



Kentucky Harvest of the Month

AUGUST: SWEET CORN

Corn in Kentucky

According to the National Agricultural Statistics Service's Farm Census, in Kentucky, 306 acres of sweet corn were harvested in 2018 by 59 different farm operations. There are six main types of corn, but while most corn is harvested at full maturity, sweet corn is harvested before the kernels dry out.



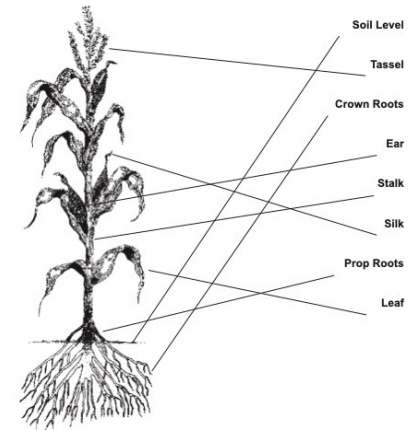
Parts of the Corn Plant



ANSWER KEY

Can you identify the parts of a corn plant?

Please draw a line from the terms on the right to the correct part of the plant.



© Kentucky Corn Growers Association

Ideas for Your Classroom

Elementary School

- Which came first, the corn or the kernel? Activities from KY Ag in the Classroom including the corn plant parts activity above! (Lessons can be adapted for all ages)
- Three Sisters Lesson from Oklahoma Ag in the Classroom (learn about the companion planting of corn, bean, & squash traditionally done by Native Americans and the history of corn)

Middle School

- Corn is Maize Activity (see attached - from Illinois Ag in the Classroom)

High School

- Some Sweet Traits Activity (see attached - from Illinois Ag in the Classroom)

Check out more corn lessons on the Kentucky Ag and Environment in the Classroom website [here](#).



CORN IS MAIZE

OBJECTIVE:

Students will learn about corn's role in key events throughout United States' history.

CORN'S IMPORTANCE IN AMERICAN HISTORY

The Native Americans called corn, maize, meaning "our life" or "our mother." It was their main food source. Corn was so important that some tribes prayed to the Corn Gods who they believed sent it to them. These tribes had festivals at planting and harvesting time. They chanted and made music, and each tribe danced its own Corn Dance.

Many tribes taught European settlers how to grow, grind and cook maize. In 1621, Chief Massasoit taught the Pilgrims and other settlers how to grow corn. During the first Thanksgiving, the Pilgrims and Native Americans gave thanks for the corn harvest. The Pilgrims relied on corn to help them survive the first winter in New England. The Pilgrims learned other uses for corn such as stuffing mattresses with corn husks and feeding it to livestock.

DIRECTIONS FOR ACTIVITY 1: CORN IS MAIZE

1. Gain students' interest by asking: What foods did the Native Americans eat?
2. Read *Corn is Maize: The Gift of the Indians* to students.
3. Then ask students some or all of these discussion questions:
 - Name the steps of corn growth.
 - What are some of the different ways Native Americans ate corn?
 - Other than food, what were some of the other uses for corn?
 - How important was learning about corn to the Pilgrims' survival?
 - Name some foods you eat that have corn in them.
 - How did the Native Americans grow and process corn? Is this different from what we do today? If so, how?
4. Create a Venn Diagram comparing how Native Americans and early settlers used corn and how we use corn today.

DIRECTIONS FOR ACTIVITY 2: CORN TIMELINE

1. Cut the "Corn Timeline" events into strips.
2. Pass out the strips to students and ask them to arrange themselves in chronological order.
3. Give students clues or hints to help them out. After students are in the correct order, review the timeline.
4. Possible discussion questions could include:
 - Why was corn so important in early American history?
 - How has corn's role in our lives advanced over time?
 - What other events could we add to this timeline?

Illinois Learning Standards:

Activity 1: 2.B.1a;
16.C.1a (W) 18.C.1

Activity 2: 16.C.2b (US);
16.C.2c (US); 16.E.2b
(W)

Illinois Assessment Framework:

Activity 1: 2.3.10



Related Resources:

Aliki, *Corn is Maize: The Gift of the Indians*. Harper Collins Publishers, New York: 1976.

Find more on the History of Corn at: www.campsilos.org

For more agricultural history information, access "Growing a Nation" at www.agclassroom.org/gan/

Or borrow "Illinois Agriculture: Innovation and Invention" from your county's Ag Literacy Coordinator.



Please see the AMAZING Activity Page on our website for hands-on Native American activities to enhance this lesson.

CORN TIMELINE

Cut these timeline events into strips. If there are not enough for each student, pair students up and have them work as a team.

Teosinte is domesticated in Sierra Madre, Mexico.

