

Agriculture in Motion

Objective

Students will read about machines used in agriculture, answer comprehension and vocabulary questions, write stories, learn about simple and complex tools and try using some simple tools, compare a variety of digging tools, and design their own machines.

Background

If you were a kid in 1830, you would be working hard every day. Everyone in the family had to work just to make sure there was enough food to eat. Kids were up before the sun to milk the cows and help feed the animals or to help with the cooking and washing.

Families grew all their own food on the farm. There were no tractors to make the job easier. A heavy iron plow was used to break up the soil and turn it over. Usually a horse, ox or mule pulled the plow while the farmer walked behind to steer it. Sometimes older children could help. Everyone helped plant the seeds in rows. Then the seeds had to be covered. Children worked in the fields, using hoes to chop weeds.

When the crop was ready, the farmer used a sickle or a scythe to cut the grain. A sickle is a hooked blade on a handle, usually used to cut wheat. A scythe is a blade on a longer handle that was used to cut hay and other kinds of grain. Children helped by tying the cut grain into bundles. Then the wheat had to be threshed, or beat, to loosen the grain kernels from the plant. After that the grain still had to be ground into flour and baked into bread. All this work was just for the family's bread. There was more work to be done to get the meat, milk, eggs, vegetables and other food the family needed.

The work would have been even harder without the machines farmers used back then. There was the plow that cut into soil, a rake or harrow for smoothing the soil, a sickle for cutting the grain and a flail for threshing it.

A machine is anything used to make a job easier. People use machines because they save time and human energy. Almost everything we do depends on machines. When you brush your teeth you are using a lever, a simple machine. When you unscrew the lid off the peanut butter jar you are using a screw, another simple machine.

People are always looking for ways to make their work easier, and farmers are no different. Many machines have been invented to make farm work easier. Someone invented a plow that wasn't so heavy, so that job became faster and easier. Someone else invented a machine to cut the wheat. It was on wheels and pulled by horses. That made harvesting the wheat faster and easier. Over time there were many more machines farmers could use with the help of horses

Oklahoma Academic Standards

PRE-KINDERGARTEN

Speaking and Listening: R.1,2,3,4;
W.1,2

Reading and Writing Process: R; W
Critical Reading and Writing: R.3,4; W
Vocabulary: R.1,2; W.1
Geometry: 1.1
Data & Probability: 1,2
Economic Literacy: 3
History Literacy: 3

KINDERGARTEN

Speaking and Listening: R.1,2,3,4;
W.1,2

Reading and Writing Process: R.1,3;
W.1,2
Critical Reading and Writing: R.2,3,4;
W
Vocabulary: R.1,2; W.1
Geometry: 1,6
Data & Probability: 1,2,3
Physical Science: 2-1,2
Visual Arts—3.1ad,2
Economic Literacy: 3
History Literacy: 3

GRADE 1

Speaking and Listening: R.1,2,3,4;
W.1,2

Reading and Writing Process: R.1,3;
W.2
Critical Reading and Writing: R.4,5; W.2
Vocabulary: R.1,3; W.1
Data & Probability: 1,2,3
Physical Science: 4-4
Economic Literacy: 3
History Literacy: 1

GRADE 2

Speaking and Listening: R.1,2,3,4;
W.1,2

Reading and Writing Process: R.1,2,3;
W.1
Critical Reading and Writing: R.3,5; W.2
Vocabulary: R.1,3; W.1
Physical Science—1.2,3
History Literacy: 4

Materials

assorted gardening tools

sticks, spoons, shells, rocks

square aluminum baking pans

apples

plastic knives

apple slicer

peanuts or sunflower seeds

mortar and pestle

plastic dishpan

art paper, plain white paper or
construction paper

marbles

watered-down paint in primary
colors

pasta

beans

glue

and other animals. The farmer could grow more food with less help from family members.

