



Overview -

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Agriculture is both Virginia and the nation's largest industry with an economic impact of \$55 billion annually in the Commonwealth. Virginia's temperate climate results in diverse crop production including corn, wheat, soybeans, tobacco, tomatoes, cotton, apples, potatoes, peanuts, and grapes, among others. Virginia farmers also raise a variety of livestock including broilers (chickens), beef cattle, dairy cows, and turkeys. The purpose of this resource is to illustrate the many steps taken by the farmer to produce a quality product while acting as a steward of the land.

Become an Erosion Expert

Objective: Demonstrate how ground cover can slow and prevent soil erosion.

Materials Needed:

Wide mouth jars; funnels; topsoil; grass clumps (including roots and soil); water; watering can; leaves; pine needles; rocks

Steps:

- 1. Define erosion as the breakdown and runoff of soil. Identify ways that erosion can occur. Ask students to brainstorm why erosion can be harmful.
- Now use a watering can to "rain" down on the funnel. Have students observe what happens.
- 4. Have groups take turns demonstrating their findings and conclusions

Exploring Further:

Explore your schoolyard for examples of erosion. Look for places where water has cut grooves into the soil or where small piles of sand have been deposited. Identify how the erosion was caused.



Background Knowledge -

Best Management Practices (BMPs)

Farmers rely on healthy land to produce healthy and bountiful crops. There are several ways that they can help protect the soil; these are called Best Management Practices (BMPs). A few common BMPs are: conservation tillage, crop rotation, vegetative

buffers, and cover crops. First, conservation tillage, which refers to leaving crop residue (the plant material that is left over after harvesting) on the ground. By leaving plant residue on the ground, farmers help prevent runoff and soil erosion. Second, crop rotation, which aids in nutrient management. By rotating complementary crops, such as corn, soybeans, and wheat, farmers can improve the quality of the soil while also reducing the amount of fertilizer needed. Third, vegetative or conservation buffers, which are trees or grasses that are planted in between fields and waterways. These act as a barrier, helping keep pollutants out of the water. Lastly, cover crops, which are planted by farmers in between harvests to prevent runoff and erosion. Cover crops, such as rye grass or clover, protect the soil from wind and water erosion. Additionally, cover crops help keep nutrients

Water Quality

Water is used by many people in many ways. But people are not the only ones who need water; it is also a critical resource for crops and animals. The earth, however, has a limited amount of water. The 🛛 🔍 water that the earth has constantly keeps going around and around and around in a cycle. This is called

in the soil and out of the waterways.



the water cycle, which is made up of five steps: sunlight, condensation, precipitation, evaporation, and accumulation. Because water is so important for farmers there are several things that they can do to conserve it and keep it clean. For example, they might utilize watering systems that put water directly at the plants' roots – this allows more water to get straight to the plant instead of evaporating. A primary goal of agricultural best management practices is to protect waterways and help keep them healthy.

2. Place a funnel at the top of a wide mouth jar. Fill the funnel with topsoil.

3. Note all of the runoff that is now in the bottom of the jar. Tell students that their task, in groups, is to come up with ways to slow down and prevent the runoff. Have available for them to use: soil, grass clumps, leaves, pine needles, and rocks.

to the class. As a class, evaluate and discuss the success of various approaches. Point out that a common theme is that plant matter slows down the runoff and erosion of the soil. Draw analogies between this and how farmers plant buffer and/or cover crops and utilize no-till.



Make it Rain

Objective: Observe the steps of the water cycle in action.

Materials Needed:

Aquarium or large glass bowl; small beaker; plastic wrap; tape or rubber bands; stone; small rocks and/or soil; water

Steps:

- 1. Review with students the steps in the water cycle and the associated vocabulary evaporation, condensation, precipitation, accumulation.
- 2. Tell students that you will be creating your own water cycle in the classroom.
- 3. Take an aquarium and cover the bottom with small rocks and/or soil. Pour water over the top of the rocks/soil.
- 4. Next, place a glass beaker in the middle of the aquarium.
- 5. Cover the aquarium with clear plastic wrap. Secure with packing tape or a large rubber band.
- 6. Place a stone in the middle of the plastic wrap, directly above the beaker. This will create an indentation in the top, resulting in a point above the beaker, allowing all liquid to accumulate in the beaker.
- 7. Place the aquarium near a window or by a heat lamp. Have students observe and record their observations daily. Be sure to take regular measurements of the water in the beaker.

Exploring Further:

94% of the earth's water is salt water in the oceans. Demonstrate the difference in a plant's reaction to salt water versus fresh water. Take one glass and fill it with fresh water. Take another and fill it with fresh water plus one tablespoon of salt. Place a slice of potato in each and observe over the course of a couple days.



Farmers who raise animals, such as that their animals are well taken care of. Animals rely on farmers



Animal Care

cows, chickens, turkeys, sheep, or hogs are called livestock producers. It is the farmer's job to make sure to provide them with food, water,



shelter, and care to keep them healthy. In turn, people rely on farm animals for food and clothing. All animals share the same basic needs of food and water. Some farm animals may graze on pastureland and might be provided with extra hay or silage. Silage is

made when a plant such as corn or grass is cut, finely chopped, and packed tightly to store. The farmer will carefully choose the correct type and combination of grains for their animals in order to give them the best possible nutrition. Additionally, farmers provide their animals with plenty of clean water.

In addition to food and water, farmers provide their animals with shelter to protect them from severe weather and to keep them safe. Lastly, in order to keep their animals healthy, farmers will seek the help of veterinarians. Veterinarians are doctors who take care of animals and make sure they stay healthy. Some veterinarians take care of pets like dogs or cats, while others, called large animal veterinarians, specialize in the care of farm animals.

