



National Agriculture in the Classroom

Relevancy and Engagement: agclassroom.org

Machines and People

Grade Level(s)

3 - 5

Estimated Time

Four 30-minute sessions

Purpose

The purpose of this activity is for students to define the word "machine" and understand how machines are used in agriculture to produce food and fiber. They will observe a variety of machines and compare and contrast them.

Materials

- Overhead transparency of "The Tractor"
- 30-50 pictures of a variety of machines
- Markers
- Sentence strips
- White construction paper (12"x18")
- "People and Machines" Activity Sheet (For every 2 students)
- "Venn Diagram" Activity Sheet
- "Machines at my House" Activity Sheet
- *Big Book of Big Tractors* book

Essential Files (maps, charts, pictures, or documents)

- "Machines At My House" Activity Sheet
[https://naitc-api.usu.edu/media/uploads/2015/03/31/Machines_at_My_House.pdf]
- "Venn Diagram" Activity Sheet
[https://naitc-api.usu.edu/media/uploads/2015/03/31/Venn_Diagram.pdf]
- "People and Machines" Activity Sheet
[https://naitc-api.usu.edu/media/uploads/2015/02/19/People_and_Machines.pdf]
- The Tractor
[https://naitc-api.usu.edu/media/uploads/2015/02/19/The_Tractor.pdf]

Vocabulary

machine: an apparatus using or applying mechanical power and having several parts, each with a definite function and together performing a particular task

Interest Approach – Engagement

1. Show students a very large, heavy object. (Use a picture or something around the school or playground). Ask them if they could lift the object by themselves.
2. Once they determine they couldn't lift it with their own strength ask them if they could with the help of a tool or machine. Could they lift it with a tractor? Could they use a lever?
3. Ask your students if they can name examples of tools used on a farm or in everyday life.
4. Ask if they can name some machines used on a farm or in everyday life. In this lesson students will be learning how machines help people perform work.

Background - Agricultural Connections

This lesson is part of a series called, *Simple and Complex Machines Used in Agriculture*. These lessons introduce students to the simple and complex machines used in their daily lives and in food and fiber production. Through a variety of hands-on activities, students create models of the six types of simple machines and discover the concepts of force and friction. The essential role of complex machines in people's daily lives and in agriculture is interwoven through a number of class and homework activities that incorporate cooperative learning, writing, mathematics, art, and drama. Together these activities are designed to stimulate creative thinking and motivate learning. Other related lessons include:

- [Machines and People](#)
- [Six Kinds Do It All](#)
- [Made to Move](#)
- [Machines in Agriculture](#)

A **machine** is a device that does work. People appreciate machines because they save time and human energy. Machines are a basic part of our heritage. The human's innate genius for invention and tinkering has resulted in the creation of many machines. Thus, machines have turned people's dreams into reality. Almost everything people do depends, in some way, on machines-simple or complex.

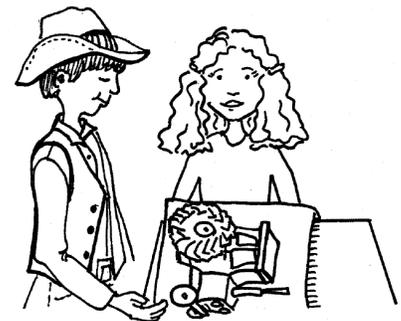
The word "machine" itself is derived from the Greek *mechane* and the Latin *machina*. Both loosely translated mean "an ingenious device or invention."

There are six simple machines from which complex machines are made: lever, inclined plane, wedge, screw, pulley, and wheel and axle.

Procedures

Part 1: Brainstorming the Definition of a Machine

1. Review with your students your rules for brainstorming and cooperative group activities.
2. Place your students in groups of three or four students. Give each group a set of markers and one piece of white 12"x18" construction paper. Instruct the "scribe" or "recorder" of each cooperative group to write one of the following questions on each side of the white paper. Read the questions aloud as you write them on the board:
 - What is a machine?
 - Why do people use machines?
3. Explain to the students that they will do two brainstorms. They will have three to five minutes to brainstorm and write their answers for the first question. At the signal they must stop, turn their paper over, and brainstorm answers to the second question. If necessary, adjust the time for each brainstorm. It is important to provide enough time to write down major ideas, but not quite enough time to write every detail.
4. Have the groups complete their brainstorms.
5. Allow three to five minutes for each group to review and determine two of their "best" or "most unique" answers from each brainstorming list. Have each group write their choices in complete sentences on four separate sentence strips.



6. Have each group post their answers under the appropriate brainstorm question that you have written on the board. Encourage a classroom discussion about the sentences.
7. Create a class definition for the word "machine."

