



The River Mile

Site Mapping

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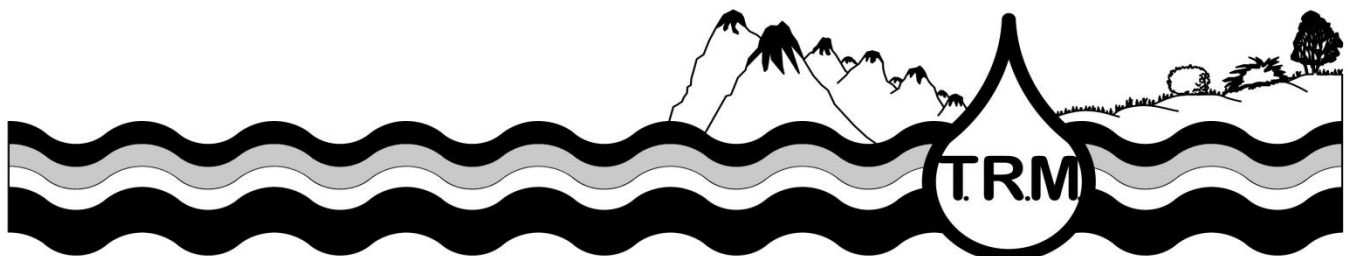
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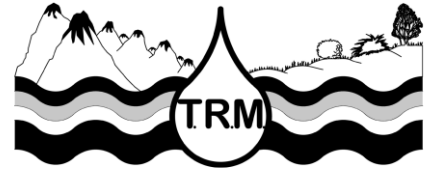
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"Awakening Inquiry"

Unit 6: Read and Use Maps



Subject: Directions, mapping techniques, technology, latitude and longitude, compass use, maps (use and types), scale, and model

Education

Standards:

Duration: 6-8 hours broken into 1-2 class periods per lesson

Location: School Site/classroom

When: Pre-Visit, site visit, and post visit

Grade: 3-12th

Objectives:

Students will be able to:

- a) Understand cardinal directions
- b) Practice using maps
- c) Learn how to use a compass
- d) Use a GPS unit and understand latitude and longitude coordinates

Materials: Variety of paper sizes, markers, grid paper (poster size and 8 1/2x11), compass, variety of maps, field journals, note cards, world globe, GPS units, "Awakening Inquiry" and other items listed in "Awakening Inquiry" available from NatureMapping Foundation.

Procedure:

Pre-Mapping Lessons

Use "Awakening Inquiry" Unit 6 to prepare your students to create a map of your site.

Background Information:

See "Awakening Inquiry" and "The Nature Mapping Program Global Positioning System (GPS)"

The River Mile Site Mapping



Subject:	Record keeping, mapping techniques, technology, latitude and longitude, GIS
Education Standards:	
Duration:	3-4 hours broken into 3 sessions
Location:	The River Mile Site, classroom
When:	Pre-Visit, site visit, and post visit
Grade:	3-12th

Objectives:

Students will be able to:

- Use a GPS unit and understand latitude and longitude coordinates
- Use skills learned to take GPS waypoints and routes to create map of the school's river mile site
- Use a digital camera to record site locations
- Use record sheets to record data
- Use tape measure to take measurements of site facilities and features

Materials: Grid paper (poster size and 8 1/2x11), field journals, GPS units, aerial photographs of school grounds and river mile site, clipboards, pencils, tape measures, digital cameras, record sheets.

Procedure:

Pre-site visit Preparation of Students

- Complete "Awakening Inquiry" Unit 6
- If your class has not been to your site before have them visit their site through the "Habitat Observation" program which you can conduct or, if you are using a site at or near Lake Roosevelt National Recreation Area, you may ask a National Park Ranger to conduct the program.
- In the classroom prior to the site mapping visit divide the class into small groups, preferably 4-5 students maximum per group.

- a) Have students decide within their group who will be doing what assignment:
record keeper, photographer, GPS user, Measurers (2)
- b) Practice assignment on school grounds

Pre-visit Preparation for Site Mapping prior to working with students (older groups can do this themselves)

- 1) Decide what features you will be mapping
- 2) Assign each group an area of the site or feature groupings (e.g., trees). The size of the assigned area or feature is determined by the size of your site, the number of small groups, and how much time you have to complete the assignment
- 3) Mark on aerial photos the assigned areas (color coded is preferable)
- 4) Utilizing the record sheets customize them for your site and groups
 - a) Record sheets include
 - i) Roads
 - ii) Boat launch and facilities
 - iii) Vegetation
 - iv) Recommendations
- 5) Secure one adult chaperone for each group
- 6) Train adult chaperones OR create or use the written instructions provided

Site Visit

- 1) Arrival
 - a) When you arrive at your site have students gather in their assigned groups.
 - b) Distribute supplies and materials to groups. Materials need to be labeled or numbered and be sure to record which group has which equipment. NOTE: It is easiest to number the groups and give each group all materials with the corresponding group number. Invariably you will need to check with a group or refer back to the GPS unit or camera to answer questions after the site visit.
 - i) Record sheets
 - ii) Aerial photographs
 - iii) GPS units
 - iv) Digital cameras
 - v) Clipboards
 - vi) Tape measures
 - c) Remind students and chaperones of site visit rules and behavior expectations of student scientists and researchers.
- 2) On-Site Mapping Procedures
 - a) Group Assignments
 - (1) Roads

Take waypoints with GPS unit. Start at one end of your assigned section. GPS user stands in the middle of the road and takes starting point waypoint. Measurers measure the width of the road with the GPS point in the middle of the tape measure. Photographer takes photos of the group and the site. Record all data on the record sheets (Latitude/Longitude, photograph number(s), road measurement and any notes about the location. Move at least 25 steps from this location and repeat.

Optional: place a pin flag or other marker at first and last waypoint. Your last waypoint should coincide with the next group's waypoint. Don't forget to pick these up at the end of your visit. If you are mapping roads open to the public then do not use pin flags.

When doing a loop or spur, place a flag or other marker at the beginning of that spur or loop and GPS that spot. Then when the section is completed, return to the starting location of that loop and begin there for the rest of the road.

(2) Boat Launches and other human-made site features

For large parking areas you will take readings of the outline of the lot, measure from one side to the other in at least 3 locations on each side. Be sure to place a marker at your beginning location so when you finish the outline you end at the correct location. For buildings follow above procedures, except measure the sides instead of across.

Follow all other instructions for road mappers.

(3) Vegetation

For individual trees or other vegetation that are safe to get to, take a GPS waypoint reading right next to it. For groves of trees or other vegetation, take GPS readings that outline the grove (like boat launches or buildings). Take waypoints at least 10 feet apart and at all corners or turns. Identify trees and vegetation as able.

- b) Once all groups have returned, have them double check their information and make sure they have their names and equipment information on their record sheets. Then collect all equipment, materials and record sheets.

3) Data Preparation In Classroom

How data is transferred and coordinated with the aerial photograph depends on the group's level. You need a database file such as MS Excel to upload your data to ArcGIS (desktop or online).

a) Electronic Transfer of data from GPS unit to computer

- a. There are simple GIS programs such as DNR Garmin which can electronically transfer your data to the computer. You will need the data cords and proper connections.
- b. Check program manuals for details.

b) By Hand

- a. You can use any database program, such as MS Excel, to create a computer file of your data.
- b. Have students create a simple database file of their group's data.
- c. Each column must have a title. Single words are best (e.g., Roads) and spelling matters.
- d. Data must be simple and formatted uniformly.
- e. Latitude and Longitudes must display at least 4 digits beyond the decimal point.
- f. Once data is entered from data sheets and the file saved, then save the file as a "csv" comma delimited file for upload to ArcGIS.

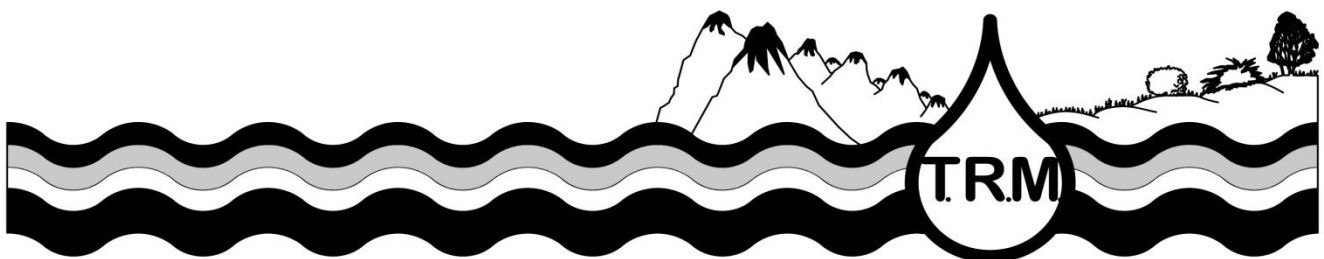
4) Data Sharing and Analysis

- a. Use several available display and analysis tools for students to examine the data they collected.
- b. See ArcGIS Online Lessons

Background Information:

See "Awakening Inquiry" and "The Nature Mapping Program Global Positioning System (GPS)"

GIS Training as needed and appropriate for level.



Appendix