# Studying Watersheds with the Earth Partnership Digital Network

## Activity Overview
Students will learn how to use Google Maps to compare their watershed projects with that of other Earth Partnership schools.

## Objectives
Students will:
- Note the location of their school on a collaborative Google Map
- Upload photographs, data, and other projects they are working on with their classmates to Google Maps
- Compare and contrast the work at their school to similar projects at other schools.

## Subjects Covered:
Technology and Social Studies

**Grades:** 6 through 12

**Activity Time:** 1 hour

**Season:** Any

**Materials:** Computer connected with a high speed internet connection, files from student projects such as photos, biophysical data, and site-specific nature essays. Optional: notebook, camera, GPS unit, turbidity tube, 2 thermometers.

## State Standards
**Technology:**
Discover how technology solves problems (A.4.1)
Realize everyone is a technologist
(A.4.2)
Explain purposes of objects (A.4.4)
Show how science and technology work together
(A.8.1)

## Background

The rise of interactive Web applications such as Google Maps has significant, and largely untapped, implications for schools. Projects that were once the domain of teachers in individual classrooms can now be shared across classrooms and schools. While the idea of internet-based data sharing is not new, interactive Web platforms make the sharing process much easier to accomplish by allowing several individuals to contribute to the site rather than depending on a single administrator.  Of course, a quality collaborative map still requires oversight for continuity, and staff at the Earth Partnership program will assume that responsibility.

In this activity, schools participating in the Earth Partnership network will place a site marker on a password-protected Google Map and on their own Google Map. Once a school's location is noted, the site liaison can add information that students have learned about their local watershed, including photos, quantitative biophysical data, and more. Students can review projects from other schools and ask comparative questions on a larger spatial scale than projects restricted to students from a single classroom. As the database becomes established over multiple years, students can also examine changes over time at the same site.

One example of such a project is the measurement of water flow, infiltration, and water clarity at a new rain garden site. Another example could include documenting change over time in the built environment, which might feature photos from the same site over time (repeat photography), or oral history interviews.

**NOTE:** if you have any questions about this activity, please contact 2012-2013 earth partnership online data coordinator Steve Laubach (slaubach@wisc.edu).

## Activity Directions

### Adding your School to Google Maps
1. Navigate to Google Maps: maps.google.com
2. Click on "My Places"
3. Click on "sign in" button on left side of screen. Username = earthpartnershiprestore@gmail.com; password = earthpartner
4. Click on the map titled  "Earth Partnership Network," located in the box to the left of the map
5. Click on the "edit" button in the upper left corner
6. Enter school's address into the google map search engine.

Social Studies
Use maps, photographs, satellite images for information (A.8.1)
Use reference points to locate positions on earth's surface (A.4.1)
Use atlases, aerial photos, satellite images, databases (A.8.5)

7. Once a red marker shows up identifying your school's location, click on the "my places," button in the upper left, select the "Earth Partnership Network" map, and the red marker will appear relative to other EPS sites.

8. Click on the blue place mark shape (upper left corner of map) and place it in the location depicted with the red marker.

9. A marker will be placed at your school address.

10. Choose Rich Text and enter the following school information in the text box: Name of School, address, contacts, and project description

11. Click OK to save your changes. Click done.

**Adding a Photo**

12. First you will need to upload photos from your camera to an online photo site like Google Plus, Flickr, or Picasa. For this activity, we recommend adding an album to your own gmail account through Google Plus. To do so, open up your own gmail account while leaving open the Earth Partnership account (to see how to sign in to multiple gmail accounts at the same time, please visit: http://go.wisc.edu/4c537z). Click on the "More" tab in the black toolbar area that lists options such as "Maps," "Gmail," and "YouTube." Click on "Photos."
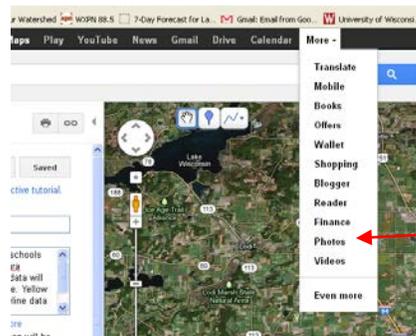


