GLOBE Mission EARTH

"GLOBE IN 10" Mini-tutorial :

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

– *By Sara Mierzwiak*

In this training, you will learn how to:

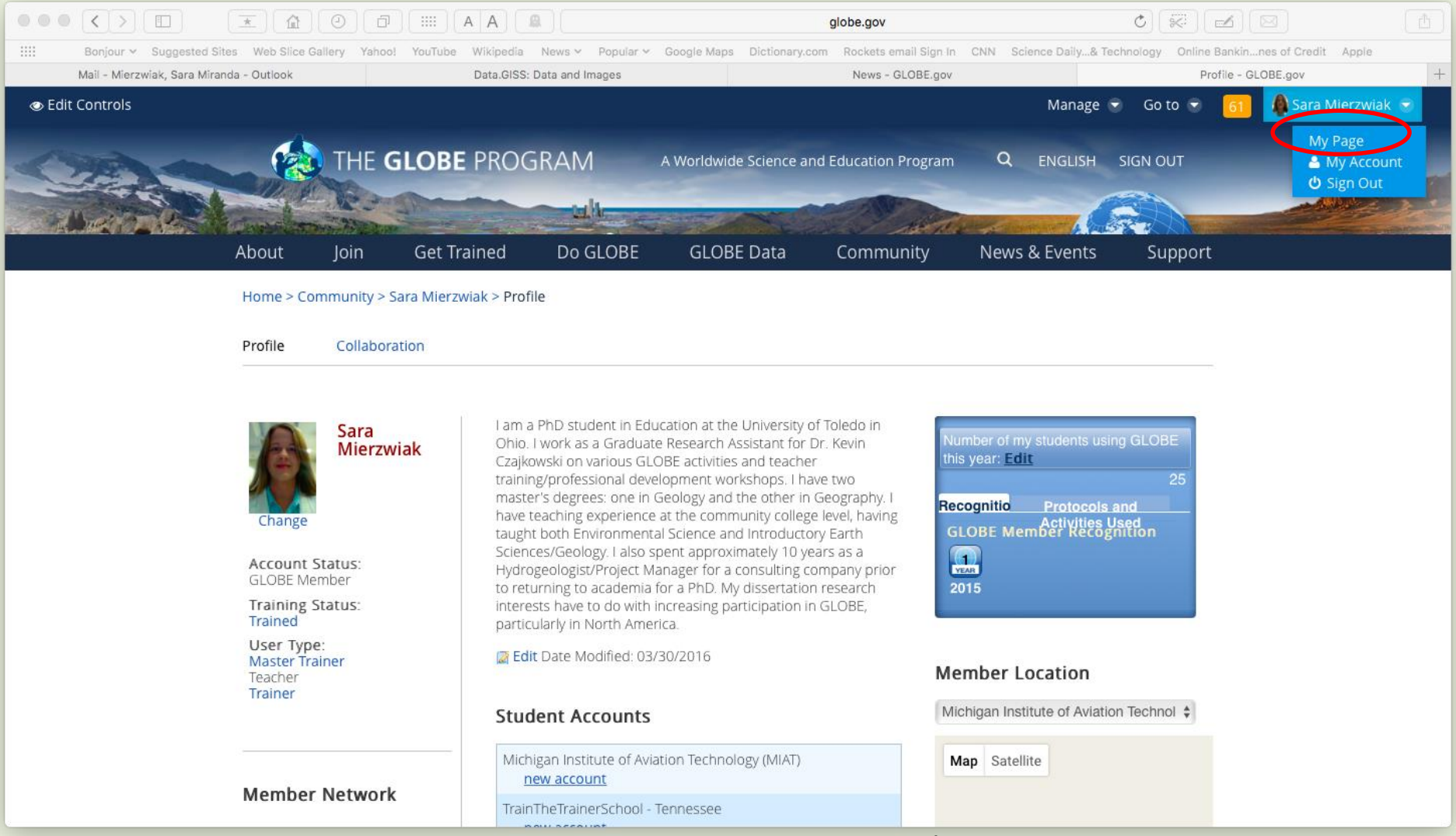
- Locate a GLOBE Atmosphere Study Site on your school grounds using Google Earth
- Collect the data needed to set it up on GLOBE

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 ….

