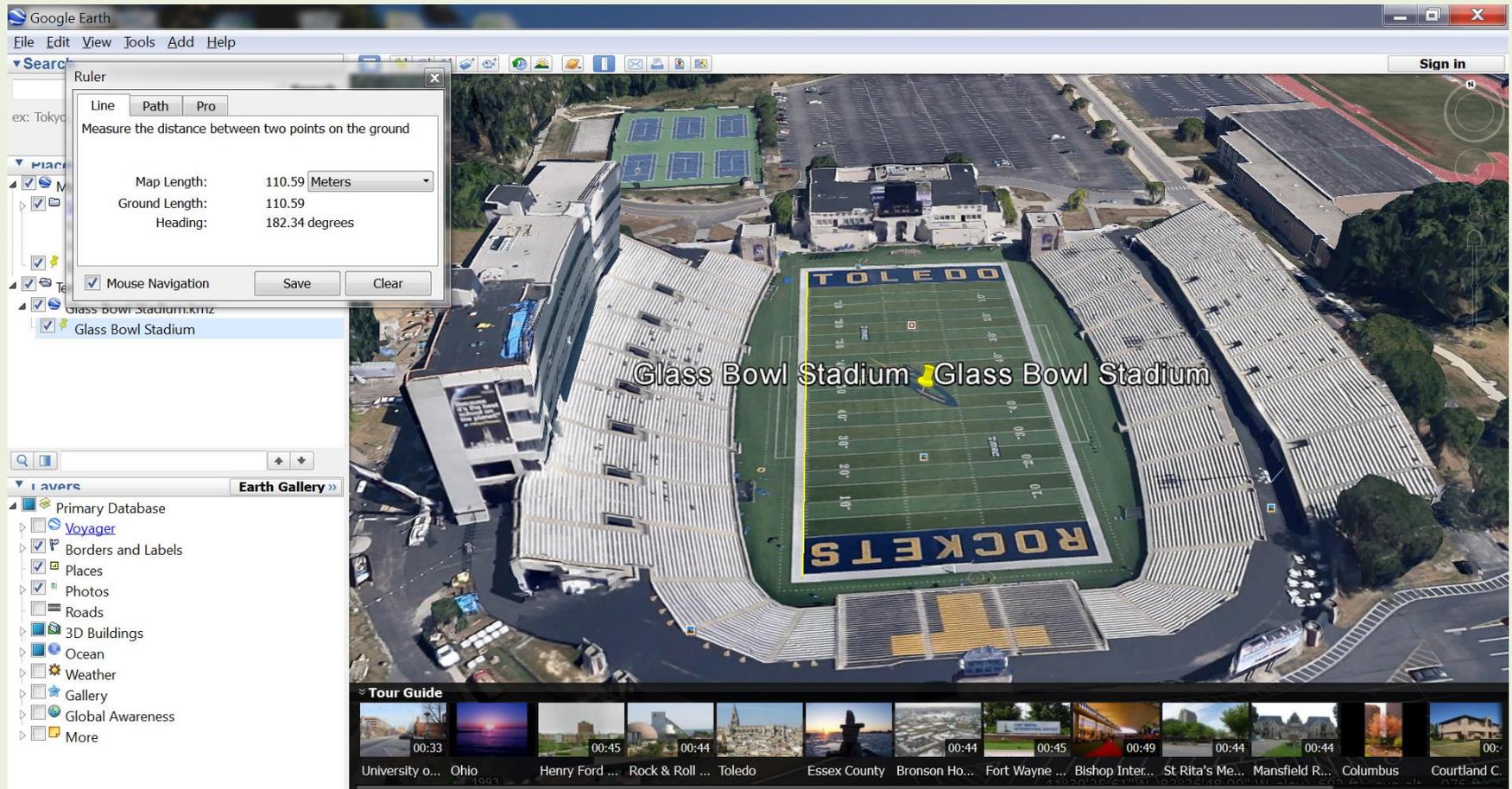
Right click on your Placemark, and select **Properties** to view the **latitude and longitude** of this location.



Record the latitude and longitude for this site in your notebook.



Now, select the **Ruler** option from the toolbar and measure the size of the field in **meters**.



Hint: click once to start the measurement and double click to end it.
Write these measurements down in your notebook.



