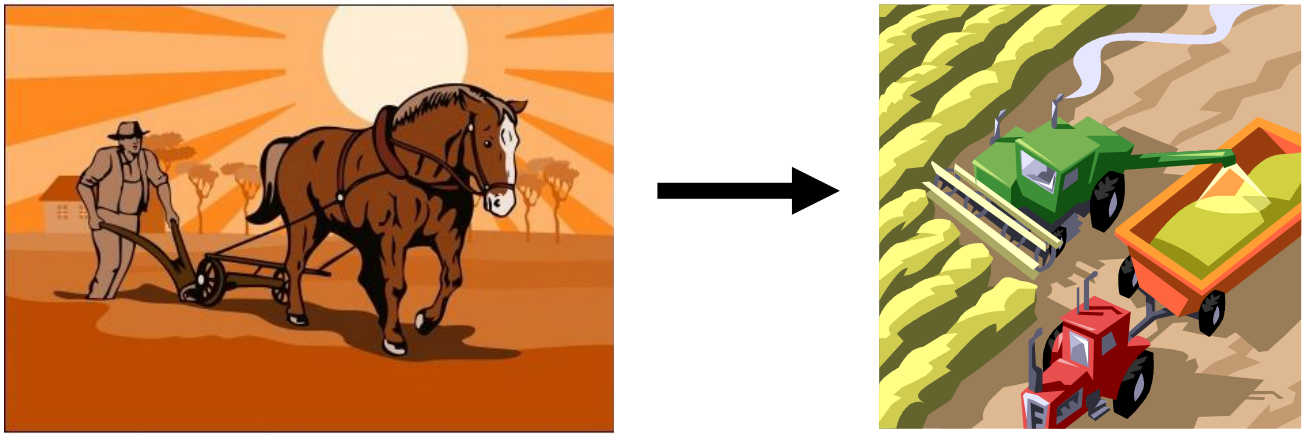
Food Science



Introduction to Food Science and History of Agriculture

Unit Handouts

Why Was Agriculture So Important?

Watch the video clip found at https://youtu.be/Hx6-m510hjU and answer the following questions

Define the following terms:

- Foraging –
- Sustenance –
- Farming –
- Symbiosis –
- Domestication –
- Sedentary –

1. Why can we not rely on Foraging in today's modern world?

2. Teosinte is the ancestor to what modern plant?

3. Where and when did farming and agriculture begin?
   a. _____Years ago - East of Mediterranean in Fertile Crescent and grew _____
   b. _____Years ago - China and grew _____; Taro and _____ in Papua New Guinea
   c. 5,000 to 4,000 years ago – Millet in _____; Maize in America; Potatoes in the _____
4. Why did people stop foraging and begin farming?
   a. _____
   b. _____
5. What happened 18,000 years ago that allowed for farming?

6. How do the villagers start farming?
   a. _____
   b. _____
   c. _____

Introduction

Some things never change

Our country has witnessed sweeping changes—from the untamed wild times of Buffalo Bill to the technological era of Bill Gates—but food has never lost its central role in our lives. Food not only sustains life but also enriches us in many ways. It warms us on cold, dreary days, entices us with its many aromas, and provides endless variety to the everyday world. Food is also woven into the fabric of our Nation, our culture, our institutions, and our families. Food is on the scene when we celebrate and when we mourn. We use it for camaraderie, as a gift, and as a reward (and sometimes as a crutch).

We are all aware of how food has changed. At the turn of the 20th century, home cooking and canning were fixtures of life in America. Lard, seasonal vegetables, potatoes, and fresh meats were the staples of our diet. And 40 percent of Americans lived on farms. Today, convenience foods and dining out are common. Ethnic diversity has influenced our tastes and the variety of foods available. Technology and trade allow us to enjoy most foods all year round. And less than 2 percent of the population grows our food, while 9 percent are involved in the food system in some way—in processing, wholesaling, retailing, service, marketing, and inspection.

What Americans often forget, however, is the remarkable system that delivers to us the most abundant, reasonably priced, and safest food in the world. The American food system—from the farmer to the consumer—is a series of interconnected parts. The farmer produces the food, the processors work their magic, and the wholesalers and retailers deliver the products to consumers, whose choices send market signals back through the system. Every piece fits every other piece, notwithstanding an occasional gap and pinch.