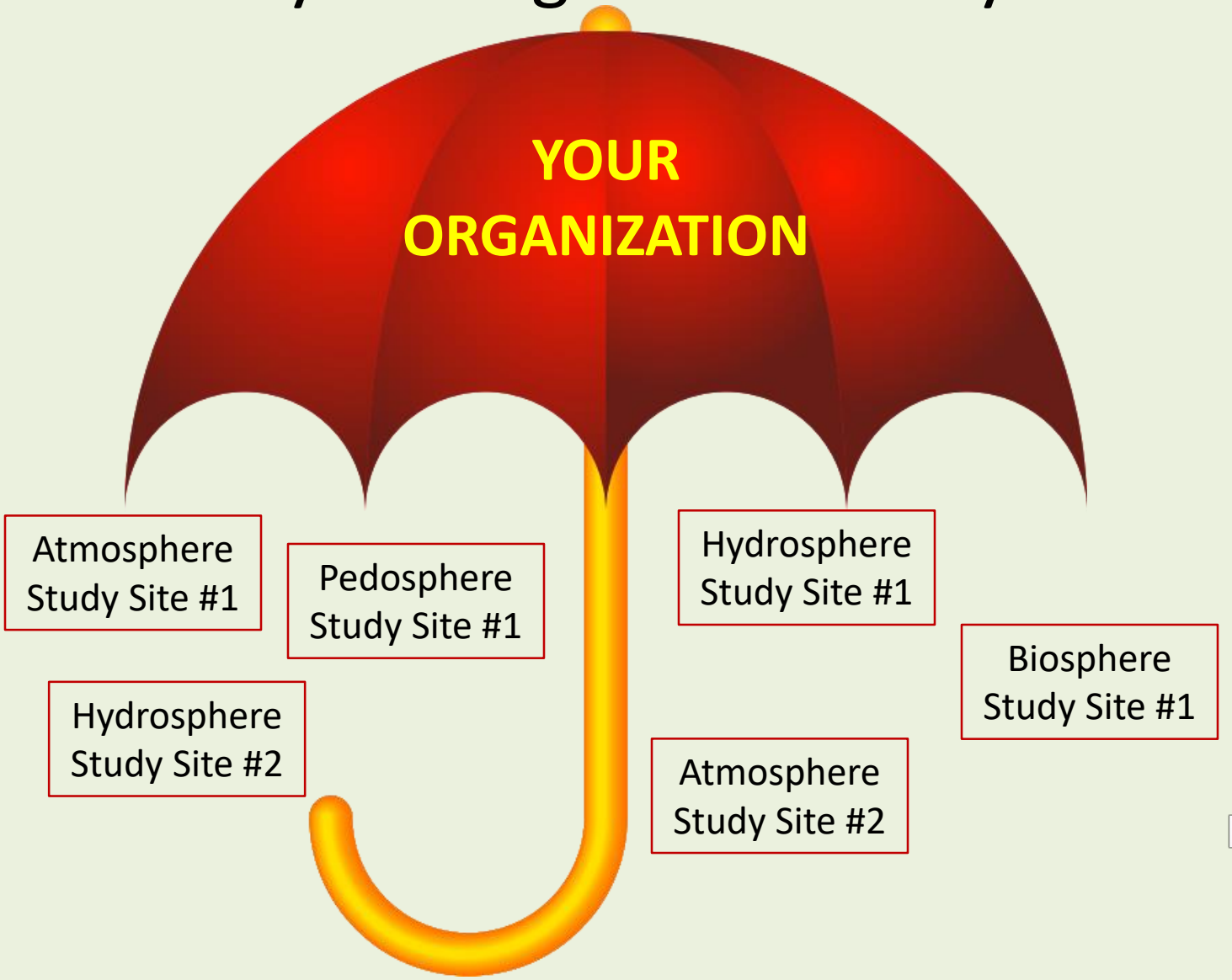
Your School = Your Organization

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



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.

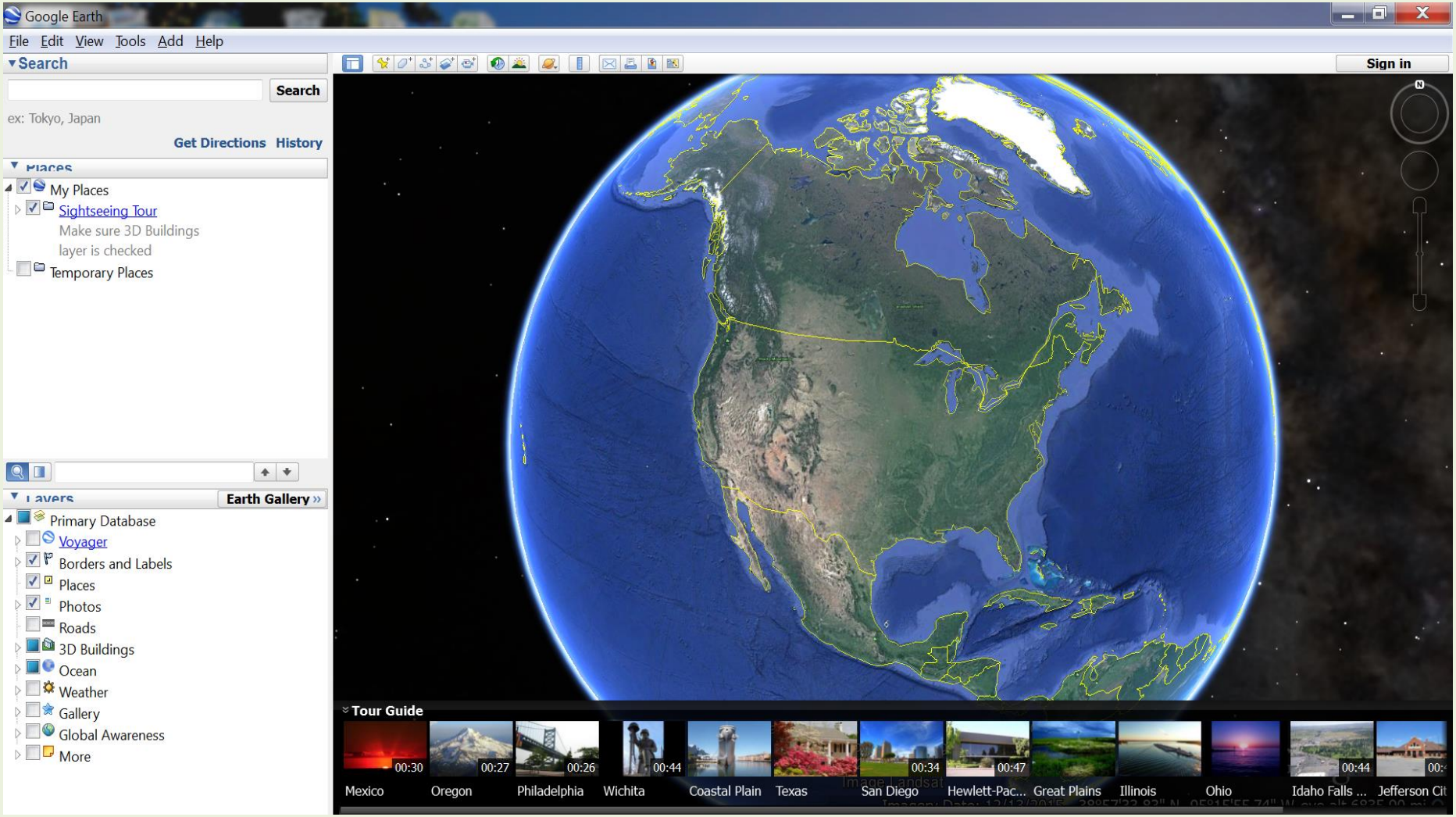
Locate GLOBE Study Sites using Google Earth

STEPS (summarized)

