



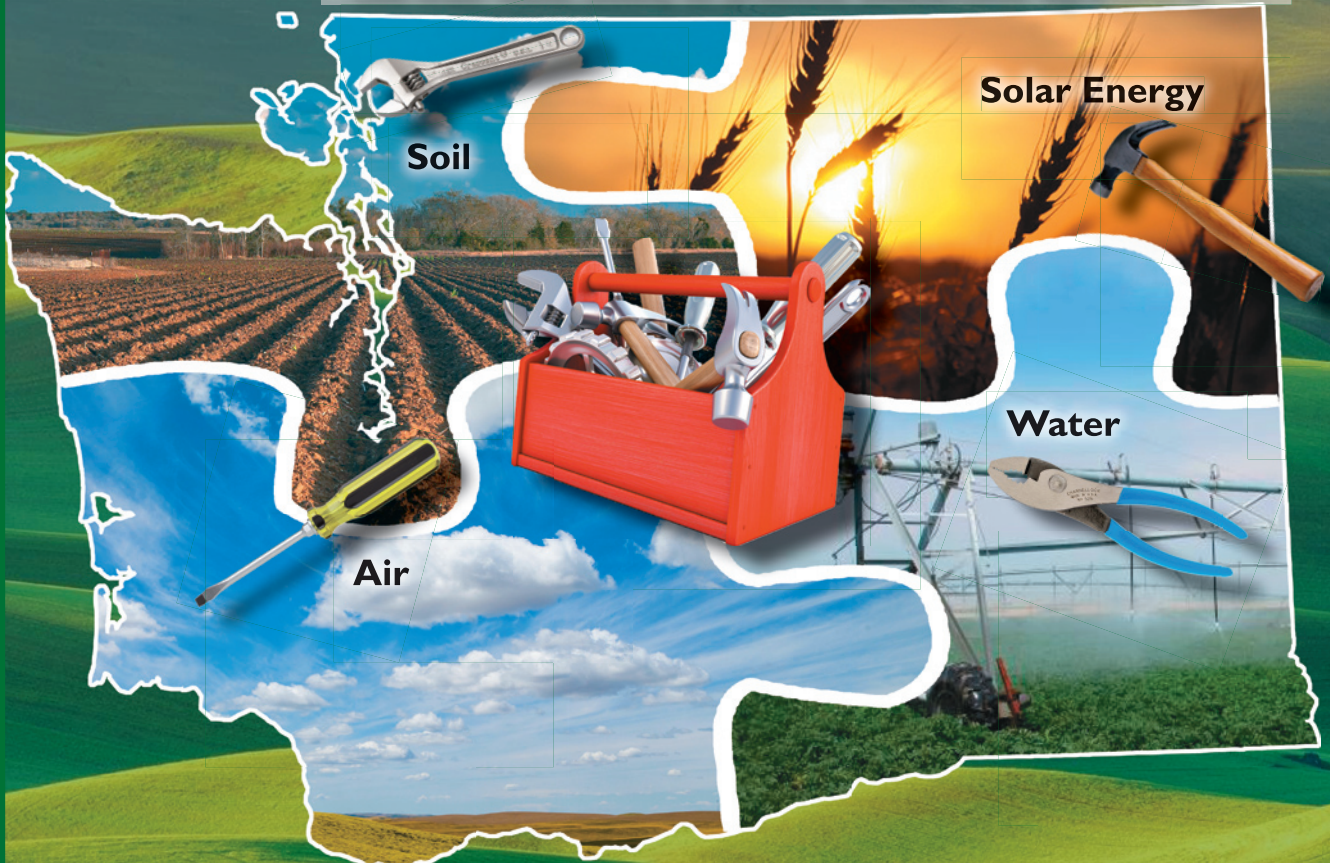
Ag@School

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Earth Day is Every Day for Farmers!

Farmers depend on the same tools which have been used since farming began more than 10,000 years ago. These basic natural resource tools are essential for plant life. Plant life is the source of food for every living thing. American farmers practice good stewardship, protect their tools, and use their tools wisely to produce sustainable agriculture.

