



THE 2018 SOUTH CAROLINA
**4-H ENGINEERING
CHALLENGE**

GPS Challenge

Challenge Description:

Teams will use a Global Positioning System (GPS) unit to navigate to seven different caches using a given set of coordinates. Once each cache has been located, teams will retrieve a token and be required to problem solve an environmental scenario addressing one of the seven principles of “Leave No Trace”.

Team Requirements:

- 2-4 students per team.
- Age Range: Senior (age 14-19)

Materials Needed:

None. All materials will be provided on the day of the challenge.

Challenge Instructions:

Each team will be given 1 GPS unit (*Garmin eTREX 30*), 1 score sheet, and seven coordinates. The teams will be given 30 minutes to follow the coordinates to each cache where they will retrieve a token and record the environmental scenario on their score sheet.

Upon returning with all seven tokens and scenarios, each group will have 30 minutes to come up with a solution to each scenario that incorporates “Leave No Trace” principles. Each team will then give a 3-5 minute presentation of their solutions to the judges. Each team member must be included in the presentation to receive full points.

Preparation Instructions:

Participants should be able to use a Garmin eTrex 30 GPS unit to find coordinates and be familiar with the seven principles of “Leave No Trace” <https://lnt.org/>.

Judging:

Points will be awarded for each cache found (25 points total for all 7 caches).

Cache tokens will also allow teams to accumulate points (10 points total).

Written description of environmental scenarios on the team score sheet will receive points as well (15 points total).

Oral Presentation (25 points total). Presentation are to be 3-5 minutes in length. Attention to detail will be judged as well as terminology and oral presentation. Each team member has to be included in presentation. Points will be deducted from score if time limit exceeds 5 minutes.

Knowledge of “Leave No Trace” concepts utilized in solution to each scenario (25 points total).

In the event of a tie, 1st place will be decided by additional questions regarding the principles of *Leave No Trace*.

Example Judging Rubric:



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GPS Coordinates (25 pts.)	Cache Tokens (10 pts.)	Description of scenario (15 pts.)	Oral Presentations (25 pts.)	Knowledge of Leave No Trace (25 pts)
Point 1 Coordinates N 34*06.847' W080*50.910				
Point 2				
Point 3				
Point 4				
Point 5				
Point 6				
Point 7				

Background Information:

The GPS contest will be set up using a Garmin GPS unit. The coordinate system that will be used is degree decimal minutes (DDM). This is a decimal version of Degree Minutes Seconds. DDM is used by geocachers and a growing number of other GPS enthusiasts. In this format, coordinates look like this:

Example: N47° 37.216' W122° 19.75'.

The north/south and east/west position remains unchanged. The difference is that the seconds' part of the location is converted to a decimal by dividing the seconds by 60. Position format is a feature that should be adjustable in the GPS unit.

Leave No Trace:

There are 7 principles of *Leave No Trace* <https://lnt.org/>

Plan Ahead and Prepare

- Know the regulations and special concerns for the area you'll visit.
- Prepare for extreme weather, hazards, and emergencies.
- Schedule your trip to avoid times of high use.
- Visit in small groups when possible. Consider splitting larger groups into smaller groups.





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- Repackage food to minimize waste.
- Use a map and compass to eliminate the use of marking paint, rock cairns or flagging.

Travel and Camp on Durable Surfaces

- Durable surfaces include established trails and campsites, rock, gravel, dry grasses or snow.
- Protect riparian areas by camping at least 200 feet from lakes and streams.
- Good campsites are found, not made. Altering a site is not necessary.
 - In popular areas:
 - Concentrate use on existing trails and campsites.
 - Walk single file in the middle of the trail, even when wet or muddy.
 - Keep campsites small. Focus activity in areas where vegetation is absent.
 - In pristine areas:
 - Disperse use to prevent the creation of campsites and trails.
 - Avoid places where impacts are just beginning.

Dispose of Waste Properly

- Pack it in, pack it out. Inspect your campsite and rest areas for trash or spilled foods. Pack out all trash, leftover food and litter.
- Deposit solid human waste in catholes dug 6 to 8 inches deep, at least 200 feet from water, camp and trails. Cover and disguise the cathole when finished.
- Pack out toilet paper and hygiene products.
- To wash yourself or your dishes, carry water 200 feet away from streams or lakes and use small amounts of biodegradable soap. Scatter strained dishwater.

Leave What You Find

- Preserve the past: examine, but do not touch cultural or historic structures and artifacts.
- Leave rocks, plants and other natural objects as you find them.
- Avoid introducing or transporting non-native species.
- Do not build structures, furniture, or dig trenches.

Minimize Campfire Impacts

- Campfires can cause lasting impacts to the backcountry. Use a lightweight stove for cooking and enjoy a candle lantern for light.
- Where fires are permitted, use established fire rings, fire pans, or mound fires.
- Keep fires small. Only use sticks from the ground that can be broken by hand.
- Burn all wood and coals to ash, put out campfires completely, then scatter cool ashes.

Respect Wildlife

- Observe wildlife from a distance. Do not follow or approach them.
- Never feed animals. Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators and other dangers.
- Protect wildlife and your food by storing rations and trash securely.
- Control pets at all times, or leave them at home.
- Avoid wildlife during sensitive times: mating, nesting, raising young, or winter.



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Be Considerate of Other Visitors

- Respect other visitors and protect the quality of their experience.
- Be courteous. Yield to other users on the trail.
- Step to the downhill side of the trail when encountering pack stock.
- Take breaks and camp away from trails and other visitors.
- Let nature's sounds prevail. Avoid loud voices and noises.