At the end of the day, it is safe to say the U.S. food system has done a remarkable job of using technology and inventiveness to its advantage and ultimately to the benefit of the consumer. We get the foods we want, when we want them, in the form we want them, all at affordable prices. Thanks to this system, Americans spend less of their income on food than do consumers anywhere else in the world.

Despite the dramatic evolution of the American food system, there are some constants in our ever-changing world. Americans will always love food. The American food system will continue to adapt, grow, and provide us with the products we desire.

James R. Blaylock, Associate Director
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Amber Waves, June 2003

Significant Agricultural Events Timeline

Era 1: Three Worlds Meet (Beginnings to 1629)

1493 Columbus introduces goats, sheep, pigs, hens, fruit, and Old World vegetable seeds.

Era 2: Colonization and Settlement (1585-1763)

1607 English colonists in Jamestown, VA, planted grain, potatoes, pumpkins, melon, cotton, oranges, and pineapples.

1609 Indians taught the Jamestown settlers to grow corn.

Era 3: Revolution and the New Nation (1754-1820s)

1780 U.S. Ambassador Ben Franklin sends soybean seeds back from France.

1786 George Washington breeds the first mules in the U.S.

1790 Total population: 3,929,214; farmers 90% of labor force; U.S. area settled extends westward on average of 255 miles; parts of the frontier cross the Appalachians.

1793 Eli Whitney invented the cotton gin, patent 1794.
Thomas Jefferson invented a moldboard for the plow.

1794 Whiskey Rebellion: Western farmers revolt against a grain tax.

Era 4: Expansion and Reform (1801-1861)

1803 Louisiana Purchase, a port for American farmers.

1805 Cotton replaces tobacco as the main crop in the South.

1807 Steamboats come into use.

1810 Beginning of the "Industrial Revolution."

1819 U.S. canning industry started.

1825 Erie Canal finished.

1831 Cyrus McCormick invented the grain reaper.

1837 John Deere manufactures the steel plow.

1843 Sir John Lawes founded the commercial fertilizer industry by developing a process for making superphosphate fertilizer.

1845-1855 Great Potato Famine in Ireland

1850 S.S. Rembert and J. Prescott developed a mechanical cotton picking machine.

1854 Development of the modern windmill.

1855 Michigan and Pennsylvania established the first state agricultural colleges.

1856 A patent for condensing milk was issued to Gail Borden.

1858 Mason jars, used for home canning, were invented.

Era 5: Civil War and Reconstruction (1850-1877)

1862 President Abraham Lincoln signed legislation creating the first Department of Agriculture and signs the Morrill Land Grant College Act.

1862 Homestead Act gives 160 acres to settlers who will farm the land for five years.

1861 Pasteurization invented.

1867 Barbed wire invented. Cattle boom. Range wars break out between ranchers and farmers.

1869 Transcontinental railroad completed.

Era 6: The Development of the Industrial United States (1870-1900)

1870 Refrigerator railroad car patented.

1881 Hybridized corn produced.

1887 Hatch Experiment Station Act was passed, providing federal grants to states for ag experimentation

Era 7: The Emergence of Modern America (1890-1930)

1888	The first long haul shipment of a refrigerated freight car was made from California to New York.
1892	The gasoline tractor was built by John Froelich.
1900	Special work projects for farm youth were organized in Illinois; "4-H" was adopted in 1913
1902	The Reclamation Act was passed, leading to water projects for irrigation.
1906	The Pure Food and Drug Law was enacted.
1908	First electric milking machine patented.
1914	Establishment of the federal-state extension service was a major step in direct education for farmers
1920	Agriculture prices collapse.
1929	Stock Market Crashes, beginning of The Great Depression.

Assignment:
Choose 1 event from each Era and explain how that individual event impacted or changed Agriculture in America

1. Era 1:

2. Era 2:

3. Era 3:

4. Era 4:

5. Era 5:

6. Era 6:

7. Era 7:

Name: _____ Date: _____ Period: _____

Foods and Families on the Move

Image	Answer to Questions	Hypothesis of How image Relates to the Locomotive	Revised Hypothesize AFTER reading Clue Sheet
1 – 1			
1 – 2			
1 – 3			

Image	Answer to Questions	Hypothesis of How image Relates to the Locomotive	Revised Hypothesize AFTER reading Clue Sheet
1 – 4			
1 – 5			
1 – 6			

What about Your Neighborhood?