Soil is one of our most valuable natural resources – useful to



produced from various plants. Plants grow in the top layer of soil, which is called topsoil. Topsoil is a product of the two lower layers of soil – subsoil and bedrock. Topsoil is best for plant growth because it contains nutrients deposited by humus. Humus is decayed organic matter in soil. In addition to nutrients, topsoil is where plants absorb water and air. However, it takes an average of 100-500 years for an inch of topsoil to form. It is important to take measures to conserve topsoil and prevent erosion because plants grow poorly in subsoil.

Soil Cereal

Objective: Construct a model of the soil profile.

Materials Needed:

Three different types of cereal; clear plastic cups; milk; spoons; dried fruit (ex: raisins, cranberries)

Steps:

- 1. Explain to students that there are 3 basic layers of soil; this is called the soil profile. Bedrock is the deepest, next is subsoil, and lastly is the top layer of topsoil. Topsoil contains the most nutrients and is where plants grow.
- 2. Give each student a clear plastic cup. Instruct them to use the different types of cereal (you may leave it whole or crush it up) to create their soil profile. On a piece of paper, have them draw a diagram of their profile and label it.
- 3. Add the dried fruit on top to represent the humus, or organic matter, in the topsoil.
- 4. Pour a little bit of milk into the cup to simulate rain.
- 5. Eat and enjoy!

Exploring Further:

Bring in extra cereal to represent the different topsoil particles – sand, silt, and clay. Crush it to appropriately represent each particle size.



Animal Needs Farm Charm

Objective: Identify needs of animals.

Materials Needed:

Small jewelry sized bags; yarn; hole punch; blue glitter; red construction paper; brown shredded paper; googly eyes; cornmeal or grits

Steps:

- 1. Make a list of animal needs air, food, shelter, water, and space (habitat). Discuss how farmers provide these needs to their animals.
- 2. Have each student pick their favorite farm animal. Then, give each student a small jewelry bag. In the bag will be items representing that animal's needs.
- 3. Have them open the bag and give it a puff of air. This represents the air that the animal needs.
- 4. Next, place a pinch of blue glitter in the bag. This represents fresh water.
- 5. Place a pinch of cornmeal or grits in the bag. This represents the ground up grain that most farm animals eat. Also place some brown shredded paper in the bag. This represents cut grass, or hay, that farm animals may eat.
- 6. Cut a small square from a piece of red or gray construction paper and put in the bag. This represents the barn, or shelter for the animal.
- 7. Last, place a googly eye in the bag because farmers keep an eye on their animals' health and well-being.

Exploring Further:

Have students create a Venn diagram comparing and contrasting their needs with animal needs.

Additional Information/Resources and SOL Alignment

You May Use this Poster to Teach the Following Virginia Standards of Learning:

Become an Erosion Expert

Science: 3.1; 4.1; 5.1 - The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations.

3.6 – The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources.

3.7 - The student will investigate and understand the major components of soil, its origin, and its importance to plants and animals including humans

4.9 – The student will investigate and understand important Virginia natural resources. 5.7 – The student will investigate and understand https://www.soils.org/lessons how Earth's surface is constantly changing.

Make it Rain

Science: **3.9** – The student will investigate and understand the water cycle and its relationship to life on Earth.

Animal Needs Farm Charm

Science:

K.7 – The student will investigate and understand basic needs and life processes of plants and animals

1.5 – The student will investigate and understand that animals, including humans, have basic needs and certain distinguishing characteristics. **2.5** – The student will investigate and understand

that living things are part of a system.

Soil Cereal

Science:

3.7 - The student will investigate and understand the major components of soil, its origin, and its importance to plants and animals including humans.

Literacy Connections:

Amazing Grazing by Cris Peterson All Around the Farm by Heather Alexander Big Red Barn by Margaret Wise Brown *Diary of a Worm* by Doreen Cronin Did a Dinosaur Drink this Water? by Robert Wells *Dirt* by Steve Tomecek Dirt: The Scoop on Soil by Natalie Rosinsky *Down Comes the Rain* by Franklyn Branley Farm Animals by Nancy Dickmann A Handful of Dirt by Raymond Bial Seed, Soil, Sun by Cris Peterson Soil by Christin Ditchfield Water Dance by Thomas Locker

Useful Websites:

The Old Farmer's Almanac for Kids, http://www.almanac4kids.com/weather/index.php Science in Your Watershed,

http://water.usgs.gov/wsc/ Soil Science Society of America,

Animal Science Image Gallery,

http://anscigallery.nal.usda.gov/index.php **Junior Master Gardener,**

http://www.jmgkids.us/

Ecolnvestigators,

http://www.pbs.org/teachers/ecoinvestigators/ lesson-plans/

Sci4Kids,

http://www.ars.usda.gov/is/kids/

4-H Virtual Farm, http://www.sites.ext.vt.edu/virtualfarm/ Dig It! The Secrets of Soil,

http://forces.si.edu/soils/index.html

Additional Extension Ideas:

Language Arts – -Describe the farm scene from the perspective of a chicken, bee, or cow. -Write and deliver a persuasive speech on erosion. -Write a song for the water cycle.

Social Studies

-Research the various careers associated with agriculture. Have students put on a mock career fair. -Research the Dust Bowl, its causes and effects. Have students create posters to describe their findings. -Compare and contrast farming practices now to those in the early 1900s. Then create a timeline for advancements in farming.

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