

corn

You probably know about popcorn and corn on the cob, but did you know corn also is used for livestock feed, fuel for engines, food sweetener and many other products? Let's learn more about corn!

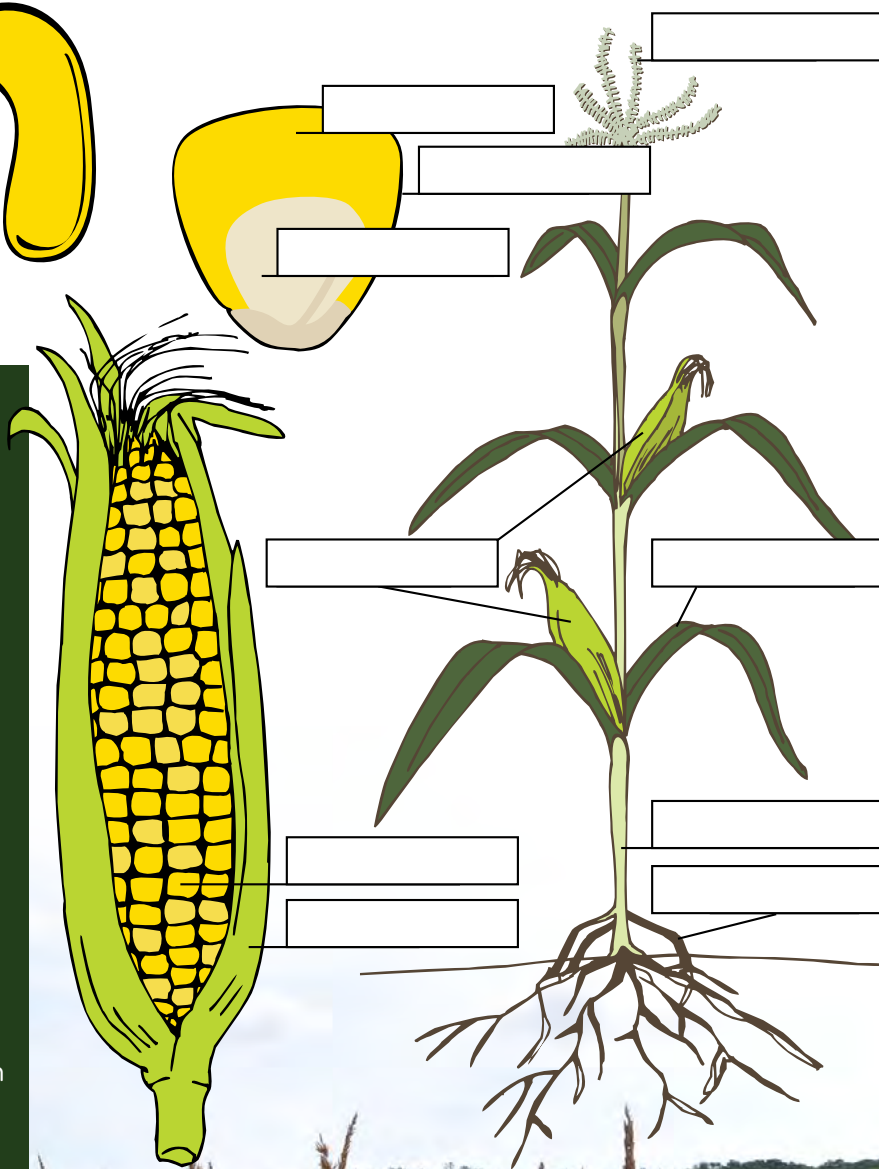
Growing Strong and Tall

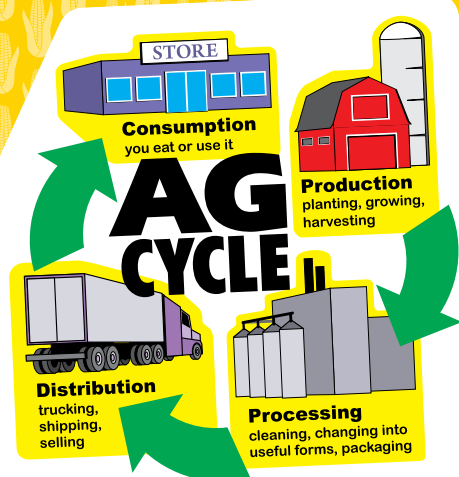
Write the words in bold below in the correct boxes to identify the parts of a corn plant.

