

THE MYSTERY OF CORN

VOLUME 2
THE HISTORY OF CORN

EXPLORING THE ORIGINS 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 THE
YEARS BECAME CORN. LEARN HOW THIS
HARD-SEEDED GRASS HAS EVOLVED,
AND CONTINUES TO EVOLVE.

KANSAS CORN STEM

Mystery of Corn High School Reader
Mystery #2



Corn Was Key in North American History

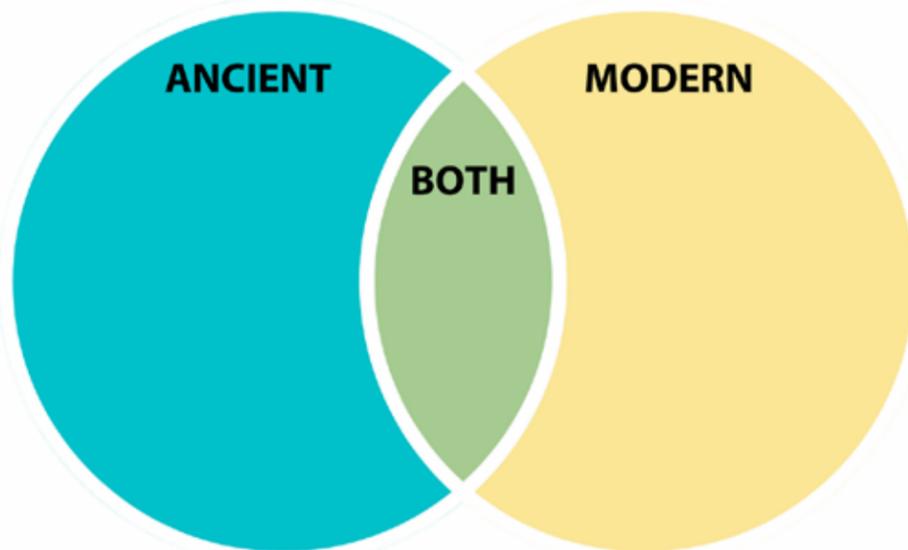
Corn is native to North America and has a prominent role in many native cultures. It was first domesticated from the grassy plant called **teosinte** about 9,000 years ago in southern Mexico.

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.

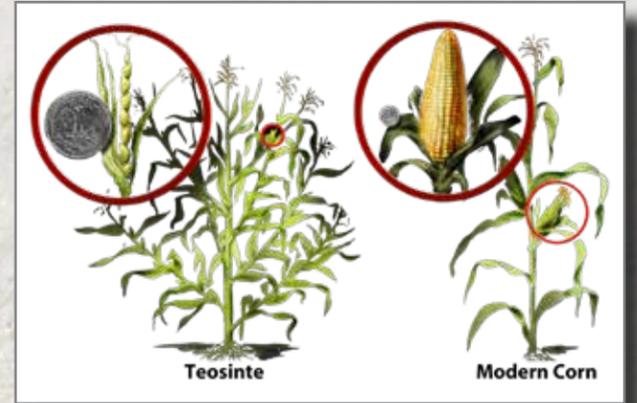


Why Does Corn Look Like It Does Today?

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.

GET TO KNOW GMOS: SEED IMPROVEMENT

How do you create new and improved varieties of plants? It starts with the seed. Plant breeders and genetic engineers work together to create new varieties by addressing existing challenges to farming and changing consumer preferences. Farmers have been using seed improvement for over 10,000 years, and in the last 100 years our understanding of genetics has accelerated and modified many seed improvement techniques. Compare and contrast the methods, benefits and risks associated with each by making more precisely one or a few genes into a seed.

The chart below compares and contrasts modern methods of seed improvement.

SEED IMPROVEMENT TECHNIQUE	SELECTIVE BREEDING (TRADITIONAL)	HYBRIDIZATION (TRADITIONAL)	MULTIPLANTING (TRADITIONAL)	TRANSGENIC (GMO)
What is it?	Choosing and breeding plants with desired traits over many generations.	Combining two different plant varieties to create a hybrid with traits from both parents.	Planting multiple seeds of the same variety to increase the chance of a successful crop.	Inserting a gene from one organism into the DNA of another organism.
Examples	Wheat, corn, rice, soybeans, etc.	Hybrid corn, hybrid tomatoes, etc.	Multiple varieties of the same crop.	Bt corn, Roundup Ready soybeans, etc.
Benefits	Increases yield and quality of crops.	Increases yield and quality of crops.	Increases yield and quality of crops.	Increases yield and quality of crops, reduces pesticide use.
Risks	Low	Low	Low	High
How long does it take?	10,000 to 100,000 years	10,000 to 100,000 years	Random and unpredictable, many years	1 to 3 years



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

CORN SCIENCE INVESTIGATION

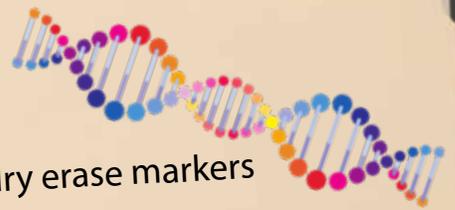
There are many different types of corn. Dent corn, sweet corn, flint corn and popcorn are the most common. These types of corn have different **genetic** traits, which is why they look different and have different uses. In this corn science investigation you will be exploring the genetic traits of normal 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

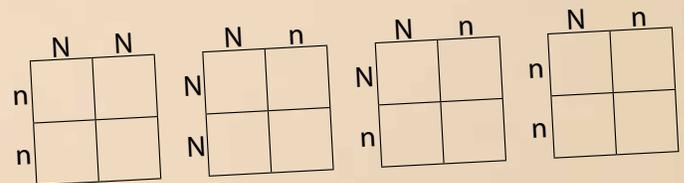
- 16 yellow pom poms (N)
- 16 white pom poms (n)
- Student whiteboards
- Black, green, and red dry erase markers



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?



The Mystery of Corn reader series is provided by:

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