5E Lesson Template

Lesson Author(s)	Mitchell Smith
Lesson Title	Leaving Bread Crumbs
Lesson Source	
Technology Needs (if any)	GPS Garmin etrex
Date/Time Lesson to be Taught	
School	
Supervising Teacher	
Math or Science?	Science
Lesson Concepts	Energy, solar and wind power
Objectives	Students will be able to understand how to work the GPS system. They will also be able to set date points within the GPS system and plot them using ArcGIS
CO State Standards	
Materials List and Advanced Preparation	GPS units, paper, writing utensil, plastic color eggs, prizes of indescribable value, note cards with directions on how to use the GPS.
Safety	• Students will be working outside, so they need to stay with buddies at all times. • Stay in sight of the teacher. • Follow the rules that the teacher has set up. • Follow proper edict when handling the GPS units.
Accommodations for Learners with Special Needs	Students will be working in groups of two. The teacher will work with those students and have already set up point for those students to find. They will stay in proximity to the teacher and or the school.

5Es

1. ENGAGEMENT		**Time: Minutes**
What the Teacher Will Do	**Probing/Eliciting Questions**	**Student Responses and Misconceptions**
• Ask the students if they have ever used a GPS system before. • Show the students how to work the GPS unit system. • Group the students in to pairs of three. • Hand out the note cards with instructions on how to work the GPS units.	• Does everyone know how to work the GPS units? • Does everyone have a partner? • Does everyone have a note card explaining how the GPS system works?	• Students will struggle with the crash course of the GPS system. • Students may not have a partner.
Evaluation/Decision Point Assessment		**Student Outcomes**
All of this lesson is going to be hands on, so there is going to be a lot of informal assessments. I want to make sure that the students are capable of working the GPS system on their own.		Students should have a working knowledge of how to work the GPS units.

2. EXPLORATION		**Time: Minutes**
What the Teacher Will Do	**Probing/Eliciting Questions**	**Student Responses and Misconceptions**
• Explain to the students what it is we will be having them do with the GPS systems. • They have 15 minutes to go and hide 3 Easter eggs somewhere within the respected area, and make on the gps unit where their eggs are located. • Once the students have hidden the 3 eggs they need to meet back at the starting point for a 5 minute debrief on how things went. • Once we have finished debriefing I will have the students switch GPS units with another group. • With the new GPS unit, it is the student's job to find the other groups Easter eggs by using the new GPS unit they just got.	• How did it go hiding the Easter eggs? • What was the best accuracy your GPS unit ever said? • Knowing how accurate your GPS units are, how is that going to affect finding the other groups eggs?	• Students may struggle working the GPS units. • They may struggle to find the eggs due to the fact that our GPS units are only so accurate.
Evaluation/Decision Point Assessment		**Student Outcomes**
Within the exploration, I want the students to hide their Easter eggs and input the information within the GPS device. I also want to see if they are going to be able to find where the other groups eggs. This will tell me if the previous group was able to input the information correctly and/or the seeking group was able to use the GPS device to discover the other group's eggs.		Students should know how to work the GPS units; to be able to set data points, and also find coordinates by using the GPS units.

3. EXPLANATION		**Time: Minutes**
What the Teacher Will Do	**Probing/Eliciting Questions**	**Student Responses and Misconceptions**
This will be done twice during the lesson. Once, in the middle of the lesson; and the second, at the end of the lesson. • For this part it's the teacher's job to see how things went during the hiding and seeking of the eggs. • When the students come back from hiding the eggs, I will ask the students how things went. This will allow for me to see if there is anything I need to go over before I allow them to go and search for the other group's eggs. • I will do the same thing when the groups come back from finding the eggs.	• How did everything go? • Did you have trouble using the GPS units? • Did you find good hiding spots for your eggs? • When seeking… did you have trouble find the eggs? • Was there anyone whose GPS unit said they were close to the egg, but it was still far away? • What was your favorite part about using the GPS units?	• Students may still struggle with using the GPS units. • Students may have a hard time finding the other groups eggs due to the accuracy of the GPS units.
Evaluation/Decision Point Assessment		**Student Outcomes**
Once again this is going to be a lot of informal assessments. I'm going to have them explain what it was they did during the hide and seek portion of the lesson.		I want students to have a good idea of why we are using GPS systems to mark and find specific locations. My end goal is to have the students be able to use the GPS systems to the point of using the GPS without having problems.

