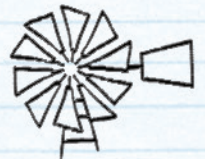


Agriculture In Wisconsin

A Resource For Educators

CORN, A-MAIZ-ING CORN



I. Enduring Knowledge:

The students will understand how the application of new technologies in corn production can transform Wisconsin farming to make it more productive and environmentally sensitive.

Learning Targets:

- Students will know the components of a corn stalk, an ear of corn, and a kernel of corn.
- Students should have an understanding of how technology has changed today's farming.
- Students should understand how some farmers work with specialists to increase plant productivity.
- Students should learn that farms are changing to support the environment by using by products in a better way. Students will be aware of other products made from corn.
- Students will have an understanding of how corn is grown and harvested.

Vocabulary:

1. **Bran or Pericarp:** Outer part of corn that protects the kernel.
2. **Germ:** The inner layer of a corn kernel contains protein, oil and enzymes that can be made into other products.
3. **Endosperm:** The rich carbohydrate (starch) part of the corn kernel.
4. **Combine:** The name of a machine used to harvest crops.
5. **Ethanol:** Grain-based fuel made from corn.
6. **Erosion:** The gradual wearing away of rock or soil by physical breakdown, caused by rain, wind, or ice.
7. **Exports:** Goods for sale or exchange to other countries.
8. **Fermentation:** The breaking down of carbohydrates by microorganisms.
9. **Fractionation:** The breaking down of corn kernels into smaller parts. These parts are then used for different products or energy.
10. **Pollination:** The transfer of pollen for fertilizing plants.
11. **Fertilizer:** An organic or synthetic substance usually added to or spread on soil to support plant growth.

II. Background Notes for Teachers:

Teachers will find many areas of the elementary curriculum projected in this video. The topics the video could support are (1) learning about corn production, (2) creating energy, (3) technology, and (4) comparing and contrasting farming methods today and in the past. The material is short and can be easily incorporated into the school day.

New technology enables Wisconsin farms to have healthier land and local economies.

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- No till or conservation planting significantly reduces and sometimes completely eliminates soil erosion.
- Farmers today have access to specialized sources to help make their farms even more productive. Farmers monitor the use of chemicals so that these chemicals do not pollute the water supply. Some farmers also use global satellite technology to pinpoint planting of crops, which allows them to have tractors that drive themselves, resulting in more precise planting and fertilization.
- Another piece of modern technology is the smart phone. It allows the farmer to communicate with specialists and other farmers in real time.
- Wisconsin is at the leading edge of farming technology.

III. Viewing Guide:

Parts of a Corn Plant

- **Ear or Cob:** protected by a husk of tightly wrapped leaves
- **Kernels:** the plant's seed and the part you eat
- **Husk:** the tightly-wrapped leaves that cover the ear of corn
- **Roots:** these go deep into the soil and carry food and water to the corn plant
- **Silk:** long soft threads at the top of the ear of corn
- **Stalk:** the stem of a corn plant
- **Tassel:** the flower at the very top of the plant

Corn Facts

- An ear of corn has an average of 16 rows with 800 kernels.
- A pound of corn consists of approximately 1,300 kernels.
- An acre (about the size of a football field) of corn, yielding 100 bushels, produces approximately 7,280,000 kernels.
- A corn kernel is made up of four major parts: starch, fiber, protein and oil.
- The corn seed (kernel) is composed of four main parts: the endosperm, the pericarp, the germ, and the tip cap.
 - The endosperm is most of the dry weight of the kernel. It is also the source of energy for the seed.
 - The pericarp is the hard, outer coat that protects the kernel both before and after planting.
 - The germ is the living part of the corn kernel. The germ contains genetic information, vitamins, and minerals that the kernel needs to grow.
 - The tip cap is where the kernel was attached to the cob.
- Corn is the number one field crop in the U.S.
- Wisconsin is part of the "corn belt" - 12 states that grow most of the corn in the U.S.