Enter the Information on the GLOBE Site Definition Sheet

<http://www.globe.gov/documents/348614/8c79fb1e-7c89-49c9-ba29-4a1ca05c5191>

Site Definition Sheet * Required Field

School Name: _____ Site Name: _____
Choose a unique name based on location, e.g. "Grassy area - Front of School"

Names of students completing Site Definition Sheet: _____

Date: Year _____ Month _____ Day _____ Check one: New Site Metadata Update

*Coordinates: Latitude: _____ ° N or S Longitude: _____ ° E or W
Elevation: _____ meters

*Source of Location Data (check one): GPS Other _____

Comments: _____

Site Type (select all that apply based on intended measurements, then complete the necessary fields below): Atmosphere Surface Temperature Hydrology Land Cover
 Greening Soil Characteristics Soil Moisture and Temperature

Fill out one Site Definition Sheet for each GLOBE Study Site you establish.



Site Definition Sheet

* Required Field

School Name: _____ Site Name: _____

Choose a unique name based on location, e.g. "Grassy area - Front of School"

Names of students completing Site Definition Sheet: _____

Date: Year ____ Month ____ Day ____ Check one: New Site Metadata Update

*Coordinates: Latitude: _____ ° N or S Longitude: _____ ° E or W
Elevation: ____ meters

*Source of Location Data (check one): GPS Other _____

Comments: _____

Site Type (select all that apply based on intended measurements, then complete the necessary fields below): Atmosphere Surface Temperature Hydrology Land Cover Greening Soil Characteristics Soil Moisture and Temperature

Atmosphere

List any obstacles (Check one): No obstacles Obstacles (describe below)
(Obstacles are trees, buildings, etc. that appear above 14° elevation when viewed from the site)

Description: _____

Buildings within 10 meters of instrument shelter (Check one):

No buildings Buildings (describe below)

Description: _____

Other Site Data:

Steepest Slope: _____ Compass Angle (facing up slope): _____

Rain Gauge Height cm Ozone Clip Height cm Thermometer Height cm

*Thermometer Type (Check one):

- Other, Soil or Air
 - Liquid-filled Maxi/Min (U-tube)
 - Liquid-filled, Current Temperature Only
 - Digital Single-Day Min/Max
 - Digital Multi-Day Min/Max
 - Reset Digital Multi-Day Min/Max Thermometer
- Note: reset is required before data collection and entry, when batteries are changed or every 6 months

Date: Year ____ Month ____ Day ____ Universal Time (hour:min): _____

Was this reset due to a battery change? Yes No

- AWS WeatherBug Station (Automated Station ID _____)
- Davis Instrument (Davis Thermometer Type _____)
- Data Logger (HOBO)
- Rainwise
- WeatherHawk
- No Thermometer

Site Definition Sheet - Page 2

* Required Field

School Name: _____ Study Site: _____ Date: _____

Surface Cover Description under instrument shelter (Check one): Pavement
 Bare ground Short grass (< 10 cm) Long grass (> 10 cm) Sand
 Roof (describe below) Other (describe below)

Description: _____

Overall comments on the site (metadata): _____

Surface Temperature

Homogeneous site size (Select one): 90m x 90m 30m x 30m
 Smaller than 30 x 30m (specify size: ____ m x ____ m)

Cover type (Select one): Short grass (< 0.5m) Tall grass (> 0.5m) Barren land
 Shrubs Dwarf shrubs Concrete Asphalt Open water Other
 Land Cover site

Type of IRT Instrument: Raytech ST20 Other (specify instrument manufacturer and model) _____

Overall comments on the site (metadata): _____

Hydrology

Name of Body of Water: _____ (the name commonly used on maps; if the body of water does not have a common name, provide a description of the water body it comes from or flows into or both.)

***Water Body Type** (Select one): Unknown Saltwater Freshwater Brackish

Water Body Source (Select one):

- Pond (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Lake (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Reservoir (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Bay (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Ditch (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Ocean
- Estuary (Area of standing water ____ km²; Average Depth of Standing Water ____ m)
- Stream (Width of Moving water ____ m)
- River (Width of Moving water ____ m)
- Other (Width of Moving water ____ m; Area of standing water ____ km²; Average Depth of Standing Water ____ m)

Pages 1 & 2 of the Site Definition Sheet (6 pages total). Note that each "sphere" is separated by a bold horizontal line.

Now go outside!