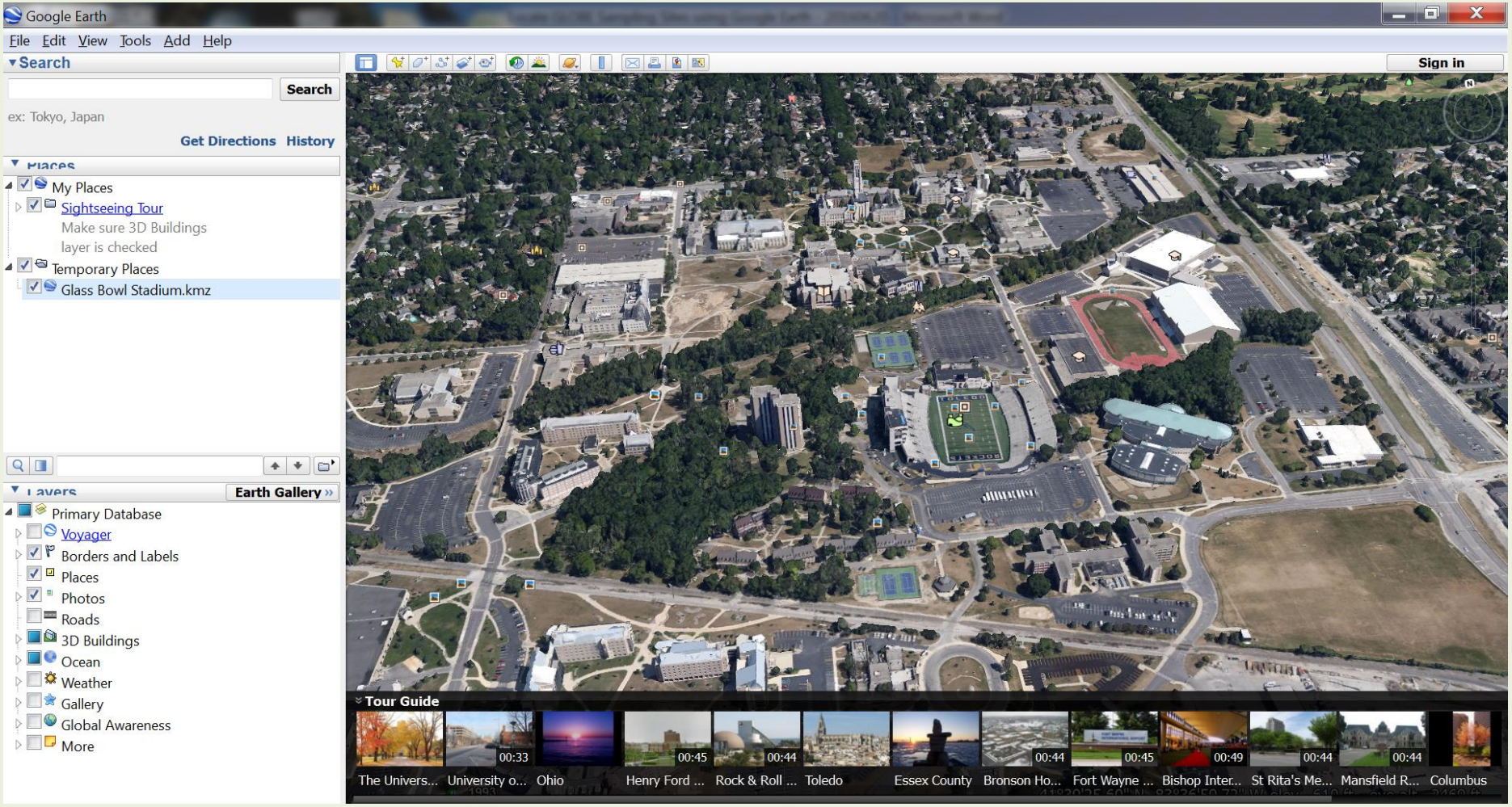
1. Open Google Earth. If you need to download it, go to: https://www.google.com/earth/
2. Zoom in to your school and then a potential GLOBE study site.
3. Use the **Add** tool to establish a **Placemark**, then give it a name.
4. Right click on that **Placemark** and select **Properties**. Record the **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.

