

Fun in the Sun with GPS: A Beginner's On-Campus Adventure

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Grade Level	High School
Duration	2 55-minute class periods

Arizona Social Studies Standards
Strand 4: Geography Concept 1: The World in Spatial Terms PO 3. Use appropriate maps and other graphic representations to analyze geographic problems and changes over time.
Concept 6: Geographic Applications PO 1. Analyze how geographic knowledge, skills, and perspectives (e.g., use of Geographic Information Systems in urban planning, reapportionment of political units, locating businesses) are used to solve contemporary problems.

Other Arizona Standards
Workplace Skills Standards Standard 7 Proficiency (Grades 9-12) <i>Students know and are able to do all of the above and the following:</i> 7WP-P1. Select and use appropriate technology to organize, send and receive information PO 1. Identify available technological tools. PO 2. Employ appropriate tools to organize, send, and receive information.

Overview

Constantly changing technology is not only fun to use with friends or family, but knowing how to use it can be beneficial when applying for a job or as a means of professional development. Students should be exposed to current geographic tools and skills to prepare them for careers in scientific, geographic, or educational fields.

Purpose

In this lesson students will gain the knowledge of how to use a personal Global Positioning System receiver (GPSr). Additionally, they will be exposed to various careers that use Global Positioning System (GPS) as a means of collecting data or conducting business.

Materials

- Fun in the Sun with GPS: A Beginner's On-Campus Adventure Student Handout
- GPS Teacher PowerPoint Lecture
- Garmin etrex GPSr; 1 receiver per group of four students

Objectives

Students will:

- Use GPS to locate waypoints.

- List ways that GPS is used in science and career fields.

Lesson Components

Prerequisite skills: Students should have some basic geographic knowledge such as “The Five Themes of Geography” and map skills.

Prior Preparation: Before lesson begins, the teacher should practice using the GPSr to locate five distinct locations to be found by students. The teacher should then write/insert the coordinates of these locations onto the student handout before distributing the handout to students.

Session One:

1. Anticipatory Set: Orally ask the following questions and have students discuss:
 - Who has seen or used a GPSr?
 - Where have you seen or used a GPSr?
 - What did you use the GPSr to do?
2. Distribute *Fun in the Sun with GPS: A Beginner’s On-Campus Adventure* Student Handout. Have students read “Overview” and “Directions” sections.
3. Present *GPS* Teacher PowerPoint Lecture. Have students take notes during lecture.
4. Divide students into groups of four. Within each group one student should fill the role of:
 - Facilitator: keeps the team on assigned task,
 - Time Keeper: is aware of the time spent on each section of the assignment and keeps the group moving,
 - Recorder: writes down notes from different speakers to help develop a thorough answer for all, and
 - Reporter: summarizes the ideas said and helps develop a thorough answer for all.
5. Distribute a GPSr to each group.
6. Take students outside to test the GPSr. Check to see that the units receive satellite signals and that latitude and longitude change as students change location.

Session Two:

1. Students work in groups to complete the “Procedure” section of the *Fun in the Sun with GPS: A Beginner’s On-Campus Adventure* Student Handout. Each group of students should start looking for different location so that there is not a “lead group” that other groups follow.
2. Students share their work in discussion with the class.
3. Closure: Have students complete the “Final Thoughts” section of the *Fun in the Sun with GPS: A Beginner’s On-Campus Adventure* Student Handout. Students may complete for homework if time is strained.

Assessment

Students will demonstrate mastery by providing waypoints in the correct location within .003 latitude and .003 longitude on at least 80% or 4 of the 5 locations (teacher will look at the students' GPS units and make sure they created waypoints in the correct location) and complete the "Final Thoughts" questions referring to information given in the PowerPoint lecture.

Extensions

Students could find their own points of interest on campus using a GPSr and trade locations with their classmates. They could then locate these points of interest, mark, and describe them as before.

Students could visit online sources for GeoCaching, such as <http://www.geocaching.com>, and participate in online activities.

Sources

You Tube. How GPS Works.

<http://www.youtube.com/watch?v=PLjld-edVj8&feature=related>

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Student Handout

Overview:

One of the most important tools in the geographer's arsenal is Global Positioning System (GPS). You and your group will be using a Garmin etrex GPS receiver (GPSr) to find five locations, mark them as waypoints, copy down their coordinates and describe the site that you have marked. This is the process that many geographers use so that future researchers can come back to the same location for a variety of purposes such as to collect additional data or expand on the previous research.

Directions:

Take notes as you learn about GPS. You should include pictures as well as key words. A dictionary may be used after the lecture to clarify terminology.

What is GPS?

How Does GPS Work?

What is GPS Used For?

Procedure:

You will be responsible for using the GPSr provided and finding five latitude/longitude coordinates at your school. Your measurement does not have to be exact, but try to get as close as possible (within .003 latitude and .003 longitude is acceptable). When you find these locations you will “mark” them in your group’s GPSr and describe the site. Use language and pictures so that a complete stranger who has never been to this location could find the exact spot you were standing.

<i>FIND</i> Latitude and Longitude	<i>MARK</i> Latitude and Longitude	Site Description
<i>Location 1:</i> N W		
<i>Location 2:</i> N W		
<i>Location 3:</i> N W		
<i>Location 4:</i> N W		
<i>Location 5:</i> N W		

Final Thoughts:

Directions: Respond to the following prompts in complete sentences using correct spelling and grammar.

1. Explain the challenges that your group experienced.

2. Explain the relevance of GPS to your daily life.
