

# What's Growing On In Virginia?

AGRICULTURE IN THE CLASSROOM

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## Farmers couldn't do their jobs without modern machinery

**I**t has been said that the conquest of hunger began with the invention of the plow.

But food production really began to change when farmers learned to harness animal power to plows. And when they transitioned to tractor power, it improved even more.

One of the most important things farmers own is farm machinery, especially their tractors. Virtually every phase of mechanized agriculture depends on tractor power.

The word tractor was not generally known until it appeared in a manufacturer's advertisement in 1906 as a shortened version of "gasoline traction engine."

Today's tractors have come a long way, and their importance hasn't diminished. In fact, modern-day tractors have added technological features that enable farmers to work their land more efficiently.

Many farmers use GPS technology to help them plant and fertilize crops. They can pinpoint exactly which areas of a field need water or fertilizer, and then they can program the equipment to treat those portions of the field exclusively. This enables farmers to be better stewards of the land, using

a minimal amount of applications on their crops instead of treating an entire parcel of land.

Tractors are the workhorses of the farm. They are used for towing equipment such as hay mowers, balers, wagons, plows and forage harvesters. Some farmers choose to plow their land using traditional tillage methods. Other farmers use a conservation method called no-till planting, which leaves the residue of a cut crop in the field; they plant a new crop directly into it. Corn choppers cut down corn during harvest.

Tractors also are designed to power other equipment through a rotating power take off shaft, or PTO. Equipment like hay balers receive their power through the tractor's PTO. Hay balers gather up cut hay and wrap it into round or square bales for storage.

Most farmers have multiple tractors that they use for different tasks. Newer models with air-conditioned cabs and satellite technology are used for major field work. But older tractors often are used to transport wagons between fields and barns.

(Continued on the next page)



Farmers buy Case IH tractors like the one shown here from large equipment dealers like Hooper International in Ashland.

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### About the Newsletter

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**AgInTheClass.org** or call **804-290-1143**



Farm equipment does not come cheap. Tractors – depending on their size – often cost hundreds of thousands of dollars. For example, combines, which are used to harvest grain crops, typically sell for as much as \$200,000. A field cultivator, which mixes soil and helps kill weeds while still leaving plant material on the ground to prevent soil erosion, can run about \$30,000.

Let’s look at a few pieces of key farm equipment and how they are used on the farm:

**Chisel plow** – used with no-till or minimal-till planting. This plow prepares soil for planting without radically breaking it up. As it churns the soil, it buries crop residue and plants that enrich the soil and make it easier to prepare a fine seed bed.

**Combine harvester** – used to harvest grains. The combine cuts the plant, separates the grains from the stalk, stores the separated grains and drops the stalks back onto the field.

**Forage chopper** – cuts grass and alfalfa and blows it into a wagon or storage container.

**Hay baler** – picks up drying hay and ties it into round or square bales. Some balers have a kicker that tosses the bales into a towed hay wagon. This reduces the need for human labor, because wagons are loaded as the hay is baled.

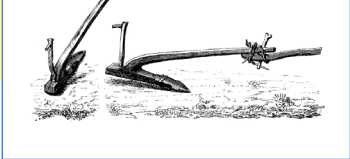

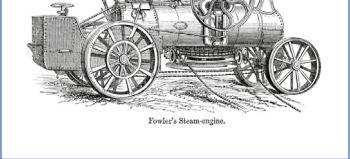
**Manure spreader** – used to carry manure and spread it on fields to help fertilize the soil. Liquid manure spreaders are used to spread manure from storage tanks or ponds, and solid manure spreaders are open on top, making them easy to fill.

**Row planter** – used to plant corn and small grains like soybeans in even rows. The planter usually holds the seed and fertilizer and places the seed at a designated depth and distance in the rows.



Terrell Farms in Caroline County uses tractors like this John Deere model, which can be found at James River Equipment in Ashland and Chester.