Corn is an annual plant that grows 7 to 10 feet tall. Strong roots called **prop or brace roots** help support the **stalk**. A **tassel** grows at the top of each stalk and contains hundreds of small flowers that produce pollen. Long, sword-like **leaves** grow out from the stalk.

Ears of corn grow where the leaves join the stalk. Leaves called **husks** protect each ear. An ear consists of a corncob covered with rows of **kernels**.

Each kernel is protected by the **outer hull, or pericarp**, which protects the grain from water, insects and microorganisms. The **endosperm**, made of starch, is the corn kernel's source of energy. The **germ** contains all the elements needed for the kernel to grow into another corn plant.





Corn Production

Maize is Thousands of Years Old

Corn has been grown in North and South America for thousands of years. Native Americans called the grain *maize*, and it was so important to their survival that some tribes had festivals at planting and harvest times.

Native Americans used all the parts of the corn plant. They ate corn, but also made beds and toys from the husks, burned the cobs for fuel and fed corn to their livestock.

Chief Massosoit taught European settlers how to grow corn, and the settlers came to depend on it. At the first Thanksgiving, the Pilgrims and the Native Americans gave thanks for the corn harvest — as the Native Americans had always done.

Europeans took corn back to the Old World, and corn spread quickly throughout the rest of the world.



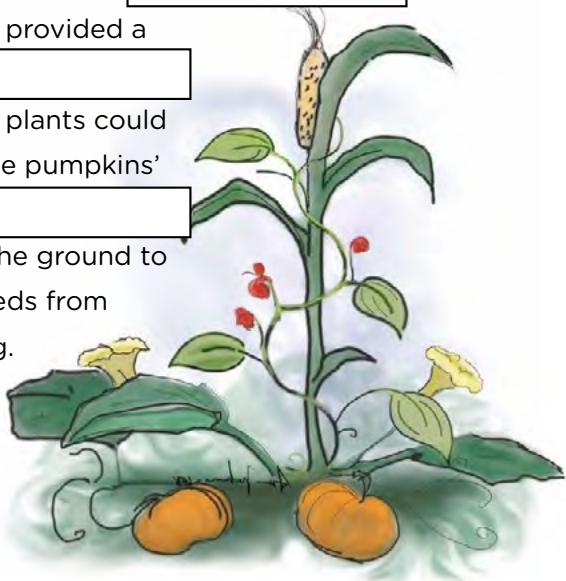
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Gardening with the Three Sisters

Use these words to fill in the blanks: healthy, stalk, seeds, leaves, diameter, circular, soil

Native Americans planted corn

1. with bean and pumpkin or squash seeds. These three crops were known as the Three Sisters. In Iroquois legend, the Three Sisters are believed to be the gift from the sun god, who created corn, beans and squash to keep the first people of the earth
2. . The Three Sisters were planted together in a 3. mound garden, reflecting the never-ending cycle of nature. Each mound was 3 feet in
4. and had 4 to 6 corn plants in the middle. The beans provided nitrogen for the 5. .
- The corn provided a
6. the bean plants could climb. The pumpkins'
7. shaded the ground to keep weeds from sprouting.



