

the mystery of **CORN**

Mystery #2 **THE HISTORY OF CORN**

CORN CAME FROM AN ANCIENT GRASS?

Imagine time-traveling into the past roughly 9,000 years. You have none of the modern conveniences of electricity, air conditioning, or a variety of food items to choose from. You must find ways to make clothes, carry items, create toys, and more. You find the native grass pictured to the right. Do you think this grass has potential to improve life and provide the necessities to help you survive? Investigate how this hard-seeded grass evolved and is now a large part of your everyday life.

What does
teosinte have
to do with
tortilla chips?
PAGE 2

Was corn
genetically
modified 9,000
years ago?
PAGE 3



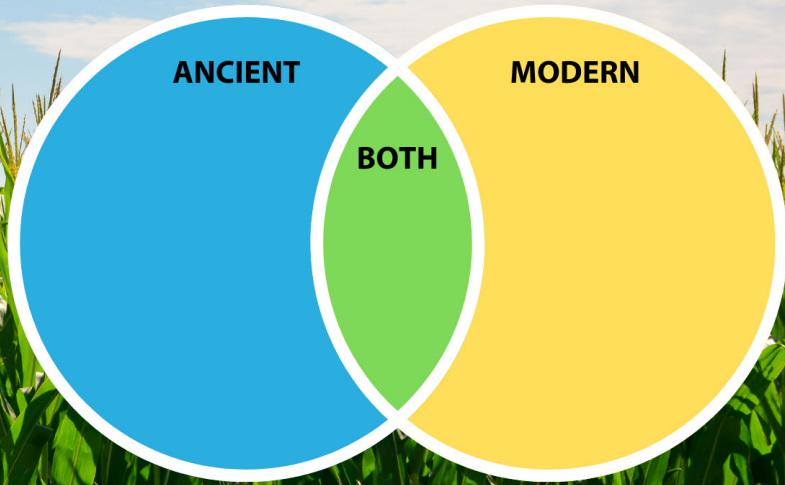
**SCOOP!
DIG INTO
CORN'S
PAST
LIVES**



Ancient vs Modern Corn

Teosinte is a Mexican grass that is the parent plant for corn as we know it today. How is it possible that a hard-sheathed grass 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 to the right.



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.

Corn was important to 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.



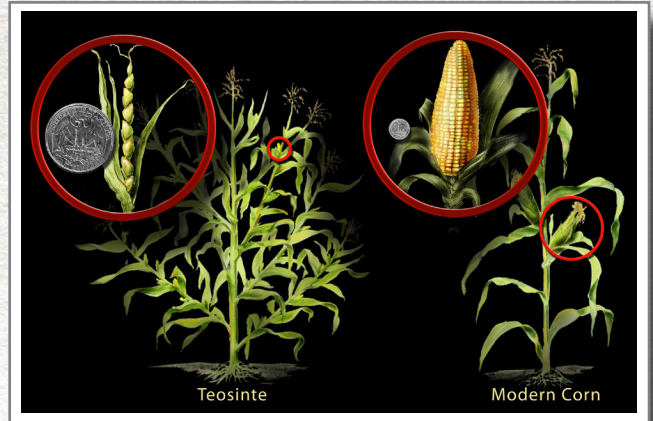
WATCH FOR THESE VOCAB WORDS! **Maize** | **The Three Sisters**

Why Does Corn Look Like It Does Today?

You learned corn has evolved from a grass to its modern form over 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 1960's, archeologist Richard McNeish traveled to Mesoamerica and found preserved corn cobs almost 5,300 years old having roughly 50 kernels. **Selective breeding** and cross-pollinating 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
- Agronomist
- Molecular Geneticist
- Plant and Cell Biology Researcher
- Regulatory Affairs Manager



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 GMOs?

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 (GMOs). You will then have a discussion with your classmates to share what you learned.