Many years later someone invented the tractor. This made work on the farm even easier. The tractor could pull new machines that saved more time and energy. The farmer could grow enough food for the family with extra to sell to other people. Chemical fertilizers helped the farmer grow more of the crop on less land. Pesticides helped keep insects from destroying the crops.

These days farmers use computers to help them grow more food on less land with less work. “Smart tractors” use satellites and computers to tell the farmer exactly how much fertilizer and pesticide is needed in the field

There are even seeds with the fertilizer and pesticides already built in. That saves time, energy and money. Today one American farmer can grow enough food to feed 130 people.

Some farm children today still get up in the dark to feed the chickens and milk the cows, but machines make the job easier and faster. This gives them more time for sports after school and camp in the summer. It also gives them more time to study so they can be artists or astronauts or scientists or agricultural engineers—inventors of machines to help make life easier for the farmer and everyone else.

Source: “A History of American Agriculture, 1607-2000” USDA Economic Research Service, 2000, <http://www.agclassroom.org/gan/timeline/index.htm>

Language Arts

1. Read and discuss background and vocabulary.
2. Read the story of the “Little Red Hen.”
 - Discuss the various steps in that story compared with those described in the background.
 - Students will list the steps for producing a crop.
3. Hand out the “Farm Tools” worksheet.
 - Discuss each of the tools pictured and how they are used.
 - Students will use the words provided to fill in the blanks.
 - Students will follow the directions to find the shapes in some of the tools.
4. Invite a farmer to class, and ask him/her to bring a machine used in the farm operation.
 - Photograph each student holding or using one of the machines.
 - Students will write stories about the farmer’s visit and write captions for their photographs.
 - Display the photograph/writing pages on a bulletin board.

Science

1. Bring gardening or farm tools to class and discuss their uses. Explain that the tools are simple machines that make work easier.
 - Ask for volunteers to demonstrate the motion used to operate each tool
 - Identify the motion used to operate each tool (slide, turn, twirl, roll).
 - Sing a farm tool version of “Old McDonald.” As you sing the song, students will demonstrate motions for using farm tools like shovels, hoes,

rakes, wheelbarrows, plows, sickles, tractors, etc.

2. Give each student one apple piece and a plastic knife or a handful of peanuts or sunflower seeds and a mortar and pestle. Explain that the knife and mortar and pestle are both simple machines.
 - Students will cut apple pieces using the plastic knives or crush the peanuts using the mortar and pestle.
 - Demonstrate cutting an apple into slices using an apple slicer or food processor or grinding the peanuts using a blender or food processor.
 - Explain that the blender and apple slicer (or food processor) are complex machines—a combination of two or more simple machines.
 - Lead a discussion about the time and energy saved using complex machines compared with using simple machines.
3. Students will use pasta, beans and other available materials to create their own machines.
 - Students will name their machines and explain what they do.

Math

1. Use a sand table or allow students to dig in soil outside. Let parents know ahead of time that students will be digging in the soil.
 - Divide students into groups of 4-5. Provide each group with a square aluminum pan and an assortment of digging implements, including sticks, spoons, shells, rocks, hand gardening tools, etc.
 - Students will dig for five minutes with each of the implements, starting with just their hands, and place the soil they have dug in the pan.
 - After each five-minute period, students will mark the level in the pan to determine how much they have dug and label the marks to keep track of which tool was used for each level.After each implement has been used, students will measure from the bottom of the pan to each mark to determine which implement worked best.
 - Each group will graph its results to share with the class.
 - As a class, students will compile their results and rank which implements were easiest to use.
 - Students will discuss what made each implement easy or difficult to use. Record adjectives students use to describe each implement. Create a class graph showing compiled results.

Extra Reading

- Collins, David R., *Pioneer Plowmaker: A Story About John Deere*, Carolrhoda, 1990.
- Geisert, Bonnie, *Haystack*, Houghton Mifflin, 2003.
- Pinckney, Jerry, *The Little Red Hen*, Dial, 2006.
- Stevens, Jan Romero, *Carlos and the Cornfield/Carlos y la milpa de maiz*, Rising Moon, 1995.
- Williams, Sherley Anna, *Working Cotton*, Harcourt, Brace, Jovanovich, 1996.

