INVESTIGATING THE GRANDE ECORE & RED RIVER: A HANDS-ON INQUIRY

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INVESTIGATING THE GRANDE ECORE & RED RIVER: A HANDS-ON INQUIRY

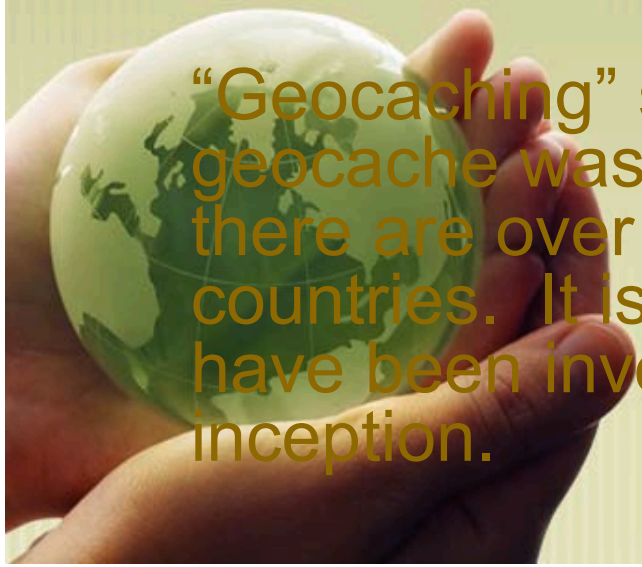
Investigating the Grande Ecore and Red River is an example of a hands-on inquiry approach to teaching Earth science.

Through the use of technology, participants will learn how to navigate basic GPS units to investigate and build natural environments. We will locate and investigate a local geo cache site by taking a brief walking field trip using GPS technology and comparing the early formation of the Red River and Grande Ecore landforms.

Utilizing Internet access, participants will explore Geo and Earthcache sites in and around Louisiana and learn how to utilize science inquiry skills.

What is Geocaching

Geocaching is a worldwide adventure game that involves the hunting for caches, normally small plastic boxes or other containers, using a GPS receiver. The details about the location and additional information for each cache are found on a Web site (www.geocaching.com) that is operated by Groundspeak, Inc.

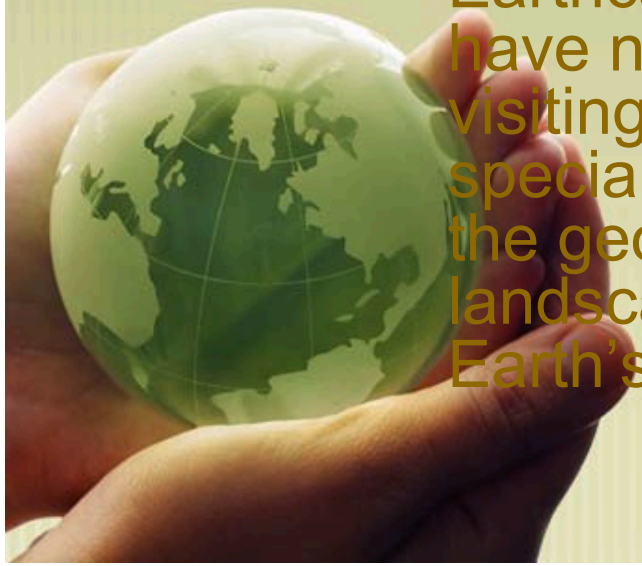


"Geocaching" started on 2 May 2000 when the first geocache was placed in Oregon, USA. Today there are over 360,000 caches in over 200 countries. It is estimated that over a million people have been involved in geocaching since it inception.

What is Earthcaching?

