Virtual Then and Now

Grade Level(s)

Grade: 3rd-5th

Estimated Time

30 minutes

Purpose

Students will learn about history, culture and innovation in agriculture by comparing old and new farm tools, machines and methods used to plan, harvest and store corn.

Materials

- Website with downloadable activities and worksheets: www.linncoag.com -2020/21 virtual learning drop down tab-November
- Farm Machines Then and Now Slides https://www.iowaagliteracy.org/Article/Farm-Machines-Then-Now
- Antique tool photo cards https://www.iowaagliteracy.org/Article/Farm-Machines-Then-Now
- Modern farm machine photo cards https://www.iowaagliteracy.org/Article/Farm-Machines-Then-Now
- Then and Now observation sheet (2 per student) https://www.iowaagliteracy.org/Article/Farm-Machines-Then-Now
- Antique tool video review https://www.youtube.com/watch?v=X1nFibxfw3k
- Iowa Ag Today Issue 5 https://www.iowaagliteracy.org/page/file?path=Files%2Fwebsite%2Fiowa-ag-today%2FIALF_IAT_issue5_digital_final.pdf

Vocabulary

Agriculture – Everything involved in growing plants and animals to be used for something else.
Auger – A rotating cylindrical tool with a large helical rim used to push grain
Combine – Modern harvesting equipment that combines many jobs during harvesting season
Combine head/header – The front attachment on a combine, meant specifically for a certain type of crop
Corn crib – Large bin, structurally similar to a grain bin, but with wire or wooden walls for additional ventilation. Used to store and dry unhusked ears of corn
Corn knife – Large, broad blade with a short handle, used to chop corn stalks down
Cultivator – Tillage equipment used to break apart lower levels of soil
Furrow – Small trench intended for planting seeds

Grain bin – Large, metallic bin that stores grain after harvest. May have grain drying equipment as well
Grain dryer – Mechanical drying system that helps farmers maintain a 13% grain moisture for the best storage possible
Husking (shucking) – To remove the outer leaves and silks (husks) from an ear of corn
Planter – Tool or machine that deposits seed in the ground
Seed bed – The area that seeds are planted in
Sheller (thresher) – To remove the seeds or kernels from the rest of the plant material, including the cob, husks, and stalk
Technology – A tool or technique that makes a job easier or more efficient.
Tillage – The act of breaking apart soil to (a) prepare the area for planting, or to (b) remove weeds
Stover – Leftover "waste" material in a corn field once it has been harvested. This includes stalks, husks, and cobs.

Interest Approach – Engagement

Begin the lesson by reading page 1 of the Iowa Ag Today (Science, Technology, Engineering and Math). Ask the students to brainstorm how STEM is used in agriculture. How has it changed over time?

Background - Agricultural Connections

Many of our advances as a society have been tied to the mechanical advances of agriculture. By studying the history and technology of these advances, students can gain a better understanding of historical timelines as well as the importance of engineering and innovation.

This lesson will cover many aspects of raising corn (this crop specifically to ensure cohesiveness). Here's an outline of each tool:

Antique:

Planter:

- This tool has a box that would hold corn seed. The user would hold the handles at the top, place the tip in the furrow, and press the handles together to drop the seed into the ground.

Hoe:

- Garden hoes are still commonly used, but only really in small scale. These tools are good for creating furrows, covering seeds, and weeding between rows.

Corn husking glove:

- There are many styles of corn husking gloves, but the type pictured has a metal hook in the palm of the hand. This would be used to peel the husks back from the ear of corn, and can also be used to cut the ear from the stalk. In this way, a person using the glove could quickly husk and pick an ear of corn and toss it into a wagon in one motion.

Corn knife:

- While this isn't the same thing as a machete, it can look similar. Corn knives are made to cut the tough stalks of corn with a swift chop to the base of the plant. This tool can also be used to cut weeds or similar plants.

Corn dryer:

- This tool is essentially just a conglomeration of metal fingers that would pierce the ear of corn and hold them away from each other, allowing the kernels to dry while still on the cob.
- Corn cribs were also used for larger volumes of corn. They resembled a grain bin, but generally had wire or wooden walls with plenty of air holes. This allowed ears of corn to be stored whole while they dried.
    - Some discussion points on corn cribs could be:
        - Effectiveness of deterring pests
        - Evenness of grain drying
        - Spoilage or waste

Corn sheller:

- Corn shellers varied greatly over time. Across all styles of shellers, the machine would have some kind of rough surface or teeth that would jostle the kernels from the cob. In the hand crank style shown in the lesson, the crank feeds the ear through the narrowed, spiky opening. The kernels would fall through the funnel into a box, basket, or barrel, and the cob would be rotated to fall the opposite direction, into a separate container.
- Note: shelling and threshing refer to the same act of removing the kernels from the rest of the plant material.