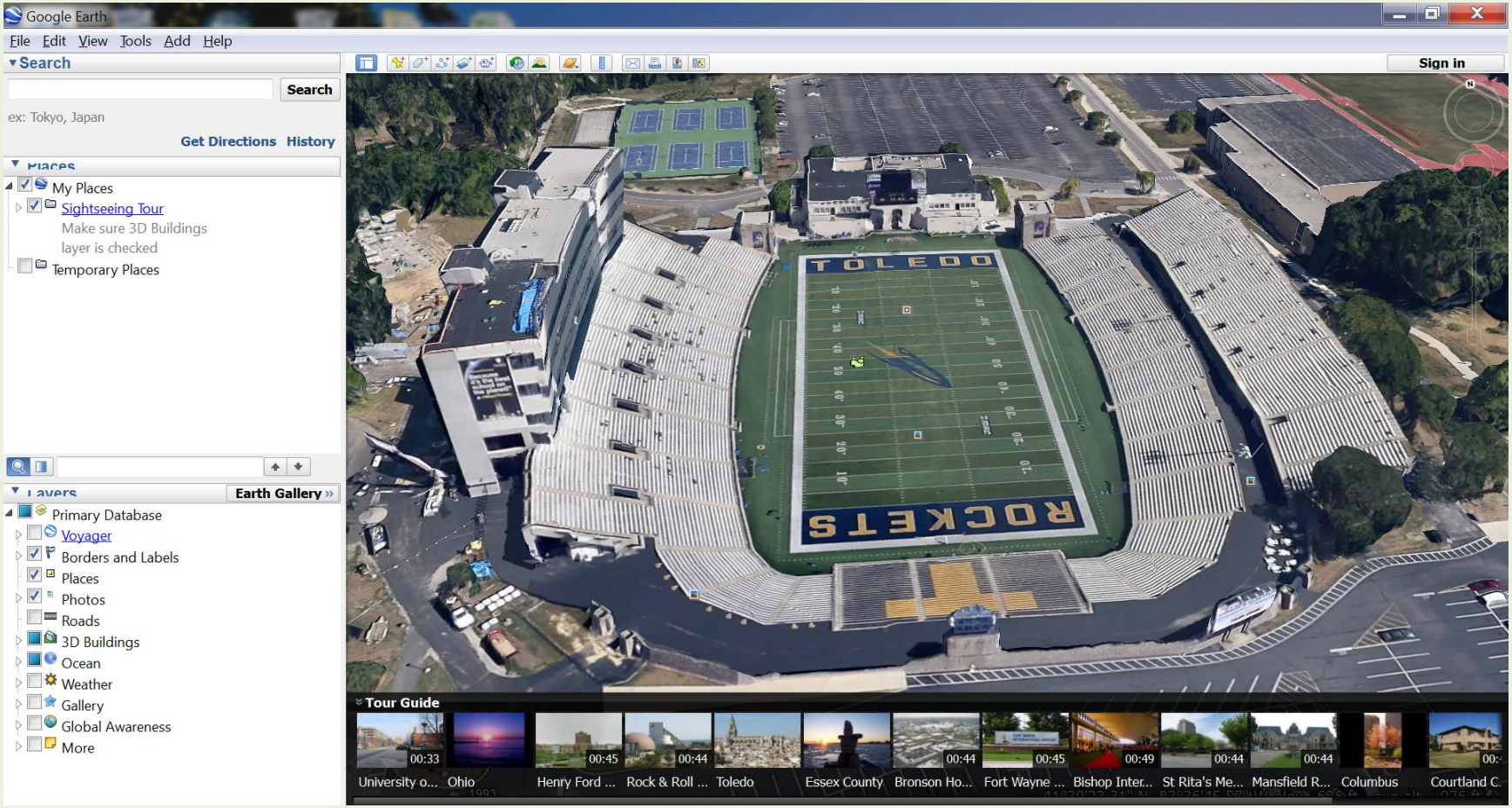
Start Google Earth



Zoom into the University of Toledo, Ohio



Zoom into the Glass Bowl Stadium.



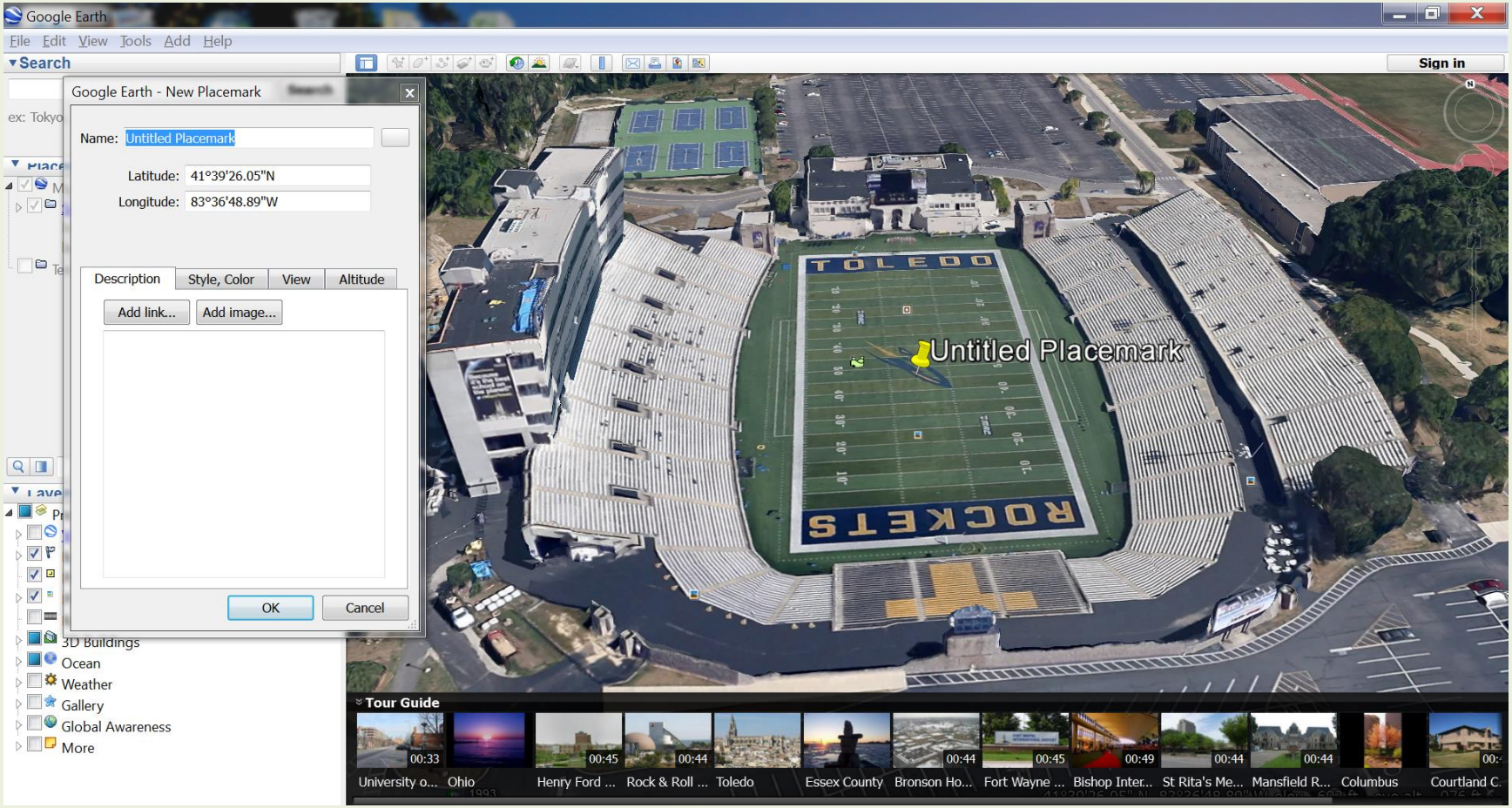
Discuss with students:

- 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?

