

Overview:

Locations stored in a GPS are called waypoints. Waypoints are coordinates that can be transferred from a GPS to a computer. In this activity the waypoint file will be saved to the hard drive then opened in Google Earth. The locations of the waypoints will appear as Placemarks in Google Earth that can be edited and have additional information added in the description.

Objectives:

The student will:

- mark waypoints with a GPS;
- import waypoints to a computer;
- open imported GPS waypoints in Google Earth; and
- edit Placemarks in Google Earth.

Materials:

- GPS with cable(s) for data transfer.
- Computer with GPS Connect and Google Earth installed.
- STUDENT WORKSHEET: "Importing Waypoints Into Google Earth"

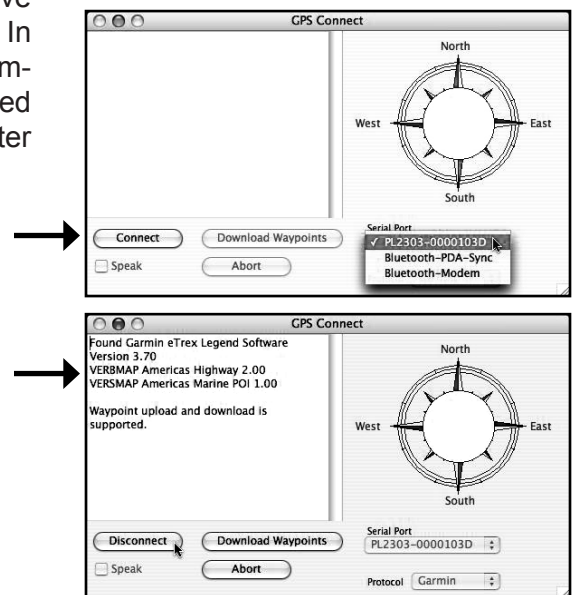
Activity Preparation:

The program GPS Connect needs to be installed on each computer that will be used to transfer waypoints from the GPS. It is available at <http://www.chimoosoft.com/products/gpsconnect>. Once the file is downloaded double click the GPSConnect.dmg file and drag GPS Connect program to the applications folder. (NOTE: If using the browser Firefox, it may be necessary to hold down the option key and click the download button to download the file to the desktop. There are no issues with downloading the file using the browser Safari.)

Computers that will be used to transfer the waypoints from the GPS should be tested to make sure they receive data from the GPS. Garmin eTrex Legend™ GPSs come with a serial cable to connect it to a computer. If the computer(s) being used only have USB ports a "serial to USB" converter cable is needed. In that case, a driver needs to be installed before the computer can recognize the GPS. The driver can be installed from the CD that came with the serial to USB converter cable.

Setting up GPS Connect for the Garmin Legend™ with a USB cable:

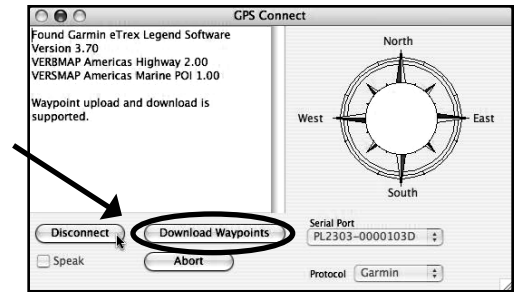
1. Plug the GPS into the computer using the cables and turn the GPS on.
2. Launch GPS Connect and select the connect GPS port.
3. Click the **Connect** button. The GPS name will appear in the window.



4. Test the connection by clicking **Download Waypoints**. The waypoints from the GPS should download and be visible in a list.

Troubleshooting

If GPS Connect does not recognize the GPS, try unplugging the GPS cables from the computer, quitting the program, then plugging the GPS cable back into the Macintosh, turning the GPS on and starting the program. If the GPS is still not recognized it could be due to a problem with the driver, cable or software. A free serial to USB open source driver that works with many cables is available at <http://sourceforge.net/projects/osx-pl2303/>. Installing the open source driver may allow the software to recognize the GPS. If GPS Connect still does not recognize the GPS, then another program, Load My Tracks, can be used. It is available at <http://www.cluetrust.com/LoadMyTracks.html>. Load My Tracks requires OSX 10.4 or above. If the GPS is still not recognized then a cable from a different manufacturer is needed.



