



Advancing through Time

Middle School Food and Agricultural Literacy Curriculum

Precepts

- O. Flexibility and Adaptability
 - O1. Embraces emerging technology in the workplace.

National Standards

- CS.03.03.01.c. Conduct a workplace study to assess the benefits to adapting emerging technologies.
- BS.01.01.01.a. Define biotechnology and explore the historical impact it has had on agriculture.
- NL-ENG.K-12.4 – Communication Skills
- NL-ENG.K-12.12 – Applying Language Skills
- NS.5-8.6 – Science in Personal and Social Perspectives
- NS.5-8.7 – History and Nature of Science
- NSS-USH.5-12.3 - Era 3: Revolution and the New Nation (1754-1820s)
- NSS-USH.5-12.4 - Era 4: Expansion and Reform (1801-1861)
- NSS-USH.5-12.5 - Era 5: Civil War and Reconstruction (1850-1877)
- NSS-USH.5-12.6 - Era 6: The Development of the Industrial United States (1870-1900)
- NSS-USH.5-12.7 - Era 7: The Emergence of Modern America (1890-1930)
- NSS-USH.5-12.8 - Era 8: The Great Depression and World War II (1929-1945)
- NSS-USH.5-12.9 - Era 9: Postwar United States (1945 to early 1970s)
- NSS-USH.5-12.10 - Era 10: Contemporary United States (1968 to the Present)

Student Learning Objectives

- As a result of this **unit** the student will...
 - Determine the advances of science and technology in the agricultural science industry.
- As a result of this **lesson** the student will
 - Determine the advances of science and technology in the agricultural science industry.

Time

Instruction time for this lesson: 45 minutes.

Resources

A Condensed History of American Agriculture 1776 – 1999. (2009). Retrieved August 7, 2009, from United States Department of Agriculture Web site: <http://www.usda.gov/news/pubs/99arp/timeline.pdf>. — Economic Research Service. (2000, September). *A History of American Agriculture, 1607-2000.* (ERS-POST-12.) Washington D.C. Retrieved August 7, 2009, from Growing a Nation The Story of American Agriculture – Agriculture in the Classroom Web site: <http://www.agclassroom.org/gan/timeline/index.htm>. — *Genetically Engineered Foods and You – Understanding the Terms.* (2002). Retrieved August 7, 2009, from Penn State Biotechnology Food and Agriculture Web site: http://biotech.cas.psu.edu/fact_sheets.htm. Herren, Ray V. (2002). *The Science of Agriculture: A Biological Approach, Second Edition.* Albany, NY: Delmar Thomson Learning. — American Farm Bureau Federation. (2009). *Food and Farm Facts, Significant Events in Agricultural History.* (pp. 28-29). Washington, D.C.: American Farm Bureau Federation Public Relations Department.

Tools, Equipment, and Supplies

MS.IAS.8.5.ASSESS.A – one per student
MS.IAS.8.5.AS.A through O – one per teacher
MS.IAS.8.5.TM.A – one per teacher
Overhead projector
Clipboard or hard writing surface for activity sheets
Tape
Scissors
Colored pencils
Markers

Key Terms

The following terms are presented in this lesson and appear in bold italics:

cotton gin
reaper

Summary of Content and Teaching Strategies

Objective 1: Determine the advances of science and technology in the agricultural science industry.



Advancing Through Time

I. Determine the advances of science and technology in the agricultural science industry.

- A. 1793 – Invention of the **cotton gin**
- B. 1834 – McCormick **reaper** patented
- C. 1837 – John Deere began manufacturing steel plows
- D. 1843 – Sir John Lawes founded the commercial fertilizer industry
- E. 1862-75 – First American agriculture revolution
 - 1. Change from hand power to horses
- F. 1867 – Barbed wire invented
 - 1. Ended era of open-range grazing
- G. 1870s – Refrigerator cars introduced
 - 1. Increase national markets for fruit and vegetables
- H. 1881 – Hybridized corn produced
- I. 1892 – John Froelich built first gasoline tractor
- J. 1900-10 – George Washington Carver found new uses for peanuts, sweet potatoes, and soybeans
 - 1. Diversifies southern agriculture
- K. 1910-15 – Open-gearred gas tractors introduced
- L. 1941-45 – Frozen foods popularized
- M. 1945-70 – Second American agriculture revolution
 - 1. Change from horses to tractors
 - 2. Increased technological practices
 - 3. Increased productivity per acre
- N. 1980s & 90s – Biotechnology becomes viable for improving crop and livestock products
 - 1. 1993 – Monsanto sells bovine somatotrophin to dairy farmers to increase milk production
 - 2. 1994 – Tomatoes are genetically modified to delay the ripening process so they could be shipped and arrive to be sold
 - 3. 1994 – USDA approves the sale of Roundup Ready soybeans and cotton
 - 4. 1995 – USDA approves the sale of genetically modified corn
 - 5. 1996 – Scottish scientists cloned a sheep, Dolly
- O. 1994 – Satellite technology becomes popular to track and plan farming practices
 - 1. Precision agriculture

