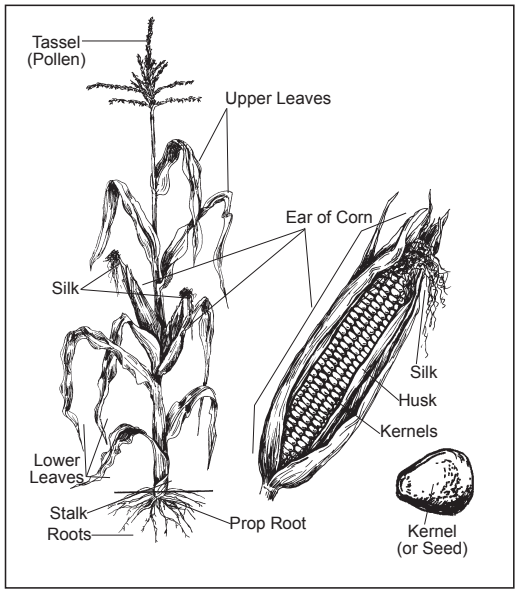
Commodity Fact Sheet

Corn

Information compiled by the California Foundation for Agriculture in the Classroom

How Produced – The most abundant variety of corn grown in the United States is dent corn. In California, dent corn is planted each spring and is often double cropped—with a second planting occurring in the summer. Seeds are planted approximately two inches deep either into moist, flat ground that is formed into seedbeds after the seed germinates, or into pre-formed seedbeds that are irrigated until germination occurs.



The corn plant has a stalk, and "ears" of corn grow where the leaves join the stalk. An ear consists of a corncob covered with rows of kernels (800 kernels on average). Each kernel is a seed that can grow into a new plant. Leaves, called husks, protect each ear.

A tassel (the male plant part) at the top of a cornstalk contains hundreds of small flowers that produce pollen, which is distributed by wind and gravity to the thread-like silks of the ears. The silks are connected to the female part of the plant. Each silk will carry pollen to a spot on a developing ear and produce a kernel.

Stalks can grow from seven to 12 feet tall. Corn is harvested with a combine from August through September. The combine strips the husks and removes the kernels from each ear.

History – Corn, also known as maize, is a cereal grain that was domesticated in Mesoamerica as many as 10,000-12,000 years ago. Corn is a member of the grass family and grew wild in what is modern-day Mexico. Native Americans grew corn as a crop and fertilized the seed by planting it with decaying fish. The fish contained nitrogen, which corn needs for good growth. The earliest known ears of corn were tiny, but centuries of breeding—first by Native Americans, then by early settlers, and later by modern scientists—resulted in bigger, fuller ears of corn.

Today, corn is cultivated on every continent except Antarctica. The three types of corn grown for human consumption are dent corn (grain), sweet corn (vegetable), and popcorn (food snack). Dent corn is primarily used as feed for animals, but is also processed into thousands of items: starch (baby food, salad dressing, glue); corn syrup (soda, fireworks, adhesives); dextrose (bakery goods, fruit juices, antibiotics); and oil (margarine, soap, paint). Today's scientists have even developed a new source of fuel from corn products called ethanol.

Varieties – More than 95 percent of U.S. corn acreage planted is hybrid corn. Hybridization is a breeding process used to improve plant characteristics and increase yield. Hybrid varieties were developed to adapt to specific growing conditions and locations, and they are continually being improved through biotechnology and breeding efforts. Biotechnology uses living organisms (such as microbes, plants, or fungi) to produce useful products and services. Biotech corn offers in-plant protection from insects and herbicides, reduced need for plowing, and higher crop yields. In 2015, 93 percent of U.S. corn acreage was planted with biotech seed.

Commodity Value – Corn is America's most important cash crop, with 80.7 million harvested acres generating a crop value of more than $49 billion in 2015. Most of California's corn crop is harvested to use as silage, which is fed to dairy cows and other ruminant animals.

Top Producing Counties – California produces 19 percent of the nation's sweet corn, ranking number two in the U.S. In 2015, California harvested 60,000 acres of corn for grain, valued at $33 million. The same year, the state harvested 365,000 acres of corn for silage. The leading counties in 2015 for corn production were Fresno for sweet corn, Sacramento for grain corn, and Tulare for silage corn.

Nutritional Value – Corn has four major elements: starch, protein, oil, and fiber. One cup of white corn has 130 calories, two grams of fat, five grams of protein, 29 grams of carbohydrates, four grams of fiber and no cholesterol. Oil from the germ or embryo of the kernel is rich in the antioxidants lutein and zeanthin, which are associated with a lower risk of chronic diseases. Fructose (from cornstarch) is a sweetener that helps the body utilize protein.