Are there trains that run near or through your community?
Are there abandoned tracks that indicate that trains once traveled there?
When did the train service begin? How can you find that out?
What company created the first railroad in your community?
Who was in the labor force that built the railroad?
What kinds of products were transported by rail in your community? Agricultural or industrial or both?
Where did these products go?
Were the rails constructed to move travelers as well as products?
Were the rails constructed to move commuters?
If trains still run today, what are they carrying? Containers? Flatcars? Commuter cars? How do you know?

Conduct oral histories.
Did someone in your community once work in agriculture or transporting food products in your state? Learn more about his or her work and how foods moved in your community. Find out about the role of transportation in their work.

Resources
American Memory Map Collections: 1500–2003, U.S. Library of Congress
(http://memory.loc.gov/ammem/gmdhtml/gmdhome.html)
Maps from different time periods from all over the United States. Click on "Transportation and Communication," "Railroad Maps Collection," and then "Browse by Geographic Location" to find railway maps of your community in the past.

Train Resources (http://www.trains.com)
Extensive information, including listings of railroad resources all over the United States. For information on railroads in your community, look under "Resources" on the left-hand side. Click "Tourist Railroads/Museums" and then your state to find attractions in your area. Clicking on "Historical Societies" leads to an alphabetical state listing of nationwide railroad historical societies. These links will provide railroad information specific to your area. Contact organizations by phone for more information.

Agriculture in the Classroom (http://www.agclassroom.org/)
Select "State Web Sites" from the "State Programs" menu and choose your state. Contact your local program for more information on agricultural history and the role of transportation. For a brief overview of agriculture in your state, click on "State Agricultural Profiles" and choose your state.

Museum of Chinese in the Americas (http://www.moca-nyc.org/)
Click on "Resources" or use the message boards to find out about the experiences of Chinese Americans in your community. Educational resource packets are available for teachers.

Main Steps in Processing Plant Products

Harvesting

- Most plants are harvested in the fall in the United States
- Fruits and vegetables are tested for maturity by checking firmness and color. If they are mature, they are picked by hand or mechanically from their growing location.

Reception

- The plant products are hauled by truck to the processing plant.
- At this point, they are inspected visually for any blemishes that may cause an issue with integrity or sanitary issues.

Size & Grading

- Fruits and vegetables are first sorted by size and separated out based upon dimension and firmness.
- After they are sized, they are graded based on appearance and internal quality, which consists of any errors in color, external blemishes, or firmness of the apple.

Washing

- External dirt and chemicals left on the peels are removed through a water bath.
- After this, water spraying and scrubbing may take place for further cleanliness.

Peeling and Coring

- Using a machine, the peel and core can be removed from the plant product or left on depending on product uses. The ***core*** is the center part of the fruit containing the seeds.
- This can also be done by hand using a paring knife, but is not completed by hand in large processing plants.

Slicing

- Processed plant products can be sliced into even sizes by machine.

Preserving

- The sulfuring process prevents browning of fruits and vegetables. This takes place in a factory using chemicals.
- Coating apple cuts, slices, and dices with a solution of 50% water and 50% lemon juice discourages the browning process.

Drying

- Large dehydrators are set at high temperatures to remove water from the plant products.
- They are then dried to desired crispness. Some products can still be pliable while others can be of potato chip consistency.

Temporary Storage

- Once fruits and vegetables are dried, they are placed in temporary storage for packaging.
- From temporary storage, products will travel down a conveyor into sorting for packaging.

Packaging

- Fruits and vegetables that are preserved are placed in airtight plastic bags for storage and shipment.
- Those that have not been preserved are packaged among soft crate trays or bags to minimize bruising and spoiling.

Shipping

- Fruits and vegetables are then packaged and shipped in crates to destinations based upon variety and local demand.

Name: _____ Date: _____ Period: _____

An Apple Adventure

Using the information learned about Processing Plant Products, create a comic or short story explaining the journey the apple took from hanging on the tree to the slices we ate today in class.

Corn Canning Flow Chart

Cobs of Corn → Dehusking → Leaves and Silks

↓

Kernel Removal

↙ ↘

Kernels Cobs

↓

Water → Cleaning → Residues, leaves, large pieces

↓

Bleaching

↓

Can → Packing

↓

Brine (water and salt)→ Filling

↓

Lid → Cover

↓

Testing

↓

250° Heat → Sterilization

↓

Quality Control

↓

Labels → Canned Corn for Distribution

Process Flow Diagram

nutella