Today's Corn Farmers Use Modern Equipment

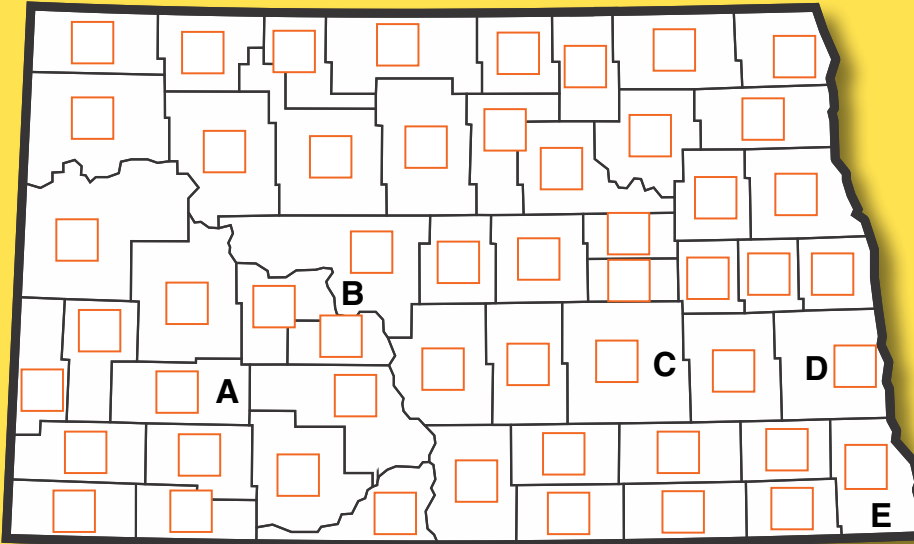
Check the box of the correct word to accurately complete each sentence.

1. Corn is planted in the spring using a planter. The machine drops the (☐ **kernels** or ☐ **kernals**) into rows and then presses the soil around each one.
2. Corn is planted in rows at about 24,000 to 32,000 plants per (☐ **aker** or ☐ **acre**), which is an area about the size of a football field.
3. Fertilizer is applied to the soil to provide (☐ **nutrients** or ☐ **nootrients**) for the growing plant and increase yields. Rain or irrigation is very important, too, because corn needs lots of water to grow.
4. Between late September and November, the corn will be (☐ **mature** or ☐ **matour**) and dry enough to be harvested by a large combine.
5. The combine removes each ear of corn and (☐ **separates** or ☐ **seperates**) the kernels from the corncob.
6. Corn (☐ **stalks** or ☐ **stocks**) usually are left to protect the soil and decompose to provide nutrients for next year's crops.

Find North Dakota's Corn Belt

On the map, check the boxes of the counties that usually are North Dakota's leading corn producers.

Barnes Dickey Grand Forks Richland Stutsman
Cass Emmons LaMoure Sargent



Cornstarch Play Putty

1 1/2 cups cornstarch
2 cups water
1 cup salt
1/2 cup flour
2 teaspoons cream of tartar
1 tablespoon corn oil
Food coloring, if desired

Mix all ingredients in a saucepan and cook over medium heat, stirring constantly, until the mixture forms a dough. Turn on to waxed paper until cool enough to handle, and then create fun shapes.

Have
Fun with
CORN

Math Challenges

Derek ate 4 ears of corn on the cob. His sister ate 3, his older brother ate 3 and his younger brother ate 5. How many ears of corn did Derek and his sister and brothers eat?

1.

The contestants in the school's corn-eating contest ate 55 ears of corn. The English teacher ate 10. The science teacher ate 13. The gym teacher ate 6. The geography teacher ate 9. The principal won the contest. How many ears did the principal eat?

2.

Farmer Jones and her family all grow corn on their family land. Farmer Jones planted 77 acres of corn. Her brother planted 140 acres. Their uncle planted 65 acres. Grandpa planted 90 acres. How many acres of corn are planted on the family farm?

3.

The Dunbars farm 510 acres of corn. During the summer, 30 acres of their land was flooded by rain, and the corn on that land is ruined. How many acres can the family harvest in the fall?

4.

One bushel of corn weighs 56 pounds. At harvest, one acre of land can produce about 120 bushels of corn. How many bushels of corn will be produced on 10 acres?

5.

On 100 acres?

