

What's Growing On?

2026-27



AGRICULTURE IN THE CLASSROOM

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Feeding the world through STEM

Feeding a hungry world requires endless innovation—and science-minded superheroes to answer the call.

Everyday heroes have long wielded the powers of science, technology, engineering and math to help meet our daily needs. Much of what we eat, wear and use every day is grown on 39,000 Virginia farms spanning 7.3 million acres, with each harvest rooted in STEM ingenuity.

Agriculture is the science of cultivating soil, growing crops and raising livestock. As the nation's largest employer, the industry offers over 250 careers

and employs more than 22 million people—only 1% of which are farmers.

STEM concepts abound in the fields of plant sciences, animal sciences, agricultural mechanics and engineering, agricultural business, environmental science and natural resources, and food systems and science.

Dive into the world of agriculture innovation, and explore the many career pathways to feeding our future! Be sure to salute the STEM superheroes who answered the call, and consider which type of hero you'd like to be.





Science

Agronomists apply science to soil and crop management to improve practices and yields.

Science comes in all shapes and sizes in agriculture—Virginia's largest private industry.

Plant, animal, soil and food scientists are farmers' ultimate sidekicks. They harness science to protect and strengthen our food, fiber and virginia.agclassroom.org

renewable fuel supply.

Animal nutritionists

develop and evaluate animal diets to improve their health, growth and productivity.

Food scientists

develop new products, improve processing, and help ensure food

safety and quality.

Plant geneticists

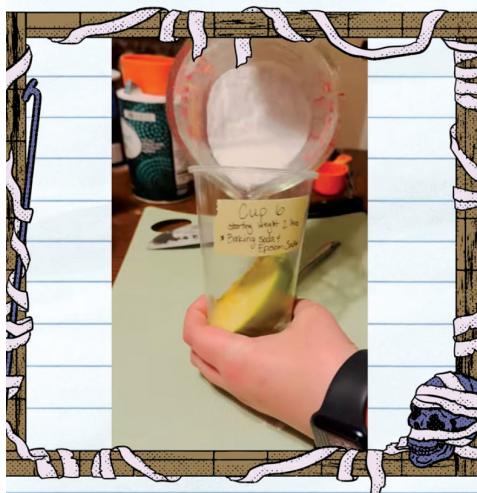
develop new crop varieties to improve their yield, quality and pest tolerance.

Soil scientists

conduct research and analyze soil samples to inform soil best management practices.

**TRY
THIS!**

Mummifying Apples Science Experiment



Try this experiment to explore how food scientists preserve and process food!



Did you know? Scientists are working with NASA to develop ways to grow fresh produce on long space missions.

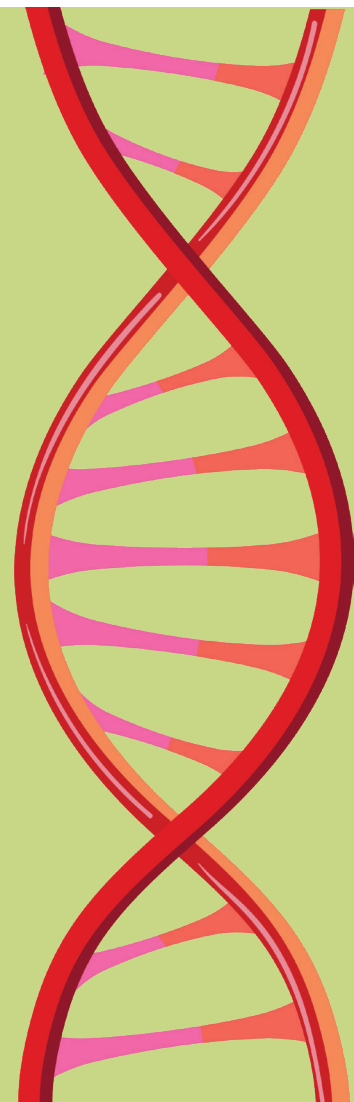


Have your students "Spice Up Space Food" in this project-based learning lesson.



**TRY
THIS!****LESSON:**

Strawberry DNA Extraction



Objective

The student will extract DNA from the nuclei of strawberry cells.

