

Activity A2: Marking and Finding a GPS Waypoint

*Note: the procedures described below are for use with the blue **Garmin eTrex Legend** GPS receivers (the model supplied in the Advanced Virginia 4-H GPS Educational Kits). The instructions can easily be altered for use with other GPS receiver models.*

Introduction:

Marking a waypoint, a unique position somewhere on the Earth's surface, is a fundamental GPS skill. Waypoints are characterized by latitude and longitude coordinates and an elevation reading in some cases. In this activity, learners will enter names and symbols into GPS receivers to identify their waypoints. They also will learn a second fundamental GPS skill by using their receivers to guide them to waypoints from other locations.

Materials Needed: GPS receivers

Time Involved: 30 minutes

Getting Started:

See "*Preparing GPS Receivers for Group Activities*"

12. Do the Activity:

Your instructions to the students:

"Turn on your GPS receiver. Go to a nearby place that you would like to record as a waypoint. If your receiver says "ready to navigate" then mark the spot by going to the *Menu* page to select and press *Mark*. (Another way to do the same thing is to press and hold the *CLICK STICK*). A 3-digit number and symbol will appear. This is the automatic "name" and symbol of the waypoint, both of which you can change, now or at a later time. To change the number to something more meaningful, highlight it and enter to view a set of numbers and letters you can use to create a new name for your waypoint. Then press *OK*. To change the symbol, highlight the black square and scroll to choose a new symbol. Then press *OK*. Be sure to highlight and press the final *OK* at the bottom of the page in order to save the waypoint, name, and symbol in your receiver.

Now, let's move to another location a few hundred yards away. As you travel, it is okay to scroll through the pages to see what data the GPS receiver is recording – you won't lose any data in the unit! When we arrive at the new location, repeat the process above to mark a second new waypoint.

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Next, find the list of waypoints in your receiver (use the FIND button or the Main Menu). Select *Waypoints*, then *Nearest*. You should see a list of your closest waypoints, along with the distance and direction to each one. Select and press the ENTER button on the first waypoint you marked. One of your options will then be to *GoTo* that waypoint. Select it. Your receiver will automatically switch to the Navigation page, with an arrow in the compass ring. Once you actually start moving, the arrow will keep you pointed in the correct direction as you travel. Your receiver will also continually update the distance to the waypoint. Follow the arrow all the way back to the starting waypoint.”

Some questions for discussion with your students:

1. When you *Marked* a waypoint, what location data did you collect?
(*Latitude-longitude coordinates, approximate elevation*)
2. As you traveled, what kinds of data did the GPS receiver display?
(*Speed, Heading, Odometer, Trip time, etc.*)
3. Why do you need to be moving for the arrow to point correctly?
(*The GPS receiver is not a magnetic compass – it calculates direction using a series of satellite fixes. Note that some models do contain an electronic compass*)
4. When you arrived back at your starting waypoint, could the arrow show you exactly where to stop? Why not?
(*Accuracy is only about 20-25 feet and varies as the satellites move*)

Background Information:

Waypoints are specific locations, entered in a GPS receiver or on a digital map. A waypoint is typically identified by horizontal (x-y = latitude-longitude) and sometimes altitudinal (z = elevation) coordinates, plus an alphanumeric name and a symbol, both of which are selectable. Waypoints may also be known as "points", "markers" or "landmarks", depending on the GPS or cartography manufacturer. Creating and using waypoints are the most fundamental and valuable GPS skills. They will be used frequently in the remaining GPS activities.

Note: Comments and suggestions regarding this activity and other components of the Virginia 4-H GPS curriculum are appreciated. Please contact Mike Clifford at: mjc4h@vt.edu / 804-561-5411 / 11131 Amelia Springs Rd., Jetersville, VA 23083

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