

Changes in Farming

Grade Level: 4-8

Lesson Overview

Students will acquaint themselves with historical farm machinery terms as they learn what changes occurred in farming methods and yields during the 19th and 20th centuries. Challenge students to practice math skills as they ponder those changes.

Student Objectives

1. Use a chart to find information and do calculations.
2. Identify the changes in farming methods and their implications.

Materials

- ✓ Historical Farming Methods & Yields information sheet
- ✓ Changes in Farming worksheet

Vocabulary

- **acre** - 43,560 square feet.
- **binder** - a machine that ties grain (wheat, oats, etc.) into bundles.
- **bushel** - unit of dry measure (1 cubic foot) for grain, fruit, etc., equivalent to 8 gallons of liquid. Weight varies with the density/bulk of the commodity. (Oats: 32 lbs. per bushel, corn: 56 lbs. per bushel).
- **combine** - a large self-propelled machine that cuts, threshes, and cleans grain crops. It has different front attachments, called heads or headers, designed for use in harvesting specific crops. Corn is harvested using a corn head; wheat and soybeans are harvested using a reel-type head known as a grain platform. (The word combine is pronounced with the accent on the first syllable, which rhymes with "Tom").
- **cultivator** - an implement that is pulled by a tractor through a field to loosen the earth and destroy weeds, either before a growing crop is established (covers all area of the field) or between the rows of growing crops (only covers area between the rows).
- **disk** - an implement that contains a number of round, concave-shaped, metal plates (disks) held perpendicular to the ground, and free to rotate. It is pulled across a field by a tractor in order to loosen the earth and destroy weeds.

- **flail** - an agricultural tool used for threshing. Normally it is made from two or more sticks attached by a short chain or leather thong; one stick is held and swung, causing the other to strike a pile of grain, loosening the husks.
- **harrow** - a type of cultivator that pulverizes or smooths the soil.
- **herbicide** - a pesticide used to control unwanted plants (weeds).
- **labor hours** - number of hours worked.
- **picker** - a self-propelled machine used for removing the ears of corn from the corn plant. The kernels of corn stay intact on the cob.
- **plow** - an agricultural implement used for cutting, lifting, turning over, and breaking up soil.
- **self-propelled** - a term used to describe an implement in which the propelling power unit is an integral part of the machine.
- **sickle** - a hand-held implement that has a semicircular blade attached to a short handle used for cutting grain and small grass. Also, the cutting mechanism of a reaper or mower.
- **thresher** - an implement that beats the stems and husks (of grain or cereal plants) to separate the seeds from the plant's stems and husks.
- **tractor** - a motor vehicle used to pull heavy loads and to provide power to operate, carry, push, and/or pull agriculture implements.
- **yield per acre** – amount of commodity produced by the acre.

Background Information

Given in the vocabulary and Historical Farming Methods and Yields information sheet.

Procedure

1. As an interest approach, the teacher could hold up a slice of bread, a sandwich, or a photo of either one, and ask students if they can explain what it's made of, where it came from, and how it was produced.
2. Discuss with the students the concepts of yield per acre and labor hours. Discuss how machines have changed the way we work and live, as they have changed the ways farmers do their work. Help the students understand the Historical Farming Methods & Yields information sheet.

3. Have the students work independently or in groups to complete the Changes in Farming worksheet, leaving question #11 to be answered by each student individually. This question could be used as an assessment tool.

Note: The changes in production per acre also were affected greatly by the use of hybrid corn, herbicides, and fertilizers.

Extension Activities

1. Have students research one of the machines listed on the chart, find a photo, and write a description of it.
2. Students can research an historical farm or farm museum in their area. They would make a pamphlet about this farm to share with other students. The pamphlet should include times of operation, cost to visit, map and directions to get to the farm, era the farm depicts, and any special festivals or happenings that take place at the farm.
3. Timeline of Farm Machinery and Technology is a social studies lesson that coordinates well with this lesson.

Standards

Illinois Mathematics Standard

7.SP.8b: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams.

Illinois English Language Arts Standard

RST 4: Determine the meaning of symbols, key terms, and other domain specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6 – 8 texts and topics.

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These mAGic lessons are designed to bring agriculture to life in your classroom. They address the Illinois Learning Standards in math, science, English language arts and social studies.

