Cultivating Oklahoma's Future

Skills: Language Arts, Visual Arts, Social Studies

Objective: Students will read and discuss information and vocabulary about some new developments in agriculture and develop posters on the future of agriculture in Oklahoma.

P.A.S.S.

GRADE 3

Reading—2.1,2; 4.1a,2c
Writing—1.5; 2.1,2,3ab,7; 3.2,6
Visual Literacy—3
Visual Arts—3.2
Social Studies—3.1

GRADE 4

Reading—2.1,3; 3.1b,2d
Writing—1.2,5; 2.1cd,2
Visual Literacy—3
Visual Arts—3.1
Social Studies—4.2

GRADE 5

Reading—1.1a,3; 3.1b,2ae
Writing—1.2,6; 2.1
Visual Literacy—3
Social Studies—7.5
Visual Arts—3.1

Background

To cultivate a field is to prepare it for a crop to be planted for future growth. A long time ago, people had to gather wild plants for their food. One day a woman figured out that she could save seeds and plant them. That way her family would have food the following year. This was the beginning of agriculture. That first ancient woman who cultivated a field was preparing for the future.

Agriculture prepares us for the future. This means growing food but also protecting our soil and water, improving our health, keeping our food safe, and making sure farmers make enough money so they can earn a living.

PROTECTING OUR NATURAL RESOURCES

Without healthy soil and clean water, farmers would not be able to grow food for the future. One of the new methods farmers use to protect soil and water is "precision agriculture." Precision agriculture uses computers and global positioning systems (GPS) to help farmers decide exactly how much water, fertilizer, and pesticide they need to use in different places in their fields. This helps the farmer use less water and also keeps fertilizers and pesticides from harming the soil or water.

IMPROVING OUR HEALTH

We all need to be healthier, and Oklahoma agriculture can help. Fresh fruits and vegetables help prevent diseases, but most Oklahomans don't eat enough of these foods. Oklahoma farmers grow many fruits and vegetables and sell them in farmer's markets across the state.

Another way to improve our health is to improve the foods we eat. Biotechnology is a method scientists can use to add nutritional value to some foods and take out some things that are not good for us. Biotechnology is the manipulation of living things to produce useful products. Humans have been using biotechnology to improve plants since ancient times. The same prehistoric woman who first planted seeds may have improved her crop a few years later by saving only the seeds of the best plants for the next year's planting. Today, scientists have the technology to work with the genes of plants to make such improvements as adding antioxidants to some vegetable oils, reducing harmful saturated fats in cooking oils, and reducing the allergenic properties of milk, wheat, and other products.

SAFEGUARDING OUR FOOD SUPPLY

The food we eat in America is very safe, but sometimes food makes people sick. When that happens, it is

Switching to Switchgrass

Switchgrass is a native Oklahoma grass that grows all over Oklahoma under a variety of environmental conditions. Scientists in Oklahoma and across the nation are exploring ways to convert switchgrass into biofuel.

Biofuel is any fuel made from an organic material. Petroleum-based fuels heat up the atmosphere by releasing carbons into the air when they are burned. Biofuel releases carbon into the atmosphere, too, but they also remove large amounts of carbon from the air as they grow.

Most of the biofuels produced today are made from traditional crops such as corn and sugar cane. These crops require much more labor and upkeep to grow than switchgrass, so some researchers think switchgrass might be a more practical alternative.

Using switchgrass instead of traditional crops would also keep us from using food crops to fill up our gas tanks.

Oklahoma has thousands of acres of land not suited for producing cultivated crops but perfect for growing switchgrass.

very important to find out quickly what caused the illness and where the food came from. That helps keep other people from getting sick. In the future several different kinds of scientists at Oklahoma State University will combine their knowledge in a new National Institute for Microbial Forensics and Food and Agricultural Biosecurity. Their job will be to quickly and accurately identify the source of any contamination in agricultural products or disease outbreaks.

KEEPING FARMERS PROFITABLE

People living in the US pay a smaller percentage of their incomes for food than anyone else in the world. That is good for the consumer but not always great for the farmer. Farmers need to earn a living.

To make farming more profitable some Oklahoma farmers are trying different ways to farm and different ways to sell what they grow. Some grow fresh fruits and vegetables and sell directly to consumers at farmers' markets. Some grow beef that is completely grass-fed for consumers who prefer that to grain-fed beef. Innovative farmers take orders over the Internet. Some grow products that are organic for consumers who are willing to pay the extra cost. Some have converted to agritourism.

