

Lesson Plan "Geocaches: Types and Sizes"

Mark Musselman
Audubon at the Francis Beidler Forest

Overview: This activity highlights the variety (types and sizes) of geocache containers as well as the plethora of devices used to provide the coordinates of the geocache's hidden location. This activity would be used subsequent to the basic Global Positioning System (GPS)/geocaching instruction available through the South Carolina Geographic Alliance (SCGA) and prior to using GPS units on field trips or geocaching beyond the school campus.

Connection to the Curriculum:

Literacy Elements

- G. Make and record observations about the physical and human characteristics of places
P. Locate, gather, and process information from a variety of primary and secondary sources including maps

Suggested Grade Range: 8th

Time: 20 minutes in classroom, 60 minutes outside

Materials Needed:

1. Variety of geocache containers.
2. GPS units (can be borrowed from the SCGA)
3. Student data sheet (created for each specific course)

Objectives:

1. Student will be able to navigate to a given latitude/longitude coordinate.

Procedures:

1. Types of geocaches (as listed at Geocaching.com):
 - a. A Traditional Cache is the original cache type consisting, at a bare minimum, a container and a log book. Normally you'll find a tupperware container, ammo box, or bucket filled with goodies, or smaller container ("micro cache") too small to contain items except for a log book. The coordinates listed on the traditional cache page is the exact location for the cache.
 - b. Multi-Cache (multiple or offset cache) involves two or more locations, the final location being a physical container. There are many variations, but most multi-caches have a hint to find the second cache, and the second cache has hints to the third, and so on. An offset cache (where you go to a location and get hints to the actual cache) is considered a multi-cache.

Cruise the Campus is an example of a multi-cache. In this case, the seeker must determine the next stop's coordinates by finding numbers in the environment around the current stop's coordinates (dates, numbers of objects, numbers on signs, etc.). In other multi-caches, the next set of coordinates might be on a sticker on the back or bottom of an object or hidden in a film canister. The variations are limited only by the imagination of the person creating the multi-cache.

http://www.geocaching.com/seek/cache_details.aspx?guid=36d24278-b890-4325-8849-6f61a4aafa37

- c. A Mystery Cache is the "catch-all" of cache types, this form of cache can involve complicated puzzles you will first need to solve to determine the coordinates. The only commonality of this cache type is that the coordinates listed are not of the actual cache location but a general

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reference point, such as a nearby parking location. Due to the increasing creativity of geocaching this becomes the staging ground for new and unique challenges.

[Gsxndkvuobc](#) is an example of a difficult mystery cache. It is no longer active, so its secrets can be revealed. The title is a clue to solving the puzzle, but the key to unscrambling the title is the location of the cache. Clicking on the map or the satellite image shows that the cache is hidden on the *USS Yorktown (CVS-10)* anchored at Patriot's Point in Mt. Pleasant, SC. A Caesar's Shift Cipher substitutes a letter of the alphabet with another letter a designated number of shifts (positions) away. Using this cipher with the ship's "10" as the number of places to shift a second row of the alphabet, "K" would line up under "A" moving through to "Z" lining up under "P" and beginning again with second row "A" lining up under "Q" moving through the end with "J" now under "Z". With the two rows (unshifted alphabet in row one and the 10-shifted alphabet in row two) so aligned, "Gsxndkvuobc" becomes "Windtalkers." With some knowledge of history or a quick search on Google, one can determine that "windtalkers" describes the Navajo codetalkers in the Marine Corps' World War II Pacific campaign. The text in the puzzle uses the once-secret code to describe where on the Yorktown the microcache is hidden. To avoid someone simply taking a piece of the code, checking it on Google for a match and solving the puzzle without any real thought, the code is also written backwards, which would not thwart someone that had solved the code. The decoded text directs one to the Marine compartment within the ship and to the particular beam on which the container sits. This is one example, but the variations are truly limitless.

- d. A Letterbox Cache is another form of treasure hunting using clues instead of coordinates. In some cases, however, a letterbox has coordinates, and the owner has made it a letterbox and a geocache. To read more about letterboxing, visit the Letterboxing North America web site.
 - e. An Earthcache is a special place that people can visit to learn about a unique geoscience feature or aspect of our Earth. Earthcaches include a set of educational notes and the details about where to find the location (latitude and longitude). Visitors to Earthcaches can see how our planet has been shaped by geological processes, how we manage the resources and how scientists gather evidence to learn about the Earth. For more information about Earthcaches, visit <http://www.earthcache.org/>.
 - f. Cache In Trash Out is an activity intimately tied to geocaching. While out there on a cache hunt, we collect litter along the trails and properly dispose of it. Cache In Trash Out Events are much larger clean-up events that involve and benefit the larger community.
2. Sizes of geocaches: Geocaches can range in size from microcaches, too small to hold anything more than a tiny paper log, to those placed in five-gallon buckets or even larger containers. They may be simple containers hidden in a hollow tree or camouflaged/disguised and hidden in plain sight.
 - a. Micro (35 mm film canister or smaller – less than approximately 3 ounces or .1 liters -- typically containing only a logbook)
 - b. Small (Sandwich-sized Tupperware-style container or similar -- less than approximately 1 quart or liter -- holds trade items as well as a logbook)
 - c. Regular (Tupperware-style container or ammo can)
 - d. Large (5-gallon/20-liter bucket or larger)
 3. Create a variety of geocache types and sizes and hide them on the school campus or other designated area. Capture the coordinates of the geocache hiding spots. A PowerPoint presentation is available through the SCGA that demonstrates how this can be done.
 4. Have students practice using the GPS units to search for the different types and sizes of caches hidden on the campus.

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Suggested Evaluation:

1. Student demonstrates ability to navigate to at least one waypoint using a GPS unit.

Extending the Lesson:

1. Create waypoints along a field trip (related to social studies standards) route and load the coordinates into GPS units. GPS units can be borrowed from the SCGA. Assign a student or students a site along the route to research prior to the field trip. That student or those students will be responsible for using a GPS unit to navigate to their assigned site at which point they will share what they have learned from their research. The SCGA has a PowerPoint presentation describing how to set up this type of field trip.
2. Have students create their own puzzle caches using historical information related to their social studies standards, including codes used in conflicts from the Civil War through World War II.

Resources:

1. Geocaching at <http://www.geocaching.com/>.
2. Google Earth at <http://earth.google.com/>.
3. Audubon Center at the Francis Beidler Forest at www.beidlerforest.com.
4. South Carolina Geographic Alliance (SCGA) at <http://www.cas.sc.edu/cege/>.
5. Singh, Simon. *The Code Book: The Secret History of Codes and Code Breaking*. Fourth Estate. London. 1999.

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Sample Student Data Sheet

Starting Coordinates	Destination Coordinates	Geocache Information
Given lat/long coordinates	Given or discovered	Information or formula necessary to discover the next set of coordinates; or information necessary to verify that the student found the correct geocache; or given coordinates for the next geocache
Lat/long coordinates discovered by completing instructions found in geocache; see <i>Cruise the Campus</i> (section 1.b) for examples of discovered coordinates		