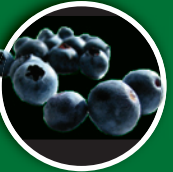


Fill in the blanks with the correct resource:

1. The sun provides _____ which plants need to grow.
2. Healthy _____ provides nutrients and minerals that are taken up by plant roots.
3. People, crops, animals, industry, aquatic life, and recreation all must share the _____ supply.
4. Trees and crops use carbon dioxide and produce oxygen, making the _____ healthier for people.

Today's Children... Tomorrow's Leaders

Sustainable Agriculture: Using technology and resources to keep farms profitable, improve human lives, yet respect the environment.





Farmers are Environmentalists

Farmers were environmentalists long before it became popular to be one. Farmers care about **natural resources** because their business depends on them. They work at keeping water and soil clean and healthy because they will eventually pass the farm on to their children.

Good **conservation** practices are part of a sustainable agricultural system. Sustainable agriculture is growing food, fiber and forestry products that are:

- 1) Environmentally friendly now and in the future:
- 2) Profitable enough to keep farmers in business:
- 3) Acceptable to society.

Natural resources can be grouped into two groups: renewable and non-renewable.

Renewable resources will naturally replenish themselves over time, like wind, solar, plants, trees, etc. **Non-renewable** will be gone forever once used, like coal, fuel, etc..



Think and Discuss:

Why is conservation important to a farmer?

Why must farmers make a profit?



Stewards of the Forest

Foresters are farmers too and good stewardship is important in forestry. This is especially true in our state. Half of Washington is covered by forests. We have 21.3 million acres of forest! Trees mature like any other crop – it just takes decades to reach maturity, not days. Part of managing a forest is keeping the tree stand healthy by removing mature trees. Older trees can be more sensitive to insect damage, disease, and decay.

Keeping forests healthy today means we will have trees to harvest in the years ahead. Responsible forest management includes removing dead and decaying wood that could fuel a forest fire. Foresters also practice modern conservation logging. This leaves many trees uncut to provide habitat for wildlife and reduces soil erosion into streams. Trees are planted to replace those removed by logging.

What is a Watershed?

A watershed is the land area that delivers runoff water to the area's lowest point – a stream, river or lake. Small watersheds flow into bigger ones until they eventually reach the ocean. This water travels across and under fields, forests, cities, streets and lawns.

We all live in a watershed and everything we do in our watershed affects its water. Run-off from streets, yards, farms and forests eventually ends up in our water.

- Washington has 62 main watersheds Which one do you live in? _____

Hint: to find the answer checkout this website:
<https://ecology.wa.gov>

- What can you do to stop pollution in your watershed?
1. _____
 2. _____



Farmers Care for Livestock Too

Farmers are very concerned about the welfare of the animals they raise. Animals that are healthy, comfortable, and well fed will grow fast and produce more meat, milk, and eggs. Farmers protect animals from predators, give them vaccinations for their health, and feed them nutritious feed. In fact, farm animals may indeed eat better than you, because they are not allowed to eat “junk” food.



Fun Fact

Farmers and ranchers provide habitat for 75% of Americas wildlife. Why do you suppose wildlife prefers to live on farms and ranches? Hint: Think of the four needs for habitat.



Habitat needs are food, water, shelter and space. Farms usually have food (crops) and water. Trees on farms and ranches provide shelter for birds and many animals. Fish and waterfowl live in the freshwater streams that run through farmland. Many animals survive winter by eating crop residue left in the fields after harvest.

