

Global Positioning System Lesson Plan

Intermediate reading lesson

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Teacher Notes and Key

Age: Young Adults / Adults

Level: Intermediate

Time: 1 hour 30 minutes

Objective: to practice speaking skills by discussing the use of GPS ; to improve listening skills ; to learn and practice vocabulary related to the theme of GPS; to read and write about GPS; to learn how to communicate information in speaking and writing

Key skills: reading, listening

Materials: one copy of the worksheet per student; recordings (Part 1 and Part 2)

Procedure

Use exercises 1, 2 and 3 as a lead-in/warmup to pave the way for learners to get familiar with the theme of the lesson. They can discuss in pairs, in groups with each other or with the teacher.

Exercise 4 gets learners closer to the reading text. Use the true/false statements to help learners narrow down their expectations and prepare them to focus on the ideas covered in the text.

Key

a) False b) True c) False d) False

Exercise 5 helps learners understand the structure of the text and the ideas discussed in it. It also motivates them to contribute their ideas in the light of their understanding of the text.

Key

1. GPS is a utility that provides users with positioning and navigation services
2. An assisted GPS receiver gets help from nearby cellular towers to get a fix, unlike a dedicated GPS receiver, which acquires a signal directly from satellites.
3. Smartphones have little room to accommodate a big GPS chip, and to save battery power.
4. What may make GPS unreliable is non updated GPS maps and data that do not take traffic changes in directions, routes and proper roads for driving into account.
5. These include locating stolen vehicles, finding victims of kidnapping, and monitoring children on their way to and from school.
6. This answer depends on learners' own opinions.
7. This answer depends on learners' own opinions.
8. This answer depends on learners' own opinions.

Exercise 6 gets the learners to find specific information in the text and organize it in a table.

Key

GPS Receiver	Definition	Features and characteristics
Regular GPS Receiver	It is a device designed specifically for GPS navigation and localization purposes by acquiring a signal directly from satellites.	It has a strong GPS chip and it does not need cellular towers.
Assisted GPS	An A-GPS receiver is found mainly on smartphones	It has smaller GPS chip to save battery power and because there is not enough space on the phone to accommodate it. It requires help from cellular towers to reduce TTFF.

Exercise 7 draws learners' attention to vocabulary items specific too the theme of the lesson.

Key

a) Time To First Fix b) Constellation c) Trilateration d) GPS tracker

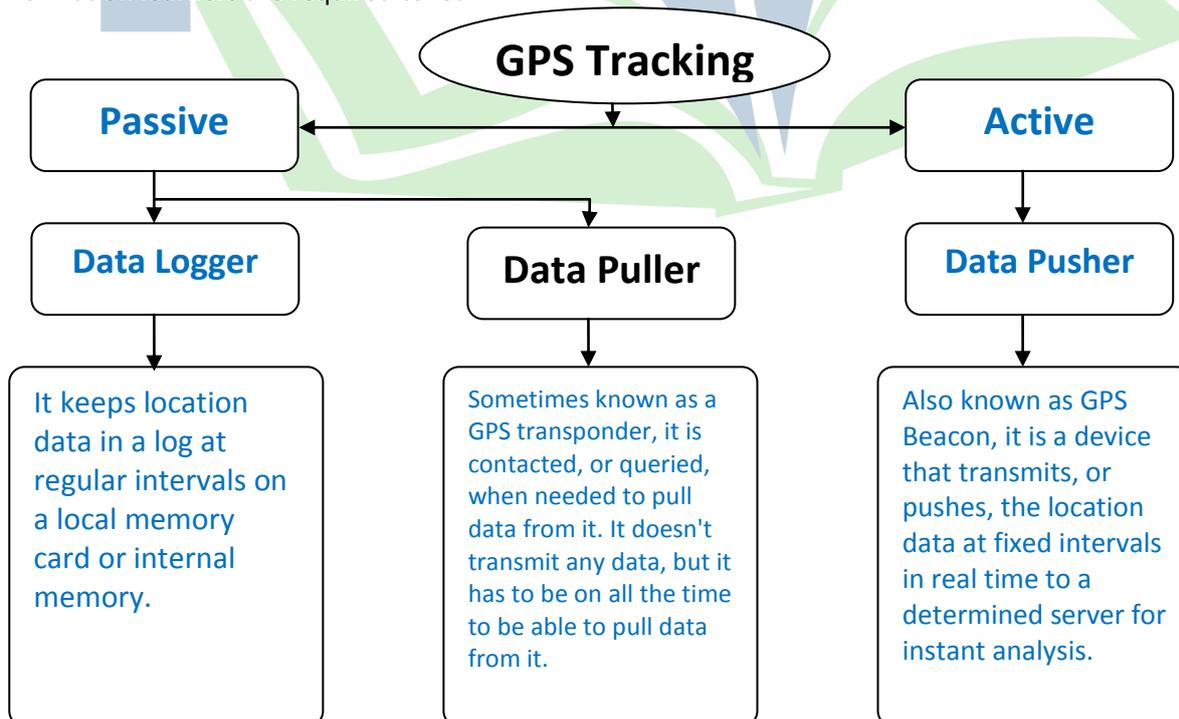
Exercise 8 is an opportunity for learners to use the vocabulary items they learnt in the previous exercise in a different context.