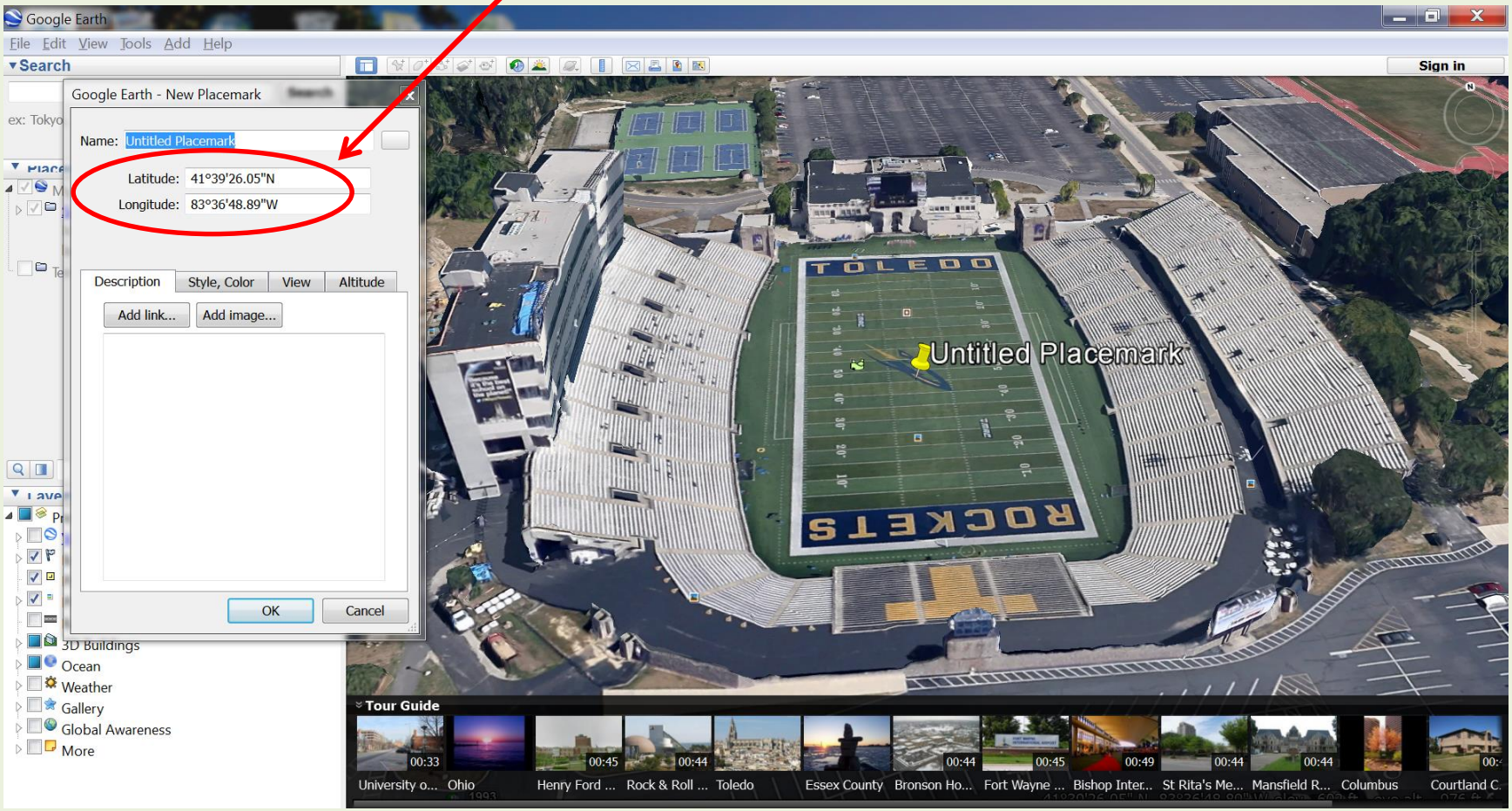
Choose your site(s):

- 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.