Pollination

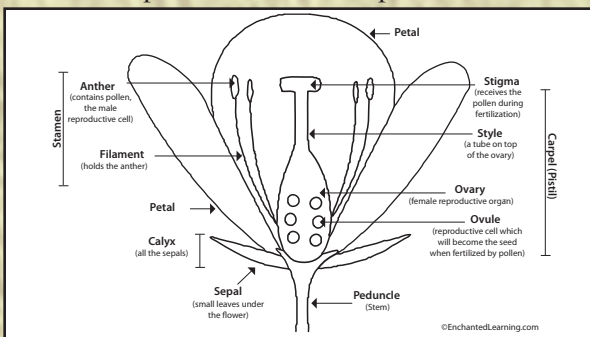
Pollination is the transfer of pollen from an anther to the stigma in flowering plants and it starts the production of seeds, or fruits that contain seeds.



How does pollination work?

It all begins in the flower. Flowering plants have several different parts that are important in pollination. Flowers have male parts called **stamen** that produce a sticky powder called **pollen**. Flowers also have a female part called the **pistil**. The top of the pistil is called the **stigma**, and is often sticky. Seeds are made at the base of the pistil, in the **ovule**.

For pollination to occur, pollen must be moved from an



anther to the stigma. When pollen from a plant's stamen is transferred to that same plant's stigma, it is called **self-**

pollination. Self-pollination means that an individual flower on a plant stem can pollinate itself, or other flowers on the same individual plant stem. Wheat, other grains, and most grasses are self-pollinators.

When pollen from a plant's stamen is transferred to a different plant's stigma, it is called **cross-pollination**. The plants must be of the same species. For example, only pollen from a daisy can pollinate another daisy. Pollen from a rose or an apple tree would not work.

How does pollen from one plant get moved to another?

About 80% of plant pollination requires the help of other living, moving creatures such as insects, birds, or bats, to transfer pollen from one plant to another.

When animals such as bees, butterflies, moths, flies, and hummingbirds pollinate plants, it's accidental. They are not trying to pollinate the plant. Usually they are looking for food, either the sticky pollen or a sweet **nectar** made at the

base of the petals. When feeding, the animals accidentally rub against the stamens and get pollen stuck all over themselves. When they move to another flower to feed, some of the pollen can rub off onto this new plant's stigma.

What about the other 20% of plants, how are they pollinated?

Some plants, especially grasses, most conifers, and some deciduous trees, are pollinated by wind. Plants that are not self-pollinators, but need to be pollinated by wind often have long stamens and pistils to enable pollen grains to be blown from one plant onto another. Since they do not need to attract animal pollinators, they can be dull colored, un-scented, and have small or no petals since no insect needs to land on them. There are also a small number of water plants that rely on water movement for pollination.



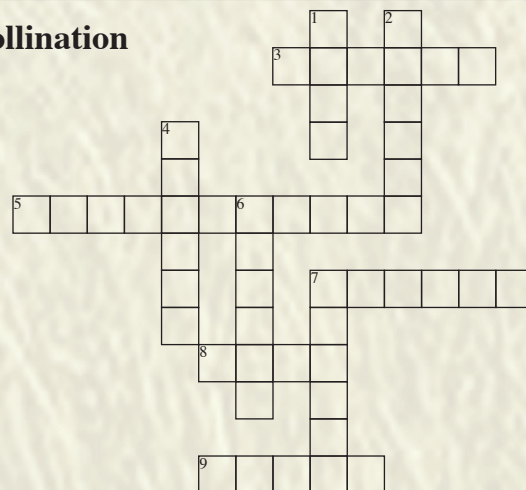
<http://youtu.be/ge3EM8AE>
RV0?list=FLAdHP75YXIMQOBLeYBWC4JA

Thanks to the University of Illinois for the information on this page.

Why we should care about pollinators?

- One out of every 3 bites of food we eat is courtesy of a pollinator.
- Birds and other animals are even more dependent upon fruits and seeds than we are.