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Historical Farming Methods and Yields Information Sheet

Crop	Year	Labor Hours	Bushels Produced	Acres	Methods Used
Wheat	1830	250-300	100	5	Walking plow, brush harrow, hand broadcast of seeds, sickle and flail
Corn	1850	75-90	100	2 ½	Walking plow, harrow, and hand planting
Corn	1890	35-40	100	2 ½	2 bottom gang plow, disk and peg-tooth harrow, and 2 – row planter
Wheat	1890	40-50	100	5	Gang plow, seeder, harrow, binder, thresher, wagons and horses
Corn	1930	15 – 20	100	2 ½	2 bottom gang plow, 7- foot tandem disk, 4 section harrow, and 2 row planters, cultivators and pickers
Wheat	1930	15-20	100	5	3 bottom gang plow, tractor, 10 – foot tandem disk, harrow, 12 foot combine and trucks
Corn	1945	10-14	100	2	Tractor, 3 bottom plow, 10 ft. tandem disk, 4 section harrow, 4 row planters and cultivators and 2 row picker
Wheat	1955	6-12	100	4	Tractor, 10-foot plow, 12-foot weeder, harrow, 14-foot drill and self-propelled combine, and trucks.
Wheat	1965	5	100	3 1/3	Tractor, 12-foot plow, 14-foot drill, 14 - foot self-propelled combine and trucks
Wheat	1975	3 ¾	100	3	Tractor, 30-foot sweep disk, 27-foot drill, 22- foot self-propelled combine and trucks
Corn	1975	3 1/3	100	1 1/8	Tractor, 5 bottom plow, 20- foot tandem disk, planter, 20 -foot herbicide applicator, 12- foot self-propelled combine and trucks
Wheat	1987	3	100	3	Tractor, 35-foot sweep disk, 30-foot drill, 25-foot self-propelled combine and trucks
Corn	1987	2 ¾	100	1 1/8	Tractor, 5 bottom plow, 25-foot tandem disk, planter, 25-foot herbicide applicator, 15-foot self-propelled combine and trucks

Information provided by USDA

Note: The changes in production per acre also were affected greatly by the use of hybrid corn, herbicides, and fertilizers.

Name _____

Changes in Farming Worksheet

Use Historical Farming Methods & Yields Information Sheet to answer the following questions. (Please show your work.)

1. What is the difference in amount of labor hours necessary to yield 100 bushels of wheat in 1987 and 1830?
2. What is the difference in the amount of labor hours necessary to yield 100 bushels of corn in 1987 and 1850?
3. What ratio of land is used in 1830 to yield 100 bushels of wheat to that of 1987?
4. What is the difference in the number of acres to yield 100 bushels of wheat from 1890 to 1987?
5. What machines were used in the production of wheat in 1955 that made the yield per acre higher than it had been before?
6. How many acres would you need in 1987 to yield 1,600 bushels of corn?
7. How many labor hours would be needed to yield 500 bushels of wheat in 1965?

8. How many labor hours would be needed to yield 500 bushels of wheat in 1987?

9. What is the difference in the labor hours to yield 500 bushels of wheat in 1965 and 1987?

10. If you were to graph the acres needed to yield 100 bushels of either corn or wheat from 1830-1987, would your line graph be ascending or descending? Explain your answer.

11. After looking at the chart, write a paragraph explaining what happened to crop production throughout the years and why.

12. Do you think change and innovation in crop production is important? Give reasons to support your answer.

Changes in Farming ANSWER KEY

Use **Historical Farming Methods & Yields Information Sheet** to answer the following questions. (Please show your work.)

1. What is the difference in amount of labor hours necessary to yield 100 bushels of wheat in 1987 and 1830? **250 to 300 – 3 = 247 to 297 hours.**
2. What is the difference in the amount of labor hours necessary to yield 100 bushels of corn in 1987 and 1850? **75 to 90 – 2 $\frac{3}{4}$ = 72 $\frac{1}{4}$ to 87 $\frac{1}{4}$ hours**
3. What ratio of land is used in 1830 to yield 100 bushels of wheat to that of 1987? **5 to 3**
4. What is the difference in the number of acres to yield 100 bushels of wheat from 1890 to 1987?
5 – 3 = 2 acres
5. What machines were used in the production of wheat in 1955 that made the yield per acre higher than it had been before? **10-foot plow, 12-foot role weeder, self-propelled combine, 14-foot drill.**
6. How many acres would you need in 1987 to yield 1,600 bushels of corn?
 $\frac{11}{8}/100 = X/1600 =$
 $100X = 9/8$ of $1600X = 1800/100$
X = 18 acres
7. How many labor hours would be needed to yield 500 bushels of wheat in 1965?
5 x 5 = 25 hours of labor
8. How many labor hours would be needed to yield 500 bushels of wheat in 1987?
3 x 5 = 15 hours of labor
9. What is the difference in the labor hours to yield 500 bushels of wheat in 1965 and 1987?
25 – 15 = 10 hours of labor

10. If you were to graph the acres needed to yield 100 bushels of either corn or wheat from 1830 – 1987, would your line graph be ascending or descending? Explain your answer.

It would be descending, as the acres needed decreases through the years.

11. After looking at the chart, write a paragraph explaining what happened to crop production throughout the years and why. **Answers will vary. Accept any with machinery making less labor hours and more yields per acre.**

12. Do you think change and innovation in crop production is important? Give reasons to support your answer.

Answers will vary.