Interest Approach

Students will use the Me-You-Us e-Moment® to create a personal timeline depicting five important events or dates that have taken place throughout their lifetime. The first event on all students' timelines will be their birth. Students will have three minutes to finish their timeline that includes four other events.

Lead students through a silent trip back to their birth, having them imagine these events in their minds before actually drawing them on their timeline.

We are about to embark on a powerful journey: a journey that will be not be the same for any two people. As we prepare for this journey, remember that we must be considerate of others as we concentrate on the instructions. Please remain absolutely silent and close your eyes. Listen to my voice and I will lead you through this journey step by step. Here we go.

Close your eyes and think back with me to the time of your birth. You may not remember your actual birth, but picture the first event you can remember. Take the next few moments to travel through your lifetime. You are now one, two, three, even four years old. What do you remember? What do you see? Now it is your first day of school, second grade now, on into fourth. Picture what is happening during this time at school, during the summer, at home with your family. You are now into your middle school years. What is happening now? What are your interests and hobbies? Do you have siblings or family members around you? Keep these thoughts close to the front of your brains, open your eyes, and silently listen to these instructions:

In just a moment you will hear the words TIME IT. When you hear those words, create a timeline labeling five important dates or events that have taken place throughout your lifetime. The first of these dates will be your birth. The other four dates are completely up to you. You may draw pictures to depict these events or simply write them and the date on your timeline. It is completely up to you, but at the conclusion of three minutes, you must have a total of five items on your timeline, the first being your birth. What questions do you have? TIME IT!

At the conclusion of three minutes, break students into pairs to share for two minutes.

I am sure we are anxious to share our timelines.



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Please take the next two minutes to share your timeline with a partner. Begin.

Randomly select students to share some of their timelines with the class. Lead a discussion about how students picked the events for their timeline, and what classified each event as being important enough to be one of their top five. Responses should lead in to the fact that these events have changed them as individuals, altered their life, made them who they are today, etc. Use the following questions/dialogue to solicit these responses:

Let's share one more time. What are some of the events we have found important enough to place on our timeline?

What is it about these particular events that made them important enough to list them in the top five events of our lifetime?

Why did these events make it onto our timelines?

What constitutes an important date or event?

Great thinking! That is exactly correct. The items we depicted on our timelines were events that impacted our personal life. They are events that have forever changed us as individuals and who we are as a person. Important dates and events that take place throughout history not only affect individuals, but they impact businesses, communities, the economy, etc. In fact, it is very interesting to track historical events and see just how things have changed in response to those events.

Today we have the opportunity to take another journey. We are going back even farther than our birth this time. We are headed back to the 1700s to get the chance to explore the agriculture industry from that time until now. Although there are many things we could track throughout the history of agriculture, we need to pay close attention to how agriculture technologies have changed and advanced since the 1700s. Today will be filled with anticipation and exploration. We will discover new information that will help us look at agriculture in a new light. It is an exciting time. Let's get going!

Scripted Content

Objective 1. Determine the advances of science and technology in the agricultural science industry.

To illustrate the importance of agricultural events throughout time, students will be creating a virtual timeline throughout the classroom. Prior to class, print **MS.IAS.8.5.AS.A – MS.IAS.8.5.AS.O**, cut around border, or cut off this nomenclature, so the letter of activity sheet does not give the order away, and place on a clipboard or hard writing surface for students' future use. Identify a starting point for a virtual timeline the students will be creating. Then have students line their chairs around the room in a line or circle beginning at the designated starting point. Students must still be able to see the overhead projector as they will be taking notes from these chairs. Assign these historical event activity sheets to each student. Instruct students to take the next two minutes to create a virtual timeline by placing each of these historical events in the correct order on the chairs. When the class thinks they have the correct sequence, they should remain in order and find a chair for later review. To make things even more challenging, students may not use their voices to organize the virtual timeline.