Pollination



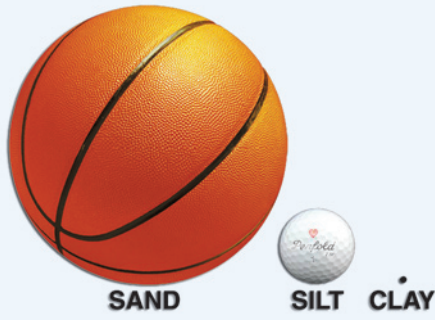
Across

- Sweet fluid in flowers
- Pollen reaching the stigma
- Male reproductive cells in plant
- Important pollinators; produce honey
- Female reproductive cells in plant

Down

- Created when pollen fertilizes ovule
- Male plant parts
- Top of pistil
- Part of stamen producing pollen
- Female plant parts

3 Basic Soil Particle Sizes



CAN YOU DIG IT?

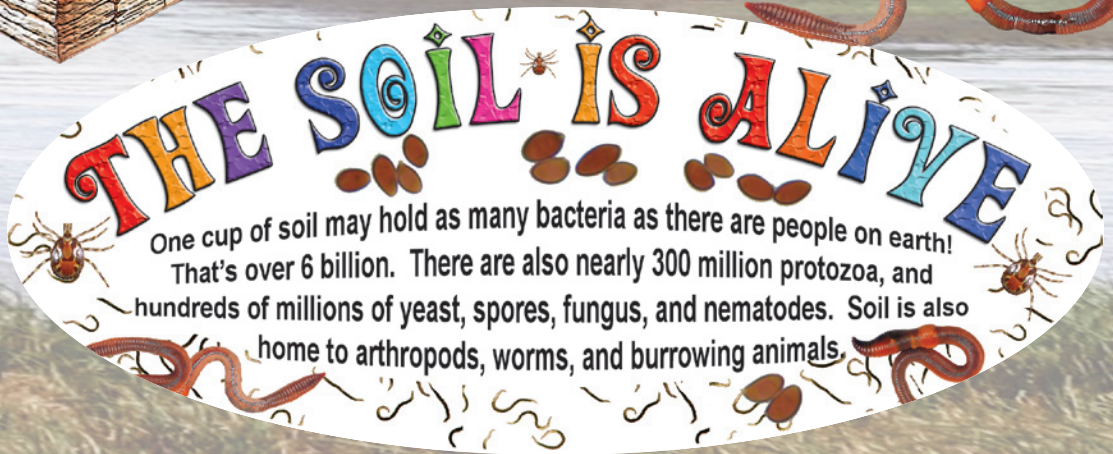
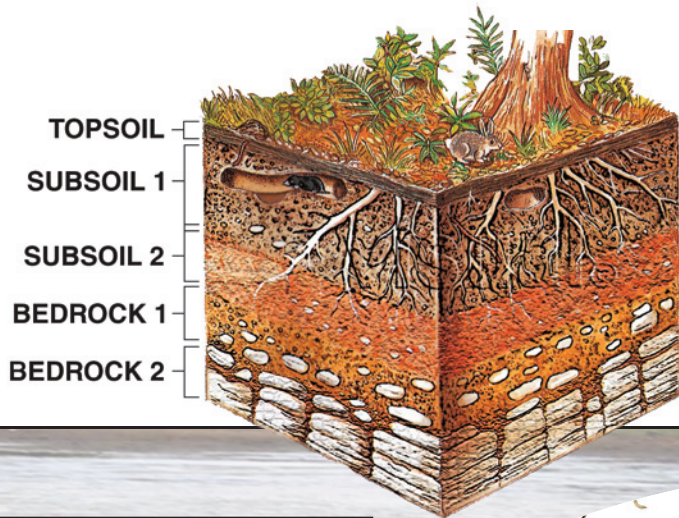
Let's talk about dirt, soil actually. There are three basic particle sizes called sand, silt, and clay. The difference in size between the three would be like comparing a basketball (sand), a golf ball (silt), and the tip of a ballpoint pen (clay). Soils from different locations vary in their amounts of each of the three particles. The amount of each type of particle is important because that determines the capacity of the soil to hold water and air. In the Columbia Basin soil can be very sandy whereas near Mica, WA the soil is nearly all clay, in fact there is a business there that uses the soil to make bricks.