Collect Remaining Site Data

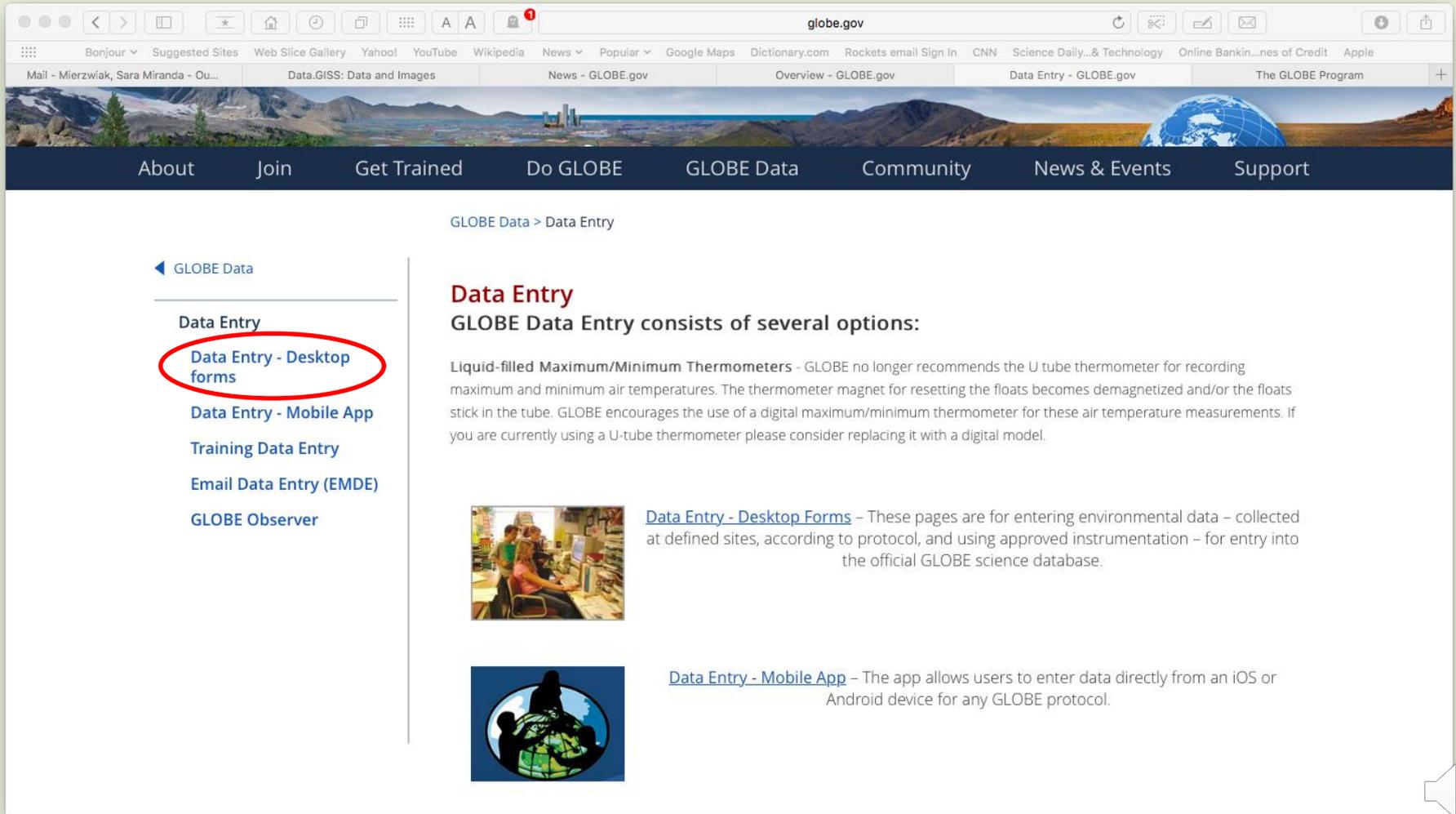
Now take your students outside to the study site(s) and collect the remaining data needed for site setup as shown in the [Site Definition Sheet](#).

Note: you could also have your students check the measurements from Google Earth (length and width of area, latitude/longitude of the center) against what they record directly the field. *Classroom discussion questions:*
“Are they the same? How much error? Why?”



Now Set up Your Study Site(s) in GLOBE

Once you've collected all of the information you need and filled out a [Site Definition Sheet](#), log into your GLOBE account and create each site. From the GLOBE homepage, select GLOBE Data → Data Entry. Choose “**Data Entry – Desktop forms**”.



The screenshot shows the GLOBE.gov website interface. The browser address bar displays "globe.gov". The navigation menu includes "About", "Join", "Get Trained", "Do GLOBE", "GLOBE Data", "Community", "News & Events", and "Support". The "GLOBE Data" section is active, showing a breadcrumb trail "GLOBE Data > Data Entry". A sidebar on the left lists "Data Entry" options, with "Data Entry - Desktop forms" circled in red. The main content area features a heading "Data Entry" and a sub-heading "GLOBE Data Entry consists of several options:". Below this, there are three sections: "Liquid-filled Maximum/Minimum Thermometers" with a paragraph of text, "Data Entry - Desktop Forms" with a photograph of people at a computer workstation and a paragraph of text, and "Data Entry - Mobile App" with a silhouette of a person using a mobile device and a paragraph of text.

