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

Copy the bold words on the correct lines to identify the parts of a corn plant.

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

Copy the bold words on the correct lines 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 corn cob 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. American Indians called the grain maize, and it was so important to their survival that some tribes had festivals at planting and harvest times.

American Indians 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 Indians gave thanks for the corn harvest — as the American Indians had always done.

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

Today’s Corn Farmers Use Modern Equipment

Circle 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 sometimes is placed in the soil to help feed the plant (nutrishously or nutritiously). Rain or irrigation is extremely important because the corn plant needs a lot 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 machine removes each ear of corn and (separates or seperates) the kernels from the corncob.

6. Some of the (stalks or stocks) often are left in the field to protect the soil for the next year.
Math Challenges

1. 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?

2. 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?

3. 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?

4. During the summer, 30 acres of the Jones’ land are flooded by rain, and the corn on that land is ruined. How many acres can the family harvest in the fall?

5. 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?

6. On 100 acres?

7. 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?

8. 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?

9. 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?

10. Extra challenge: How many six-packs of pop can be sweetened with 120 bushels of corn?
Did you know that more than 20 million Americans work in some phase of agriculture? But only 2 million people live and work on farms or ranches. Many of the remaining 18 million people are involved in the processing phase of agriculture. They change crops and livestock into products we can use – because corn doesn’t grow in a can and corn oil doesn’t suddenly appear in a bottle.

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

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

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

**North Dakota’s Corn Processing**

Corn sweetener is produced at the ProGold plant in Wahpeton.

Ethanol, a fuel made from corn, is produced at:
- **Blue Flint Ethanol**, Underwood, 65 million gallons per year (mgy)
- **Dakota Spirit AgEnergy**, Spiritwood, 65 mgy
- **Hankinson Renewable Energy**, Hankinson, 130 mgy
- **Red Trail Energy**, Richardton, 50 mgy
- **Tharaldson Ethanol**, Casselton, 130 mgy

Identify these six towns on the North Dakota map on page 3.
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?

Corn can be processed at the elevator or 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 first and last ones are filled in for you.

- The trucker delivers cornstarch to the manufacturer who makes biodegradable cups and straws.
- Your mom purchases biodegradable cups and straws at the store.
- The farmer harvests the corn.
- The farmer buys corn seed from the elevator.
- The railroad hauls the corn to the cornstarch processor.
- The farmer sells the corn to the elevator.
- The elevator stores the corn.
- The farmer plants the seed.
- The elevator sells the corn to companies that will process it into cornstarch and other products.
- A truck picks up paper tableware from the manufacturer and delivers it to stores across the region.
- The elevator sells corn seed to the farmer for a new crop in the spring.
- You and your friends enjoy lemonade from cups made from a biodegradable, renewable resource.

Where Does U.S. Corn Go?

- 46% is fed to livestock
- 13% is exported to other countries
- 31% is made into ethanol
- 10% is made into sweeteners and other food products

Source: www.worldofcorn.com, 2014
**Corn Consumption**

**Ethanol: A Renewable Energy Source**

Ethanol is a fuel made from corn. Petroleum-based gas is nonrenewable since once oil is used, the Earth can’t make more. However, corn can be grown every year. Using ethanol increases an engine’s efficiency, emits less carbon monoxide pollution into our environment and helps the U.S. be less dependent on importing oil from other countries.

The U.S. produced 14.4 billion gallons of ethanol in 2014. For E15 fuel (a blend that’s 15% ethanol and 85% petroleum-based gas), that would be enough to fill 958 million 15-gallon gas tanks.

Henry Ford 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 pumps, drivers can select their own blends of gas and ethanol.

**Career Corner**

**Jason Strand** – Race Car Driver, Portland, North Dakota

Not many race cars have ears of corn painted on them, but Jason Strand is proud of his E85 Racing.