Ideally soil is:

- 45% particles (sand, silt, and clay)
- 5% organic matter (dead plants and animals)
- 50% empty space (pores) with half filled with air, and half filled with water

Organic matter is usually near the surface and enriches the **topsoil** which is where we plant seeds.



SOIL CONSERVATION

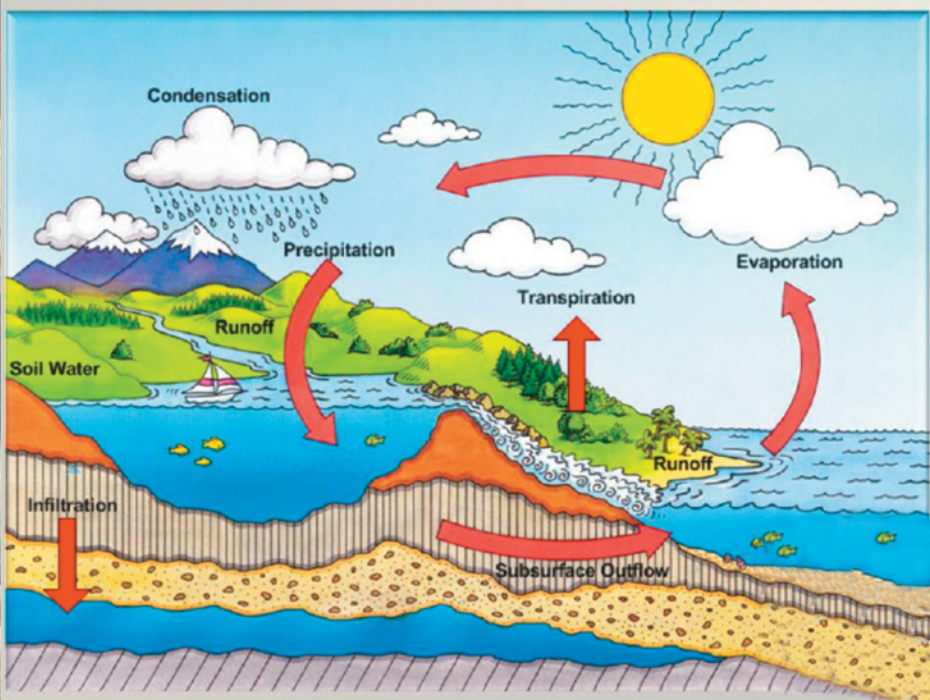


With help from science, farmers have developed conservation practices that reduce soil loss. The movement of soil from one place to another by wind or water is called **erosion**. It can occur anywhere but is usually worse in places that are steep or where there are no plant roots to hold soil in place. Stopping erosion is important because it can take hundreds of years for nature to replace just one inch of good topsoil.

These practices include planting windbreaks, farming with the contour of the land and planting strips of crops across hillsides (both slow down the gravity flow of

water). Another is **reduced tillage**. When land is tilled (plowed or cultivated), soil particles are exposed to wind and water erosion. The more times a farmer disturbs the soil, the finer the particles become and the worse the erosion potential. To stop erosion many farmers now use equipment and methods that use less tillage. Following harvest, crop residue is left in the field and often the field is not disturbed until time to plant the next crop. The roots hold the soil in place. Less tilling means fewer tractor trips across the field and less air pollution from dust and burning fuel and less fuel used.

Water—The Most Common Material on Earth



The water cycle is the circulation of the earth's water in a never-ending process. The heat from the sun causes (1) water from the ocean, streams, lakes, and even plants to evaporate. As the water vapor rises, it is cooled by the upper air. Cold air cannot hold as much water vapor as warm air so (2) water vapor condenses into water droplets and creates clouds. The wind carries clouds over the land and (3) water falls back to earth as precipitation.

Water is Life!

All living things (plants, animals, humans) must have water to survive. **The amount of water on earth stays the same. It is never 'used up', but continues to move through the water cycle.** However, the water in a specific location can change in amount or form, sometimes we have a drought and sometimes we have extra snow or rain. A growing human population puts pressure on available water.