Corn cultivation reached both Mexican coasts.

Native American tribes planted corn for a variety of uses.

Columbus encountered Native Americans cultivating corn as crop.

Coronado saw Pueblo Indians raising corn near the Rio Grande River.

Powhatan's people saved Captain Smith's starving people with gifts of corn.

Jacques Marquette reported that the Illinois Tribe raised and relied on Indian corn to survive.

Cornhusk-stuffed mattresses are used in colonial homes.

Settlers ate corn in all 3 daily meals.

The Underground Railroad transported slaves to freedom; they found corn along the way to survive.

Lewis and Clark set up a corn mill in the Dakota Territory.

The Erie Canal opened for shipping corn east.

John Deere developed the first successful steel plow.

Pioneer wagon trains headed west on the Oregon Trail carrying "Journey cakes."

During the Civil War, corn meal was an important staple for soldiers. It was used to make Johnnie cakes and corn bread.

Henry Ford built the first car to run on ethanol.

CORN TIMELINE

Kellogg's corn flakes are first produced in Battle Creek, Michigan. Corn flakes are made with corn grit or the "heart of the corn."

The Lever Act is passed, which gave the president power to regulate the nation's food supply. Advertising encouraged Americans to eat more corn, poultry and vegetables as part of the war effort.

Fuel demands increased ethanol use to 60 million gallons per year.

The 18th Amendment is ratified. Ethanol can only be sold when rendered with 5 percent petroleum.

Congress passed tax incentives to promote ethanol production and increase business for farmers.

Geneticists discovered that growing corn hybrids produced healthier crops and higher yields.

In Peoria, Illinois, Dr. Howard Florey and Norman Heatley discovered that a corn by-product from the milling process along with other ingredients produce faster growth and larger amounts of penicillin.

In Peoria, Illinois, Andrew Moyer increased the yields for penicillin ten fold, which provided enough penicillin to treat Allied soldiers.

During World War II, 20 million Americans planted gardens and produced 9-10 million tons of fruits and vegetables, such as sweet corn.

The first Kwanzaa celebration occurred, featuring fruits of the harvest such as corn.

Widespread interest in ethanol developed as several Arab oil-producing nations refused to sell oil to countries that supported Israel.

The number of ethanol plants reached the highest point at 163, producing almost 600 million gallons of ethanol in one year.

Corn varieties developed by genetic engineering were first introduced.

Ethanol production surpassed three billion gallons per year.

In response to growing ethanol demands, farmers planted 92.9 million acres of corn.

CORN TIMELINE: TEACHER ANSWER KEY

4000-3000 B.C.: Teosinte is domesticated in Sierra Madre, Mexico.

1400 B.C.: Corn cultivation reached both Mexican coasts.

1400: Native American tribes planted corn for a variety of uses.

1492: Columbus encountered Native Americans cultivating corn as crop.

1540: Coronado observed Pueblo Indians raising corn near the Rio Grande River.

1608: Powhatan's people saved Captain Smith's starving people with gifts of corn.

1621: Jacques Marquette reported that the Illinois Tribe raised and relied on Indian corn to survive.

1669: Cornhusk-stuffed mattresses are used in colonial homes.

1750: Settlers ate corn in all 3 daily meals.

1801: The Underground Railroad transported slaves to freedom; they found corn along the way to survive.

1804: Lewis and Clark set up a corn mill in the Dakota Territory.

1825: The Erie Canal opened for shipping corn east.

1837: John Deere developed the first successful steel plow.

1840: Pioneer wagon trains headed west on the Oregon Trail carrying "Journey cakes."

1862: During the Civil War, corn meal was an important staple for soldiers. It was used to make Johnnie cakes and corn bread.

1896: Henry Ford built the first car to run on ethanol.

CORN TIMELINE: TEACHER ANSWER KEY

1906: Kellogg's corn flakes are first produced in Battle Creek, Michigan. Corn flakes are made with corn grit or the "heart of the corn."

1917: The Lever Act is passed, which gave the president power to regulate the nation's food supply. Advertising encouraged Americans to eat more corn, poultry and vegetables as part of the war effort.

1918: Fuel demands increased ethanol use to 60 million gallons per year.

1919: The 18th Amendment is ratified. Ethanol can only be sold when rendered with 5 percent petroleum.

1933: Congress passed tax incentives to promote ethanol production and increase business for farmers.

1940s: Geneticists discovered that growing corn hybrids produced healthier crops and higher yields.

1941: In Peoria, Illinois, Dr. Howard Florey and Norman Heatley discovered that a corn by-product from the milling process along with other ingredients produce faster growth and larger amounts of penicillin.