When I say GO, take the next 30 seconds to gather your chair, a writing utensil, and a sheet of paper. Take these items and station yourselves in a circle around the room.

Stand at the starting point and walk around the room in the circle or line you want the students to create. Indicate the stopping point.

This is the starting point for the first chair. The circle will continue around the room like this and eventually end at this point. When you find your spot within this circle, be sure everyone can see the overhead projector. GO!

Thanks for the quick movement! Now we really are ready to begin our journey. Coming around to you now is a clipboard (or some type of hard writing surface) with an important event that has taken place throughout the history of the agriculture industry. Each student has a different agriculture event. When I say ACTION, we will have two minutes and 30 seconds to begin creating a virtual timeline with the given agriculture events. Once again, the first event will be placed on the first chair I designated as the beginning of the circle, and the last event will end here at the last chair. Silently work together with classmates to correctly line up in the order these events occurred. We will be moving around the room but we must silently work together. What clarification is needed? How long do we have to create this timeline? GO!

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At the conclusion of two minutes, count down the remaining 30 seconds until students are to line up accordingly. Instruct students to then begin the creation of their agriculture timeline. Create your own on the overhead for students to use as an example. As events are identified and placed on the overhead, compare them with the order in which the students predicted.

Everyone will be sitting in 5 – 4 – 3 – 2 – 1. Well, let's see how our virtual timeline compares to the one that will soon be revealed. Before the big revelation, let's prepare to capture these events in our notes. Gather a writing utensil and a sheet of paper. Attach this paper to your clipboard (or hard writing surface) and draw a straight line horizontally on your sheet of paper. Let's get rolling and discover how we did.

Interact between students and their virtual timeline and the events listed below. For each event, first see where it was found in the student's timeline, and then reveal the next event on the teacher timeline. If the student's spot is correct, they may hang their event on a hard surface above them to display to the entire class. If the students' event has been misplaced, the correct one should be found and should take over the appropriate spot. The student who was in the wrong place will sit in the center of the circle until they can be appropriately placed. Continue this process until reaching the final event. Students will record these events on their personal timeline as you reveal them on **MS.IAS.8.5.TM.A**. Be sure students include the year on their timelines.

As the correct spot is identified, the activity sheets may be placed at a specific location in or around the room where they can remain to be used in future lessons. If this is the case, have students add the year these events took place before they are placed in their permanent spot.

Use the following timeline list to facilitate this activity and interaction. If an event has a side note or numbered entry under it, please reveal to students, having them add it to their timeline in a manner other than the other events. Example: if students are writing the events inside boxes, they should place the items inside a circle or without any boundaries. Events on **MS.IAS.8.5.TM.A** are placed within a square shape. For the 1867 event, reveal to students the square that says "barbed wire invented." Next, use a transparency pen to write "ended era of open-range grazing" and draw a circle around this side note. Model this action for students on **MS.IAS.8.5.TM.A**

1793 – Invention of the cotton gin

1834 – McCormick reaper patented

1837 – John Deere began manufacturing steel plows

Introduction to Agricultural Science: Overview

1843 – Sir John Lawes founded the commercial fertilizer industry

1862-75 – First American agriculture revolution

1. Change from hand power to horses

1867 – Barbed wire invented

1. Ended era of open range grazing

1870s – Refrigerator cars introduced

1. Increase national markets for fruit and vegetables

1881 – Hybridized corn produced

1892 – John Froelich built first gasoline tractor

1900-10 – George Washington Carver found new uses for peanuts, sweet potatoes, and soybeans

1. Diversifies southern agriculture

1910-15 – Open-gear gas tractors introduced

1941-45 – Frozen foods popularized

1945-70 – Second American agriculture revolution

1. Change from horses to tractors
2. Increased technological practices
3. Increased productivity per acre

1980s & 90s – Biotechnology becomes viable for improving crop and livestock products

1. 1993 – Monsanto sells bovine somatotrophin to dairy farmers to increase milk production
2. 1994 – Tomatoes are genetically modified to delay the ripening process so they could be shipped and arrive to be sold
3. 1994 – USDA approves the sale of Roundup Ready soybeans and cotton
4. 1995 – USDA approves the sale of genetically modified corn
5. 1996 – Scottish scientists cloned a sheep, Dolly

1994 – Satellite technology becomes popular to track and plan farming practices

1. Precision agriculture

Wow, what a timeline we have created! Let's step back and think to ourselves about how the agriculture industry has changed from 1793 to the present day.

