Innovation in Agriculture

Then & Now

National Agriculture in the Classroom Conference
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Presented by:
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What is Agriculture?

- Everything involved with growing plants or animals to be used for something else – Food, Fiber, Fuel
How much of the Earth is suitable for growing food?
If the Earth was an apple...

Less than 10% of the earth’s land (or 3% of the earth) has ideal conditions for growing crops.
Innovation in Agriculture: Then & Now

Pigs & Pork
Then
Now
Now
Innovation in Agriculture: Then & Now

Com
How were these tools used to grow or harvest corn long ago?
What does the same job today?
What is this tool?
What does the same job today?
Cultivator
What would this gadget do?
What does the same job today?
Planter
What is this tool?
What does the same job today?
Combine
How would farmers use this?
What does the same job today?
Combine
What does this tool do?
What does the same job today?
Grain Dryer
What would this machine do?
What does the same job today?
Combine
Were there any negative effects of the moldboard plow?

https://youtu.be/fuMvT0jgbjU
Inventions and Technology

How long does it take you to remove the seeds from a cotton boll?

https://youtu.be/12IQurjUomU
Inventions and Technology

**First 3 minutes.**

https://youtu.be/nCohUi4EAs8
Inventions and Technology

These cotton harvesters are made at John Deere Works Des Moines.

https://youtu.be/EPFGgThMe-k
Making Social Studies Connections

**Compelling questions** derive from an enduring understanding (40 years), focus on “big ideas,” are intellectually challenging and do not have a right answer.

Examples:

- Was the American Revolution revolutionary?
- Was the Civil Rights movement of the 1960s a success?
- Why do we need rules?
- Is the American Dream still possible?
- What defines us—nature or nurture?
Making Social Studies Connections

**Supporting questions** scaffold students’ investigations into the ideas and issues behind a compelling question. These are unpacking of the compelling question and are generally lesson level questions.

**Examples:**

- What are some rules that families follow?
- What were the regulations imposed on the colonists under the Townshend Acts?
- What legislation was enacted as a result of the Civil Rights Movement?
- What influence does the environment have on shaping our identity?
Resources for Learning

- Ag Today – (NAITCO)
  - Issue 3, page 6
  - Issue 4
  - Issue 5, pages 4 & 5

- Iowa Ag Today (IALF)
  - Culture & Society Issue
  - Middle School Edition
Change Over Time

Since settlers first arrived in the Midwest, farmers have cultivated or tilled soil to remove weeds and make fields ready for planting. How farmers cultivate has changed a lot in the last 200 years!

200 YEARS AGO

Early Midwest settlers used wood or iron plows pulled by horses to break through the deep prairie grass roots. Plowing brought the rich soil to the surface. This prepared the field for planting. Farmers had to stop the horses frequently to clean off the plow. In 1837 a blacksmith named John Deere made a plow out of steel. The sticky prairie soil easily slid off the polished steel, making plowing much easier.

100 YEARS AGO

In the early 1900’s, tractors were used to pull plows. Tractors were expensive, but worked faster than horses. Plows completely turned the soil over like a shovel. The soil on the surface was left exposed to wind and water. Soil on hills would blow or wash away. So, farmers mainly farmed flat land.

50 YEARS AGO

In the 1960’s, farmers began using chisel plows to prepare the soil for planting. The chisel would make deep slits into the soil. The soil doesn’t get broken up as much. Farmers could grow crops on hills without losing as much soil to wind and water erosion. Minimally tilling the soil is called conservation tillage. It is still used today when tilling is necessary.

TODAY

Now many farmers do not till the soil before planting! No-till farming is when farmers plant seeds directly into unbroken soil. Stems, leaves and roots from last year are left on the ground. This helps protect the soil from wind and water erosion.
A History of Agriculture in the United States

For thousands of years, Native Americans lived and grew food in North America. There were hundreds of Native American tribes. Different tribes had different customs. They hunted, fished, and planted crops. Three of their main crops were corn, beans, and squash. They are known as the Three Sisters.