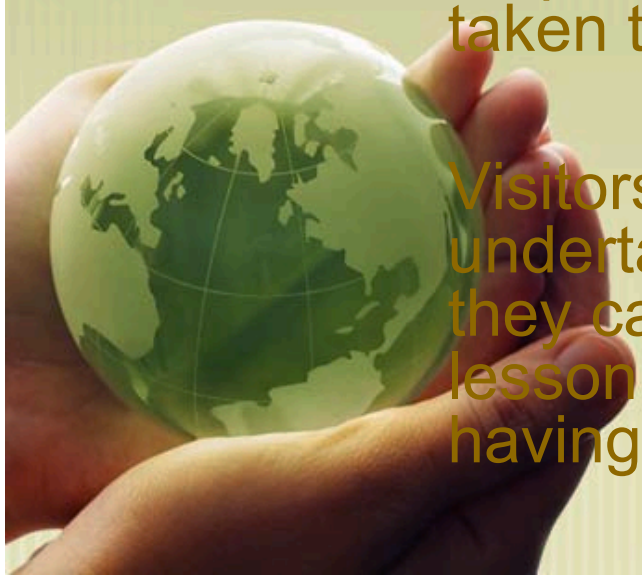
Earthcaching is a type of geocaching that was developed to make the process more educational. It works under the rules of geocaching and has been developed in association with Groundspeak, Inc., the geocaching community, and other partners.

Earthcaches are virtual caches – that is, they have no physical container. The 'reward' for visiting an Earthcache is to learn something special about earth science, and, in particular, the geology of the location and how it affects the landscape and/or the way we manage the Earth's resources and environment.



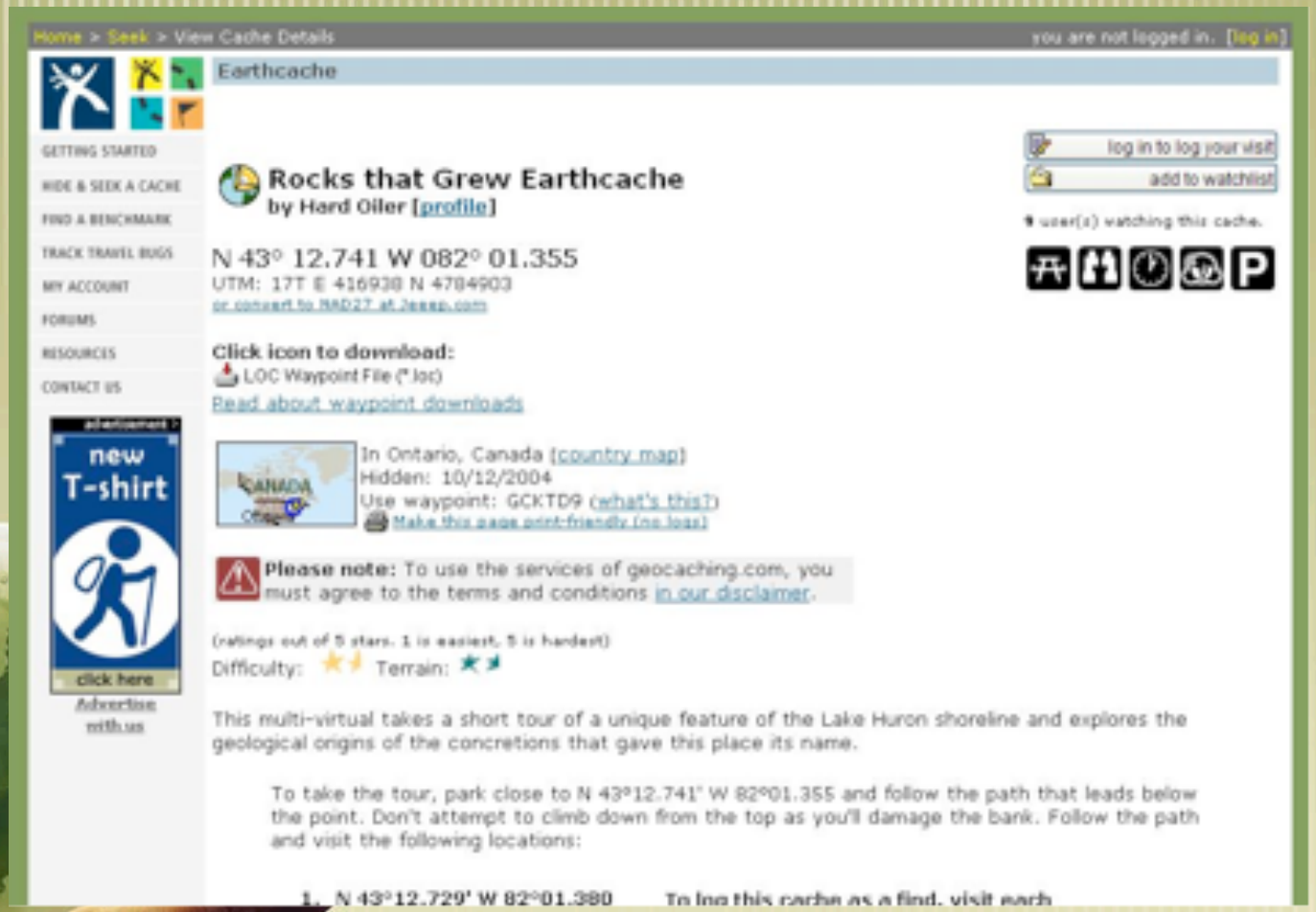
What is Earthcaching?

