Teacher Resources: Geocaching

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STEMbound Contact Information

If anything seems missing or damaged, please contact us as soon as possible. Thank you!

Contact	Contact Information
STEMbound Team	Email: STEMbound@sourcewell-mn.gov

Website Quick Links		
STEMbound Home Page	Equipment Check-out Library Equipment Request	Consultant-led Learning Consultant-led Request
STEM Network	Partnership in Planning Request	Professional Learning

You can access the above links and more at: https://mn.sourcewell.org/education/STEMbound

Equipment Snapshot

Geocaching is a real-world outdoor treasure-hunting activity that uses GPS-enabled devices to locate hidden containers ("geocaches"). Teachers or students input coordinates and navigate to specific locations. Once there, they search for the cache, record their findings, and often exchange small items or educational messages. For classrooms, it offers hands-on experiences in navigation, problem-solving, teamwork, and critical thinking. The equipment (GPS units) allows students to explore geography, practice math skills through coordinates, and engage in outdoor STEM-based learning.

- Age appropriateness: Typically designed for ages 5-12, although certain games and applications can be suitable for younger children with assistance.
- Common uses: Outdoor scavenger hunts to learn navigation. Cross-curricular lessons connecting math (coordinates), science (ecosystems), history (landmarks), and technology. Team building and collaboration activities.
- Classroom applications: Geocaching can be a versatile tool but lends itself best to mapping grounds, integrating STEM curriculum to study latitude/longitude, environmental observation, and data collecting, and project-based learning where you can design geocaches, create puzzles, and embed QR codes to name a few.

Operation

It will be necessary for you to play with the GPS for 20-30 minutes to fully understand how they operate.
Setup: Turn on GPS device and familiarize yourself with how it works. The power button is at the top of the device. The screen is **not a touch screen**. You must use the buttons on the left side to scroll up and down and the right side to select (OK) or go back.

How to find longitude and latitude

Navigate > Waypoints > OK > OK > OK > Edit > Coordinates > input desired values > Done > back > back > OK > Go

Maintenance

- Cleaning: Wipe down GPS devices and containers before returning them. Avoid using harsh chemicals.
- Storage: Keep the components organized in their designated containers.

Safety Considerations

- Always supervise younger students outdoors; implement a buddy system.
- Handle electronic devices with protective cases and straps.
- Avoid use in unsafe weather conditions (storms, extreme heat/cold).
- Encourage sunscreen, hats, bug spray, and closed-toe shoes for outdoor excursions.
- Carry a basic first aid kit for cuts, stings, or minor injuries.
- Teach emergency contact procedures and boundaries (stay within mapped areas).
- Avoid placing chemicals, scented items, or food that could attract animals into containers.

Possible Projects

- **Math & Mapping:** Students calculate distances between caches or design coordinate-based puzzles.
- **Science:** Track biodiversity or collect environmental observations at cache locations.
- **History/Social Studies:** Place caches at local landmarks with historical facts.
- **Language Arts:** Write riddles, stories, or poetry to include in cache logs.
- **STEM/Engineering:** Have students design weatherproof cache containers.

Contents Checklist

Please ensure all items and totes are present before and after use.

Item	Picture	Quantity
Garmin eTrex® SE GPS Handheld Navigator, Extra Battery Life, Wireless Connectivity, Sunlight Readable Screen AA batteries included with extras provided.		15
Hanging Pinecone Devious Cache Container		5
Small Cylinder Geocache- Dark Camo		5
Micro Ammo Container Geocache		5
Pelican Cache Container - Small		5
Pelican Cache Container - Medium		5

Usage instructions

General GPS Usage
It will be necessary to play with the device for 20-30 minutes on your own to become familiar and confident using the device before providing it to students.

The power button is at the top of the device. The screen is not a touch screen. You must use the buttons on the left side to scroll up and down and the right side to select (OK) or go back.

As the teacher, you will need to decide how many caches to create and what should be inside them. You are given 25 different containers. You DO NOT need to fill all of them. You can choose how many caches you want to use, fill them, and place them outside in a school forest or around campus. You will want to take the GPS with you as you hide them and mark a way point at the location and record the Latitude “N” Longitude "W” of that item.

