

FIELD CORN

USES: baby food, cake mixes, chewing gum, condiments, antibiotics, ethanol, glue, paints, plastics, fabrics

WHAT IS FIELD CORN?

Field corn is not the type of corn you eat on the cob. It is a special type of corn that has a hard outer shell and is full of starch. It is processed to make products you use every day. Processing means changing field corn into different useable products through a series of events. The corn is soaked and milled (ground) so that the germ oil, starch, gluten and hulls can be separated. These items are then made into cornstarch, cooking oil, sweeteners, high fructose corn syrup, cereal, beverages and fuel. And that's just the beginning! In fact, there are over 4,200 uses for corn products and more are being found every day.

VOCABULARY

ACRE: a unit of land measure equal to 43,560 square feet (about the size of a football field).

BARGE: a large, flat-bottomed boat used to transport products, like grain, down a river. A typical inland barge has a capacity 15 times greater than one rail car and 60 times greater than one semi trailer truck.

BUSHEL: a unit of weight used to measure how much grain is harvested. One bushel of corn weighs about 56 pounds.

COMBINE: piece of machinery used to harvest grain.

COMMODITY: something of value that you can buy, sell or trade. It is usually an unprocessed or partially processed good, such as fruits, vegetables, grains and livestock.

EAR: the part of a corn plant that contains the kernels or seeds.

GRAIN ELEVATOR: place where corn is stored and prepared for wholesale.

KERNEL: the yellow seed on an ear of corn. One ear of corn averages 800 kernels in 16 rows.

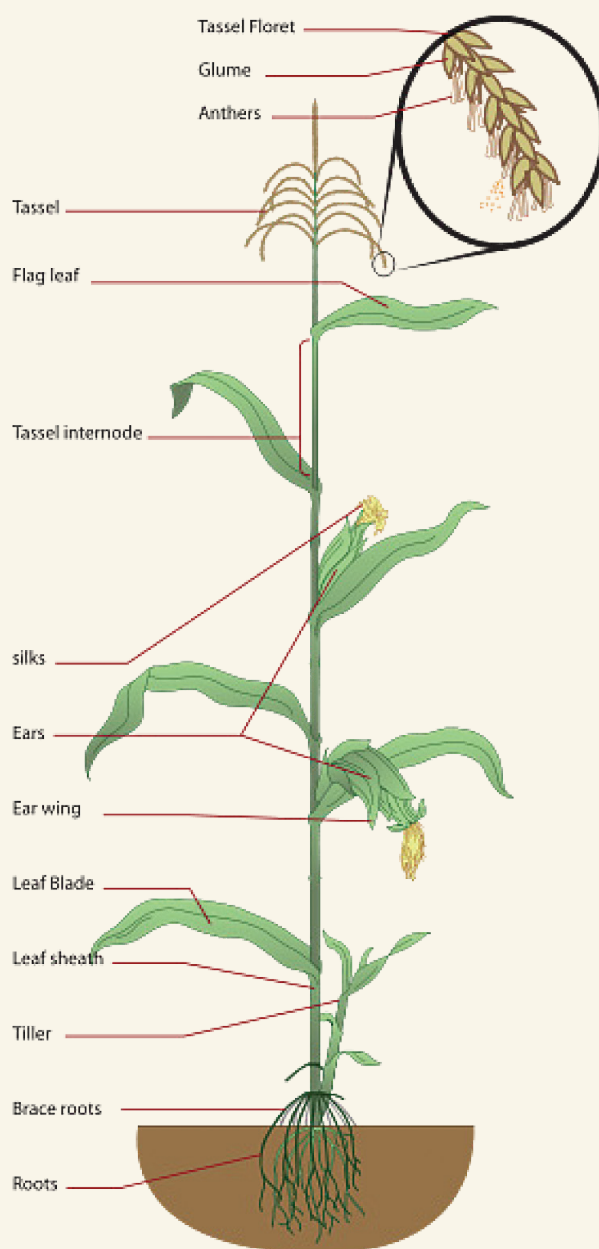
POLLEN: a fine powdery substance produced on the tassel of the corn plant which contains the male reproductive cells.

SHUCK: the husk or outer covering of an ear of corn. This term is also used to describe the removal of the corn husk—as in to shuck corn.

SILK: the long, silky “threads” at the top of an ear of corn.

TASSEL: the tuft at the top of the corn plant that contains the pollen.

YIELD: the amount of corn produced. Usually measured in bushels per acre.