Activity Procedure:

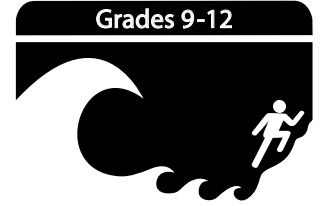
1. Students should have completed the lesson “GPS – Using the Global Positioning System” and be familiar with marking and naming a waypoints with a GPS. It is available at <http://www.aktsunami.com/lessons/GITExercises.html>. Review with students how to mark and name waypoints.
2. Have students use the GPSs to mark waypoints around the community. Give students specific places to mark such as the location of tsunami sirens, the high water mark from a past tsunami, etc. Have them work in pairs or small groups so they have a backup of their waypoints. Be sure they give descriptive names to the waypoints instead of using the Garmin™ default numbers.
3. In class, have students follow the procedure in the STUDENT WORKSHEET: “Importing Waypoints Into Google Earth.” Students will connect the GPS to the computer, download the waypoints and save the waypoint file.
4. Students launch Google Earth and open the waypoint file. The waypoints will open as Placemarks in Google Earth. The name and icon of the Placemarks can be changed and additional information can be added to the Placemark. The Placemarks should be saved to MyPlaces in Google Earth so they can be viewed later or saved as a KMZ file to share with others.

Answers:

1. It helps to determine the location. If the default numbers are used it can be difficult to decide where that waypoint is located.
2. Answer will vary. The waypoints are usually pretty close, but not exactly at the same spot.

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Student Worksheet (page 1 of 3) Importing Waypoints into Google Earth



GPSs can store hundreds of waypoints. It would be very time consuming to manually enter all the coordinates from a GPS into a computer. Luckily, waypoints stored in a GPS can be transferred to a computer with the use of software and a cable connecting the GPS to a computer. Once the file is stored on a computer the file can be viewed in mapping applications such as Google Earth. The waypoints are displayed in Google Earth as a Placemarks.

Importing waypoints from the GPS:

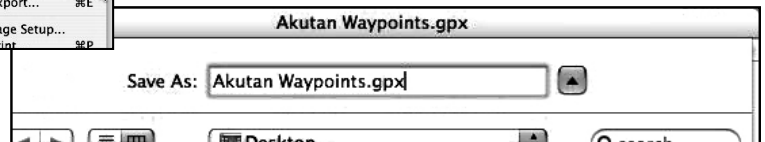
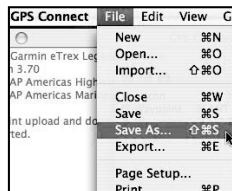
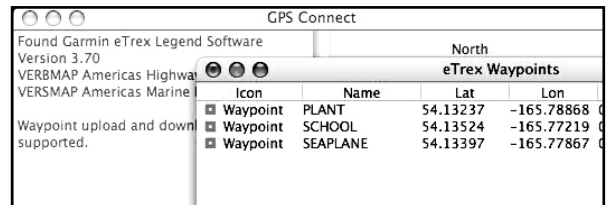
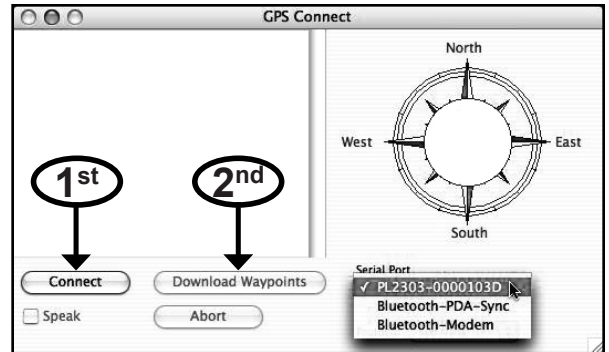
STEP 1. Mark waypoints in the community as instructed by your teacher.

STEP 2. Back at school, connect the GPS to the computer using the cables supplied by your teacher and turn the GPS on.

STEP 3. Launch the program GPS Connect.

STEP 4. Click **Connect** then **Download Waypoints**. The waypoints should transfer to the computer. They will be listed in GPS Connect.

STEP 5. Select **File** → **Save As**. Give a descriptive name to the file **along with the extension “.gpx.”** Save it to the desktop or where your teacher wants the files saved.

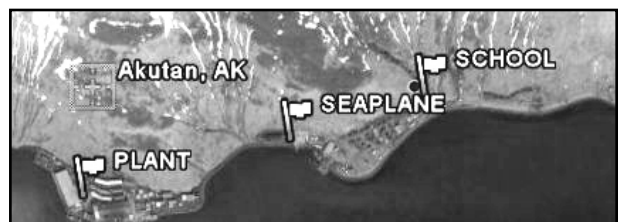
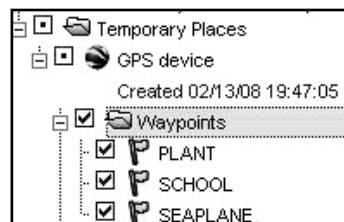


Open the waypoint file in Google Earth:

STEP 6. Launch Google Earth.

STEP 7. From the Google Earth menu select **File** → **Open**. Navigate to the saved waypoint file and open it.