# Farming has come a long way

10,000 B.C.		  	
Farming and the domestication of animals leads to the change from hunter-gatherer societies to the development of the first permanent civilizations along the Tigris and Euphrates rivers in what is now Iraq.			
1701	1834	1862-1875	1940
Jethro Tull introduces the seed drill.	The McCormick mechanical reaper is patented, allowing farmers to harvest grain more efficiently.	The change from hand-power to horse-power characterizes the first American agricultural revolution.	One farmer, on average, produces enough food for about 11 people.
1945-1970	1954	1970	2014
The change from horses to tractors and expanded technology characterize the second American agricultural revolution.	The number of tractors on farms exceeds the number of horses and mules for the first time.	One farmer, on average, produces enough food to feed 48 people.	One farmer, on average, produces enough food for about 155 people.
Source: Growing a Nation: The Story of American Agriculture			

## Bonus Activity

Sing **The Tractor Song** (to the tune of **Wheels on the Bus**)

The tractor in the field  
plows the ground  
plows the ground  
The tractor in the field  
plows the ground  
All around the farm

The tractor in the field  
plants the seed  
plants the seed  
plants the seed  
The tractor in the field  
plants the seed  
All around the farm

The tractor in the field  
cuts the corn  
cuts the corn  
cuts the corn  
The tractor in the field  
cuts the corn  
All around the farm



Planters, like this John Deere model, are used to plant seeds in even rows.

Note: When discussing the song with your students, show pictures of the tractor pulling the tools that plow, plant and harvest.



## LESSON PLAN &gt;&gt; PRESCHOOL

## CONTENT AREAS:

Math: Geometry

## Objective:

to identify basic shapes and manipulate them to create a tractor.

## Materials:

- White paper
- Pre-cut construction paper shapes: 1 rectangle, 1 square, 2 circles and 1 triangle per student
- Glue sticks

[AgInTheClass.org](http://AgInTheClass.org)