4. ELABORATION		**Time: Minutes**
What the Teacher Will Do	**Probing/Eliciting Questions**	**Student Responses and Misconceptions**
Once I have had the students do the activity, my next goal is to have them input their data in the ArcGIS system. This will allow for the students to input their on a map so they can make the correlation to where they were actually at within the park according to the map. • Demo how to us ArcGIS, and how make a new layer with specific data points shown. • Allow for the students to create their own layers with their maps. • Have all the students put their points into one map layer to show where everyone went. • Once finish talk about using a topographical map compared to a GPS unit.	• Does everyone know how to use the ArcGIS program? • What happens if you don't put a negative on your coordinates? • Are the points where you thought they'd be? Why or why not? • How can you relate this to real world activities? • Who would be using programs like this?	• Students may not see the correlation between the GPS unit and actually mapping the data points. • Students may struggle with the real world application of this activity… So might need to have some examples ready to show them. • May not realize the pros and cons of maps and GPS units.
Evaluation/Decision Point Assessment		**Student Outcomes**
The Evaluation point of this portion is actually having the students input their data into the ArcGIS program and actually having their data point show up on the map. This is very cut and dry. If the students did the activity right you will be able to see the points, and if not then you have to figure out where they went wrong.		Students should have a working knowledge of how to input information on to the ArcGIS program. I also want them to make the connection of why using both a map and a GPS system is a good skill to have.

5. EVALUATION		**Time: Minutes**
What the Teacher Will Do	**Probing/Eliciting Questions**	**Student Responses and Misconceptions**
Overall, there are a few things that I want my students to come out with on this lesson. One, that they know how to use a GPS system, meaning they know how to mark points and also that they know how to use a GPS unit to find specific locations that have already been set up. Two, I want the students to be able to take the information from the GPS units and input into a program that allows for them to actually place them on a map. Hopefully, by doing this the students would be able to understand the correlation between the GPS and actual map making.		

Differentiation	**Time: N/A**
Students who are behind or need support.	**For advanced or gifted students.**
I will have the students work in groups so if they miss a day, their group-mates can inform them of what they missed. I will also have them in groups to help each other out when they need support, and I will also be there to help out if no one in the group can figure out the issue.	• Have them help out other groups. • Have them set up more data points. • Have them input the whole class's information onto one map. • Have them find specific points just by using the maps.

GPS Instructions for Garmin "etrex"

Buttons:

Right side-

- Power button (lower button)
- Page button (upper button)
  - Scrolls through pages.
  - Back button

Left Side-

- Enter button (lower button)
  - Selects highlighted fields.
- Scroll arrows (upper 2 buttons)
  - Moves the cursor up and down.

Marking Points:

1. Hit the page button until you find the **MENU** page.
2. Move the highlighter over the word **MARK.**
3. Hit the enter button on the bottom left side.
4. The highlighter defaults to the work **OK.** Hit the enter button again to mark the "waypoint"
5. Repeat steps 1-4 to mark other points.

Finding Points:

1. Hit the page button until you find the **MENU** page.
2. Using the arrow buttons highlight the word **WAYPOINTS** and hit the enter button.
3. Once in the **WAYPOINTS** screen, hit the up and down arrow until you find the column with the specific waypoint, and then hit the enter button.

4. This will more the highlighter into the next row.
5. Once you have the highlighter on the correct waypoint, hit the enter button to select the programmed point.
6. This will take you to the **REVIEW WAYPOINT** screen.
7. Use the up and down arrows until you highlight the word **GOTO.**
8. Hit the enter button, and it will take you to the **COMPASS** screen.
9. Follow the compass until you find you destination.