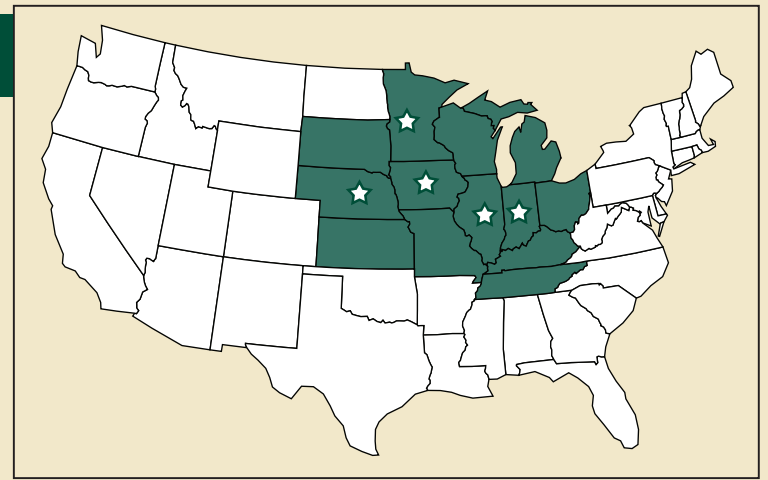
FIELD CORN

TYPES: sweet corn, dent corn, broom corn, popcorn, flint/indian corn, flour corn

UNITED STATES CORN PRODUCTION

☆ Illinois, Indiana, Iowa, Nebraska and Minnesota account for over 62% of the corn grown in the United States.

■ Other major corn growing states are Wisconsin, South Dakota, Michigan, Missouri, Kansas, Ohio and Kentucky. These 12 states are known as the “Corn Belt.”



CORN TIMELINE

CIRCA 5,000 - 4,000 B.C. —

Fossilized corn cobs and pollen found in Mexico suggest that the corn planted across the Americas in the 21st century was first domesticated by early Mesoamerican farmers between 6,000 and 7,000 years ago.

CIRCA 900 - 1250 A.D. —

By the 13th century A.D., corn had become a staple crop not only among native nations of the American Midwest, but also among the Iroquois nation of the area now known as New York, Cape Cod and Martha's Vineyard.

1492 — Spanish explorers were among the first Europeans to record the existence of a plant called corn in the New World when they were given gifts of corn and tobacco by the native residents on the island of Cuba.

1609 — Taking cues from their native neighbors, white colonists settling in Virginia in 1609 planted 30 acres of what they termed “Indian corn.” By 1631, the new settlers had cultivated enough corn to have a surplus of the crop ready for export.

1847 — Robert Reid, an Illinois corn farmer, stumbled upon a new breeding method when he and his son bred Gourdseed corn with a yellow flint variety to produce a higher-yielding hybrid cross: Yellow Dent. Reid's accidental hybridization revolutionized corn farming in the United States, allowing for the higher yields and disease-resistant traits. Yellow Dent corn is still the most popular hybrid grown in the U.S.

1933 — As the Great Depression swept the nation, President Franklin Delano Roosevelt appointed Henry A. Wallace as Secretary of Agriculture. Wallace encouraged farmers to limit corn production in order to keep prices high when their crop hit the market.

1968 — High-fructose corn syrup was first produced for commercial use.

1973 — President Richard Nixon signed the Agriculture and Consumer Protection Act of 1973 into law. The new bill reflected the goals of Nixon's Secretary of Agriculture Earl Butz, who championed an expanded system of government price supports that encouraged all-out corn production.

1984 — Soft-drink giants Coca-Cola and PepsiCo approved the wholesale replacement of sugar by high-fructose corn syrup in their recipes.

1998 — Monsanto introduced the first genetically altered corn seeds to U.S. farmers.

2009 — U.S. corn farmers harvested more than 13 billion bushels of corn surpassing their previous record by more than a billion bushels and achieving the nation's largest corn harvest ever.

One bushel of corn weighs 56 pounds.

One bushel provides 31.5 pounds of starch or 33 pounds of sweetener or 2.8 gallons of ethanol (fuel) plus 17.5 pounds of distillers dried grains, 13.5 pounds of gluten feed, 2.6 pounds of gluten meal and 1.5 pounds of corn oil.

There are approximately 72,000 kernels in one bushel of corn.

170 baseballs will fit in one bushel.

**DID YOU
KNOW?**

FIELD CORN

CAREERS: soil scientist, farmer, marketing, corn, entomologist, sales geneticist, researcher

SPOTLIGHT ON CAREERS:

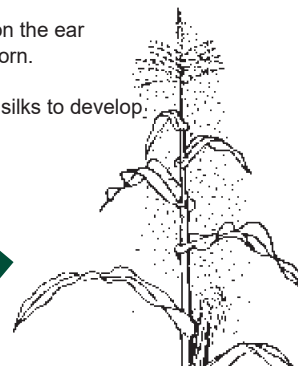
CORN BREEDER/GENETICS – A **Corn Breeder** works with the genetics of corn to create hybrids, or crosses, that are best suited for specific weather and soil conditions. Grain quality, test weight, drought tolerance, cold tolerance, early seedling vigor, uniform emergence, dry down, early maturity and grain yield are very important characteristics in a hybrid with very good performance. This is essential for the improvement of corn for food, feed, fiber and fuel.

AGRICULTURAL ENGINEER/LOGISTICS – An **Ag Engineer** works with technology and engineering science and applies it to agricultural production and processing. Ag Engineers work on everything from irrigation and drainage to consulting and manufacturing agricultural machinery and equipment, processing technology and structures for storing crops.