6.

Extra challenge: How many pounds of corn will have been produced on those 100 acres?

7.

One bushel of corn weighs 56 pounds, and four barn mouse families want to share it equally. How many pounds of corn will each barn mouse family get?

8.

One bushel of corn can produce sweetener for 325 cans of pop. How many cans of pop can be sweetened with 120 bushels of corn?

9.

Extra challenge: How many six-packs of pop can be sweetened with 120 bushels of corn?

10.

Corn Processing



North Dakota's Corn Processing

Ethanol, a fuel made from corn, is produced at:

- ☐ **Blue Flint Ethanol**
Underwood, 73 million gallons per year (mgy)
- ☐ **Dakota Spirit AgEnergy**
Spiritwood, 75 mgy
- ☐ **Guardian Energy**
Hankinson, 154 mgy
- ☐ **Red Trail Energy**
Richardton, 63 mgy
- ☐ **Tharaldson Ethanol**
Casselton, 175 mgy

Write the correct letter in the box in front of each plant to identify where they are on the North Dakota map on page 3.

These five plants produce about 540 million gallons of ethanol per year. A rail tank car holds about 30,000 gallons, so how many rail cars would be required to move all of North Dakota's annual ethanol production? 1.

If each tank car is 50 feet long, how long is the train? 2.

How many miles is that? 3.

The **ProGold** plant at Wahpeton makes high fructose corn sweeteners, corn gluten feed and corn gluten meal. The plant also separates corn germ, which is sold for corn oil production.

Corn Means Business

Identify the following agricultural careers by fitting them into the **crossword puzzle**.

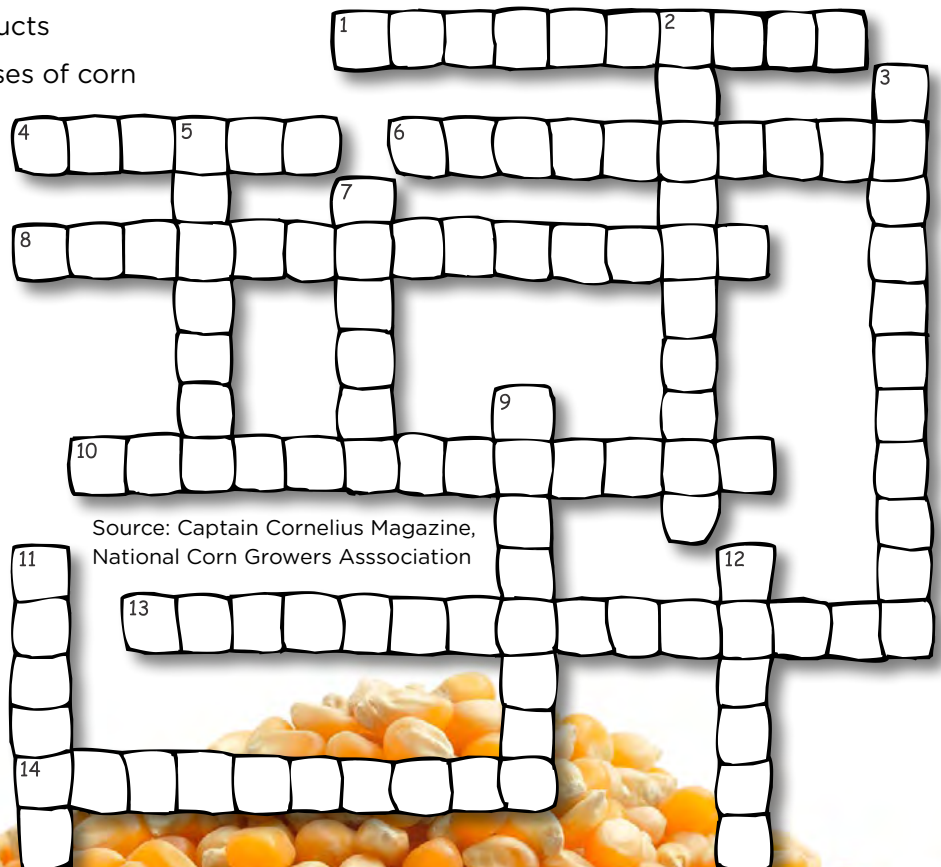
Across

1. Supplies hybrid seed to the corn farmer
4. A person who sells corn food products
6. Scientist who investigates future uses of corn
8. Provides current information from university research to the corn farmer
10. Forecasts the weather
13. Sells the tractors, planters, tillage equipment and combines
14. Keeps the financial records

