Teacher's Guide

Underground Aquifer Water: Precision Farming

Planet H_2O

Grade Levels:
Intermediate
Junior High

Subject Areas:
Environmental Education
Technology and Civilization
Social Studies

Synopsis:

In Nebraska, young Jack Nelson tours his father's farm by ATV and tractor. He shows viewers how acres and acres of corn and soybeans are irrigated by gravity flow or pivotal irrigation systems and how these systems are controlled to produce the highest yield and conserve water. His father explains that the fields are not irrigated by surface water but are totally dependent on the Ogallala Aquifer. After years of drought he is concerned that not enough water is being returned to the aquifer. On a neighboring farm, Jack observes the latest farming technology: the use of GPS and GIS systems to remotely control farm equipment and photograph water use related to crop yield. Jack's excitement over these precision farming methods shows his hope that technology will be the answer to achieving sustainable agriculture.

Learning Objectives: Students will:

- Understand the importance of water conservation.
- Explain the difference between gravity flow and pivotal irrigation systems.
- Appreciate the need for sustainable agriculture and agriculture's dependence on sources of water.
- Provide examples of the use of technology in precision farming.

Vocabulary:
Cornhusker State, gravity flow irrigation, center pivot irrigation, aquifers, GIS (Geographic Information Systems), GPS (Global Positioning System), precision farming, precision crop management

Pre-Viewing Discussion:

What food crops are grown in Nebraska? Why do these crops thrive in this state?

What is the source of water for Nebraska farms? Are the farms solely dependent on surface water?

What are large underground sources of water called? How do they differ from wells?

Can you think of a way that the GPS or other satellite-based tracking systems could be used in farming?

Post-Viewing Discussion:

Why does Jack prefer the pivotal irrigation system to the gravity flow system?

With the Ogallala Aquifer providing so much of their water, why is Mr. Nelson still concerned about water conservation?

How do you know that Jack will make an enthusiastic, knowledgeable farmer when he is an adult?

What is precision farming? How are GPS and GIS systems used in this type of farming?

Further Activities:

Find other examples of precision farms and the technology used in precision farming.

Using maps and Internet resources, determine the location and extent of other aquifers in the United States.

Investigate how aquifers sustain agriculture in certain regions of Texas.

Investigate the geological history of the Ogallala Aquifer.

Related New Dimension Media Titles:

Water Environment (series)
Water and Life on Earth
Sustaining America's Agriculture: High Tech and Horse Sense