THE MYSTERY OF CORN

THE HISTORY OF CORN

FROM ANCIENT MESOAMERICANS TO EARLY SETTLERS TO TODAY'S SOCIETY, CORN IS A KEY PART OF HUMAN LIFE. ANCIENT CIVILIZATIONS USED SELECTIVE BREEDING TO CHANGE THE GENETIC STRUCTURE OF A NATIVE GRASS, TEOSINTE, THAT OVER YEARS BECAME CORN. LEARN HOW THIS HARD-SEEDED GRASS HAS EVOLVED, AND CONTINUES TO EVOLVE.

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CORN SCIENCE INVESTIGATION

There are many different types of corn. Dent corn, sweet corn, flint corn and popcorn are the most common. These types of corn have different **genetic** traits, which is why they look different and have different uses. In this corn science investigation you will be exploring the genetic traits of normal and albino corn. Albinism in corn can be caused by multiple factors. The albinism occurs when the plant cannot produce chlorophyll. With a lack of this essential green pigment, corn plants are not able to produce their own food during photosynthesis. The lack of a food source causes lethal outcomes for the corn. However, it has the unique ability to live long enough for observation and to study gene traits.

INSIDE THE LAB

Albinism in Corn

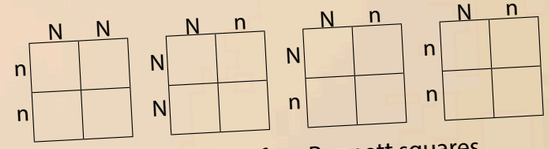
MATERIALS

- 16 yellow pom poms (N)
- 16 white pom poms (n)
- Student whiteboards
- Black, green, and red dry erase markers

PROCEDURE

Draw four punnett squares onto your white board (make sure to space them out).

Label your punnett squares as you see at right:.



In corn plants, normal coloring N is **dominant** to albinism n. Complete these four Punnett squares showing different crosses. Place yellow pom poms in punnett squares needing the dominant trait N. Place white pom poms to place in punnett squares needing the **recessive** trait n. Then shade all of the homozygous dominant offspring red. Shade all the **heterozygous** offspring green. Leave all the homozygous recessive offspring unshaded.

- How many heterozygous offspring have been produced out of the 16 offspring?
- How many homozygous dominant offspring have been produced out of the 16 offspring?
- How many homozygous recessive offspring have been produced out of the 16 offspring?
- You have just created the **genotypes** for various corn offspring.
- What will be the two different **phenotypes** produced?

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Some art and text provided by Kansas Corn.

Corn Was Key in North American History

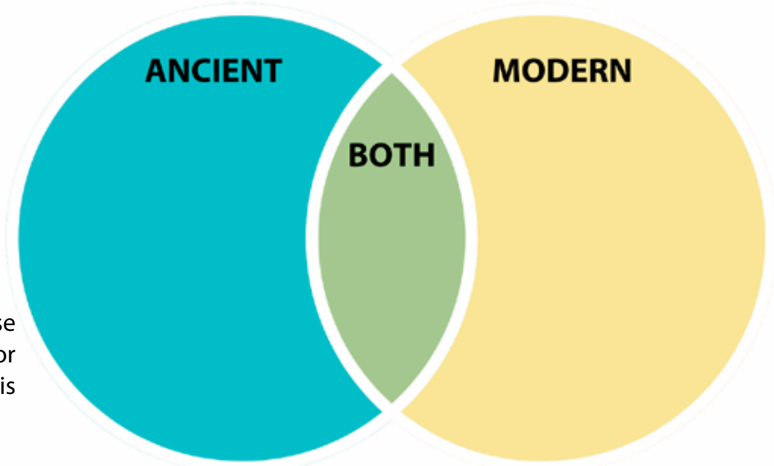
Corn is native to North America and has a prominent role in many native cultures. It was first domesticated from the grassy plant called **teosinte** about 9,000 years ago in southern Mexico.