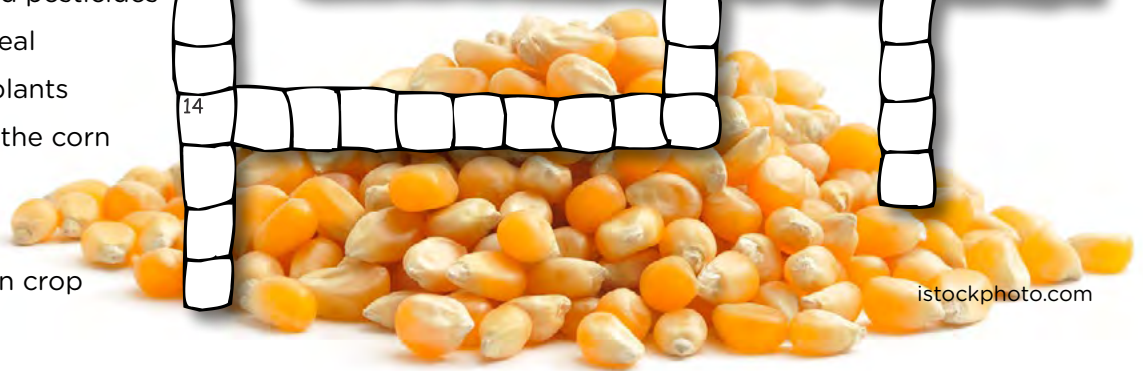
Down

2. Person who deals with crop production and soil management
3. Hauls the corn from the farm to the processing plant or elevator
5. Scientist who develops new and effective herbicides and pesticides
7. Grinds the corn into meal
9. Scientist who studies plants
11. Repairs and maintains the corn farmer's machinery
12. Responsible for planning, cultivating and harvesting the corn crop

accountant	extension agent	miller
agronomist	farmer	researcher
botanist	grocer	seed dealer
chemist	mechanic	truck driver
equipment dealer	meteorologist	



Source: Captain Cornelius Magazine, National Corn Growers Association



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Corn Distribution

The Grain Elevator: A Hub of Activity

At huge storage facilities called grain elevators, corn and other grains are bought from farmers and stored in temperature- and humidity-controlled bins and silos to prevent spoilage.

Have you ever seen a grain elevator? There are many in North Dakota, and they are usually next to railroad tracks. Why do you suppose that is?

The corn is sold to mills or factories for processing. Each step of processing adds more value to the basic raw corn.



Corn on the Move

Here are the steps of how just one corn product - cornstarch - moves through the production, processing, distribution and consumption cycle. Number these sentences in the order in which they happen.

- ☐ The elevator stores the corn until selling it to a company that will process it into cornstarch or other products, such as ethanol or livestock feed.
- ☐ A semitruck picks up the paper tableware from the manufacturer and delivers it to stores across the region where you can buy it.
- ☐ The farmer buys corn seed from a seed dealer and plants it in the spring.
- ☐ The corn is delivered to the cornstarch processor by railroad or semitruck.
- ☐ In the fall, the farmer harvests the corn and sells it to the elevator or stores it.
- ☐ The manufacturer makes cornstarch and turns some of it into biodegradable cups and straws.

Where Does U.S. Corn Go?