13. Click on "Albums" in the top left

14. Click on "Upload New Photos" (top right) and give the album a name in the dialog box that appears. Upload photos that have been saved temporarily on your computer's desktop.
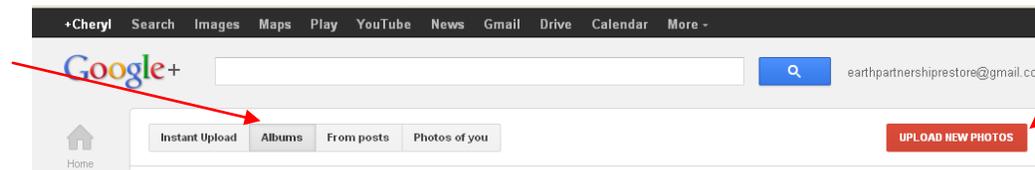
15. Go to the photos you just uploaded, right click on the photo you want to upload and select "copy image location" or "copy image URL" from the menu that appears.
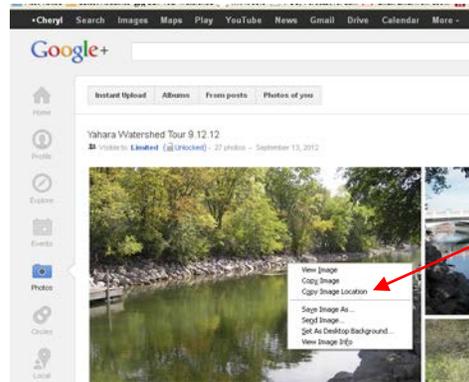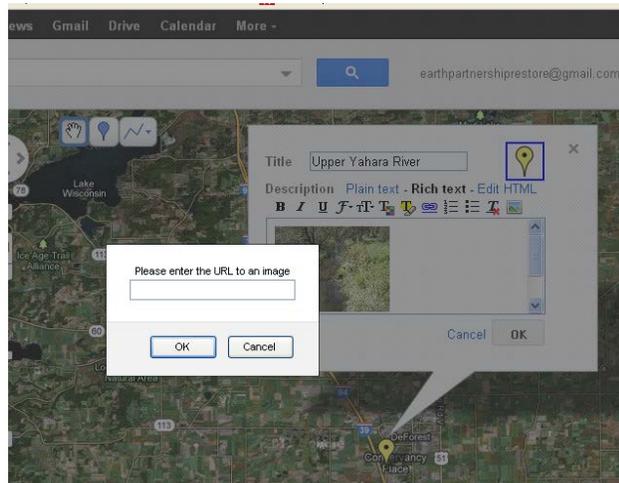


16. Go back to the Earth Partnership gmail account and click on your school's placemark.
17. Choose the "Rich text" option in the window that comes up when you click on the placemark (see diagram on next page).
18. Click on the insert image button (the icon with the small image) on the far right
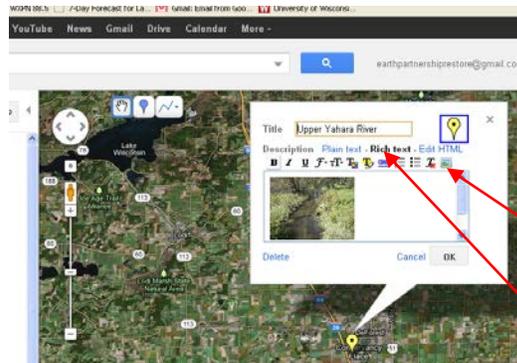


19. Paste the link from step 15 into the dialog box that appears.



20. Click OK and then exit editing mode by clicking Save and then Done.

**Adding Quantitative Data to a Google Spreadsheet**

21. Click on the "Drive" tab in the black toolbar area that lists options such as "maps," "Gmail," and "YouTube."
22. The "Earth Partnership Shared Data Set" spreadsheet will become visible, as well as a separate file titled "data collection protocols" that describes how to collect data using the same techniques across schools.
23. Columns have already been listed, including watershed name, school name, address, and data columns with units.

**Depicting a watershed in your own Gmail account**

Now that you have learned how to enter your school into the Earth Partnership Google Map, you can set up a watershed map for your students in Google Maps:

24. Identify the boundaries of your watershed and take a trip around it. If possible bring along supplies to collect water quality data such as a turbidity tube, thermometers (1 each for measuring air and water temperature), and a notebook to record your data. If you have a simple GPS unit such as a Garmin etrex, bring it along and set its units to decimal degrees.
25. Mark waypoints on your GPS for each location you visit, collect water quality data, and take a photo.
26. Upon returning, add placemarks to a Google map <u>in your Gmail account</u> following steps 1 through 11, using your username and password instead of Earth Partnership's.
27. Upload pictures to your Google map that show the places you visited, including bodies of water and highpoints in elevation, following steps 12-20.
28. GPS waypoints can be entered into the Google search bar in decimal degrees, as in the following example: N43.09423 W89.36958. Upon entering the location in this way, a red placemark will show up; add a new permanent placemark to that location following the instructions in steps 7 through 11 above.
29. Upload to <u>your own Google Spreadsheet</u> data collected from bodies of water visited in the watershed.

### Extensions

- If your projects relate to natural features of the watershed such as water clarity, have students compare their data with that of at least one other school in the Earth Partnership google map (accounting for variables such as time of year, body of water, etc.).

- Contact a local water quality specialist (e.g., DNR staff, university researcher, or water utility staff), share student findings with that person, and see if she can come to class to have a discussion with students about their findings.

- Identify where your drinking water comes from and where your sewerage is treated. If drinking water comes from wells, indicate the location of one or more city wells. Contact the local water utility and ask for recent reports of water quality to learn about the most pressing water quality issues in the area.

### Additional Resources

Alibrandi, Marsha. (2003). GIS in the classroom: using Geographic Information Systems in social studies and environmental science. Portsmouth, NH: Heinemann.

Milson, Andrew J. and Alabrandi, Marsha, eds. (2008). Digital geography: Geospatial technologies in a social studies classroom. Charlotte, N.C.: Information Age Publishers.

Pernisco, Nick. (2011). Google tools for education. (Video). New York: Carmelina Films—films for humanities and sciences.

Webb, Robert H, Diane E. Boyer, and Raymond M. Turner, eds. (2010). Repeat photography: methods and applications in the natural sciences. Washington, D.C.: Island Press.

### Assessments

- Demonstrate how to locate your school on a Google Map

- Upload a photograph or data on Google Maps

- Compare and contrast the work at your school to a similar project at another school