GRADES 5 & 6 — ABILITIES OF TECHNOLOGY IN AGRICULTURE

NATIONAL SCIENCE STANDARD

- Science and Technology: Abilities of technological design

OBJECTIVE

The student will identify what benefits technology can provide to agriculture.

BACKGROUND

Biotechnology

Understanding that the earth has a limited amount of land and soil (A Slice of Soil-grade 4/5) to grow food to feed our growing world population brings to light the importance of new technologies.

For nearly 300 years plant breeders have worked to create better crops. We have been genetically modifying the food supply for thousands of years. Modern corn bears little resemblance to the first corn, teosinte. Those early cobs were just one to two inches long with a few tiny kernels.

Modern plant biotechnology is a much more precise tool that traditional plant breeding. It allows researchers to select a gene with a specific trait-such as a taste or hardiness-in one plant and move it to another.

With traditional plant breeding, many genes are transferred to create a new plant variety. Some of these genes carry desired traits, others carry unwanted traits that must be removed with still more breeding. Getting it right is often difficult.

In the US more than 50 biotech crops have been approved for sale in the US and Canada. The list includes enhanced soybeans, cotton, corn, canola, cantaloupe, papaya, potato, squash, sugar beets, and tomatoes.

Scientists can create plants that are resistant to chemicals that kill weeds, plants that produce chemicals to kill insects, plants that grow in poor dry soil, and plants that last longer after harvesting.

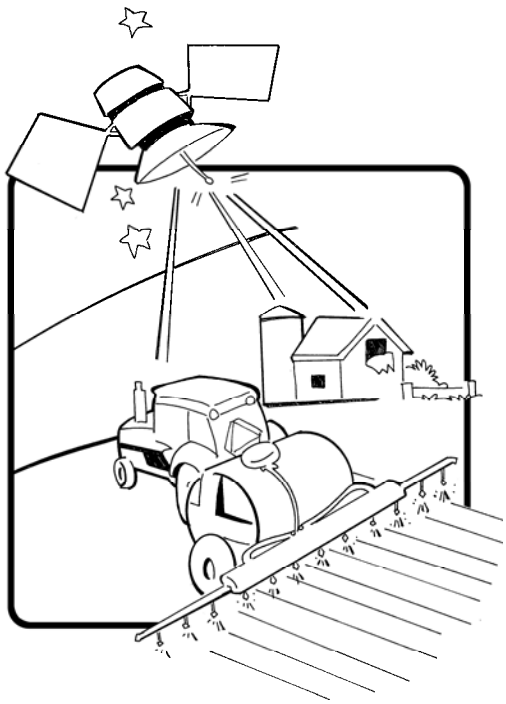
ABILITIES OF TECHNOLOGY IN AGRICULTURE (CONTINUED)

BACKGROUND, CONTINUED...

Satellite Technology
Global Positioning Satellite (GPS) technology was originally developed for the U.S. Department of Defense but has found many civil uses including agriculture.

GPS uses a satellite in outer space to take special pictures of a farmer's field. Different parts of a farmer's fields have different needs.

The field monitor can determine a farmer's yield (the amount of food grown in a specific area). If the yield is adequate, the farmer knows he does not have a pest problem, which then eliminates the unnecessarily spraying pesticides. GPS as a navigational tool can also be used to direct a combine to harvest a field without a driver!



WORD POWER

biotechnology *n.* Using scientific discoveries about living things to solve problems.

gene *n.* The part of a chromosome that determines one of more characteristics that living things inherit from their parent.

pesticide *n.* Chemicals used to kill pests on crops.

satellite *n.* An object that orbits, or travels around, a planet and carry out a variety of jobs.

technology *n.* Using scientific discoveries and inventions to solve problems.

global positioning satellite *n.* 24 satellites arranged so that several can be seen from any one point on Earth by radio at any given time. Radio signals from the satellites are then used to locate a position on Earth's surface with greater accuracy.

NAME_____

ACTIVITY 1: THE COST OF CROP PROTECTION

WHAT TECHNOLOGY CAN DO:

___Biotechnology can develop plants that are not destroyed by insects.

___Biotechnology can develop plants that grow without much water

___Biotechnology can provide rice high in beta-carotene to prevent vitamin A deficiency.

___Biotechnology has developed new cooking oils higher in vitamin E

___A GPS field monitor can determine the crop yield.

___GPS can guide a combine around a field to harvest without the need for a driver.

IT'S EFFECT ON AGRICULTURE:

A. If a farmer's yield is high, he knows he doesn't have a pest problem so he won't spray unnecessary pesticides.

B. Developing countries could see a reduction in blindness due to vitamin A deficiency.

C. Reduced amount of insecticides would be used.

D. Decrease labor costs to harvest a crop.

E. Increase vitamin E in the US diet which has been shown to lower the risk of heart disease.

F. Can grow crops in dry areas increasing the amount of land available for food production.