1943: In Peoria, Illinois, Andrew Moyer increased the yields of penicillin ten fold, which provided enough penicillin to treat Allied soldiers.

1943: During World War II, 20 million Americans planted gardens and produced 9-10 million tons of fruits and vegetables, such as sweet corn.

1966: The first Kwanzaa celebration occurred, featuring fruits of the harvest such as corn.

1970s: Widespread interest in ethanol developed as several Arab oil-producing nations refused to sell oil to countries that supported Israel.

1983: The number of ethanol plants reached the highest point at 163, producing almost 600 million gallons of ethanol in one year.

1996: Corn varieties developed by genetic engineering were first introduced.

2004: Ethanol production surpassed three billion gallons per year.

2007: In response to growing ethanol demands, farmers planted 92.9 million acres of corn.

SOME SWEET TRAITS

OBJECTIVE:

Students will demonstrate chromosome pairings and complete Punnett Squares to determine possible offspring outcomes.

BACKGROUND INFORMATION:

Sweet corn varies in plant height, ear length, and kernel type. Sweet corn also varies in sweetness levels. Super sweet varieties are the result of breeding sweet corn hybrids for a high sugar concentration. The super sweet varieties start out with a high sugar content at harvest and tend to hold their sweetness through shipping and storage. Taste preference and longer shelf life make this hybrid very popular for consumers and retailers. Because science has been able to keep up with consumer preferences, fresh market sweet corn sales have increased in recent years.

The popular super sweet varieties are hybrids. A hybrid is the offspring of two plants of different varieties produced through human manipulation to obtain specific genetic characteristics. To create a sweet corn hybrid, pollen from one plant is placed on another plant. The crossing of these two plants yields an offspring and potentially another variety of sweet corn.

The nucleus of a plant cell contains Deoxyribonucleic Acid. DNA in the nucleus is grouped into 23 sets of chromosomes. In each chromosome, the DNA is grouped into genes. DNA is responsible for the expression of a variation of a trait. The DNA that makes up genes may vary. One gene may express tall plant height while the other may express short plant height.

A Punnett Square is a chart used to show/predict all possible gene combinations in a cross of parents, whose genes are known. Punnett Squares show the genotype (genetic makeup) and the phenotype (physical makeup).

DIRECTIONS:

1. Before starting this activity, students need to be familiar with chromosomes, DNA, and Punnett Squares.
2. Create 8 containers of beads of eight different colors.
3. On a tray, create the following bead pairs: brown/green, yellow/blue, white/orange, and black/clear. These represent four different traits of the sweet corn plant.
4. Provide students with the trays, pipe cleaners, and the worksheet.
5. Review students answers for Punnett Squares. These answers will vary based on the traits they selected.

Illinois Learning Standards:

12.A.3a; 12.A.3b;
12.A.3c

Illinois Assessment Framework:

12.7.02; 12.7.05; 12.7.08
12.7.11



Related Resources:

Biotechnology Ag Mag

DNA Activity available at:
www.agintheclassroom.org

DNA Basics available from the University of Utah:
<http://learn.genetics.utah.edu/>

Discussion Questions:

- What is a genotype?
- What is a phenotype?
- What is a dominant gene?
- What is a recessive gene?
- How have hybrids impacted agriculture?
- How have hybrids impacted consumer choices?

SOME SWEET TRAITS



<u>Trait</u> or	<u>Variation</u>	<u>Symbol</u>	<u>Bead Col-</u>
Kernel color	yellow	Y	brown
	white	y	green
Sweetness	super sweet	S	yellow
	mild	s	blue
Seed texture	smooth	T	white
	wrinkled	t	orange
Height	tall	H	black
	short	h	clear

1. Create a make believe sweet corn plant with the four traits listed above:
 - Pick two beads from each tray representing a trait. They can be any color for that trait.
 - Once the beads have been selected, string them onto the pipe cleaner, so that one bead from each trait is represented. Make sure that the order of the beads follows the order of traits listed above (kernel color, sweetness, seed texture, height).
 - Examine your chromosome pair. List the genotypes and phenotypes for this pair.
2. Create another make believe sweet corn plant with the four traits above.
 - Examine your chromosome pair. List the genotypes and phenotypes for this pair.
3. Now, let's cross your sweet corn plants to create a new sweet corn hybrid.
 - Draw four Punnett Squares on the back of this worksheet. For each trait, determine the possible genotypes and phenotypes of the offspring for this cross.
 - What is the probability that your hybrid will be a super sweet variety?
 - What is the probability that your hybrid will be a short plant?
4. On the back of this worksheet, create two Punnett Squares showing the cross of two plants yielding a super sweet variety with 100% probability.