Europeans began settling in America in the early 1600s. The English first settled on the East Coast. The Spanish settled in Florida and the Southwest. By the 1600s, immigrants had settled in the Midwest. Eventually, the United States spread from coast to coast.

Railroads were built while the West was being settled. This made it easier for people to travel. It also made it easier for goods to travel. Farmers could sell their products to many more people. People in California could buy tools from the East Coast. Beef and produce could be taken from the South and West to the North and East.

Railroads weren’t the only thing that helped American agriculture. People began studying hybrid plants that could grow better. Scientists learned more about fertilizers. Tractors helped farmers work more land.

Today, farmers can use many technologies. Biotechnology can help farmers grow more food. Genetic testing can help farmers grow better livestock herds. What do you think will be the next technology?

A Timeline of Historical Agricultural Moments

Native Americans hunted, fished and gathered food.

European settlers came to America

Farmers are 50% of the labor force

John Deere develops steel plow

Railroads bring many settlers west

John Fordwich invents the gasoline powered tractor

1600s 1790 1837 1850s 1882

Farmers are 2.6% of the labor force

1900

Farm Crisis - many farmers face financial ruin

Drought and dust-bowl conditions in Texas, Oklahoma, Kansas, Colorado, and New Mexico

Great Depression - low farm prices

1930s

1932-1936

1914

World War I - Farmers purchase land to raise corn, beef, and pork for the war effort

1980

1990

Today biotechnology helps increase yield and protect the environment

Farmers are 50% of the labor force
Americans Who Made a Difference

America has had many great innovators... maybe you'll be next!

George Washington Carver was a very smart scientist. Carver found many uses for peanuts and soybeans. His research changed how farmers grow crops. He told cotton farmers they should plant peanuts every other year. This made soil better. It also helped the cotton crops. Today, farmers plant corn one year and soybeans the next year thanks to Carver.

Eli Whitney was another American innovator. He is known for creating the cotton gin. A cotton gin pulls the seeds from the cotton. People used to do this by hand. It took many hours, and was hard work. It took lots of people to do this job. After the gin was invented, farmers could raise more cotton. Today's cotton industry is only possible because of Whitney's invention.

There is one scientist who has changed what we know about livestock. If cattle are scared, they balk and stop moving forward. This takes time and can make the animals dangerous. Temple Grandin is an animal scientist that has created special chutes that keep animals comfortable. The chutes have solid, curved walls that keep animals happy and farmers safe.

Norman Borlaug is given credit for saving more lives than any other human. He studied how to make plants better. He studied wheat in Mexico. After that, wheat production increased five times. Borlaug won the Nobel Peace Prize for his work. He is known as the Father of the Green Revolution.

Digging Deeper

These are just a few of America's agriculture innovators. Do you know what made these other Americans famous?
• Henry A. Wallace
• George H. Shull
• Rachel Carson
• Cyrus McCormick
• Robert Flaxey
• Hugh Dennett
• John Deere
• Earl Butz
• Algo Leopold
Corn: Tools of the Trade Then & Now

Native Americans were the first people in the United States to grow corn. They prepared the soil, planted, weeded, harvested, and ground the corn by hand. They used tools made from rocks, bones, and sticks. As time went on, farmers created hand-powered machines and tools to make planting, and harvesting easier.

Today’s farmers use combines to harvest corn. This one machine does the job of a corn picker, corn husking hook, and corn sheller.

At the front of a combine is the head. Farmers switch heads to harvest different crops. A corn head has points that go between the rows of corn. As the combine moves through the field, the head cuts the corn stalks down and removes the ears. Spinning parts then move the ears of corn to the center of the head. The feeder takes the ears inside the combine.

In the threshing area, the ears are pushed against a spinning cylinder. The corn kernels fall off the cob. The corn falls through slots in large sieves and is moved into the grain tank. When the grain tank is full, the anger takes the corn out to a wagon or truck.