Setup
There are many ways to approach geocaching as an educational experience for your students. It may be wise to learn about navigation, cardinal directions, and Latitude “N” Longitude "W” before this experience.

If you are new to geocaching, the general concept is that you have containers (caches) that are hidden (by you) ahead of time, where notes or objects are placed inside them and students need to find the caches, record something while at the location (info on paper or coordinates on GPS device) , return the cache to its original location and repeat the process as many times as you wish (depends how many caches you choose to use).

You will need to familiarize yourself with the device, decide what you want in your caches, place the caches around the school grounds (using the GPS indoors may not work).

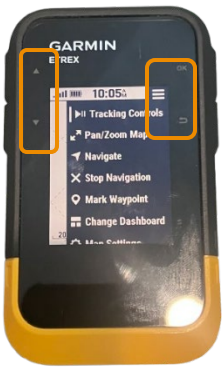
We recommend a general navigation, problem solving, team building experience if this is new to you. Here are two ideas to help you get started.

- 1 Provide students Latitude and Longitude coordinates and need to work as a team locate that spot and find the cache which may have a piece of paper or object that either has content knowledge they need to record, a clue to find the next cache, or anything that students need to remember or record.
- 2 Given written clue(s) to the locations around your school grounds to find caches and once located find and record Latitude “N” Longitude "W” in degrees using the GPS.

Estimated Device Setup Time: 5-30 minutes
How to power on: 3-4 minutes

- Press and hold the Power button (located on the top) until the screen lights up.
- Wait while the device initializes and acquires satellites (place by window or go outside).

Usage basics

Image	Description
	**Most of the information needed to facilitate the cache and show students how to work the device can be found in the "Tracking" tab and the categories and options found within. See below. Click the "OK" button on the right side of the device.**
	Once there, you will find 4 different viewing panels on the left side of the device. Toggle between them with the up and down buttons on the left side of the device.
	Clicking "OK" on any of the 4 different views will open a submenu of options you will find helpful. Note – The submenu may be different depending on the which of the 4 panels you are on.

Considerations

- Do not bury or hide your geocaches under rocks, dirt, or debris.
- Ensure students have appropriate clothing.
- Establish a buddy system for activity.
- Establish and review safety and procedures for students before activity.
- Remind students to place the geocache back exactly where they found it.
- Teach students to log each waypoint/cache found on paper or digitally for accountability.
- Practice a “mock cache” on school grounds before facilitating a full cache activity.

Cleaning and Maintenance

Cleaning

- **Materials Needed:** Disinfectant wipes, microfiber cloth, zip-top bags (for cache contents).
- **Cleaning Schedule:** After each outing—wipe screens and buttons; weekly—deep clean and inspect devices.
- **Proper Storage:** Store in a dry, cool location, preferably in a lockable cabinet or teacher supply closet.

Maintenance

- Check battery power.
- Replace AA batteries if needed by lifting and twisting the metal latch on the back of the device.
- Inspect cache containers for damage or water leaks; report to STEMbound if damage is found.

Troubleshooting Guide

Problem	Solution
Can’t locate satellites or low signal	Take the device outside. Wait. Turn them on and off again.
Batteries low	Change AA batteries with the extra provided. Turn metallic latch on the back of the GPS to open battery access. 