Take 20 seconds to let the students silently ponder this thought. Next, lead the students to realize the importance of them adapting to changing technologies in the workplace.



Lesson Number: MS.IAS.8.5

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How would things be different if farmers or agriculturalists had not adapted to all the changes that have happened since 1793?

Solicit responses and allow students to discuss.

That's exactly right. They would probably be left behind and not be nearly as productive as some farmers today. In fact, they may not even been farming or in the agriculture industry because they would be so far out of the game. Eventually we will all be employed. What role will technology play in our future job or career? How important will it be for us to adapt?

Review/Summary

Use the Hieroglyphics e-Moment® to have students draw an icon to represent the six most important events in the history of agriculture. These events are personal beliefs and may vary from student to student.

Technology is forever changing, and we have certainly seen its effects in the agriculture industry as we have become more productive and efficient agriculturalists. Take a few moments to look over your agriculture timeline. Think about the importance of these events and how they have ultimately made the agriculture industry what it is today.

When I say DRAW IT, select what you believe to be the top six agricultural events in history. Next, create an icon to represent each of these events, and place it next to its appropriate spot on your timeline. These important events are personal to you and your beliefs. The six you select may be different from those of the person sitting next to you. The important thing to remember is to select six events that you personally feel has positively impacted the agriculture industry. You have three minutes. DRAW IT!

Provide three minutes for students to complete their drawings.

Now that we have reviewed and committed this information to memory, let's continue to appreciate and welcome these kinds of changes that improve our quality of life.

Application

Extended classroom activity:

Create the front page of the local newspaper 20 years from now. There should be at least three agriculture articles included that highlight new technology in the agriculture profession.

FFA activity:

Hold a community forum interviewing adults about the changes in farming, science, technology, etc. Invite community patrons, alumni members, FFA members, other school organizations, politicians.

SAE activity:

Identify emerging agriculture technology. Research the technology and create a TV, video, or newspaper advertisement for that technology.

Evaluation

Complete **MS.IAS.8.5.ASSESS.A**

Answers to Evaluation

Answers will vary from student to student but should involve the student's individual events identified within the review section of this lesson. The explanation for these events should lead to farmers being more productive and efficient in their work, creating lower prices for consumers, etc.

Invention of the cotton gin



McCormick reaper patented



John Deere began manufacturing steel plows

Sir John Lawes founded the commercial fertilizer industry



First American agriculture revolution



Barbed wire invented

Refrigerator cars produced



Hybridized corn produced

First gasoline tractor

George Washington Carver found new uses for peanuts, sweet potatoes, and soybeans



Open-gearred gas tractors introduced



Frozen foods popularized



Second American agricultural revolution

Biotechnology becomes viable for improving crop and livestock products

Satellite technology becomes popular to track and plan farming practices



1994	Satellite technology becomes popular to track and plan farming practices	1980s & 90s	Biotechnology becomes viable for improving crop and livestock products	1945-70	Second American agriculture revolution	1941-1945	Frozen foods popularized	1910-1915	Open-gearred gas tractors introduced	1900-1910	George Washington Carver found new uses for peanuts, sweet potatoes, and soybeans	1892	John Froelich built first gasoline tractor	1881	Hybridized corn produced	1870s	Refrigerator cars introduced	1867	Barbed wire invented	1862-1875	First American agriculture revolution	1843	Sir John Lawes founded the commercial fertilizer industry	1837	John Deere began manufacturing steel plows	1834	McCormick reaper patented	1793	Invention of the cotton gin
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Name _____

Directions: Identify three events that have taken place throughout the history of American agriculture. Explain how you believe these events have impacted agriculture today.

Event #1:

Event #2:

Event #3:
