South Carolina Geographic Alliance
CarolinaCaching: Global Positioning Systems

Field Trip GPS Navigation – Teachers' Guide

Curriculum Note:
This document corresponds with the slideshow titled "Field Trip GPS Navigation."

Technical Note:
This document is specific for the Garmin Legend GPS unit. The information is applicable for any GPS unit, however the specific steps and menu options may differ.

Narrative for Slideshow: "*Field Trip GPS Navigation*".
1. Global Positioning Systems for the Classroom, Field Trip GPS Navigation, Mark Musselman
2. After completing GPS training on a practice course at school, students will be ready for field trip navigation (see How to Set Up a Practice GPS Course).
3. This presentation will use downtown Anderson, SC as the hypothetical field trip site with students acting as the guides and instructors. The steps shown in this presentation can be applied to any site on Earth.
4. How can a teacher determine the latitude/longitude coordinates for a destination like the Anderson County Arts Council, which is located at 405 N. Main Street in Anderson, SC?
5. Google Earth is a free program that incorporates the latest satellite images of the Earth with various other geographic data such as roads, political boundaries, schools, airports, volcanoes, etc. When the address is typed in the Google Earth search field, the location will be highlighted on the satellite image.
6. By placing the computer mouse's cursor over the target...
7. …the location's latitude and longitude coordinates will be shown at the bottom left of the image. Latitude and longitude coordinates can be shown several ways with the most commonly used being "degrees, minutes, seconds (like Google Earth)," "decimal degrees or degrees.degrees," and "degrees, minutes.minutes." For example, the coordinates for the SCGA office could be shown as [33° 59' 45.95" N, 081° 01' 34.43" W or 33.99608^oN, 081.02622^oW or 33° 59.765' N, 081° 01.573' W]. Enter setup data to ensure all GPS units are set up to accept coordinates in "ddd mm ss.ss"
   a. Using the thumb stick, toggle to highlight the icon in the upper right corner and press down on the center of the thumb stick (center select).
   b. Toggle down to "Main Menu" and center select.
   c. Toggle down to "Setup" and center select.
   d. Toggle down to "Units" and center select.
      i. Toggle down, center select, and change where appropriate.
         1. Position format should be ddd^o mm' ss.ss".
         2. Map Datum should be WGS 84.
         3. Distance/Speed should be metric.
      ii. Toggle back to the X icon in the upper right corner. Center select.
   e. Toggle back to the X icon in the upper right corner. Center select.
8. Waypoints can be manually entered in advance. Just as the name can be changed, so too can the location (coordinates). Toggle down until the location field is highlighted. Press the center of the thumb stick to reveal a number keypad for editing. (See *Global Positioning Systems for the Classroom*)
9. Waypoints can be downloaded directly from a computer to the GPS unit using free software such as EasyGPS at http://www.easygps.com/, which accommodates most GPS models. For example, all 280 waypoints (including trailheads, camp sites, water, & major junctions) of the Foothills Trail in SC can be downloaded at http://www.travelbygps.com/premium/foothills/foothills.php. After determining the coordinates for the field trip waypoints, they can be manually loaded to one GPS unit, loaded onto the computer from the GPS unit using EasyGPS, and then loaded back from the computer onto as many GPS units as is desired. Working in this manner is more time efficient and prevents keypunch errors that will send students to the incorrect coordinates.
10. If waypoints have already been loaded to the GPS unit, press the bottom button on the left side to reveal the waypoint options. Select "Waypoints". Waypoints may be displayed by name or by the nearest to your current position. Selecting either will produce a list of waypoints.

11. Selecting and displaying a waypoint, will bring up the waypoint's screen. Simply toggle to the "Goto" button and press the center of the thumb stick to navigate to the waypoint.
12. The student that navigated to the Anderson County Arts Council would also be responsible for providing the educational content to the group. The student would have been assigned the research prior to the field trip. At the previous stop, the student would have received the GPS unit and been told to navigate to the Anderson County Arts Council coordinates.
13. Repeat the previously described procedures for the next address, which is 100 South Main St.
14. It would be a short walk from the Arts Council to the man statue, which is located at 100 South Main St.
15. The student that navigated to this point would also be responsible for providing the educational content to the group. The student would have been assigned the research prior to the field trip. At the previous stop, the student would have received the GPS unit and been told to navigate to the statue's coordinates.
16. The Civil War Memorial could be another historical destination. A student navigating to this spot would be responsible for providing the educational content to the group. The student would have been assigned the research prior to the field trip. At the previous stop, the student would have received the GPS unit and been told to navigate to the monument's coordinates.
17. Cultural aspects of the community can be highlighted. What do the various paintings on the fish tell us about what the community deems important? Any theme or area of study can be investigated via stops along the field trip route.
18. Art and public areas also provide rich opportunities to explore the geography of a place.
19. The total distance between the two farthest stops along this example field trip route is less than 0.6 miles! All of the waypoints were determined from 160 miles away at the Audubon Center at the Francis Beidler Forest using Google Earth!
20. Waypoints collected during a field experience can be converted to Google Earth (kml) files to document the trip and for use in later lessons.
21. This slide shows the trails maintained by the Audubon Center at the Francis Beidler Forest in Four Holes Swamp. All of the trails were mapped by collecting waypoints using a GPS unit as the trail was walked or paddled. There are several software programs that can convert the waypoint data into Geographic Information Systems (GIS) files or Google Earth (kml) files or both. In the kml format, files can be projected by anyone using Google Earth. Files can be shared with other schools or classes within the same school. Screen images of the files shown in Google Earth can be easily saved producing quality map images for presentations or other student work.
22. It's easy to incorporate geography and global positioning systems (GPS) technology into any field trip experience. A field trip route can be set up prior to the trip without physically visiting the destination. Using navigation technology that can be easily taught and mastered, students of all ages can enjoy success studying any theme or subject.

Author Credit: Mark Musselman, Audubon Center at Francis Beidler Forest, Harleyville, South Carolina