GLOBE Data > Data Entry

Data Entry
GLOBE Data Entry consists of several options:

Liquid-filled Maximum/Minimum Thermometers - GLOBE no longer recommends the U tube thermometer for recording maximum and minimum air temperatures. The thermometer magnet for resetting the floats becomes demagnetized and/or the floats stick in the tube. GLOBE encourages the use of a digital maximum/minimum thermometer for these air temperature measurements. If you are currently using a U-tube thermometer please consider replacing it with a digital model.

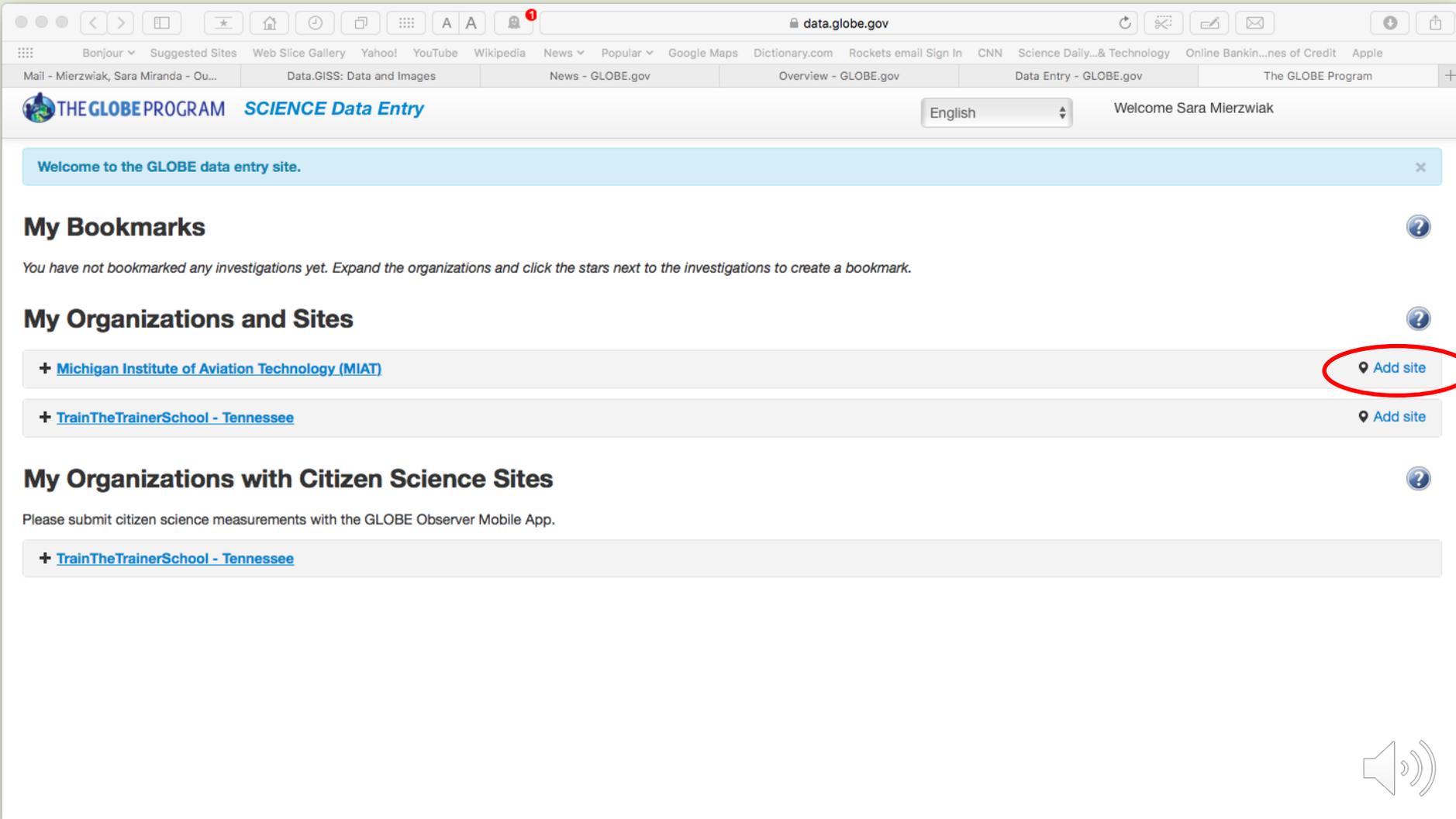
Data Entry - Desktop Forms – These pages are for entering environmental data – collected at defined sites, according to protocol, and using approved instrumentation – for entry into the official GLOBE science database.