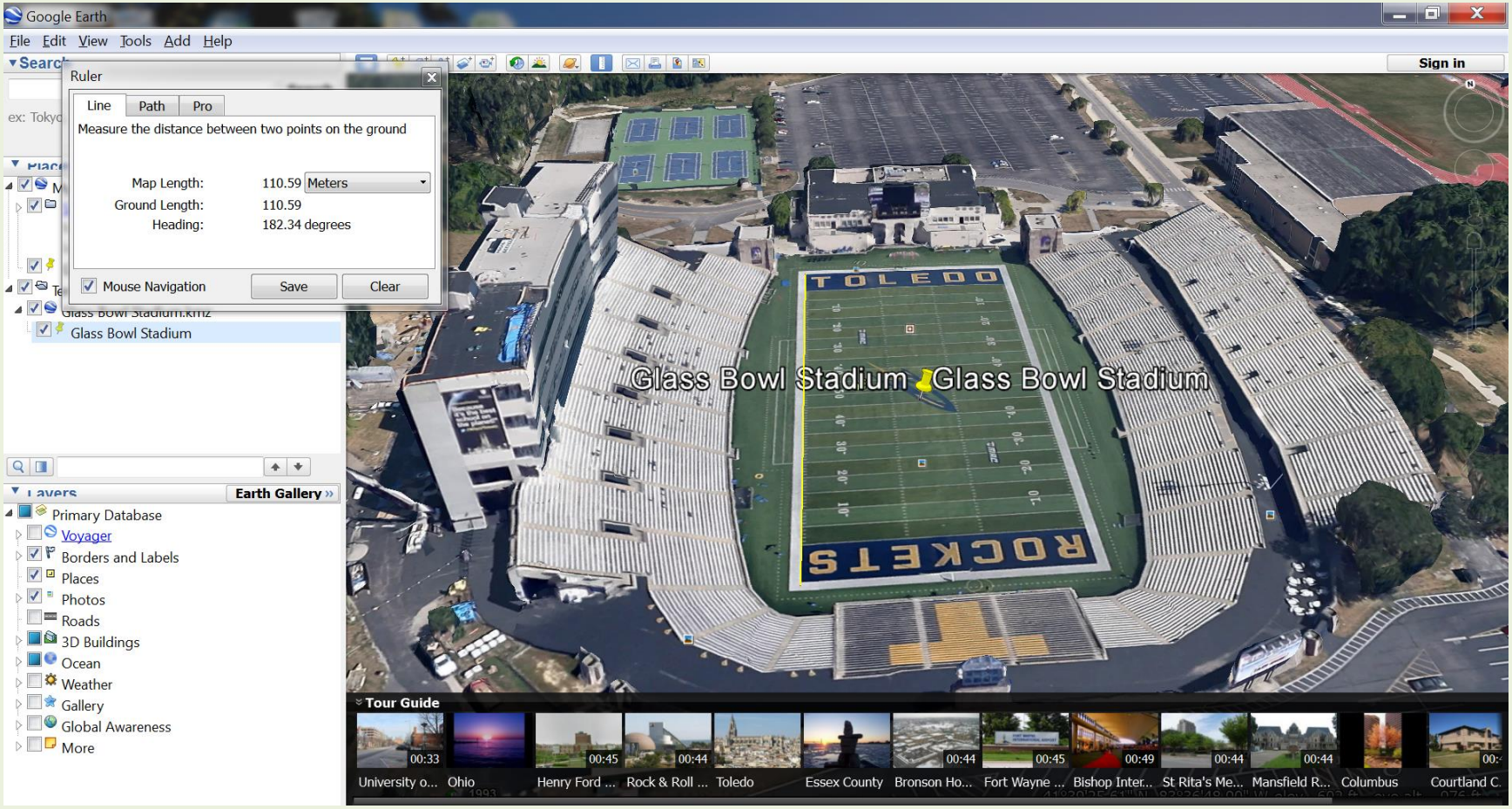


Right click on your Placemark, and select **Properties** to view the **latitude** and **longitude** of this location**.**



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

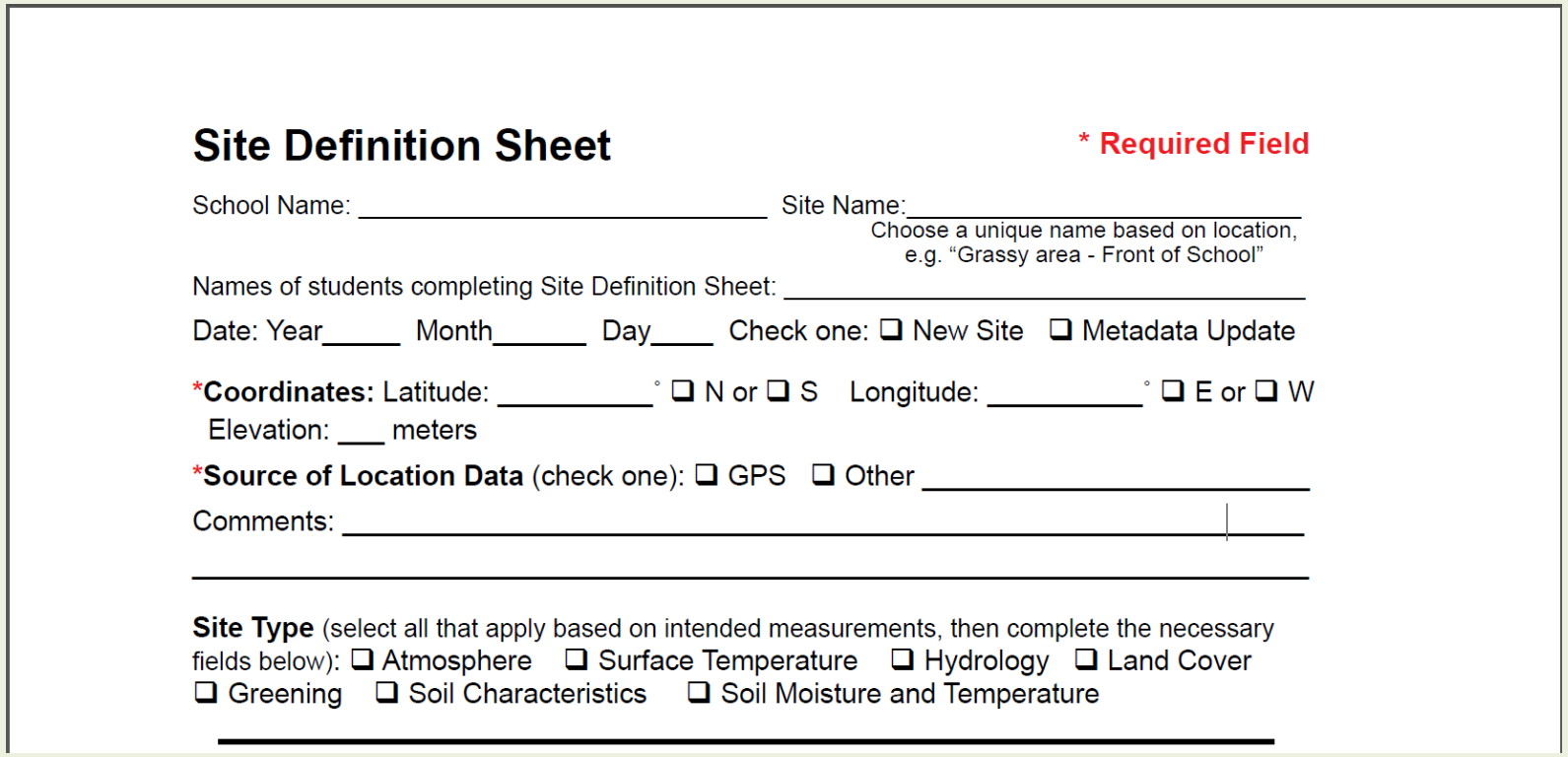
Now, select the **Ruler** option from the toolbar and measure the size of the field in **meters**.