Extension Options

Cross-curricular uses

Grades 5-8
ELA ▪ Cache Clue Writing Students write descriptive clues for geocaches using figurative language. Benchmark: 6.7.1.1 – Write narratives with clear sequences and details. ▪ Environmental Journaling Students reflect on geocaching experiences in nature journals. Benchmark: 7.7.2.2 – Write informative texts to examine a topic.
Math ▪ Coordinate Geometry Challenge Students plot geocache locations on a grid and calculate distances. Benchmark: 6.3.1.1 – Use coordinate grids to solve problems. ▪ Ratio & Scale Mapping Students convert GPS distances into scaled maps. Benchmark: 7.1.1.2 – Apply ratios and proportional reasoning.
Science ▪ Ecosystem Cache Hunt Students geocache to locations representing different ecosystems and record observations. Benchmark: 5E.2.1.1.1 – Record observations and describe patterns in nature. ▪ Weather Station Mapping Students use GPS to locate and log weather stations, comparing data across sites. Benchmark: 6E.2.2.1.1 – Analyze weather data to identify patterns.
Social ▪ Historical Landmark Hunt Students geocache to local landmarks and research their significance. Benchmark: 6.3.1.1 – Use maps and geographic tools to analyze spatial patterns. ▪ Civic Trail Mapping Students create a geocache trail highlighting civic institutions. Benchmark: 7.1.1.1 – Analyze civic responsibilities and institutions.
Art ▪ Cache Container Design Students design and decorate geocache containers with symbolic art. Benchmark: 6.1.1.1 – Create artworks using elements and principles of design. ▪ Nature Sketching at Cache Sites Students sketch landscapes or objects found near geocaches. Benchmark: 7.1.2.2 – Use observational drawing techniques.
Music ▪ Soundscape Composition Students record natural sounds at cache sites and compose music. Benchmark: 6.1.1.1 – Create music using rhythm and environmental sounds.

- Rhythm Mapping
  Students create rhythmic patterns based on GPS coordinates.
  Benchmark: 7.1.2.1 – Use musical elements to express ideas.

Physical Education

- Orienteering Relay
  Students navigate a geocache course in teams.
  Benchmark: 6.1.1.1 – Demonstrate competency in motor skills. Minnesota 2018 Physical Education Standards with edits 4.2022 041922
- Fitness Cache Circuit
  Students complete physical challenges at each cache.
  Benchmark: 7.2.1.1 – Participate in physical activities that improve fitness.

Grades 9-12

ELA

- Technical Writing for GPS Use
  Students write manuals for using GPS devices.
  Benchmark: 9.7.2.2 – Write informative texts with clear organization.
- Persuasive Essays on Outdoor Learning
  Students argue for geocaching as a learning tool.
  Benchmark: 9.7.1.1 – Write arguments to support claims.

Math

- Route Optimization
  Students calculate shortest paths between caches using geometry.
  Benchmark: 9-12.4.1.1 – Model with mathematics.
- Statistical Analysis of Cache Data
  Students analyze time, distance, and success rates.
  Benchmark: 9-12.4.4.1 – Interpret data and make inferences.

Science

- Environmental Impact Study
  Students geocache to sites and collect data on pollution or biodiversity.
  Benchmark: 9E.1E.2.2.1.1 – Use quantitative data to describe Earth processes.
- GPS-Based Field Sampling
  Students use GPS to mark and sample soil or water quality.
  Benchmark: 9E.2.1.1 – Design and conduct investigations.

Social

- Cultural Geography Trail
  Students geocache to sites representing diverse cultures.
  Benchmark: 9-12.3.1.1 – Analyze geographic patterns and cultural diffusion.
- Economic Mapping Project
  Students geocache to businesses and analyze local economies.
  Benchmark: 9-12.4.1.1 – Evaluate economic systems and structures.

Art ▪ Environmental Installation Art Students create temporary art at cache sites. Benchmark: 9-12.1.1.1 – Create artworks that communicate ideas. ▪ Digital Cache Mapping with Visual Design Students design digital maps with artistic elements. Benchmark: 9-12.1.2.2 – Integrate design principles in digital media.
Music ▪ Field Recording Remix Students remix natural sounds into compositions. Benchmark: 9-12.1.2.1 – Use technology to create and refine music. ▪ Cache Rhythm Composition Students create rhythmic pieces based on cache coordinates. Benchmark: 9-12.1.1.1 – Compose music using musical elements.
Physical Education ▪ Geocache Fitness Challenge Students complete fitness tasks at each cache. Benchmark: 9-12.1.2.1 – Apply movement concepts and strategies. Minnesota 2018 Physical Education Standards with edits 4.2022 041922 ▪ GPS Orienteering Tournament Students compete in timed navigation events. Benchmark: 9-12.2.1.1 – Demonstrate advanced motor skills.

Video tutorials

- How To Video Tutorials – This is one video but you will find a set of 11 different videos demonstrating different functions. It is NOT recommended to set up and follow the Geocaching instructions in this video set. It is intended for the general public and will not be suitable for your classroom needs.

User Manual

- Garmen ETREX USER Manual