Key

a) GPS tracker b) trilateration c) constellations d) Time To First Fix

Exercise 9 transitions the lesson towards the listening part. The recording is split into two parts. This exercise covers Part 1. This activity is a lead-in to the next exercise.

Exercise 10 deals with Part 2 of the recording. Learners listen for specific information and they organize it in a chart. Both the table in exercise 6 and the chart in this exercise sum up the gist of information learners are required to learn.



Exercise 11 is a continuity to exercise 10. This time, learners exploit the information they have learned from the previous exercise in a different way to help them with understanding and vocabulary retention. This exercise also prepares learners for the writing activity.

Key

a) Data Pusher

b) Data Pusher

c) Data Puller

d) Data Logger

Exercise 12 is a consolidation activity. It is recommended to encourage learners to use information they learned from the reading text in completing this exercise.

Exercise 13 is a follow up exercise in the form of a homework assignment. The learners practice doing research online to learn more about the theme of the lesson.

Audio script

Part 1

Have you ever wondered how the police can locate a stolen vehicle? How do athletes track their outdoor jogging paths?

Have you ever wondered how it is possible to track the itinerary of a travelling vehicle? If this is the case, then you should probably learn about GPS tracking system.

All this is possible thanks to GPS tracking devices, or units, that can be attached to a vehicle or carried around by a person, regardless of whether they are aware of it or not. This tracking unit records location data, which is either stored on the device for later retrieval, in the case of passive tracking, or transmitted in real time to a dedicated server where it is analyzed, in the case of active tracking.

Part 2

There are three main types of GPS tracking devices. First, there is the GPS Data Logger. As the name suggests, this device keeps location data in a log at regular intervals on a local memory card or internal memory. This data can be downloaded to a computer with the appropriate software to analyze the data. The next type is the Data Pusher, also known as GPS Beacon, a device that transmits, or pushes, the location data at fixed intervals in real time to a determined server for instant analysis. Finally, there is the Data Puller, sometimes known as a GPS transponder, which is contacted, or queried, when needed to pull data from it. A Data Puller doesn't transmit any data, but it has to be on all the time to be able to pull data from it.

Global Positioning System

Speaking

1. Which of the following would you choose to use to find your way in a) a forest, b) a city, c) on the road to another city?

Compass – GPS receiver – a map

2. Which one do you think is more reliable? Explain.

3. Discuss the following ideas. Do you agree or disagree with each one of them?

- There is no need for maps and compasses anymore. We can always use GPS.
- You should only trust your instinct to find directions if you were lost.
- You cannot trust a GPS receiver because it may give you wrong directions.
- Almost all smartphones have built-in GPS. You do not need to know how to read a map.

4. State whether these statements are true or false. Read the text and check your answers.

- a) An Assisted GPS receiver is as powerful as any other GPS receiver.
- b) A GPS receiver requires four satellites to get an accurate position.
- c) If one of the satellites breaks down, GPS service becomes unstable.
- d) The satellite coverage may not be available all over the earth all the time.