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 Max/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

* 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)

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

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

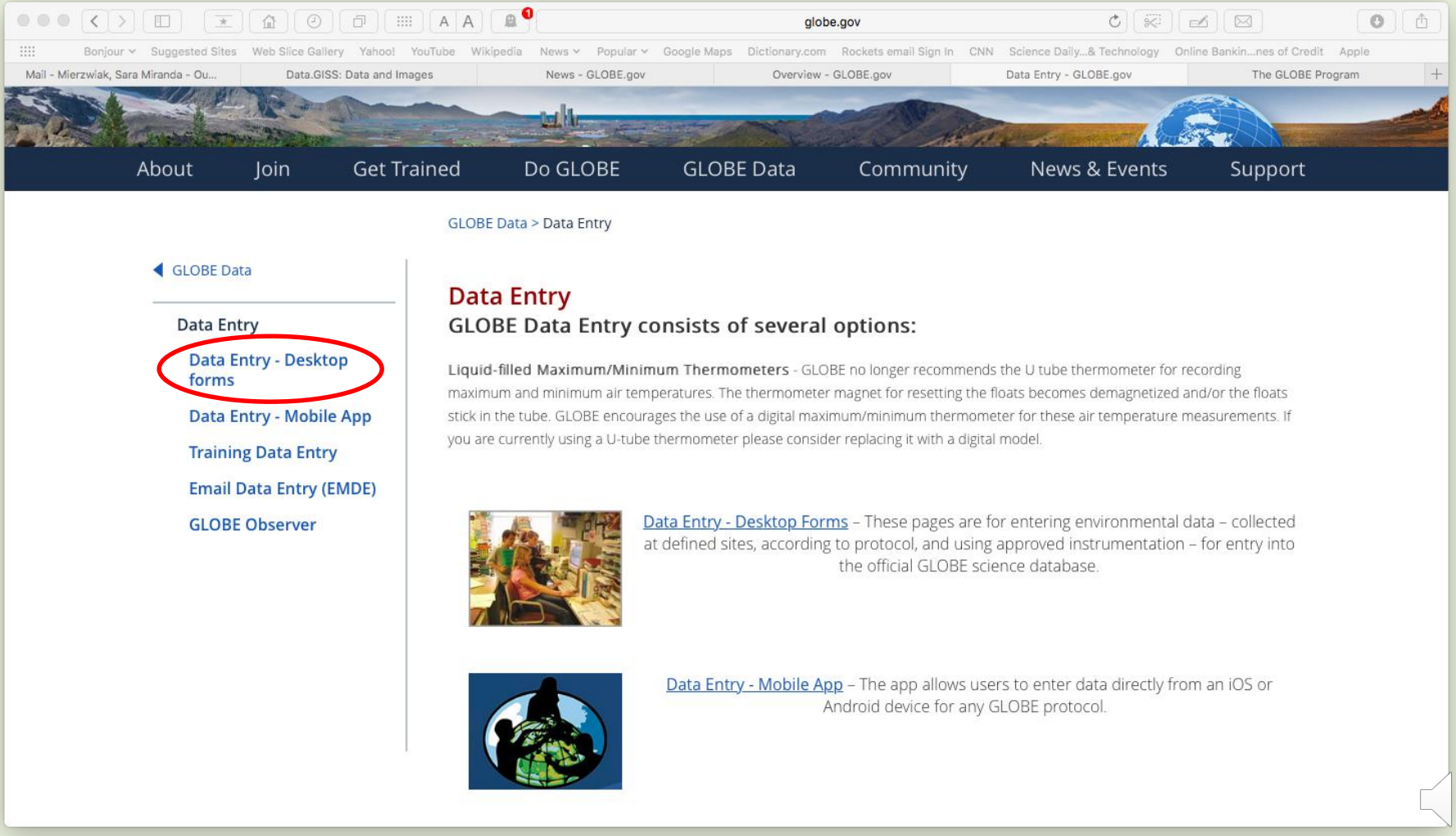
Now go outside!
Collect Remaining Site Data