GET TO KNOW GMOs: SEED IMPROVEMENT

How do we create new and improved varieties of plants? It starts with the seed. Plant breeders and scientists work together to create new varieties to address evolving challenges to farming and changing consumer preferences. Humans have been central in seed improvement for over 10,000 years, and in the last 100 years our understanding of genetics has accelerated and enabled new seed improvement techniques. Combined with other methods, breeders can now make improvements to seeds by moving 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	INTERSPECIES CROSSES	MUTAGENESIS	TRANSGENESIS (GMO)
How it works	10,000 years to 100s of years	100s to 1000s of years	Hours to weeks	Weeks to weeks
What is it?	Combining traits from similar and distantly related plants by crossing and genetic recombination with improved traits	Breeding and/or gene transfer between different species to combine genetic mechanisms from different species crossing naturally	Using chemicals or radiation to alter or change DNA and to occasionally induce a favorable trait	Adding a specific trait characteristic gene to a new seed to transfer a specific trait
Examples	Almost everything we eat	Rice, bananas, some apples, and wheat	Many types of fruits, like apples, oranges, lemons, limes, kiwis, and some vegetables, like tomatoes, bell peppers, and soybeans	Golden rice, some corn (used to transfer traits like herbicide tolerance and sugar levels)
Improved by breeders?	YES	YES	YES	YES
How many genes are introduced?	10,000 to 300,000+	10,000 to 300,000	Random and unknown, likely thousands	1 to 3



CSI

Corn Science Investigation



Dent, sweet, flint and popcorn make up four of the most common varieties of corn. Within these four groups seeds can be used to create modifications to color. Today's investigation will focus on Glass Gem Corn. This corn is similar to flint or Indian corn but usually is much more vibrant and typically smaller in size. Farmers of glass gem corn will often choose the brightest colored seeds to grow their future colorful crop. Glass gem corn grows multiple cobs on a stalk versus other types of corn that may grow just one. This contributes to their smaller size.



Learn about Glass Gem Corn

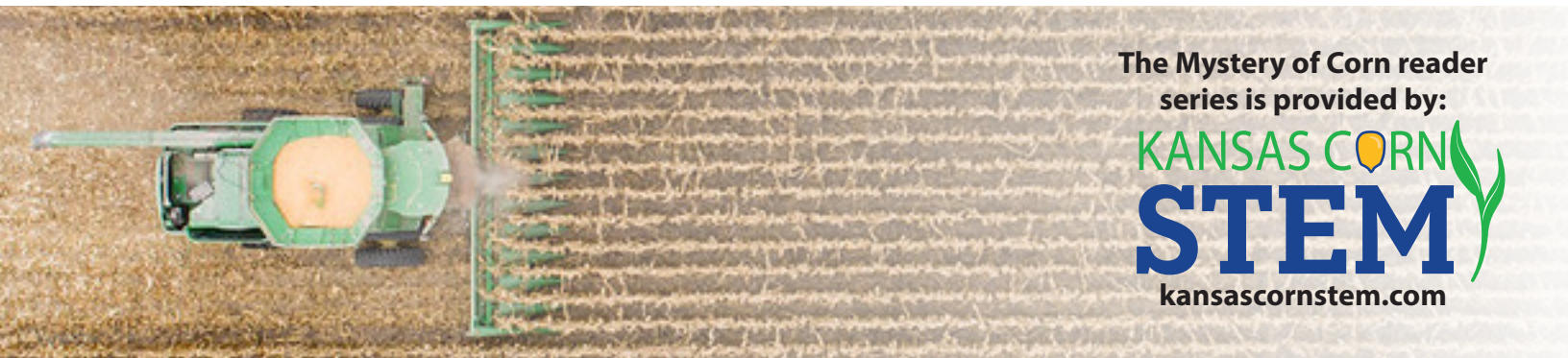


MATERIALS

- Water
- Small containers
- Food coloring
- Micro or disposable pipettes
- Vellum or graph paper in a sheet protector

GLASS GEM CORN PROCEDURE

- Lay out a piece of vellum or graph paper in a sheet protector on a flat surface.
- Using small containers with water and food coloring, create various colors mimicking the seed selection process when growing glass gem corn.
- Using a pipette create your own varieties of glass gem corn.
- You can mix colors, dilute colors, or add more color to the water.
- When you are done creating your cob, write about your selection process for color and creation.



The Mystery of Corn reader series is provided by:

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