Reading:

Getting around using GPS

You have probably heard of Global Positioning System (GPS) and you may have a GPS equipped smartphone or a GPS receiver built in your car dashboard. But have you ever asked yourself how it works or where the navigation information comes from and how?

GPS is a utility that provides users with positioning and navigation services that are available for civilian users for free all over the world. You have the choice between a dedicated GPS receiver or the use of the Assisted GPS (A-GPS) on your smartphone. It is so called because it gets help from nearby cellular towers to get a fix. This helps save battery power and reduces Time To First Fix (TTFF).

Unlike dedicated GPS receivers, smartphones have little room to accommodate a big GPS chip. The latter uses up battery power that the smartphone cannot afford. Because the chip on the smartphone is small and uses limited power resources, it cannot pull in weak satellite signals. This is why it needs help from cellular towers.

There is a constellation of at least 27 satellites orbiting the earth, at least 24 of them are operational and the rest are kept for backup in case of failure. The orbits of these satellites are mapped in such a way that there are at least 4 satellites visible in the sky anywhere from earth at any time. A user needs a GPS receiver to communicate with four or more satellites to determine its location through

what is referred to as 'trilateration.' The satellites send radio signals to the GPS receiver to get a fix on your location. Although three satellites are enough to get a position, the latter won't be as accurate as that determined by four satellites.

GPS is not absolutely reliable as it can go wrong and cause accidents and even tragedies. There are numerous reports in the news about users getting into tragic accidents because of bad GPS directions that led them into one-direction roads, forests, blocked roads, and even right into a lake or to a cliff's edge. These accidents are mainly due to non-updated GPS maps and data that do not take traffic changes in directions, routes and proper roads for driving into account.

However, GPS is not always the cause of accidents and disasters; there are numerous cases in which GPS has helped save lives. There are cases in which the police have been able to locate criminals thanks to GPS trackers. This has also saved many victims of kidnapping and has helped track stolen cars. Just recently, a journalist investigating ivory trafficking has been able to track the journey of an ivory tusk from Africa thanks to a GPS tracking device. GPS trackers can also help parents trace their children's safety on their way to and from school.

Just like any other technology, GPS has a negative and a positive side and needs to be used responsibly. We cannot rely on technology blindly and trust it to replace our intelligence and common sense. Technology is meant to help us make our lives easier, not to make decisions for us.

5. Answer the following questions from the text

- a) What is GPS?
- b) What is the difference between the types of GPS mentioned in the text?
- c) Why do smartphones have small GPS chips?
- d) What may make GPS unreliable?
- e) What positive uses does GPS have?
- f) What do you think of GPS in comparison with maps and compasses?
- g) What do you need to keep in mind when using GPS?
- h) What do you think of our use of technology?

6. Fill out the following table with information from the text

GPS Receiver	Definition	Features and characteristics
Regular GPS Receiver		
Assisted GPS		

7. Find words in the text with the following meanings

- a) The amount of time a GPS receiver requires to receive navigation data from satellites to calculate its position.
- b) The gathering or assemblage of a group of satellites or stars

- c) A mathematical technique to determine a user's position through radio signals by calculating distance to each satellite.
- d) A device that uses GPS to monitor and follow the location or movement of a person or an object.