For additional information:
National Corn Growers Association
(636) 733-9004
Website: www.ncga.com

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This is one in a series of fact sheets composed by the California Foundation for Agriculture in the Classroom (CFAITC). For additional educational materials: CFAITC, 2300 River Plaza Drive, Sacramento, CA 95833-3293 (916) 561-5625 ✣ (800) 700-AITC ✣ Fax: (916) 561-5697
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Corn Activity Sheet

A historical look at corn improvement

< 5,000 B.C.
Early farmers domesticated wild plants by saving the seeds from the best plants and planting them as next year's crops. This is the earliest form of genetic modification.

5,000 B.C. - 1500s A.D.
Native Americans improved on corn farming by selectively sowing seeds from plants with preferred characteristics for the next year's crop. Settlers from Europe began breeding corn.

Early 1800s
When Europeans started to settle along the eastern coast of North America, two races (varieties) of corn dominated in this region—the Northern Flints and the Southern Dents. Settlers cross-pollinated these two races and created the Corn Belt Dents, the ancestor of nearly all the corn hybrids in the United States.

1870 - 1890
William James Beal produced the first experimental corn hybrid in a laboratory.

1933
Hybrid corn is commercialized by Henry Wallace in the 1920s. Growing hybrid corn eliminated the need to save seeds because the increased yields outweighed the increased costs of annual seed purchases. By 1945 hybrid corn accounted for 78 percent of U.S. grown corn.

Mid 1900s
Corn yields and quality improve through crossbreeding and hybridization. Crops are developed that contain built-in protection against insect pests, disease causing organisms and harsh environmental conditions.

Present Day
Plant breeders can precisely select single genes that produce desired traits, such as insect resistance and herbicide tolerance.

The corn you buy in the store is different from the plant that scientists believe corn originated from thousands of years ago. The most prevalent scientific theory is that corn was first developed from a wild grass called teosinte and looked much like grass and not the golden vegetable so many people love today. Early civilizations created corn hybrids by cross-pollinating plants from different varieties.

Lesson Ideas

- Using the data given, calculate the value of sweet corn per acre and the value of grain corn per acre. Compare your results and brainstorm reasons why there is a difference in value.
- Corn is used to produce a variety of products, including packaging peanuts, ethanol, disposable tableware and more. Choose a corn-based product and research the technology used to develop it.
- What role do the four major nutrients found in corn play in nutritional health? Write a report to summarize your findings.
- Read "Four Seasons of Corn: A Winnebago Tradition" by Sally M. Hunter.
- Research how different cultures incorporate corn into their cuisine.
- Draw a poster showing some of the past and present dangers known to threaten corn crops.

Fantastic Facts

1. The tassel is the male part of the plant that contains hundreds of small flowers.
2. Corn was domesticated 10,000-12,000 years ago in Mesoamerica.
3. A cornstalk can grow 7-12 feet tall.
4. Hybridization is a breeding process used to improve characteristics of the plant.
5. 40 percent of the world's corn is produced in the United States.
6. Tulare county leads the state in the production of corn not consumed by humans.
7. Starch, protein, oil, and fiber are the four nutritional elements of corn.
8. Ethanol is an alternative fuel that is derived from corn.

Lesson Plan: Growing Up with Corn

Introduction: Corn plants will move toward light when growing. Called phototropism, this occurrence is actually the result of increased cell division and growth in the area of the plant that does not receive direct light. The lopsided growth causes the plant to bend toward the light source.

Objective: Students will conduct an experiment to examine phototropism in corn seedlings.

California Standards: NGSS: 4-LS1-1, MS-LS1-4, MS-LS1-5

Materials: A Petri dish or sealable plastic bag with holes punched at the top (enough for one per group), popcorn kernels, absorbent cotton balls, packing tape.

Procedure:

1. Divide students into groups and give each group four kernels of corn, one Petri dish (or plastic bag) and 3-4 cotton balls. Put the cotton balls in the container. Plant one kernel in the moist cotton ball on each of the four sides of the dish or bag.
2. Tape the bags or Petri dishes to the wall in various places around the classroom and in varying degrees of light.
3. Observe how the plant grows, how many days it takes to germinate and how long the roots grow. Have students document which emerges first, the roots or stem, and which way the roots and stems grow.
4. As students report on their findings, help them use scientific reasoning to understand how phototropism affects the likelihood of successful reproduction.

04/17 This Fact and Activity Sheet was developed by California Foundation for Agriculture in the Classroom in conjunction with California educators and meets the required education standards of the California Department of Education.