Another way to make small farming more profitable is to add value to commodities produced on the farm. For example, a farmer who grows wheat might make pizza dough and sell it for more than what he would get if he just sold the wheat. The Made in Oklahoma Coalition and OSU's Food and Agricultural Products Center help farmers develop and market products made from Oklahoma-grown commodities in order to keep more dollars in the state.

In 1890, 40 percent of the US population lived on farms. One hundred years later, fewer than 2 percent of the US population is responsible for feeding us all. The demand for food and fiber will keep growing as some 70 million people are added to the world population each year. In Oklahoma the agricultural community will need young people like you in many new and different career areas to help cultivate an exciting future.

Activities

1. Read and discuss background and vocabulary.
   —If they could talk, what would things in your grocery bag say to each other about the future?
   —Based on discussion of the background, students will draw pictures of items in their grocery bags and use idea bubbles to develop dialogue.
2. Hand out the worksheet, "How Well Do I Know These Words?"
   —Students will complete the worksheet and compare their definitions with those of other students.
   —Students will use a dictonary or thesaurus to list synonyms for at least five words from the vocabulary list.
3. Each student will write one or two sentences about each of the four categories covered in the background.

—Students will select one of the categories and illustrate what they have written.
—Students will create posters based on the theme, "Agriculture: Cultivating Oklahoma's Future."

Extra Reading

Buckwoldt, Davis, *From Farm to Table*, Evan-Moor, 1996.
Gardiner, John R., and Marc Simont, *Top Secret*, Little, Brown & Co., 1999.
Hall, Donald, *The Milkman's Boy*, Walker, 1997.
Hill, Lee Sullivan, Farms Feed the World, Carolrhoda, 1997
Rendon, Marcie R., and Cheryl Walsh Bellville, *Farmer's Market: Families Working Together,* Carolrhoda, 2001.
Wiesner, David, *June 29, 1999*, Clarion, Houghton Mifflin, 1992.

Vocabulary

agriculture—the science or occupation of cultivating the soil, producing crops, and raising livestock
agritourism—the act of visiting a working farm or any agricultural, horticultural or agribusiness operation to enjoy, be educated or be involved in activities
allergenic—a substance (as pollen) that causes allergy (exaggerated or abnormal reaction as by sneezing, itching, or rashes) to substances, situations, or physical states that do not have such a strong effect on most people)
ancient—of or relating to a period of time long past
antioxidant—a substance that opposes oxidation or prevents or makes difficult reactions made easier by oxygen
biofuel—fuel made from an organic material
biosecurity—policies and measures taken to protect from biological harm
biotechnology—the manipulation (as by changing genetic material) of living things to produce useful products (as crops resistant to disease)
carbon—a nonmetallic element found more or less pure in nature (as in diamond and graphite) or as a part of coal and petroleum and of the bodies of living things or obtained artificially
commodity—a product of agriculture or mining
consumer—a person who buys and uses up goods
cultivate—to prepare land for the raising of crops
fertilizer—a substance (as manure or a chemical) used to make soil produce larger or more plant life
forensic—belonging to, used in, or suitable to courts of law or to public discussion and debate
future—time that is to come
gene—a part of DNA or sometimes RNA that is usually located on a chromosome and that contains chemical information needed to make a particular protein (as an enzyme) controlling or influencing an inherited bodily trait or activity (as eye color, height, or metabolism) or that influences or controls the activity of another gene or genes
global positioning system (GPS)—a navigation system that uses satellite signals to find the location of a radio receiver on or above the earth's surface
health—the condition of being sound in body, mind, or spirit; especially, freedom from disease
income—a gain usually measured in money that comes in from labor, business, or property
innovative—characterized by a tendency to try something new
manipulation—the treatment or handling of something in a skillful manner
microbial—having to do with microorganisms
organic—of, relating to, or derived from living organisms
pesticide—an agent used to destroy pests
precision agriculture—a management strategy that uses site-specific information to precisely and economically manage and optimize production inputs
profitable—producing gain after all the expenses are subtracted from the amount received
saturated fat—fat that consists of triglycerides containing only saturated fatty acids. Saturated fatty acids have no double bonds between the carbon atoms of the fatty acid chain; hence, they are fully saturated with hydrogen atoms
technology—the use of science in solving problems
traditional—based on custom

Name_____

How Well Do You Know These Words?

vocabulary word	Don't know the word at all	Have seen or heard but don't know the meaning.	I think I know the meaning.	I know the meaning. (Define the word in five words or less
agriculture				
biofuel				
antioxidant				
biosecurity				
biotechnology				
commodity				
consumer				
cultivate				
forensic				
gene				
innovative				
microbial				
organic				

Compare your definitions with those of other students.

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