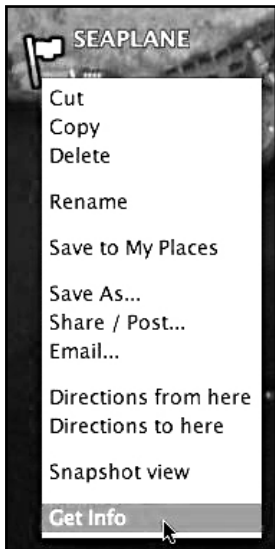
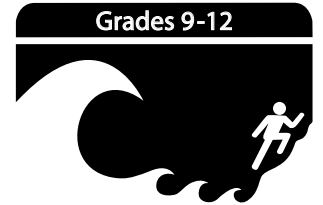
STEP 8. The Waypoints will be added to Temporary Places. Click the “+” sign next to Waypoints to expand the list to show all the waypoints. In this example, three waypoints in Akutan were opened in Google Earth.



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Student Worksheet (page 2 of 3)

Importing Waypoints into Google Earth

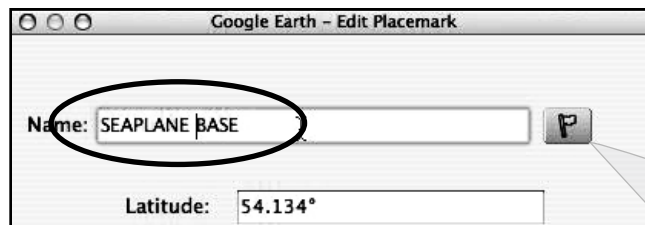


Changing Placemark Names

STEP 9. Changes to Placemarks can be made in the Edit Placemark box. Control click on a Placemark to open the Edit Placemark box.

In this example, the SEAPLANE Placemark has been control clicked to edit the Placemark.

This is the location where seaplanes dock. Change the name from SEAPLANE to SEAPLANE BASE. Click **OK**.



Changing Placemark Icons

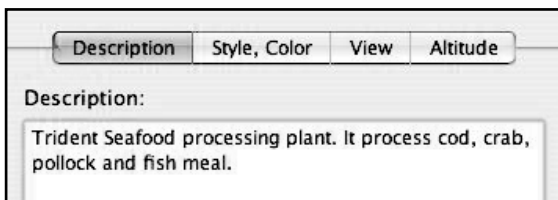
STEP 10. In the Edit Placemark window, click the icon next to the Name to select a new icon for the Placemark. Click **OK** after a new icon is selected.

In this example, the icon for the school Placemark is changed from the flag to a school icon.



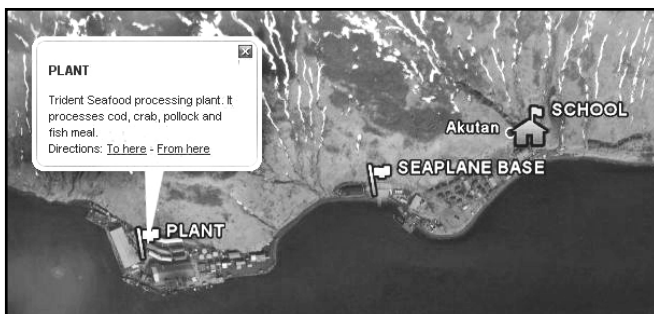
Adding Descriptions to Placemarks

STEP 11. Text can be added to a Placemark in the Description box. This information will be displayed when the Placemark is clicked on in Google Earth. Click **OK** after text is added.

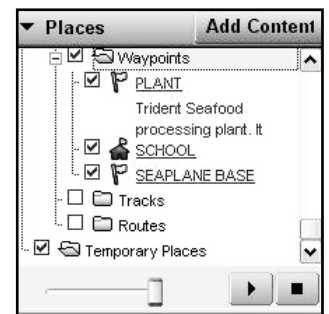


In this example text is added for the "Plant" Placemark. The Google Earth screen showing the changes in the Akutan example is shown.

STEP 12. Currently the Waypoint file is stored in Temporary Places. To save waypoints so they will be available next time Google Earth is used, click and drag the Waypoint file from **Temporary Places** up to **My Places**.

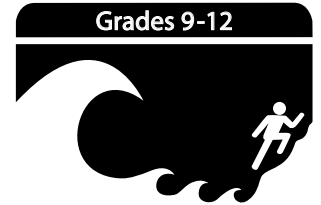


STEP 13. Show the imported Placemarks in Google Earth to your teacher.



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Student Worksheet (page 3 of 3) Importing Waypoints into Google Earth



Questions

1. Why is it important to give a descriptive name to waypoints saved in the GPS?

2. Did the waypoints show up exactly where you marked them with the GPS?