# Shape a Tractor

**Background Knowledge**

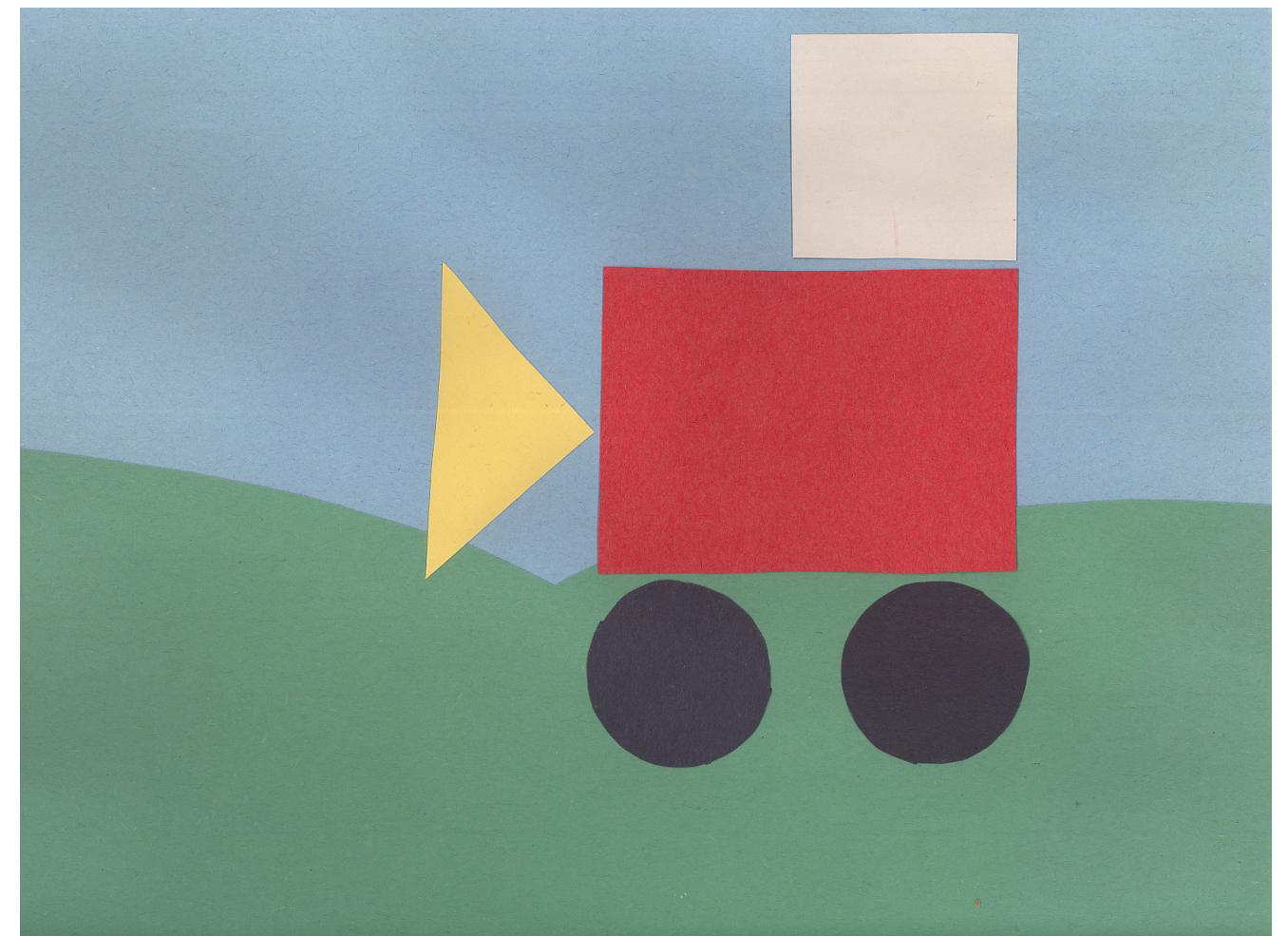
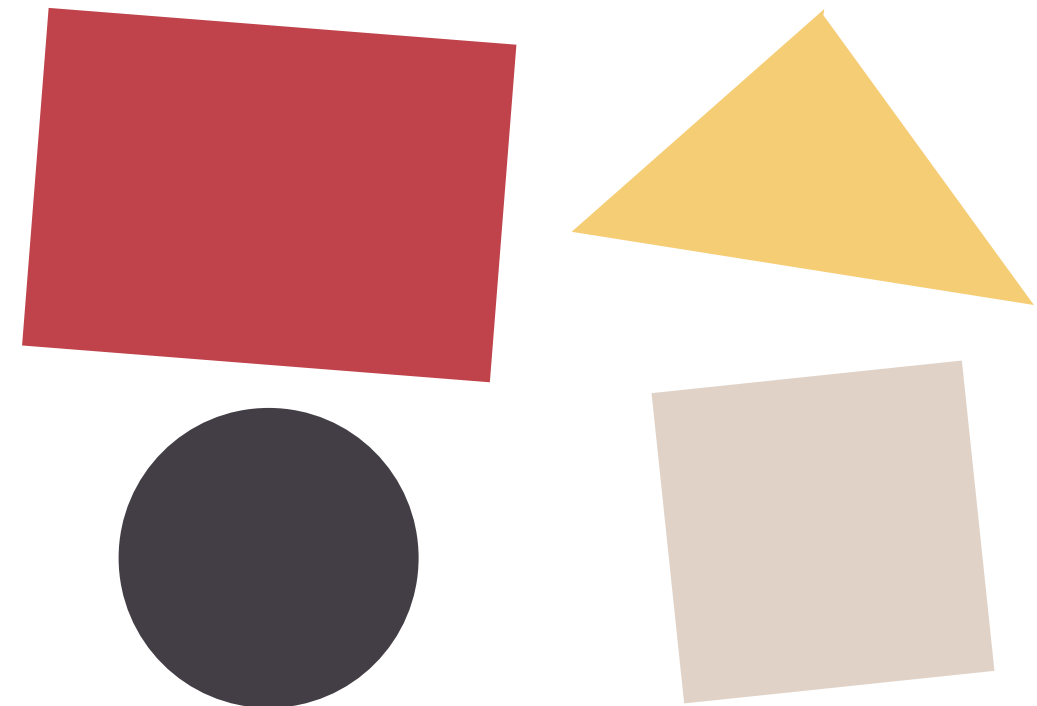
Farmers do a lot to prepare the soil for planting and to care for their crops before harvesting them. One of farmers' most helpful pieces of equipment is the tractor. Tractors come in many different sizes and have different attachments that help them accomplish various tasks, such as planting, mowing or baling hay. Before tractors, farmers used horses or other animals to help plow and harvest the crops.

**Procedure**

1. Begin by reading a book about farm tractors to students. Check out Literary Connection at [AgInTheClass.org](http://AgInTheClass.org) for suggestions. Discuss with students how tractors help farmers on the farm. Have them use their arms to act out how the circular wheels roll.
2. Review standard shapes by pointing out various shapes that can be seen in the book.
3. Give each student a piece of white paper, pre-cut shapes and a glue stick.
4. Instruct students to glue the two circles near the bottom of the page. Next, glue the rectangle on top. Then, glue the square on top of the rectangle. Lastly, glue the triangle to the front. (You may choose to model this by using a large sample of the shapes at the front of the class.)
5. Have students decorate the background with a farm scene that includes their favorite farm animals and/or crops.