Materials

- blender
- $\frac{1}{2}$ cup strawberries
- 1 cup water
- $\frac{1}{8}$ teaspoon salt
- coffee filter or cheese cloth
- 2 tablespoons dish detergent
- test tube
- pinch of meat tenderizer (enzymes)
- rubbing alcohol
- wooden stick

Background

DNA is present in the cells of all living organisms. Mashing the strawberries will break the cells' walls, exposing the inner membranes; the DNA extracting solution will disrupt the cell and nuclear membranes; filtration of the mixture will remove all cell parts larger than DNA; and the alcohol will cause DNA to precipitate out of the solution.

Students will become familiar with one aspect of biotechnologists' work. Biotechnologists assist in waste treatment or environmental

remediation, and develop new medicines, medical treatment options and new characteristics in livestock and plants for agricultural use. They work in hospitals, research facilities, private food or animal production companies, pharmaceutical companies, government agencies, food processing plants and other sectors. They have backgrounds in science and engineering, or a combination of disciplines like chemistry, biochemistry, microbiology, life sciences and pharmacy sciences.

Procedure

1. In a blender, add strawberries, water and salt.
2. Blend on high for 15 seconds, then strain the mixture through a coffee filter or cheese cloth to remove any unblended material.
3. Add dish detergent. Swirl to mix, then let sit for 5-10 minutes.
4. Fill a test tube about $\frac{1}{3}$ full with the mixture. Add a pinch of meat tenderizer to the test tube, and stir carefully. Tilt the test tube, and slowly pour an equal amount of rubbing alcohol down the side so it sits on top of the mixture.
5. Stringy DNA should appear at the boundary between the mixture and the alcohol. Use a wooden stick to gently move the mixture into the alcohol so more DNA will precipitate out. Let the tube sit for 30 minutes.



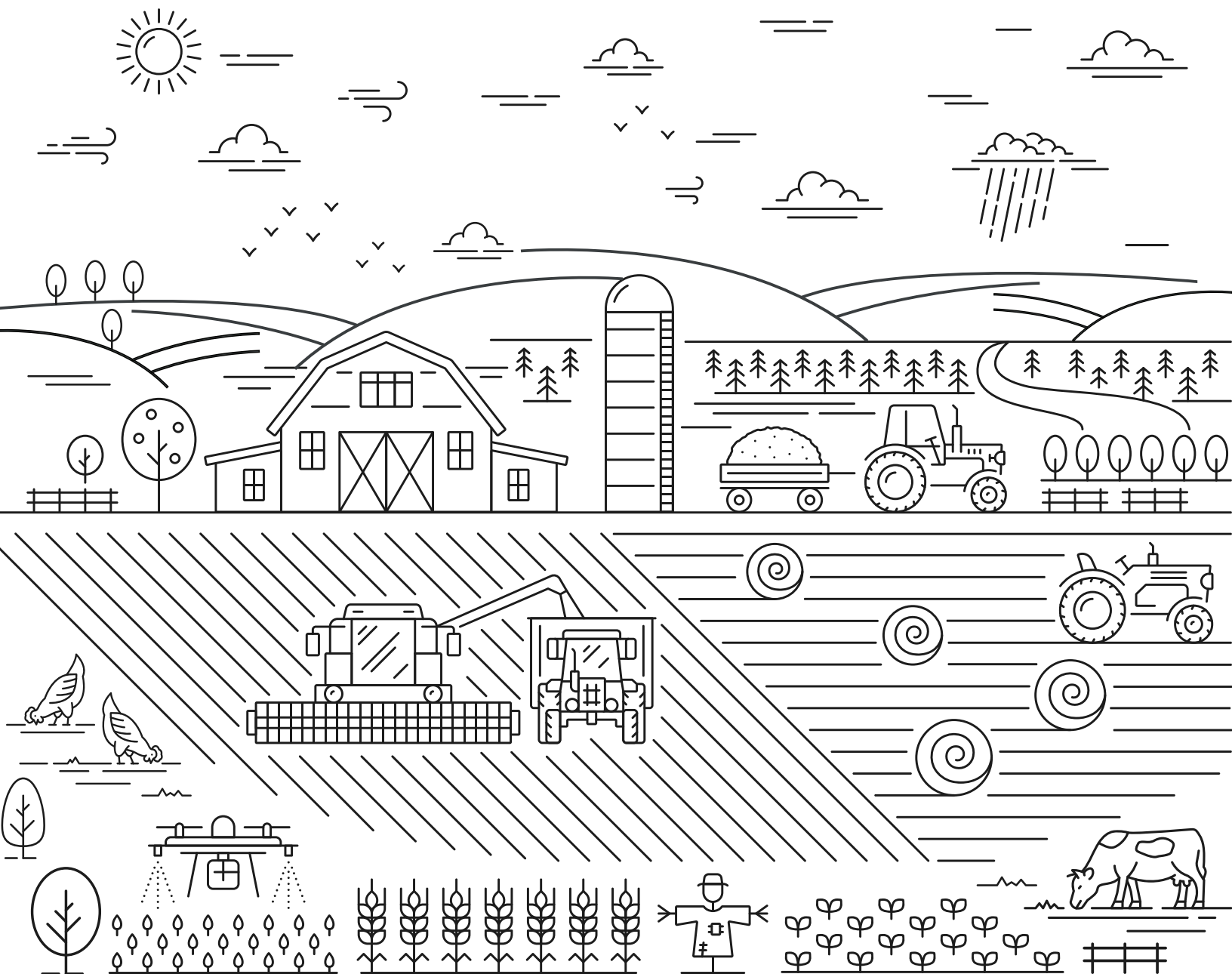
Purchase a kit for
100 students to make
strawberry DNA
necklaces!