Part 2: Discovering a Machine

1. Read the book, *Big Book of Big Tractors* by Lisa Jane Gillespie and Mike Byrne. This book describes and illustrates many machines used in agriculture. Help students understand that various machines make the production of our food more efficient. Our food and some of the fiber used to make our clothes and other necessities come from farms. Machines used on farms make it possible for farms to produce enough food for our population. As you read the book, ask the students, "If a farmer did not have this machine, how would he/she [insert task name here]?" For example, without a Seed Drill, how would a farmer plant hundreds or thousands of acres of corn or wheat? In most cases the labor would have to be performed by hand. Help students see that it would not be possible for farmers to produce enough food for our population without machines.
2. Using the overhead transparency of *The Tractor*, lead the class in a discussion that previews the questions on the *People and Machines* activity sheet. Discuss that scientists call machines either "simple" or "complex." The tractor is a complex machine made of simple machines such as wheels and axles, and levers.
3. Next, group students into pairs.
4. Give each pair of students a pencil, a picture of a machine, and one copy of the *People and Machines* activity sheet. Instruct students to use their pictures to answer the questions on the activity sheet. Allow sufficient time to complete the activity. Have each pair share their answers with the class. You may choose to give certain teams soil preparation equipment, others planters, some cultivators, and some harvesters. You can discuss the varieties of equipment farmers use.

Part 3: Similarities and Differences of Machines

1. For this activity sheet, each pair of students will need a pencil, two pictures of machines, and a Venn Diagram activity. If you have not previously performed a Venn Diagram activity with your students, take time to do one as a whole class before proceeding.
2. Instruct the students to write the name of one machine on the line in one of the circles and the name of the other machine on the line in the other. In each circle they should list the characteristics that are unique to each particular machine. Where the circles intersect, the students should list ways in which the machines are similar.
3. Have students volunteer to share their results, and/or create a bulletin board to display the Venn Diagrams.

Part 4: Machines at My House

1. Distribute and explain one or both of the homework assignments to your students. Have the students complete the assignment(s) at home.
2. After collecting the homework, discuss what it would be like if certain machines were not available to assist people in the kitchen.

Concept Elaboration and Evaluation:

After conducting these activities, review and summarize the following key concepts:

- Simple and complex tools make work easier and more efficient.
- Food comes from farms. Farms require a lot of physical labor to plow fields, plant and harvest crops, and raise animals. Machines replace the work of many people and make work more enjoyable.
- If work on the farm is easier and more efficient, it makes it possible for the farmer to produce more plants and livestock that become your food and or more fiber or trees that become your clothing and shelter.

Variations

- Using a picture of a machine and a variety of materials, have students invent an improved machine.
- Do the Venn Diagram as a whole class activity.
- Have students write a description of how to build or plant something. Their explanations must include a description of the machines used in the process.

Enriching Activities

- — **Draw Around:** In this activity, each student will need a pencil, a photograph of a machine, and a piece of drawing paper. Place students into groups of five or six. Allow students two or three minutes to draw a part of their photograph before passing it along and receiving another photograph passed to them by a fellow student. Each student will then draw a part from the new photograph. This should continue until each student has incorporated a part of each photograph into his or her own drawing. The result will be a drawing of a new machine. The students may give their new invention a name, describe what it might be used for, color it, add some background, and then display it.
- **“Yes” or “No”:** This game is similar to “20 Questions.” Give one pair of students a photograph of a common machine. They must not let anyone else see it. Have the rest of the class try to guess what the machine is by asking questions. The questions must be answerable with a simple “yes” or “no.” If the class cannot guess the machine’s name in twenty questions, the team holding the photograph is the winner. Bicycles, hoes, shovels, screwdrivers, lawnmowers, and stairs are good machines to use in this activity.
- **Make Peanut Butter:**
For each group of 3-4 students:
 - Two cups roasted peanuts in shells
 - Nutcracker
 - Plastic knife
 - Crackers
 1. Have one-half of the students in each group shell peanuts by hand while the others use the nutcracker. When partly finished, have the students trade jobs.
 2. With your assistance, have each group take turns putting their whole peanuts in a blender and blend until smooth. Discuss how the peanuts could be ground if a blender were not available.
 3. When the peanut butter is made, use the knife to spread it on crackers.
 4. As the students enjoy their snack, have them discuss the following:
 - What machines were used to make the peanut butter?
 - Which machines made the work faster or easier?
 - Would the final peanut butter product have a different appearance if different machines were used?
 - As a class, read the book, [From Peanuts to Peanut Butter](#).
- Read Issue 5 of [Ag Today](#) titled *Agriculture in Society*. This reader can be printed or accessed digitally. Students will learn the term sustainability and what that means to farmers who need to produce 60% more food with the same amount of land in order to feed a growing world population. Learn what byproducts are and how they are used, how food packaging has decreased waste, and how farmers use technology such as various tools, robots, and hand-held devices to improve their efficiency.



Suggested Companion Resources

- John Deere, That's Who! (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=763>]
- Machines on the Farm (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=426>]
- Time for Cranberries (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=384>]
- Big Book of Big Tractors (Book)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=250>]

- Simple and Complex Machines on the Farm (Multimedia)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=818>]
- How a Combine Works (Multimedia)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=778>]
- Hookin' Up and How it Works on the Farm (Multimedia)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=419>]
- Ag Today (Booklets & Readers)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=829>]
- Tractor Timeline- A History of Tractors (Website)
[<https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=646>]

Sources/Credits

This lesson was funded in 1996 by the California Beef Council and the California Farm Bureau Federation. To meet the needs of California educators, Simple and Complex Machines Used in Agriculture was revised to support the Curriculum Content Standards for California Public Schools and updated to include recent agricultural innovations. Funding from the Wells Fargo Foundation made this revision possible.

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