The husks and cob (chaff) do not fit through the holes in the sieve. A spinning spreader throws the chaff out behind the machine onto the field.

Can you identify what each of the tools below may have been used for?

1. Can you find something that made the job of picking and husking ears of corn easier?
2. What tool could be used to cut down whole corn stalks?
3. Removing corn kernels from the cob was hard work. What tool could help in this job?

DID YOU KNOW?

In the early 1900s, farmers could harvest about 20 acres of corn per day. They picked the cob by hand and hauled it in wagons. Today, farmers can harvest more than 300 acres of corn per day. They use combines and load it out of the field with trucks.
FARMING THEN & NOW

THINK & DISCUSS.

In the 1930's one farmer produced enough agricultural products to feed about four people. By 1960 that increased to 28. Today's farmer feeds about 168 people. What other advances in technology have allowed farmers to grow more? How did this affect jobs and where people live?

100 years ago

When your great-great grandparents were your age, a typical Iowa farm looked like those we see in children's books. Farms usually had a few cows, chickens, and some pigs. Most grew corn, hay, and oats, and had a large garden too. The farm provided nearly everything the family ate. Some grain and livestock were sold to buy other necessities and upgrade buildings and farm equipment. Some farms had tractors, but they were not commonplace yet.

During World War I, the demand for farm products soared. Farmers enjoyed good overseas markets. The US government guaranteed prices for farm products to supply the army. Farmers planted more acres and expanded their herds. These good times for farmers ended in the 1920's. Iowa farmers experienced a recession after the government ended the guarantees. Prices for crops and land fell. This signaled the beginning of the Great Depression in Iowa.

50 years ago

At this time, farms when your grandparents were your age were similar to farms today. Most Iowa farmers grew corn and soybeans and raised pigs, cattle, or poultry. They used tractors, planters, and combines, but they were much smaller than those used today. Tractors with cabs were a luxury to farmers in the 1960's. Farmers focused on growing better crops and livestock. Instead of saving seed from year to year, they purchased hybrid seed corn. Improved genetics resulted in more consistency and higher yields. The same is true with livestock.

Today

Farms today are specialized and high-tech. Farmers use tablets, laptops, drones, and more. If farmers raise livestock, they usually raise one type. This enables them to acquire the facilities, technology, knowledge and skills needed to produce it, and produce it well. Many livestock barns have Wi-Fi and automated feed and climate control systems. Farmers can monitor a cow to labor or adjust the temperature in a barn from their smart phones. If the power goes out, back-up generators start and the farmer is alerted with a text. This technology enables farmers to be efficient and better care for their animals.

DID YOU KNOW?
The first gasoline powered tractor was made in Iowa! It was invented by John Froehlich in 1892.
Lesson 1: 1600–1929
SEEDS OF CHANGE

Lesson 2: 1930–1949
FROM DEFEAT TO VICTORY

Lesson 3: 1950–1969
PROSPERITY & CHALLENGES

Lesson 4: 1970–Present
INTO A NEW MILLENNIUM

ACCESS THE INTERNET:
LEARNING RESOURCES

https://www.agclassroom.org/gan/index.htm
Century Farm
One Hundred Years on a Family Farm
by: Chris Peterson
Farming Then and Now
by Charles R. Smith Jr.
Farms Long Ago
by Jennifer Blizin Gillis
ISBN: 0-7565-0671-9
Food and Agriculture \{Geography Focus\}
by Louise Spilsbury
John Deere That’s Who!
by Tracy Nelson Maurer
ISBN: 978-1-250-19507-4
The Kid Who Changed the World
by Andy Andrews
ISBN: 978-1-4003-2433-0
Farmer George Plants a Nation
by Peggy Thomas
ISBN: 978-1-59078-460-0

(Also available: Thomas Jefferson Grows a Nation)
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