Farm Tools and Machinery

Farmers use many different tools and machines to produce our food.

1. Circle all the tools and machines in the picture below, then color it in.
2. Choose one of the tools or machines that you circled. How is this machine used on a farm?



Natural, Human and Capital Resources

Agriculture involves many different natural, human, and capital resources to produce goods and products for consumers. Complete the Word Search by highlighting the capital resources in **yellow**, the natural in **green**, and the human in **pink**. Words may go horizontally, vertically, or diagonally, but not backward.

T	R	A	C	T	O	R	Q	L	M	P	Z	V	S	N
K	F	A	R	M	E	R	D	H	T	W	J	Y	E	X
B	U	N	S	U	N	P	I	G	R	A	I	N	R	C
L	Q	W	V	E	T	E	R	I	N	A	R	I	A	N
D	R	O	N	E	X	C	B	U	I	L	O	S	C	T
F	H	J	K	L	M	C	O	M	B	I	N	E	I	Y
G	T	R	U	C	K	M	N	V	O	P	Q	O	E	U
S	I	L	O	R	S	T	U	V	W	X	Y	R	N	I
P	L	A	N	E	A	B	C	D	E	F	G	I	H	N
I	N	S	P	E	C	T	O	R	L	M	N	L	O	G
W	A	T	E	R	P	Q	R	S	T	U	V	N	W	A
S	O	I	L	X	Y	Z	A	B	C	D	E	D	F	R
W	O	R	K	E	R	G	H	I	J	K	L	S	M	V
M	N	O	P	Q	R	S	T	U	V	W	X	Z	Y	H
S	C	I	E	N	T	I	S	T	A	B	C	D	E	F

Word Bank:

TRACTOR	FARMER	SUN	SCIENTIST	PLANE
DRONE	VETERINARIAN	COMBINE	TRUCK	SILO
INSPECTOR	WATER	SOIL	WORKER	



Technology

Agricultural drones are being developed to help farmers precisely monitor crop health, soil conditions and irrigation needs. Drones are the cornerstone of precision agriculture—a new farming approach that aims to put the right amount of resources where and when they are needed.

The Virginia State Dairymen's Association estimates about two dozen Virginia farms have shifted to robotic milking systems. Cows wear ID tags that notify milking machines when they've entered the milking parlor. Then, a robotic arm guided by lasers will clean the cow and attach the milking cups.