Data Entry - Mobile App – The app allows users to enter data directly from an iOS or Android device for any GLOBE protocol.



Your Organizations and Sites

To add a new Study Site to your Organization, choose “Add Site”.



The screenshot shows a web browser window with the URL `data.globe.gov`. The page header includes the GLOBE PROGRAM logo, the text "SCIENCE Data Entry", a language dropdown set to "English", and a welcome message "Welcome Sara Mierzwik". A blue notification bar at the top says "Welcome to the GLOBE data entry site." Below this, there are three main sections:

- My Bookmarks**: A section with a question mark icon and the text "You have not bookmarked any investigations yet. Expand the organizations and click the stars next to the investigations to create a bookmark."
- My Organizations and Sites**: A section with a question mark icon and a list of organizations. The first organization is "Michigan Institute of Aviation Technology (MIAT)" with a plus sign icon on the left and an "Add site" button with a location pin icon on the right. The second organization is "TrainTheTrainerSchool - Tennessee" with a plus sign icon on the left and an "Add site" button with a location pin icon on the right. The "Add site" button for MIAT is circled in red.
- My Organizations with Citizen Science Sites**: A section with a question mark icon and the text "Please submit citizen science measurements with the GLOBE Observer Mobile App." Below this is a list with one organization: "TrainTheTrainerSchool - Tennessee" with a plus sign icon on the left.

In the bottom right corner of the browser window, there is a speaker icon indicating audio content.

Master List of GLOBE Protocols - Page 24 of the Implementation Guide Appendix

https://www.globe.gov/documents/10157/2660220/implementation_guide-appendix.pdf

Investigation Area	Recommended Measurement Frequency Range						
	Daily	Weekly	Monthly	Seasonally	Semi-Annually	Annually	Once per site
Atmosphere							
GPS Measurement Protocol							X
Instrument Construction, Site Selection and Setup							X
Cloud Protocols	X						
Aerosol Protocol	X						
Water Vapor Protocol	X						
Barometric Pressure Protocol	X						
Relative Humidity Protocol	X						
Precipitation Protocols (based on local precipitation)	X	X	X	X			
Maximum, Minimum, and Current Temperature Protocol	X						
Digital Multi-Day Maximum/Minimum Soil and Air Temperatures Protocol	X	X					
Automated Soil and Air Temperature Monitoring Protocol		X	X				
Surface Temperature Protocol	X						
Surface Ozone Protocol	X						
AWS WeatherBug Protocol			X				X
Automated Weather Station Protocols		X					



For More Information, See:

Selecting Your GLOBE Study Sites –

Page 21 of the Implementation Guide Appendix

https://www.globe.gov/documents/10157/2660220/implementation_guide-appendix.pdf

Selecting Your GLOBE Study Sites

Initial Considerations

The selection of the local study and sample sites can be an opportunity to begin an inventory of the area around the school, and to discuss criteria for measurement sites. What is a good place to measure water temperature, and why? What do you have to consider when planning where to dig a soil profile? Where can you get representative samples of soil moisture, and what might influence the choice of sampling strategy? How can Landsat imagery help with these decisions? These are only a few of the multiple questions that can serve as catalysts for learning.

For each measurement site within your GLOBE Study Site there will be hard choices to make because no one will have a perfect set of locations. This is an opportunity to work on solving problems with your students in order to come up with the best arrangement for your class, your school, and your schedule.

Atmosphere, Biosphere, Hydrosphere, and Soil Moisture as detailed below. Once established, these study sites are locations to which students will return again and again to take measurements. The *Land Cover* and *Soil Characterization* Protocols involve measurements which are done only once at specific locations which are referred to as sample sites.

Study Site for Atmosphere

Study sites are defined generally and have various protocols associated with them. Typically, you and your students will conduct most of the atmosphere protocols at a site in close proximity to your school, so that students will have easy daily access to the instruments. These protocols may include temperature, precipitation, cloud type and cloud cover, aerosols, or surface ozone. Several siting considerations for these protocols are detailed below.

1. Measurements of cloud cover and cloud type require an unobstructed view of the sky. The middle of a sports field or parking lot is an excellent

Home

Introduction

Protocols



Thank you!

For more information...

Connect with GLOBE Mission EARTH!

- Website: <https://www.globe.gov/web/mission-earth>
- Email: globe.mission.earth@gmail.com
- Facebook: www.facebook.com/globemissionearth
- Twitter: [@globemissionear](https://twitter.com/globemissionear)
- YouTube: <http://tinyurl.com/globemissionearth>