People who want to visit Earthcaches can gather information about a site and what they will experience there through educational notes provided on the Web site. The notes are written so that an upper-middle school student (reading age 12-14 years) can understand the science concepts. Additional technical notes can also be provided. These pages can be printed and taken to the site.



Visitors to Earthcaches are required to undertake some form of educational task before they can log their visit. This reinforces the lesson in the notes so that they truly leave having learnt something from the experience.

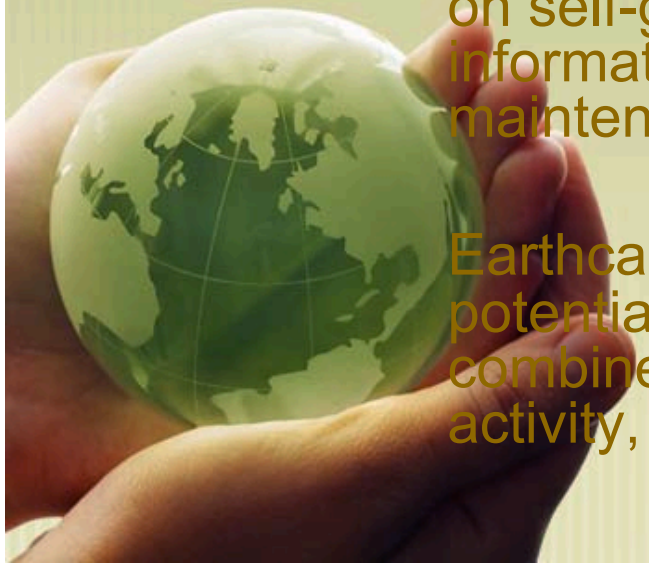
Earthcaching Example



Earthcaching History

Earthcaching started as a pilot program early in 2004. Four initial caches were established in Colorado and two in Australia. Since then, participants have developed an additional 720 Earthcaches in 28 countries. Earthcaches are listed on the geocaching web site and through the www.earthcache.org portal.

Earthcaches are a perfect way to take people to geological monuments, geologic type sections or just on self-guided field trips. They allow you to provide information for the general public without the cost or maintenance of interpretive signs.