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?"*

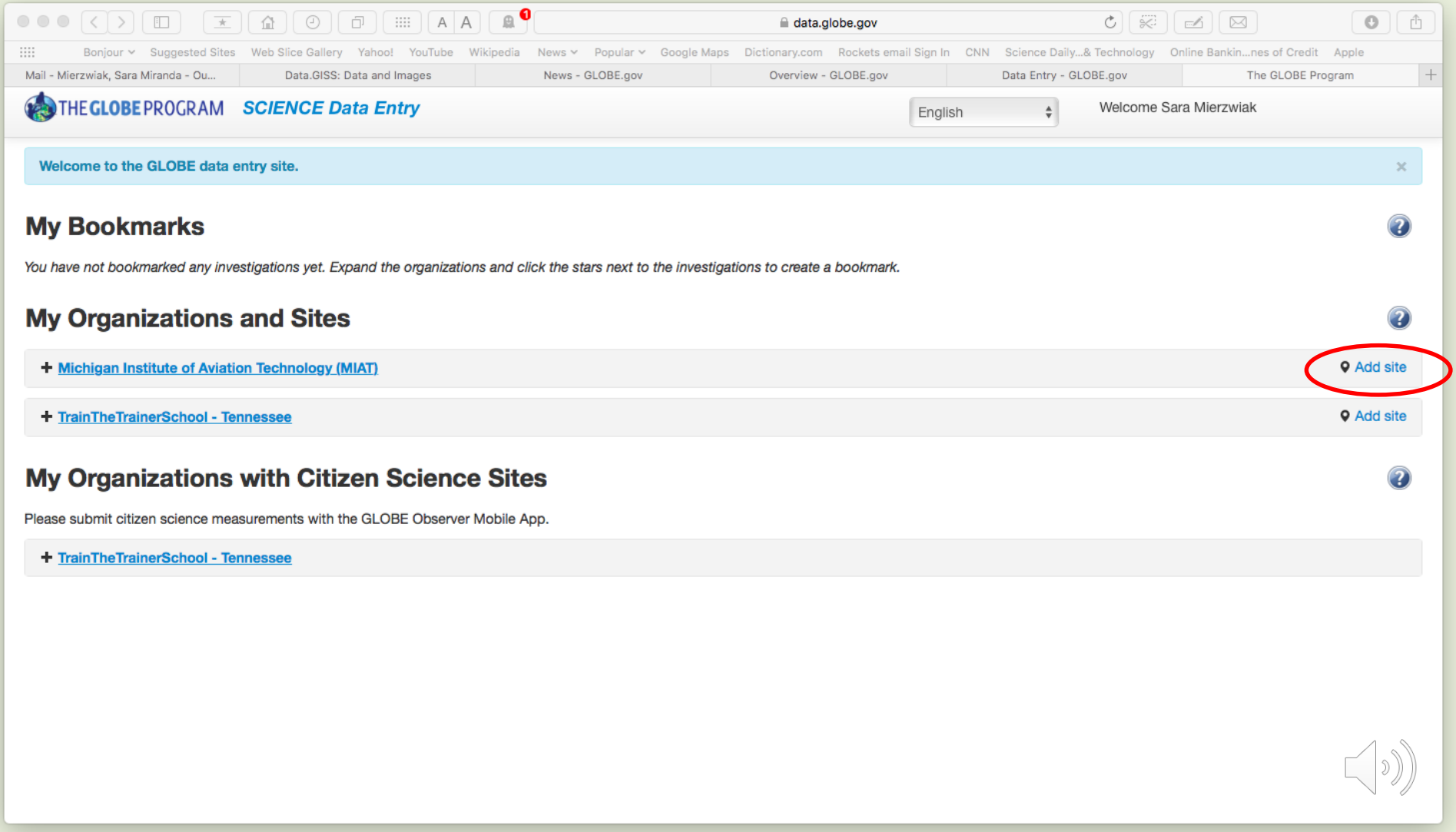
Now Set up Your Study Site(s) in GLOBE

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".



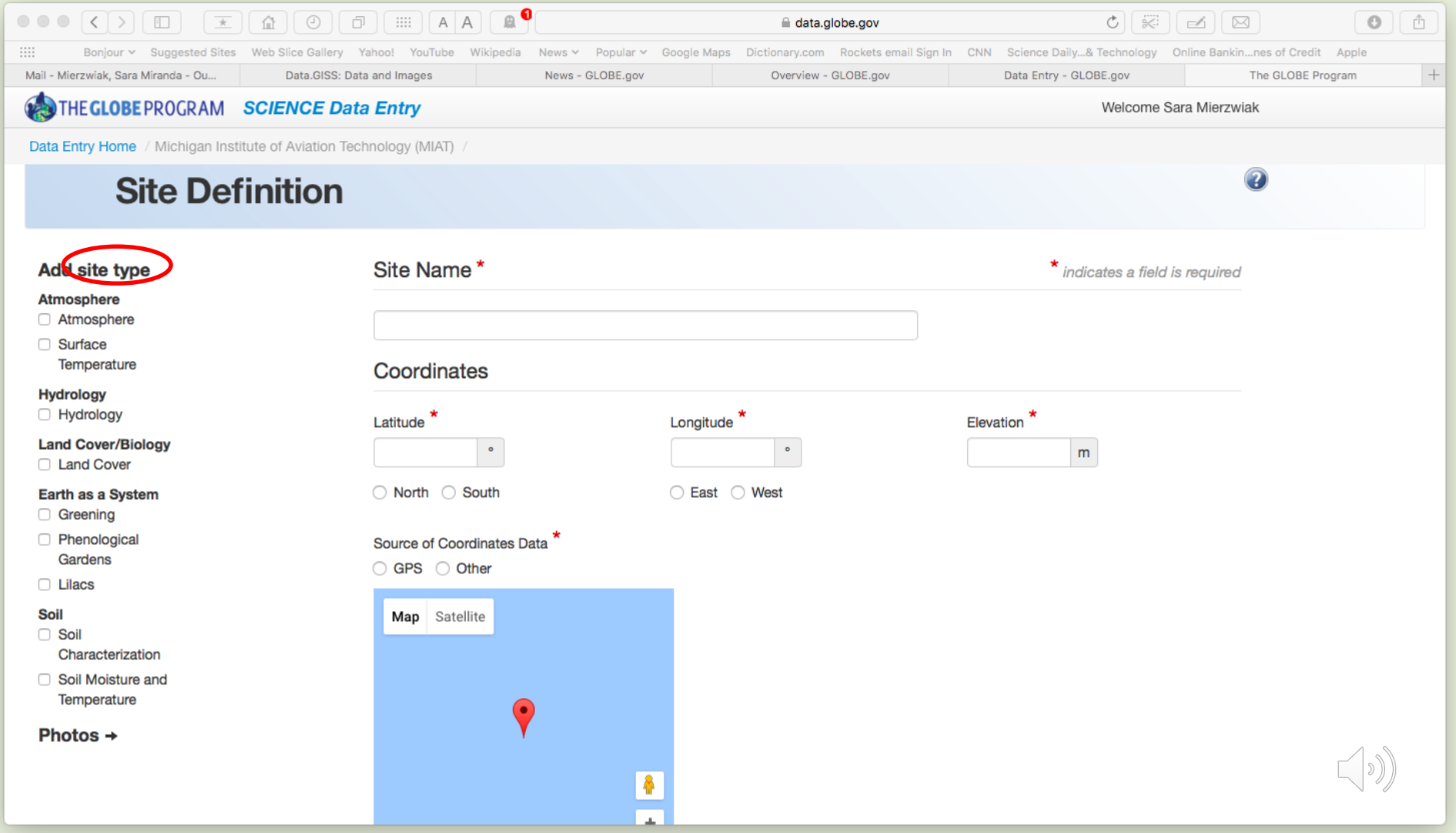
Your Organizations and Sites

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



Choose Site Type and Enter your info

Click on the site type (ex. Atmosphere or Surface Temperature),
then enter the info from your Site Definition Sheet.



Once your site is set up, have your students log in with their student account, and enter their data.

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						
Atmosphere	Daily	Weekly	Monthly	Seasonally	Semi-Annually	Annually	Once per site
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

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

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
- YouTube: http:tinyurl.com/globemissionearth