Modern:

Planter:

- Planters today are attached to tractors, and create a furrow, deposit seeds evenly, and cover the furrow in one pass.
    - Some producers may attach other equipment at once to fertilize or till at the same time as planting. This can save the producer fuel, time, and can protect the soil from unnecessary compaction (which makes it harder for plants to grow).
    - Video of row tracking system display in a tractor: **https://youtu.be/J_YpIfgfrjU**
- Modern technology such as variable rate technology, row-track, and autosteer, can use maps of the field and GPS to plant the rows straight, evenly, and not overlap when turning corners or on irregularly shaped fields.

Field cultivator: Though there are many different types of tillage equipment, field cultivators are widely used.

- Other types of tilling equipment might be discs, harrows, chisel plows, moldboard plows, para-plows, subsoilers, rotary hoe, and others. See here for more information on tillage equipment: **http://snapplus.wisc.edu/wp-content/uploads/2013/12/R2TillageGuide.pdf** (field cultivator photo on page 31)
- Note: tillage can meet many objectives; to break apart soil in seed bed preparation, to control weeds, or to make the field more level and even (perhaps if the field was grazed by cattle, they can leave ruts, etc.). Depending on the purpose of the tillage, different types of equipment can be used.

        - Today, many producers are concerned about weed management, soil conservation, and erosion/runoff, making no-till or minimum till operations more prominent.
    - Field cultivators (with sweeps) are essentially V-shaped blades attached to a curved, vertical bar. The shape of the blade helps incorporate materials at a lower level without disturbing as much topsoil. By disturbing more soil at the surface, you increase the risk of runoff and erosion.

Combine: Combines earned their name from *combining* many kinds of jobs in the harvest season. Within the combine, the ears would be picked, husked, and shelled; the stalks would be cut; the grain would be collected; and all other material (cobs, husks, and stalks) would be deposited back onto the field.

- These machines do not go very fast in terms of miles per hour, but by handling multiple rows at once and by doing all of these jobs at once, the amount of time it takes to harvest a field has fallen dramatically.

Mechanical Grain Dryer: Now, farmers generally prefer to store their grain in a grain bin and use a mechanical grain drying system as opposed to corn cribs. Grain bins look much like corn cribs, except their walls are solid metal.

- Though grain drying systems can vary depending on brand, the overall idea is that augers inside the bin will rotate dry grain away from the air source so that wet grain will be subjected to the air flow. Eventually, the grain should be dried equally (to a moisture content of about 13%).

Procedures

1. Distribute one antique tool picture to each student. Ask them to look at the photo to fill out one then and now observation sheet.
2. Distribute one modern tool picture to each student. Ask them to look at the photo to fill out one then and now observation sheet.
3. Use the Then and Now presentation slides to review the antique tool and their modern-day equivalent.
    - Review with video https://www.youtube.com/watch?v=X1nFibxfw3k
4. Finish reading Iowa Ag Today: page 4 and page 6

Optional activities:

- Have the students choose an antique or modern-day tool not represented in slides to research and present to the class.
- Future of farming video: https://www.youtube.com/watch?v=Qmla9NLFBvU&t=2s

Organization Affiliation

Lesson is adapted to a virtual format from the Iowa Agriculture Literacy Foundation lesson "Farm Machines: Then and Now." https://www.iowaagliteracy.org/Article/Farm-Machines-Then-Now

Then and Now activities were adapted to a virtual lesson by Morgan Hibbs and Shelby Hawkins

Agriculture Literacy Outcomes

T5.3-5.c. Explain how agricultural events and inventions affect how Americans live today (e.g., Eli Whitney - cotton gin; Cyrus McCormick - reaper; Virtanen - silo; Pasteur - pasteurization; John Deere - moldboard plow)

T5.3-5.d. Explain the value of agriculture and how it is important in daily life

T5.3-5.f. Understand the agricultural history of an individual's specific community and/or state

Iowa/ Common Core Standards

SS.4.10. Describe how societies have changed in the past and continue to change.

SS.4.23. Explain probable causes and effects of events and developments.

SS.4.24. Develop a claim about the past and cite evidence to support it.

SS.4.25. Analyze the impact of technological changes in Iowa, across time and place.

SS.4.26. Explain how Iowa's agriculture has changed over time.