Vocabulary

crop—a plant or animal or plant or animal product that can be grown and harvested

energy—the capacity for doing work

fertilizer—a substance (as manure or a chemical) used to make soil produce larger or more plant life

flail—a tool for threshing grain by hand

harrow—a cultivating tool that has spikes, teeth, or disks and is used for breaking up and smoothing the soil

harvest—the gathering of a crop

hoe—a farm or garden tool with a thin flat blade at nearly a right angle to a long handle used especially for weeding and loosening the earth

kernel—a whole grain or seed of a cereal

machine—an instrument (as a lever or pulley) designed to transmit or change slightly the application of power, force, or motion

pesticide—a substance used to destroy pests

plow—a farm machine used to cut, lift, and turn over soil

screw—a simple machine consisting of a solid cylinder with a winding groove around it and a correspondingly grooved hollow cylinder into which it fits

scythe—an implement consisting of a long, curved, single-edged blade, with a long, bent handle, used for mowing and or reaping

sickle—a tool with a sharp curved metal blade and a short handle used to cut grass

thresh—to separate seed from a harvested plant especially by using a machine or tool

tractor—a vehicle that has large rear wheels or moves on tracks and is used especially for pulling farm implements

Name _____

Farm Tools

Use the words below to fill in the blanks.

dig

pull

chop

cut

break

smooth



This is a shovel. A shovel is used to _____ in the soil. The shape of the shovel blade is most like a:

circle
square

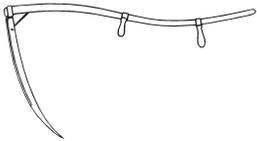
triangle
rectangle



This is a hoe. A shovel is used to _____ the weeds. The shape of the shovel blade is most like a:

circle
square

triangle
rectangle



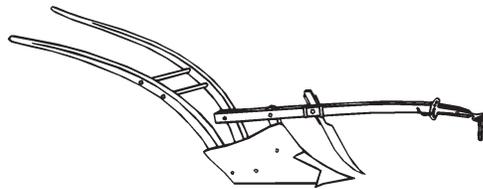
This is a sickle. A shovel is used to _____ the grain. What shape do you see in the sickle?

circle triangle square rectangle

Draw the shape.



This is a rake. A rake is used to _____ the soil.



This is a plow. A plow is used to _____ the soil.



This is a tractor. A tractor is used to _____ the grain.

What shapes can you find in the tractor?

circle triangle
square rectangle

Draw the shapes.

Name _____

Farm Tools (answers)

Use the words below to fill in the blanks.

dig

pull

chop

cut

break

smooth



This is a shovel. A shovel is used to dig in the soil.

The shape of the shovel blade is most like a:

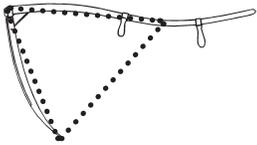
circle triangle
(or) square rectangle



This is a hoe. A shovel is used to chop the weeds.

The shape of the shovel blade is most like a:

circle triangle
square (or) rectangle



This is a scythe. A scythe is used to cut the grain.

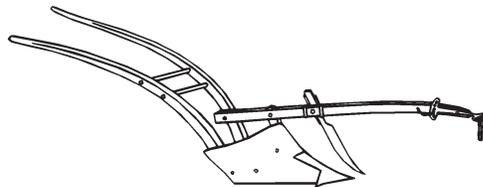
What shape do you see in the sickle?

circle triangle square rectangle

Draw the shape.



This is a rake. A rake is used to smooth the soil.



This is a plow. A plow is used to break the soil.



This is a tractor. A tractor is used to pull heavy equipment.

What shapes can you find in the tractor?

circle triangle
square rectangle

Draw the shapes.