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- Number Facts about Corn:
 - There are 800 kernels of corn on one ear of corn
 - 11/2 ears of corn make a pound
 - 56 pounds make a bushel
 - 150 bushels to an acre
 - Wisconsin produces:
 - about 3 million acres of corn
 - 440 million bushels
 - 25 billion pounds
 - 32 trillion kernels
- 99% of the corn grown is field corn. Only 1% is the sweet corn we eat off the cob.
- About half of every corn cob is used to make livestock feed. Of the remaining supply, about 30% is used to make ethanol, 10% is exported and the last 10% is used to make other products, such as paint, crayons, soap, and even fireworks. Just a small portion is used to make food products like corn flakes and corn oil.
- Ethanol is a grain-based, environmentally friendly fuel made from corn and other grains.

How Corn is Grown and Harvested

1. Farmers plant corn in spring when the soil is warm enough to germinate the seed. This usually means early May in Wisconsin.
2. On some farms today, corn is grown differently than it was in the past.
 - Conservation tillage or “no till” planting means the ground is not tilled in the spring, but new corn crops are planted over the remnants of corn crops from the previous year.
 - No till planting helps fight erosion, promotes healthier soil, and saves fuel.
3. Fertilization is important for growing crops and getting a better yield of corn. From 1967 to 2007 bushels per acre have almost doubled in yield due to fertilization practices.
4. Corn grows in about 130 days, and must dry before being harvested, except for sweet corn that is eaten by people. Corn stalks generally grow to be 7 to 10 feet tall- and each stalk usually produces one ear of corn.
5. Corn harvest takes place in the fall. In Wisconsin, this means early to mid October.
6. Combines are used to harvest the corn. The most modern combines use high technology computers to maximize efficiency and production.

Today, there are uses for every part of the kernel – even the water in which it is processed. A grocery store may contain 4,000 products that list corn ingredients on the label, but many other products also depend on corn, from paper goods and cardboard packaging to all the meat, milk, eggs, poultry, and other protein products that come from corn-fed animals.

Corn can be made into fuel, charcoal, animal feed, bedding for animals, insulation, adhesives, and more. The kernel is used as oil, bran, starch, and animal feed. The silk is combined with other parts of the corn plant to be used as part of animal feed, silage, and fuels. Husks are made into dolls and used as filling materials. The stalk is used to make paper, wallboard, silage, syrup, and rayon (artificial silk).

IV. Discussion Questions:

The viewing guide above can be used to create points of discussion at the completion of the video. Some of the following questions may be given to the students before viewing the video. The children can pick a certain number of questions they think they could answer before viewing the video. This allows students to look over the questions first and also to make some choices in their learning.

1. Describe some of the changes taking place in farming today. What do you see as advantages to these changes? Are there any disadvantages to these changes? Why do you think these changes came about?
2. As you watch the video write down something you think would be important to teach someone else about this topic.
3. As you watch the video write down two or three words that you think are important to understanding the topic.
4. Finding new sources of energy is important to our world. What types of energy can come from corn?
5. Why do we see so many corn fields growing as we drive around Wisconsin in the summer?
6. Discuss the many uses of corn in our homes, businesses and environment.

V. Assessment and Extra Assignments:

For credit or extending knowledge for higher level learning. Assessment will depend on how teachers use the video.

1. Because of the excellent information given in the video, teachers may want to use the material for other student driven projects.
2. Teachers can use the discussion questions as an assessment of student understanding.
3. Students can create a Venn diagram that shows a comparison between traditional farming and farming with technology (how they are alike and different).
4. On National Corn Growers Association website (www.ncga.com) conduct activities from Corn is Amazing student booklet. Examples include: making biodegradable corn plastic, word search activity, making cornbread or popcorn, etc.
5. Explore the Iowa Corn Growers website (www.iowacorn.org) for color sheets, information about a corn experiment, and corn export information. Write and present reports to the class.
6. Take one hour in your home and find as many products as you can that list corn or corn products on the ingredient list. (Teachers can collect and give rewards for all/or longest lists. Reward should be products containing corn – for example, corn flakes, corn syrup, corn starch, etc.
7. Research the history of a corn husk doll and make your own.
8. Research the Corn Palace – its history, location, and construction.
9. Investigate the effects of fertilizers and pesticides on water resources in Wisconsin. What have farmers, communities, and regulatory agencies done to protect water resources?
10. Design a poster that explains no-till planting and its advantages.
11. Is all farm machinery powered by ethanol? Why or why not?
12. Research the role of agricultural consultants on the University of Wisconsin Discover Farms web site (www.uwdiscoveryfarms.org). How do these consultants use technology on the farm?