**Extension**

Bring in objects representing the various shapes, such as old milk cartons, cereal boxes and frozen juice containers. Have students use the objects to create tractors.





LESSON PLAN >> ELEMENTARY SCHOOL

SOL:

Science: 3.2  
Language Arts: 3.6

Objective:

to read and demonstrate comprehension of a fictional narrative, and to identify simple machines found on the farm.

Materials:

• Reading comprehension excerpt below

AgInTheClass.org

# Farmer Ben and Simple Machines

Background Knowledge

There are six basic simple machines that are tools that help us accomplish tasks more easily and efficiently. The six simple machines are the lever, the pulley, the wheel and axle, the screw, the inclined plane and the wedge. Every day, farmers use simple machines, and complex machines made from these elements, to help them work around the farm.

Procedure

1. Review the six different types of simple machines, and discuss how they help us accomplish tasks each day.
2. Have students read the paragraphs below and underline each of the simple and complex machines.

Excerpts

**A Day in the Life of Farmer Ben** – Read the paragraphs below and underline each of the simple and complex machines. Then, on a piece of notebook paper, list each of the machines that you circled, and identify which type of machine was being used.

Farmer Ben wakes up before the sun this morning. After a breakfast of scrambled eggs, toast and juice, he screws the top back on the juice carton and gets ready to begin his day. First, it is time to check the fence around his cattle. He puts on his helmet and hops on his ATV to ride around the farm. Oh, no! At the far edge of his farm a tree has fallen on top of the fence. Farmer Ben gets an axe to chop the tree into smaller pieces that can be rolled away in his wheelbarrow. Next, he uses a hammer and nails to fix the fence. By mid-day, it's time to meet Farmer Brown, who is bringing him a new bull. But how will he get the bull out of the trailer? Farmer Ben gets a ramp to help the bull down and leads him to the pasture.

As Farmer Ben walks back toward the house for lunch, he sees Farmer Ann working in her garden. She is using a shovel to plant some new flowers. After lunch Farmer Ben readies his tractor to plant corn that the cows will eat. But first, he must tighten the lug nuts on the tire using his wrench. Once the tractor is ready, Farmer Ben climbs into the cab and uses his tablet to check the weather. Then he inputs the coordinates of the cornfield so that he can keep track of his crops.

After a long day at work on the farm, Farmer Ben lowers the flag on the flagpole and heads inside for dinner with his family.

Extension

Farmer Ben used various tools to help him do his work. Imagine that you could create a new tool to help make your day easier. What would it be? What would it look like? How would it work? What task would it help you accomplish?



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LITERARY CORNER

*Farm Machines*, Nancy Dickmann, Heinemann  
ISBN: 1432939424

*Touch and Feel Tractor*, DK Preschool  
ISBN: 9780756691677

*Pioneer Plowmaker: A Story about John Deere*, David Collins, Hobar Publications  
ISBN: 0913163325

*Farm Tractors*, Matt Doeden, Capstone Press  
ISBN: 073686721X

*Grandpa's Tractor*, Michael Garland, Boyds Mills Press  
ISBN: 1590787625

*A Day in the Life of a Farmer*, Heather Adamson, Capstone Press  
ISBN: 0736846743

*Fantastic Farm Machines*, Cris Peterson, Boyds Mills Press  
ISBN: 1590782712

*I Drive a Tractor*, Sarah Bridges, Picture Window Books  
ISBN: 1404816097

*Tractor*, Caroline Bingham, Unknown Publisher  
ISBN: 1435115643



## AITC Program Highlights

### Grants available for ag-related projects

Agriculture in the Classroom has mini-grants available to teachers and schools to help incorporate agriculture into their curriculum. Funds are available for projects such as egg hatching or school gardens. Visit AITC online at [AgInTheClass.org/Teachers](http://AgInTheClass.org/Teachers) for more information and to download an application.

### Celebrate Ag Week by reading Book of the Year

Celebrate National Ag Week March 23-29 by reading AITC's 2014 Book of the Year, : **What's in the Garden** by Marianne Berkes. Check out the AITC website for lesson plans and activity pages to accompany the book. You also can browse our comprehensive booklist at [AgInTheClass.org](http://AgInTheClass.org).

### My Virginia Plate offers new resource

Check out the AITC website for our latest curriculum resource, “My Virginia Plate.” You can download the My Virginia Plate poster and curriculum to help your students learn about Virginia farms and the components of a healthy meal. Thank you to the Bon Secours Richmond Health System for sponsoring this new resource!