CORN USE IN THE UNITED STATES

Pollen, from the tassel, lands on the silk on the ear and travels down to make one kernel of corn.

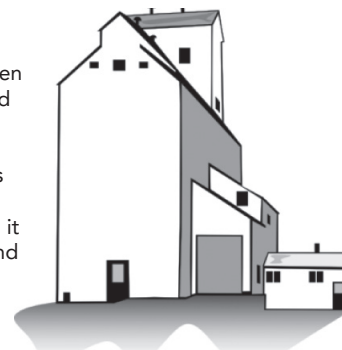
800 grains of pollen land on 800 different silks to develop into the 800 kernels on an ear of corn.



After 120 days of growth, the corn plant dies and is harvested with a machine called a combine. The combine separates the kernels from the ear and the rest of the corn plant.



After the corn is harvested, it is taken to a grain elevator where it is stored and prepared for wholesale. When the corn is ready, it is loaded onto semi-trucks, freight trains or barges and shipped all over the United States and around the world where it will be used for animal feed, fuel and other consumer products.

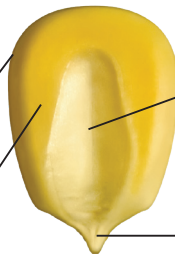


What's Inside that Seed?

Corn seeds are called kernels. One ear of corn averages 800 kernels in 16 rows.

Pericarp (seed coat): Outside cover of the seed. It protects the inside of the seed from cold temperatures, moisture, and insects until the seed is ready to germinate.

Endosperm: Holds the energy and protein the new plant will use to begin to grow. This area is full of starch, which is used the most in corn processing.



Germ: Only living part of the seed. It will become the new plant. It has all of the genetics, vitamins, and minerals for a new plant to be created. There is also oil inside of the germ, which is the most valuable part of the corn kernel when it is processed.

Tip Cap: Where the kernel was attached to the cob. As the kernel grew on the cob, it took in water and nutrients from this area.



FIELD CORN

The U.S. produces about **40%** of the world's corn.

90% of all U.S. corn is produced on family farms.



SCIENCE AT HOME

USE CORN TO MAKE YOUR OWN BIODEGRADABLE CORN PLASTIC! HERE'S HOW:

1. Place a tablespoon of cornstarch in a plastic zipper-seal bag.
2. Add 2 drops of corn oil to the cornstarch.
3. Add 1 1/2 tablespoons of water to the oil and cornstarch. Seal the bag.
4. Mix the cornstarch, oil and water in the plastic bag by rubbing the outside of the bag with your fingers.
5. Add 2 drops of your favorite food coloring to the mixture and mix well. DO NOT completely seal the bag.
6. Place the bag in a microwave oven for 20-25 seconds on high. Be careful. It will be hot. What happens to your plastic?
7. Form your plastic into a ball while it is still warm and describe what it does.
8. Record your scientific observations.



Cooperative Extension

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ETHANOL

Ethanol is a high-performance fuel made from corn. Most gas stations sell gasoline that is mixed with ethanol. Just look for the sticker on the fuel pump that says "10% ethanol." Some vehicles now use fuel mixed with 85% ethanol or E-85. These vehicles have a yellow gas cap to let the driver know that they can use gasoline mixed with more ethanol.

SO WHY IS IT IMPORTANT FOR US TO USE THIS FUEL MADE FROM CORN? ETHANOL IS BETTER FOR THE ENVIRONMENT. HERE'S HOW:

- Highway vehicles are responsible for 17% of air pollutant emissions.
- Ethanol helps to reduce these up to 29%.
- Ethanol is a renewable resource. When we need more fuel, we grow more corn.
- Ethanol is biodegradable and does not pollute groundwater.
- Gasoline is made from crude oil, which is made from plants that died millions of years ago. When we mix ethanol with gasoline, it makes Earth's limited supply of crude oil last longer.

CORN-BASED PRODUCTS

All corn is not the same.



Sweet corn is the kind of corn that is grown in gardens and is sold on the cob in the grocery store and at farmer's markets and roadside stands. You will also find this type of corn in the canned and frozen veggie aisles at the store.

Popcorn is another type of corn that we eat. Illinois ranks 3rd in the nation for popcorn production. Popcorn is also the official Illinois snack food. There is a little bit of water in every kernel of popcorn. When the kernel is heated, the water heats and builds up pressure. The pressure makes the water take up all the available space. When enough pressure builds up, the kernel pops and turns inside out.

Field corn, or dent corn, is a special type of corn that has a hard outer-shell and is full of starch. Most of the corn grown in the United States is field corn. There are over 4,000 uses for corn products and more are being found every day. Corn is used in everything from livestock feed to cereal, wallpaper, skateboards, cosmetics and even plastic! Today, some brands of carpet, as well as the stuffing in pillows and bed comforters, are made from corn plastic that has been spun like cotton.