- 47% is fed to livestock
- 29% is made into ethanol
- 15% is exported to other countries
- 9% is made into sweeteners and other products

Source: www.worldofcorn.com



Career Corner

Alicia Harstad — NDSU Extension Agent, Agriculture and Natural Resources, Barnes County (Valley City), N.D.

As an Extension agent, Alicia Harstad works with corn but also many other crops and topics.

“Extension agents bring up-to-date information from North Dakota State University out across the state,” Harstad said. “We do this by teaching workshops; answering questions one on one; and through newspaper articles, radio interviews and social media. As an agriculture and natural resources Extension agent, I provide information related to agronomy (crops), horticulture, livestock and 4-H.”

Harstad organizes two crop plot tours each year. One plot includes small plantings of different soybean, wheat and barley varieties. The other plot is corn hybrids. Varieties, or hybrids, have different genetic traits like different breeds of dogs have different traits.

“We host plot tours so farmers can see and learn about new crop varieties and hybrids,” Harstad said. “The yield data also helps farmers determine which varieties or hybrids they should grow for the next year.” Yield means how much grain is produced at harvest.

Harstad also helps lead a workshop for youth ages 12-18 to learn basic agronomy skills through hands-on experience called Junior Crop Scout School.

During the winter, Harstad plans workshops and meetings for farmers on a wide range of topics such as marketing; weed, insect and disease control; and fertilizer recommendations for corn and other crops. Sharing this research-based information helps producers farm in a more profitable and sustainable way.

“I love the diversity of Extension work,” Harstad said. “The day-to-day tasks can include being on the phone with someone who has a question about their maple tree to presenting at a farmer workshop about weed control to conducting a radio interview about the current crop conditions in the county to running a local 4-H contest to attending a local organization meeting. I get to learn something new and meet new people all the time through my work.”

Harstad grew up in Hoople, ND, on a potato farm. At NDSU, she received a bachelor’s degree in Crop and Weed Science and a master’s in Plant Science emphasizing weed science.

Harstad says there are several different paths to prepare to be a successful Extension agent. She encourages students to try different activities to explore interests and build knowledge.



Corn Consumption

Ethanol: A Renewable Energy Source

Use these words to fill in the blanks: gasoline, Ford, pollution, renewable, gallons, dependent, pumps, performance

About 14.2 billion 1. of fuel ethanol are consumed in the U.S. each year. For E15 fuel, which is a blend that's 15% ethanol and 85% petroleum-based 2. , that would be about 947 million 15-gallon gas tanks.

Henry 3. designed the first Model T in 1908 to run on ethanol. Today all major car manufacturers design their cars for a 10% ethanol blend. Many models use a fuel called E85 that is 85% ethanol. At some gas 4. , drivers can select their own blends of gas and ethanol.

Ethanol is a 5. fuel since corn can be grown every year. Ethanol has a higher octane number than gasoline, which provides increased power and 6. . Using ethanol also results in less carbon monoxide 7. for our environment and helps the U.S. be less 8. on importing oil from other countries.



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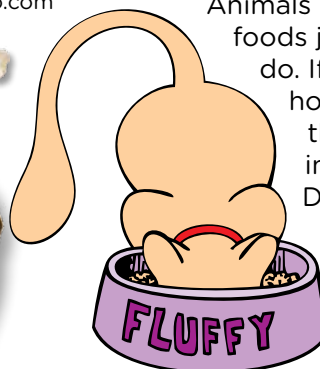
Popcorn

Iroquois Indians popped corn in pottery crocks with heated sand. The colonists may have created the first breakfast cereal when they added sugar and milk to their popped corn.

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Fido and Fluffy Like Corn, Too

Animals need nutritious foods just like people do. If you have a pet at home, look at the pet food ingredient label. Does it contain corn?



Find the answers to the activities in this Ag Mag and learn more about corn at www.ndda.nd.gov/agmag.

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N.D. Department of Agriculture
600 E. Boulevard Ave., Dept. 602
Bismarck, ND 58505-0020
701-328-2231

ndda@nd.gov
www.ndda.nd.gov/aitc

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