8. Complete the following sentences with the phrases from the exercise above

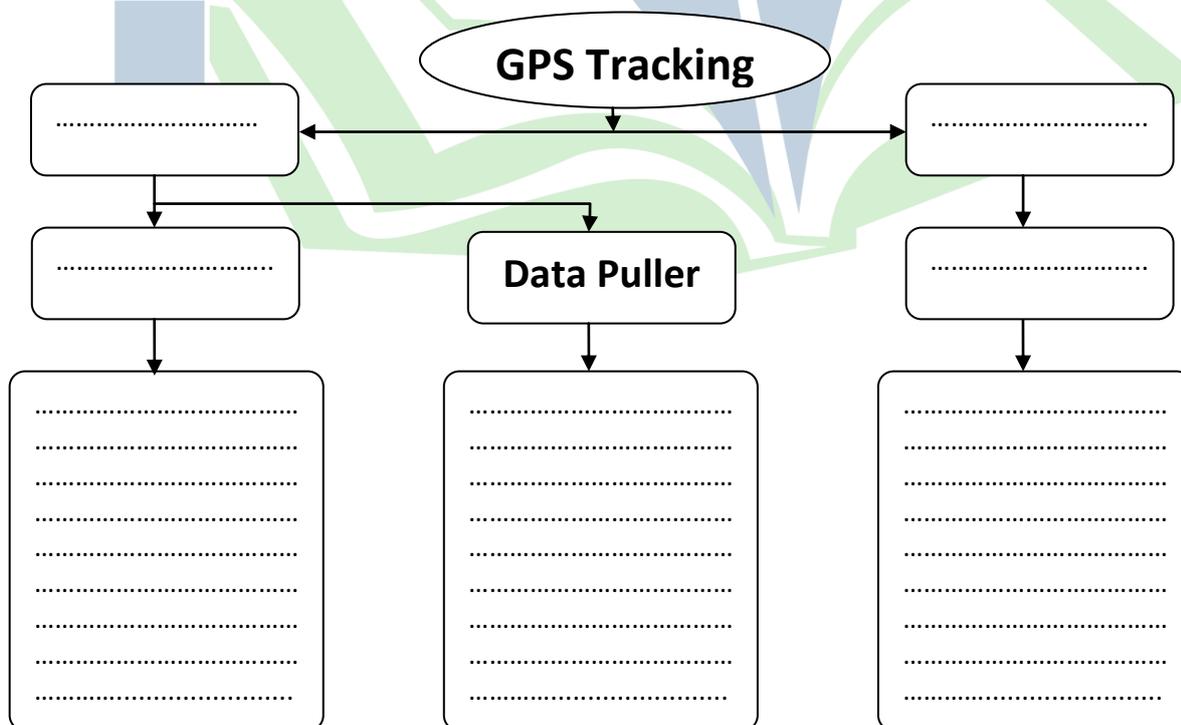
- a) There are numerous apps that transform a smartphone into a to find friends and get directions to their whereabouts.
- b) Many people mistakenly use triangulation and interchangeably because they do not know the key difference between the two.
- c) In 1930, the International Astronomical Union defined the names and boundaries of eighty eight in the entire sky.
- d) If a GPS receiver has been turned off for a long time, the gets longer and some devices may take up to 12 minutes.

Task: Choosing a GPS tracker

9. Discuss the following statements with your partner. Listen to Part 1 of the recording and correct the wrong information in each statement.

- 1. It is not possible for people to carry a GPS tracking device.
- 2. A GPS tracking device always has to be visible on the vehicle to which it is attached.
- 3. GPS tracking units are used only for passive tracking.
- 4. The information collected by the GPS device has to be sent immediately as it cannot be stored.

10. Look at the chart below. Listen to part 2 of the recording and fill in the necessary information. Listen again and add any information you missed.



Speaking

11. Look at the information you filled in the chart. Decide which type of GPS tracker is appropriate for each of the following situations. Give reasons for your choice.

- a) A delivery service company wants to track its fleet of vehicles. The company wants to know whether a given vehicle arrived on time at the specified destination. The data needs to arrive in real time to keep track of the actual location of the vehicle.
- b) A taxi company needs to log the destinations its vehicles travelled to, the time they took to arrive there, and the distance they travelled. This information is used to evaluate the drivers' performance. In some cases, the location data is needed to determine which vehicle is close to a given location.
- c) The police want to locate a stolen car equipped with a GPS tracking device. The tracking unit can be activated via an SMS to get it to send its location.
- d) A scientist studying animal behaviour wants to track the movement pattern of an animal. This will help the scientist determine the boundaries of this animal's habitat.

Writing

12. Choose one of the situations above and write a short paragraph explaining why one of the trackers is more appropriate than the others. Give the reasons for your choice.

Homework assignment

13. In Paragraph 6, the writer mentions the example of the journalist who succeeded in tracking the location of an ivory tusk thanks to a GPS tracking device. Look for information about this topic online and write a paragraph. Include the following information:

- **Where the journalist planted the tracking device;**
- **How he tracked the location of the device;**
- **The information he has gathered; and**
- **What he has learned from this experience.**