

# GPS and GIS Technology in Ag

## Grade Level(s)

Middle School

## Estimated Time

30 minutes

## Purpose

Students will learn how GPS and GIS technologies are used to improve agricultural production.

## Materials

### ▪Links:

Website with virtual resources: [www.linncoag.com](http://www.linncoag.com) -2020/21 virtual learning drop down tab- March

Book: Iowa Ag Today Issue 1, technology page [file \(iowaagliteracy.org\)](http://file.iowaagliteracy.org)

What happens when a farming goes high-tech? <https://youtu.be/tbkTi3zNN9s>

Where will robots go next? <https://youtu.be/hjd5DaxkLhQ>

How a GPS works <https://youtu.be/IoRQiNFzT0k>

### ▪Worksheets:

Where in the world activity sheet

### ▪Other:

Computers with internet access

Atlas or maps

## Vocabulary

**Geographic Information Systems (GIS):** a computerized data management system used to capture, store, manipulate, analyze, manage, and display spatial information

**Global Positioning Systems (GPS):** a space-based satellite navigation system that provides location and time information in all weather conditions anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites

**precision agriculture:** an information technology-based site-specific farm management system that collects and responds to data ensuring that crops receive exactly what they need for optimum health and productivity

## Background - Agricultural Connections

**Global Positioning Systems (GPS)** and **Geographic Information Systems (GIS)** are areas of emerging technology in agriculture. In this lesson students will learn how GPS and GIS technology is used to improve agricultural food production. GPS and GIS are both used in **precision agriculture** for many purposes including farm planning, field mapping, soil sampling, crop scouting, and yield mapping. GPS technology also provides tractor guidance and allows farmers to operate tractors and equipment in low visibility situations. These advanced systems enable farmers to accurately manage their crops by applying the precise amount of pesticides, herbicides, and fertilizers to crops. Farmers can also monitor problem areas in a field where crops may be struggling with weeds or disease. Once farmers have collected important data about their land, GPS technology allows them to precisely navigate their field and manage crops year after year. The precision that comes from using GPS and GIS technology reduces expenses for farmers, increases yield, and produces a more environmentally friendly farm.<sup>1</sup>

### Procedures

1. Watch the instructional video (link provided above) and read about GPS in the Iowa Ag Today Mag.
2. Show students the videos “What happens when Farming goes High-Tech?” and “Where will robots go next?” Both are short videos.
3. Ask the students if they know of any other high-tech examples of agriculture. Keep a list on the whiteboard and add other ideas throughout the lesson.
4. Define GPS and GIS. **Geographic Information Systems (GIS):** a computerized data management system used to capture, store, manipulate, analyze, manage, and display spatial information. **Global Positioning Systems (GPS):** a space-based satellite navigation system that provides location and time information in all weather conditions anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites
5. How does a GPS work? Brainstorm as a class and then show the video “How GPS works.” Explain that Technology plays an important role in agriculture, which provides the food, fiber, and shelter needed to cover the basic needs of people everywhere. There are a variety of careers available in agricultural technology.
6. Instruct the students to journal about how GPS and GIS have changed agriculture. Predict what farming will look like 15+ years from now.
7. Pass out the where in the world worksheet and computers. Follow worksheet instructions.

### Organization Affiliation

National Ag in the Classroom

### Agriculture Literacy Outcomes

**T4. 6-8.d.** Discuss how technology has changed over time to help farmers and ranchers provide more food to more people.

### Iowa/ Common Core Standards

**SS.6.18** Explain how changes in transportation, communication, and technology influence the movement of people, goods, and ideas in various countries.