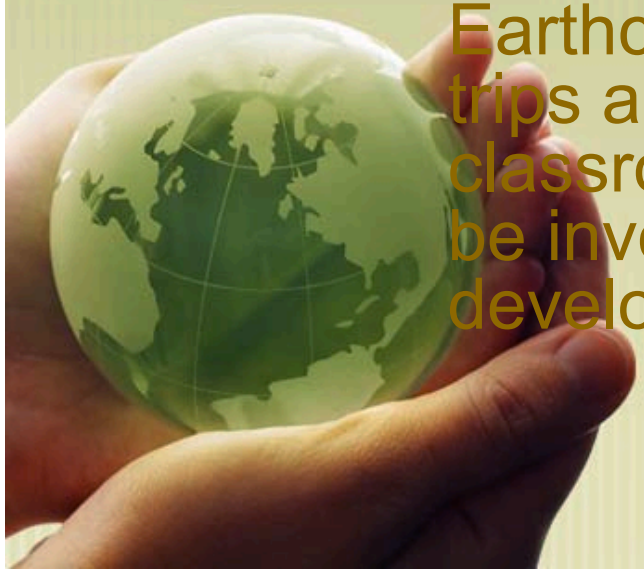


Earthcaches require no maintenance and can potentially exist forever once established. This fact, combined with the rapid growth of geocaching as an activity, will ensure the long-term impact of the project.

Who is Earthcaching for?

The primary audience for Earthcaching is individuals and families who are already involved in geocaching, and the science-interested community.

Because of the educational aspect of Earthcaching, schools will be able to use Earthcaches to assist them in leading field trips and to use GPS technology in the classroom and the field. Students may also be involved in geoscience research when developing their own Earthcaches.

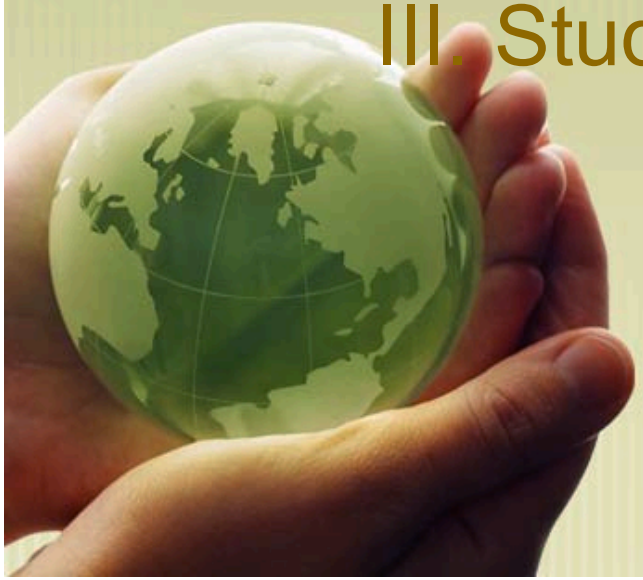


Three Types of Earthcaches

I. Teacher Created Earthcaches

II. Earthcaches on Campus

III. Student Created Earthcaches



Teacher Created Earthcaches

Identify an Objective

- What Geography/Earth Science concept or system do you want to highlight?
- What other subject areas can be brought into the EarthCache? (mathematics, history, art..)

Teacher Created Earthcaches

Develop Educational Goals

- Students will be able to……
  - Observe
  - Measure
  - Compare/contrast
  - Produce
  - Navigate
  - Use technology

Teacher Created Earthcaches

Identify a Location

- Does it meet your objective and goals?
- Can you get permission?
  - National Park?
  - Forest, state, county, private lands?
- Is it accessible?
- Is its safe?
  - Cliffs, roads, railways, fences,
  - stinging plants

Teacher Created Earthcaches

Do the Research

- Educational notes will require some research
- Potential Sources
  - Internet
  - Library
  - University
  - Geological Survey
  - Visitor Centers
  - On site signage etc

Earthcaches on Campus

What can you do when you can't leave campus?

With GPS Unit

- **Develop a Campus EarthCache Site**
- **Create a Cache Tour on Campus**
  - **practice using GPS to find simple landmarks such as lampposts, playing fields, parking spaces, fence lines, etc.**
  - **create a genuine EarthCache on campus not to be submitted**
- **Develop an EarthCaching Orienteering Tour**
- **Develop a Real EarthCache**

Earthcaches on Campus

What can you do when you can't leave campus?

