



UNIT 10: AGRICULTURAL TECHNOLOGY

Agriculture... It's Out of This World

Grade level: Primary

NATIONAL
STANDARDS
NL-ENG.K-12.2
NS.K-4.3
NS.K-4.4

Student Learning Objectives

After completing this lesson, students will be able to:

1. Define Global Positioning Systems (GPS).
2. Explain how GPS technology assists farmers.

Time: 50 minutes

Tools, Equipment, and Supplies: Writing surface, copies of Teaching Master 27:1

Key Term: Global Positions Systems (GPS)

Background Information

Agriculture in the 21st century is very different from agriculture of previous generations. The industry has become very complex; farmers now rely on many new technologies to help ensure their businesses are successful.

Agricultural research scientists work with NASA and the Earth Observing System to give farmers a complete overview of their farms by using satellites. The satellites allow farmers to assess crops for damage, map soil conditions and look for changes in the environment that could affect the season's crop or the overall farming operation.

These satellites form a **Global Positioning Systems** or **GPS**. **GPS** is a computerized tool that maps and examines the Earth showing its existing conditions and predicting situations that may occur. **GPS** works through satellites that continuously transmit signals to the Earth and gather information from them. Farmers can mount **GPS** receivers to equipment and receive information that helps them make important decisions about their farming operation. They can determine the appropriate amount of fertilizer to use at various locations in their fields, how to control weeds, insects and disease, and they can even predict crop yields.



NOTES

Interest Approach

How many of you like to travel? How many of you have ever traveled to another state? How about another country? It looks like we have a bunch of experienced travelers! Today we are going on an adventure. We are going to join Cob as he visits a farmer.

Use the Me You Us e-Moment® to have the students brainstorm some ways in which the farmer travels to space. Capture the responses on the board.

OBJECTIVE 1: Define Global Positioning Systems.

Great! It looks as if we are ready to travel with Cob to meet the space traveling farmer.

Read Activity Sheet 27:1 to the students. For older students copy the story and have them ready along or read the story independently.

OBJECTIVE 2: Illustrate how GPS technology assists farmers.

Cob and Farmer Fred may not have gone on a wild adventure to space this time, but Cob did learn a lot about **GPS**. I hope you all learned some new things about how farmers use **GPS** to help them on the farm.

Use a Picasso e-Moment® to have the students illustrate how farmers use GPS technologies on the farm. You may want to brainstorm a list on the board based on the story or provide each student with a copy of the story so they can review it for ideas.

REVIEW/SUMMARY

Those pictures are awesome! We can see now how important **GPS** is to farmers and how it can help them make important decisions on the farm. Maybe one day, farmers really will get to travel to space to collect information or even to farm new crops! As technology changes and new advances are developed, the agriculture industry will continue to change. These changes will help the agriculture industry to be even more successful.

REFLECTIVE REVIEW QUESTIONS:

- Why is it that **GPS** data are so important to farmers?
- Who else uses **GPS** data to help them do their job?
- What are other technologies you have seen that may be used on the farm?

10:1 - 3



Transparency Master 27:1

Cob's Space Adventure

NOTES



Cob rushed to his mailbox, anticipating the arrival of a package. And there it was! His supersonic extra-terrestrial space suit was finally here!

"Oh boy," thought Cob, now I can find out first-hand about all the space travel that Farmer Fred's been doing!"

Cob hopped on the back of the milk truck, hitching a ride to Fred's farm.

"Farmer Fred, Farmer Fred— I'm ready for our space adventure."

Farmer Fred looked down at the big ear of corn and laughed when he saw his little silver jacket and boots.

"What on earth, Cob...what are you doing here? Oh well, now that you're here, let's



NOTES

take a little trip that'll be out of this world!"

"Yes," cried Cob. "I'm going to space, I'm going to space..."

Fred picked up Cob and took him to his office.

"Hmm, this doesn't look like a launching pad," thought the would-be space explorer.

"This is my computer, Cob. Every day I visit my computer, which has been collecting information about my farm from a satellite. The computer has a GPS receiver on it—that's short for Global Positioning System."

"The GPS gathers information from satellites that orbit in space. The information I gather from the satellites is varied. I might learn the latest weather data, reports from the worldwide

grain markets, banking information, moisture detectors for the soil, digitized maps

that tell me an area has an infestation of insects or even weeds. All this information helps me make good decisions about what I need to do on my farm that day."

"Cool. But when do we blast off?" wondered Cob.

"Let's go out to my tractor now and I'll show you another GPS," said Fred, scooping up the little astronaut.

"A rocket launching pad on a tractor? What will they think of next?" thought an amazed Cob.

Farmer Fred and Cob got aboard the big tractor.

"See this, Cob. This is a GPS receiver and it's like a mini-computer for my tractor. This receiver is used to record locations. It will record information like how much fertilizer or chemical I apply in a certain location of the field, and it can record information like the moisture in the soil, the weed density, and even crop yields."

"Wow. I never knew farmers were so high tech," thought Cob.

Farmer Fred continued, "Well, Cob, in order for farmers to produce enough food to feed the world, we need to rely on all sorts of information and the GPS is one tool to help us. Come on, let's go for a ride!"

With that, Farmer Fred powered up the big machine. It rumbled, shook, and made loud engine sounds. Cob had never been in such a big noisy machine before and he wasn't sure he liked it.

"Uh, Farmer Fred, I think I'll just stay here on earth," said Cob as he leapt from the tractor to the ground. "I'll leave the space stuff to you humans."