

The Tools Of Agriculture

Summary: Students identify several of the tools and machinery that are used in agriculture, as well as the types of energy used in producing food and fiber.

Objectives:

The students will:

- Identify several tools and machines necessary for farming.
- Identify several tools and machines used in the production of agricultural products.
- Discuss some of the types of energy used in producing food and fiber.

Materials:

Activity #1:

- pictures or examples of primitive farming tools (scythe, sickle, horse-drawn plow, etc.)
- pictures or examples of small-scale garden tools used today (shovel, trowel, hoe, etc.)
- pictures of large-scale farm equipment (tractor, combine, plow, etc.)
- pictures or examples of computers and global positioning units (GPS) that farmers use today

Activity #2:

- book A Tractor Goes Farming by Roy Harrington (or pictures of tractors and other pieces of farm equipment with explanations of their functions)

Activity #3:

- background information and pictures about alternative energy sources

Getting Started:

Activity #1:

- Prepare all visual aids and decide if you might want to create a garden plot outside on the school grounds where the students can get a chance to use the garden tools.

Activity #2:

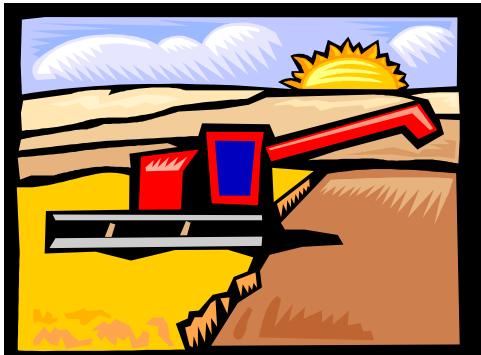
- If you can't get the listed book, find alternative materials that will introduce several pieces of farm equipment and their functions to the students.

Activity #3:

- Find some information on alternative fuels such as ethanol (derived from corn) and biodiesel.

Background:

The types of technology and energy that are used in agriculture today vary greatly. Though farmers still incorporate many traditional ideals into their practice, the face of agriculture is changing with the times. Intricate machines and high-tech equipment such as computers and Global Positioning Systems are being used to help produce the world's food and fiber in a more efficient manner. A farmer can link to a system of satellites and use a receiver to pinpoint his or her exact location to within inches. The receiver analyzes information that can help the farmer decide where to plant and apply



Grade Level: K-6

Topic: Tools, Machinery, Energy used in agriculture

PA Environment & Ecology Standards Addressed:

Agriculture and Society:

4.4.4.D: Identify technology and energy use associated with agriculture.

- Identify the various tools and machinery necessary for farming.
- Identify the types of energy used in producing food and fiber.
- Identify tools and machinery used in the production of agricultural products.

Teaching Methods:

- Lecture/Discussion
- Analyzing
- Compare/Contrast

Multiple Intelligences Utilized:

- Naturalistic
- Visual/Spatial
- Intrapersonal
- Verbal/Linguistic

fertilizers or pesticides. This type of precision can increase crop yields while decreasing cost and the use of chemicals. As of 2002, 14.5% of young farmers and ranchers in the United States were using GPS technology.

Energy from the sun helps to grow the crops that farmers plant on their farms, but what kind of energy is used to power the machinery that does the work on the farm? Though most farm equipment is powered by petroleum-based products, there are some new alternatives, called renewable fuels, coming on the market. Corn and soybeans are being used to produce ethanol, which is a cleaner burning fuel that will reduce pollution, reliance on foreign oil, and boost the rural farm economy. Biodiesel is another renewable fuel that is catching on with major vehicle fleets in the U.S. Army and in public transportation.

Activity #1: Primitive to Modern: Scythe to Satellite

Agriculture is a unique industry in that it incorporates the latest computer and GPS technology as well as complex machinery, yet still relies on some of the primitive concepts and tools of yesterday.

- Show pictures or examples of primitive farming tools such as the scythe, sickle, or horse-drawn plow.
- Show pictures or examples of small-scale tools such as a shovel, trowel, or hoe.
- Share pictures of large-scale farm equipment such as tractors, combines, or plows, etc.
- Show pictures or examples of the modern technology such as computers and GPS units that farmers use today.
- What are the main differences between these categories? Can modern farmers produce more product with more efficiency? Why? Do some tasks still need to be done by hand? How were animals used as machines?
- Create a Venn Diagram comparing what it would have been like to be a farmer in the early 1800s as compared to present day. If given the choice, would students rather be a farmer in the past or present day?

Activity #2: A Tractor Goes Farming

- Read A Tractor Goes Farming by Roy Harrington (if you cannot get the book, show pictures of several different pieces of farm equipment with tractors and explain their functions).
- Discuss the different roles of the tractor and the many types of equipment used on farms. What did people use before tractors were invented?
- As a group, write a sequence story about the growth of a crop including all of the steps the farmer takes from beginning to end. How does the farmer prepare the land for planting? How are weeds dealt with? How is the product harvested? How is it transported from the farm? What equipment is used throughout this process?

Activity #3: Fueling Up

- Talk about the types of energy that are used in producing food and fiber. Besides the sunlight that helps the plants grow, discuss the types of energy that are traditionally used to power farm equipment.
- Compare traditional fuels to newer technologies such as ethanol and biodiesel, which are more environmentally friendly. Where do these fuels come from and what will be their impact on agriculture, the economy, and the environment?
- Can the students think of any other creative sources of energy for the future?

Extensions/Variations:

- Ask a farmer who uses modern technology, such as computers and GPS/satellites, to visit and explain how the technology has impacted his or her business.
- Visit a farm where the farmer can show you pieces of equipment and explain the functions and what type of energy they use. Ask the farmer to describe the process of planting, caring for, and harvesting a crop.
- Compare a backyard garden to a farm by using a Venn Diagram. What kinds of tools, machinery, and energy are used at each?



Evaluation:

Rubric: The Tools Of Agriculture

3	2	1	0	The student can identify several tools and machines necessary for farming.
3	2	1	0	The student can identify several tools and machines used in the production of agricultural products.
3	2	1	0	The student can list some of the differences between farming in the past and present.
3	2	1	0	The student can discuss some of the types of energy used in producing food and fiber.
12	8	4	0	Total Score: /12

Resources:

Harrington, R. (1995). *A tractor goes farming*. American Society of Agricultural Engineers: St. Joseph, Michigan.

www.deere.com (John Deere Homepage)

www.fb.org (American Farm Bureau--- good statistics)

www.kidsfarm.com/equipment.htm (Kidsfarm)