Without GPS unit

- Visit Existing EarthCache Sites
  - Sample Lesson 1 - Erosion
    - sites can be used to create printouts
    - visit sites online using computer projector
    - individual computer access by students
      - sites assigned based on lesson objectives

Earthcaches on Campus

What can you do when you can't leave campus?

Without GPS unit

- Mapping Activities to Meet Standards
  - research earthcache.org online or from printouts
  - find latitude and longitude of various formations
  - locate on map

Earthcaches on Campus

What can you do when you can't leave campus?

Without GPS unit

- Use EarthCache sites to study
  - sort by classification
  - choose U.S. and Canada glacial features
  - mark and annotate on a map
    - location
    - time period
  - research where icecaps are today and compare

Student Created Earthcaches

Do you want students to create an EarthCache?

- Goals for students?
  - Teaching is the best way to learn
    - * Creating an EarthCache is teaching someone about the earth science at that site
  - Research
    - * Students must have the earth science knowledge in order to produce the educational notes for the EarthCache

Student Created Earthcaches

- Goals for students?
  - Determine what type of EarthCache
    - Content
      - Like the Rock and Sand Pit EarthCache
    - Connected
      - Links stops for learning – like Work of Water
    - Community
      - Issues of concern – erosion, landfill

Student Created Earthcaches

- Goals for students?
  - Following directions
    * Adhere and complete the EarthCache Submittal Guidelines (most rejections are because submissions are incomplete)
  - Assess
* Students must come up with appropriate educational logging requirements!
* They must ‘make the test’

Earthcaching onThe Red River

The Relationship Between Earthcaching and Constructivist Science Paradgims

- **The paradigm shift from "Earth Science" to "Geosciences" is indicative of the inquiry based nature of science education.**
- **This shift includes project based learning, service learning, and most importantly, Process Oriented Guided Inquiry Learning or, POGIL.**

Geosciences and The Red River

Characteristics of the Red River Experience

- Culturally Relevant
- Real Life
- Holistic
- Cross Curricular

Development of the GLEs for this Lesson

- Use technology when appropriate to enhance laboratory investigations and presentations of findings (SI-H-A3)
- Interpret geological maps of Louisiana to describe the state's geologic history (ESS-H-C3)
- Determine the results of constructive and destructive forces upon landform development with the aid of geologic maps of Louisiana (ESS-M-A7)
- 20. Describe how humans' actions and natural processes have modified coastal regions in Louisiana and other locations (ESS-M-A8)

Questions

- **What activities changed the course of the Red River at the Grand Ecore?**
- **Why were the levees and revelles formed in the Red River/**
- **What kinds of layers were formed in the banks of the Red River?**

Instructional Strategies

- Cooperative Grouping
- Integrated Instruction
- Differentiated Instruction
- Process Oriented Guided Inquiry

Cooperative Group Jobs

- Photographer-Photograph the environment
- Cartographer-Draws maps of the location
- Geologist-locates and identifies rocks and rock bed formation.
- Reporter-Reports the findings and changes in the river course

Concepts

- The results of constructive and destructive forces on landform development
- Describe how humans' actions and natural processes have modified coastal regions and other locations.
- Drawing topographic maps of landforms.
- Using the appropriate technology and equipment for studying geologic formations.

Project Structure

Students will:

- Develop an earthcache including the geological and historical background of the development of the Grand Ecore and Red River river basin.
- Learners will describe the historical background of the Grand Ecore community.

Erosion of the Red River Banks

- Students will take pictures of the Red River course, levees, archived maps from the Army Corps of Engineers.
- Students who will be serving as cartographers will be drawing maps from the school site using GPS.
- Each reporter will develop a presentation which will be recorded and presented to each class.

Closure

Earthcaching and POGIL are important instructional strategies for at risk students. All three sites for this activity are located in a small urban town with a geological landform located within four miles. This allows at risk learners to participate in an informal science experience.