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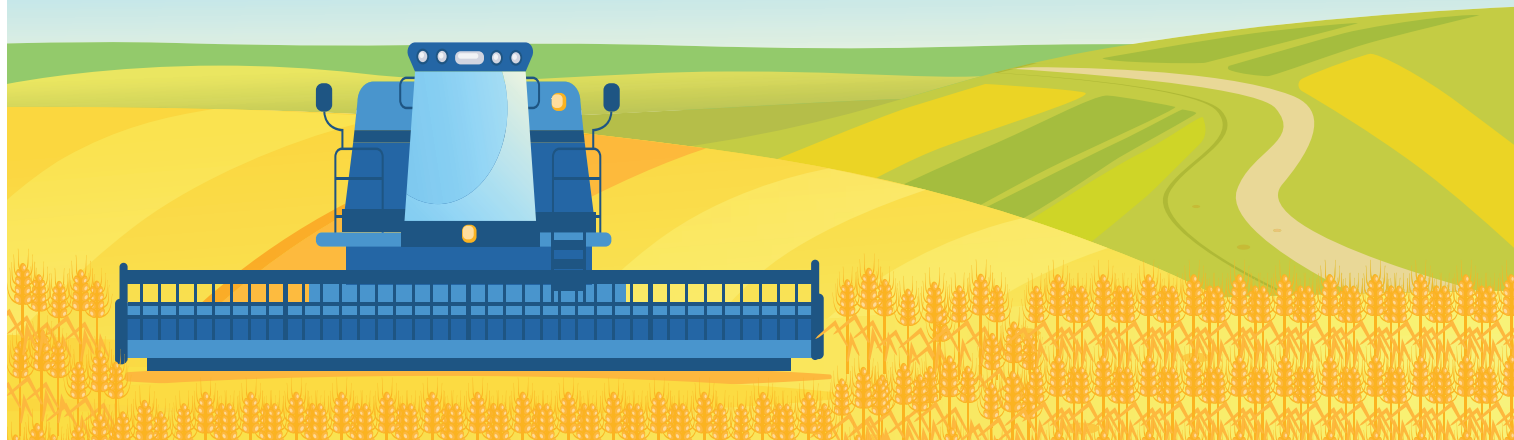
Watch how robotic milking works on a Virginia farm!



**TRY
THIS!**

LESSON:

Engineering a Sweet Harvest



Objective

The students will work cooperatively to create a “harvester” using household items and simple machines.

Materials (substitute as needed)

- plastic cups
- rubber bands
- paper towel rolls
- popsicle sticks
- plastic straws
- pipe cleaners
- paper clips
- scissors
- construction paper scraps
- tape
- small hard candies
- graph paper

Background

An engineer is someone who uses math and science to solve a problem; an agricultural engineer applies these concepts to the farm to maximize its efficiency. They may design farm machines such as tractors or tools, or

facilities such as chicken houses or milking parlors.

Agricultural machines have made work easier for the farmer, and advanced technology continues to make machines more efficient. Regardless of the machinery’s complexity, each part includes variations of six simple machine types: lever, inclined plane, wedge, screw, pulley, and wheel and axle.

Procedure

1. Review the six types of simple machines. Discuss how complex machines are made up of multiple simple machines. Ask students to identify machines they use every day, and what it would be like if there were no machines. Explain how both household and farm machines help make jobs easier and more efficient.
2. An agricultural engineer is someone who helps design farm machines. Tell students

they will be agricultural engineers for the day, and their job is to create a harvester to collect their “crops.”

3. Give each group of students a piece of graph paper and some hard candies. Instruct them to “plant” their candy crops in rows on the paper.
4. Tell students they will be using everyday items to create a complex machine that can pick up a piece of candy. They must use at least two simple machines.
5. Have students share their complex machines with the class and point out the simple machines they incorporated.

Extension

Have students pretend to be graphic designers and sales people. Challenge them to create a poster advertisement for their machine, then present their sales pitch to the class.

Ag Careers from Farm to Fork



An **animal nutritionist** helps plan a healthy diet for beef cattle.



A **greenhouse manager** grows produce that can be enjoyed year-round.



A **food safety inspector** checks that beef is handled safely.



A **truck driver** transports fresh milk from the dairy farm in a refrigerated tanker.



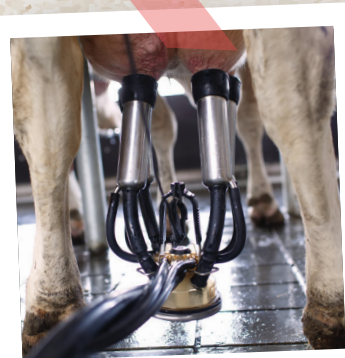
An **agricultural loan officer** helps the farmer finance land, equipment or other farm needs.



A **pest management specialist** helps produce farmers protect their crops from harmful insects, weeds and diseases.



A **seed salesperson** sells wheat seeds to the crop farmer.



A **mechanic** helps keep large farm machinery working.



A **mechanical engineer** designs the equipment to process milk into cheese.



A **packaging specialist** helps design packaging that keeps food fresh and protected on the way to consumers.



What's Growing On?

Virginia Foundation for Agriculture in the Classroom

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