Jason’s modified race car runs on E85, a fuel blend that’s 85% ethanol and 15% petroleum gas. “Ethanol is better for the motor. It gives me more horsepower, makes the engine run cooler and is more efficient,” he says. “A couple other drivers run ethanol, but not many. It takes a lot of time and research to figure things out with the fuel — for example, the carburetor is manual instead of electronic and I have to spend a lot of time tuning the engine.” But Jason believes the benefits are worth it.

Working on his race car requires using math to figure the weights of the car and the fuel required, and geometry to develop aerodynamic angles for his car. He also uses mechanical skills like welding as he figures out how to fix the car. “I’m always working with numbers,” Jason says.

Jason also is proud of E85 Racing since he’s a farmer himself. He and his father raise corn, edible beans, soybeans and wheat west of Portland, N.D. They also do custom work for other farmers — seeding (planting) and combining (harvesting) their crops for them.

Since 2008, Jason has partnered with the N.D. Corn Growers Association and N.D. Corn Council as sponsors of his racing. “I’m a member of the Corn Growers Association and had already decided to run ethanol, so we made a good team. The partnership has worked out really well for both of us.”

Jason hopes that every time fans see his E85 car with the ears of corn on it zipping around the track, they’ll think about the benefits of ethanol in their vehicles for the environment.
Popcorn Crunch

Try This Corn Recipe

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.

Popcorn Crunch
3 quarts popped popcorn
1 cup nuts
1/2 cup butter or margarine
1/2 cup light corn syrup
1 teaspoon vanilla, optional

With an adult’s help, preheat oven to 250 degrees F. Place popcorn and nuts in a large ovenproof mixing bowl. Keep warm in oven. Lightly oil a cookie sheet or coat with cooking spray. In a saucepan, melt butter over low heat. Mix in corn syrup until well blended. Stir in vanilla. Remove popcorn mixture from oven. Set oven at 350 degrees F. Pour butter-syrup mixture over popcorn-nut mixture and mix well. Spread in thin layer on cookie sheet. Bake 10 to 15 minutes or until crisp. When cool, break apart and eat. Makes 3 1/4 quarts.

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?

Processed Corn has Many Uses
We consume corn in many different products. Circle the corn products that people eat and check the ones that people don’t eat.

cereal
fructose
ethanol
tortilla chips
plastic bags
cornbread
livestock feed
corn oil
licorice
batteries
cups and straws
marshmallows
ice cream
soft drinks
chewing gum
road deicer
shoe polish
packing peanuts
engine fuel filters
baby diapers
antibiotics
clothes

processed corn has many uses we consume corn in many different products. circle the corn products that people eat and check the ones that people don’t eat.
The North Dakota Ag Mag is a project of the North Dakota Agriculture in the Classroom Council, which is organized through the North Dakota Department of Agriculture.

N.D. Department of Agriculture
600 E. Boulevard Ave., Dept. 602
Bismarck, ND 58505-0020
Voice: (701) 328-2231
Toll-free: 1-800-242-7535
Fax: (701) 328-4567
Email: ndda@nd.gov
Web: www.nd.gov/ndda

Ag Mag Production by North Dakota State University
Agriculture Communication: Becky Koch, Editor;
David Haasser, Graphic Designer

Thank you to the following for providing information for this issue of North Dakota Ag Mag:

North Dakota Corn Council
North Dakota Corn Growers Association
North Dakota State University
North Dakota Agricultural Statistics Service
Colorado Department of Agriculture
Corn Marketing Program of Michigan
Governors’ Ethanol Coalition
Kansas Corn Commission
Kansas Foundation for Agriculture in the Classroom
National Corn Growers Association
North Dakota Ethanol Council
Renewable Fuels Association
Utah State University
North Dakota Department of Agriculture

Find the answers to the activities in this Ag Mag and learn more about corn at www.ag.ndsu.edu/agmag.

To sponsor the next AgMag, please call Margaret Kiefer, Farm & Ranch Guide Special Projects, 800-530-5714 or email: mkiefer@farmandranchguide.com