

MIDDLE SCHOOL
CURRICULUM

SOY SAVVY

SOYBEAN FARMING



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I. Enduring Knowledge:

Because of the significance of soybean production to the economy of Wisconsin, students should know the basic processes of soybean farming.

Learning Targets:

1. Students should know that soybeans are the second most important crop in the country and that Wisconsin farmers' production equals almost half of the world's soybean needs.
2. Students should be able to discuss the steps in raising a soybean crop.
3. Students should know that soybeans are a major source of high-protein food for humans and animals.

II. Teacher Background Materials:

This short DVD gives the student an idea of the importance of soybeans to the economy of Wisconsin: Wisconsin soybean farmers supply almost half of the world's soybean needs and are the second most important crop in the country.

The process of growing soybeans is described as follows:

1. The farmer analyzes and tests the soil for acidity and nutrients.
2. The farmer has to pick out the right kind of soybean seed to match the soil, moisture, and temperature conditions of the farm. He will also consider whether or not to choose genetically modified (GM) seed varieties. Some GM seeds are resistant to insect infestations so that the farmer can use fewer insecticides. Also, seeds can be modified genetically to be drought resistant and to produce higher yields. (GM seeds are also somewhat controversial; for example, many are banned in Europe and other places around the world.)
3. Soybeans are usually planted in April. The seeds are set about 1½ inches deep, in rows that are 30" apart.
4. After a week, sprouts begin to show above the soil. At this time, these sprouts are vulnerable to birds, animals and insects, as well as competition from weeds. The farmer must decide if applications of herbicides or pesticides are appropriate.
5. The plant has small usually purple flowers (some are pink or white), which turn into small bean pods with the soybeans inside. Each plant grows 60-80 pods, while each pod has 2-3 beans in it. One soybean plant can produce 150-200 beans each.

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6. The typical yield is about 50 bushels per acre, which is double what was produced per acre 40 years ago.
7. The pods are ripe when they turn yellow. The crop will be harvested when the leaves have turned from yellow to brown.
8. A farm machine called a combine is used to harvest the crop. The combine cuts and collects the soybean plants, then separates the soybeans from their pods and stems.
9. The soybeans are then trucked to market where they are processed into a wide variety of products: animal feed, human foods, or by-products for food and industrial applications.

Vocabulary:

1. **acre:** a measurement of land, 208 feet by 208 feet (In metric system, hectares are the measurement of land used. A hectare is 10,000 square meters, or 2.47 acres.)
2. **combine:** a harvesting machine that heads, threshes, and cleans grain while moving over a field
3. **genetically modified seeds:** seeds that contain genetic material that has been artificially altered so as to produce a desired characteristic
4. **herbicide:** an agent used to destroy or inhibit plant growth
5. **insecticide:** an agent that destroys insects
6. **yield:** the amount of a crop produced, often in terms of an amount per acre

III. Before Viewing the Video:

Ask students what they know about soybeans. Some may live on soybean farms and know a good deal. Others may know about some soy foods that they eat or drink, such as soymilk, tofu, etc. The students should get a general feeling for the importance and varied uses of soybeans.

IV. Viewing Guide:

Have students make a numerical list of steps in the raising of soybeans as they view the DVD.

V. Discussion Guide:

1. Go over the steps of the process with the students allowing them to fill in or ask questions as you go along. (See teacher background notes.)
2. Ask the students if they heard any statistics or facts about soybeans in the DVD. (Soybeans are very high in protein; it is the second most important crop in the country; Wisconsin supplies about half of the world's soybean needs; it came from China; an acre of land is 208 feet by 208 feet; farmers produce almost double the amount of soybeans as they did 40 years ago)

VI. Evaluation:

1. An informal assessment can be made of students' notes and participation in discussion.
2. Activities can be assessed using rubrics based on good research, presentation, and material construction.

Suggestions for extended learning:

1. Have a farmer visit the class and talk about raising soybeans. If possible, have the class visit a farm.
2. Research the history of soybean production in the United States.
3. Research the multiple uses of soybeans, from food for livestock and people, to industrial products (polymers, paints, food additives, etc.)
4. Find recipes for soy dishes. Prepare some and share with the class.
5. Find out how to test soil; have soil from your home garden or lawn tested and share the results with your classmates. A local farm agent (contact the Extension Office in your area) could talk to the students about soil testing or other aspects of farming.
6. Make a poster illustrating the germination and growth of a legume.
7. Take pictures of soybean fields in your area. Make a poster that includes statistics about the importance and uses of soybeans in modern life.
8. Find products that contain soy; collect pictures or containers and make a display.

The following Wisconsin Student Proficiency Standards can be met by teaching *Soybean Farming*:

Geography: “Students in Wisconsin will learn about geography through the study of the relationship among people, places, and environments.”

- **8th grade:** A.8.1, A.8.3, A.8.10, A.8.11

History: “Students in Wisconsin will learn about the history of Wisconsin ... examining change and continuity over time in order to develop historical perspective, explain historical relationship, and analyze issues that affect the present and the future.”

- **8th grade:** B.8.1, B.8.7, B.8.8

Economics: “Students in Wisconsin will learn about production, exchange, and consumption so that they can make informed economic decisions.”

- **8th grade:** D.8.3, D.8.4, D.8.7, D.8.11

Wisconsin Teacher Standards which can be met with this curriculum, including rationale:

Standard 1: Subject matter

This curriculum provides information not readily available in other forms. A teacher using this material will be well informed about the subject matter.

Standard 3: Adapt instruction

This curriculum provides suggestions for learners with a variety of intelligences and levels of ability.

Standard 4: Instructional strategies

The curriculum includes the use of technology to gain information and suggestions for using research in extending learning.

Standard 5: Individual and group motivation

Both the use of prior knowledge and carefully designed group projects promote motivation for students to learn.

Standard 6: Verbal and nonverbal communications

Instructional media and technology that promotes active learning are key parts of this curriculum.

Standard 7: Organizes and plans systematic instruction

The curriculum is organized to support teacher knowledge, to draw on and motivate students to engage in active learning, and promotes active inquiry, collaboration, and supportive interaction in the classroom.

Standard 8: Formal and informal assessments

Suggestions for a variety of assessments, both formal and informal, are offered in the curriculum.

Standard 10: Fosters relationships

This curriculum could be used to create relationships with local soybean farmers through field trips or class speakers.