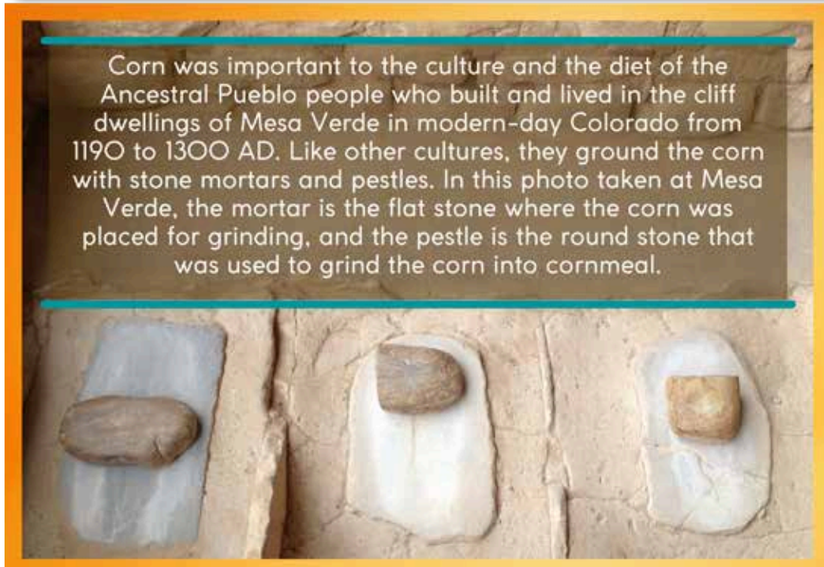
Archaeologists determined that corn came to what is now the United States about 5,000 years ago. Corn is one of the Three Sisters, (corn, beans and squash) which were three key crops for many Native American cultures.

Corn was easy to dry and use during the winter months for foods like hominy which is preserved dried corn.

Ancient vs Modern Corn

How is it possible that a hard-sheathed grass, teosinte, became the sweet corn and dent corn varieties we have today? Watch the video to learn more about the history of corn. Then, complete the Venn Diagram below.





Corn was important to the culture and the diet of the Ancestral Pueblo people who built and lived in the cliff dwellings of Mesa Verde in modern-day Colorado from 1190 to 1300 AD. Like other cultures, they ground the corn with stone mortars and pestles. In this photo taken at Mesa Verde, the mortar is the flat stone where the corn was placed for grinding, and the pestle is the round stone that was used to grind the corn into cornmeal.

FUN FACT

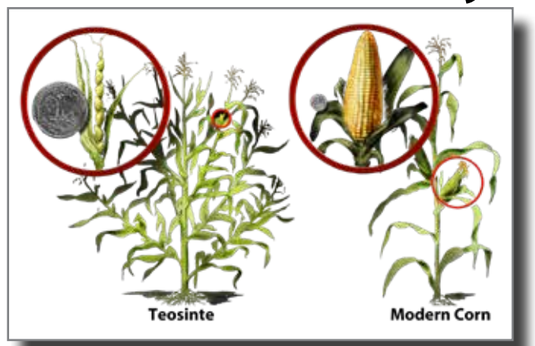
The Mayans and Aztecs created some of the earliest known calendars to help with the planting and harvesting of corn.

Why Does Corn Look Like It Does Today?

You learned corn has evolved from a grass to its modern form after 9,000 years of modification. These changes were made possible by ancient people who used selective breeding by selecting and breeding plants with preferred **traits**, which led to the domestication and development of corn. Corn is also known as **maize**.

In the 1960s, archeologist Richard McNeish traveled to Mesoamerica and found preserved corn cobs almost 5,300 years old having roughly 50 kernels. **Selective breeding** and cross pollination of early corn plants produced desired traits such as larger kernels and bigger ears. These plants were then used to breed the next generations of crops. The plants with undesirable traits were not selected.

The process of choosing desired traits in a crop still exists today. In addition to conventional plant breeding, scientists can genetically modify the DNA of corn crops. These genetic modifications in corn generally include herbicide tolerance, insect protection, drought tolerance and other beneficial traits.



Credit: Nicolle Rager Fuller, National Science Foundation

CAREERS IN CORN

- Plant Breeder
- Nutrition and Product Labeling
- Agronomist
- Molecular Geneticist
- Plant and Cell Biology Researcher
- Regulatory Affairs Manager

LEARN MORE

Explore the Careers of Biotechnology Experts

What Is the Importance of GMOs to Farmers?

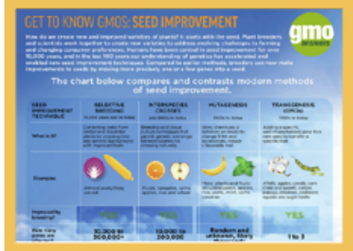
DID YOU KNOW?

The tallest corn plant grown in the world was sweet corn measuring 48' 2" tall, verified by the Guinness Book of World Records in March 2021. It was grown by researcher Jason Karl in New York, who applied genetic mutations to breed the plant. It is long enough to fill the length a semitruck trailer. That's a big load!

(Illustration not to scale)

What do you know about GMO's?

If someone asked you what a GMO is would you know the answer? Your teacher will introduce you to an activity where you will research genetically modified organisms. You will then have a discussion with your classmates to share what you learned.



FIND THE VOCAB WORDS! Maize, Teosinte, Traits, Genetic, Dominant, Recessive, Selective Breeding, Heterozygous, Genotype, Phenotype