Condensation: The process of water vapor in the air turning into liquid. As water vapor rises it cools and becomes liquid again. These droplets form around dust particles in the air and become clouds.

Evaporation: Changing from a liquid or solid state to a vapor or gas. Only pure water evaporates. Substances like salt and minerals are left behind when water evaporates.

Groundwater: Water which has seeped below the earth's surface and is held there in the underlying sand and gravel. Water bearing layers are called **aquifers**. In Washington, 2/3 of the people get their drinking water from aquifers.

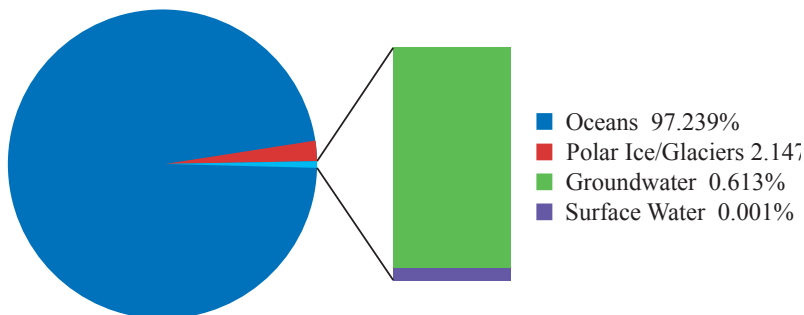
Percolation: The movement of water into soil through pores, holes and cracks.

Precipitation: Rain, snow, hail, sleet, dew, and frost.

Transpiration: Water that is absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface through leaf pores.

Total Water on Earth

Remember that about 70% of the earth is covered by oceans and those oceans hold more than 97% of all the water. Just over 2% of the water is frozen in glaciers. That means that less than 1% of the earth's water is available for drinking, and most of that is groundwater. The very thin purple line at the bottom of the bar to the right of the pie chart represents all the combined water in lakes (0.017%), the atmosphere (0.001%) and rivers (0.00001%)



How Much Water is Enough? There's An 'App' for That!

Farmers can use their smart phones or computers to operate center pivot irrigation systems. They can also use an irrigation scheduling program that will calculate how much water to use based on soil types, weather (rain, wind, heat), crop being grown, how much water has already been applied, etc. The goal is to keep crops growing at an optimum without wasting water. WSU researchers at Prosser developed the program.



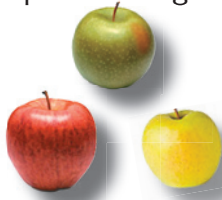
A VERY "FRUITFUL" STATE

WASHINGTON IS A TOP PRODUCER OF APPLES, PEARS, SWEET CHERRIES, RED RASPBERRIES AND CONCORD GRAPES.



TREE FRUIT

Washington produces 63% of all US apples, but accounts for 90% of all apples exported to other nations. Our slogan "The Best Apples on Earth" certainly describes Washington apples that are shipped to over 60 countries around the world. Washington produces nearly 45% of the pears grown in the US. Thanks to advancements in Controlled Atmosphere (CA) storage technology, fresh apples and pears are available to consumers nearly year-round. The three main tree fruit regions are the Wenatchee Valley, Columbia Basin and Yakima Valley. These areas are ideal because of the mild climate, dry growing season, good soils, and plentiful irrigation water from nearby rivers.



1. Because we produce over half of the U.S. crop of this fruit and ship them world wide, Washington is know as the _____ Capital of the World.

A BERRY NICE PLACE

Berries are grown in many areas of our state but the major production area is the Puget Sound lowlands. The soil and climate there are great for blueberries, strawberries, raspberries and blackberries. Most cranberries are grown in the Willapa Hills region. 60% of America's red raspberries used in processing (quick frozen berries, concentrates, purees and other products) are grown in Washington, most of those in Whatcom County



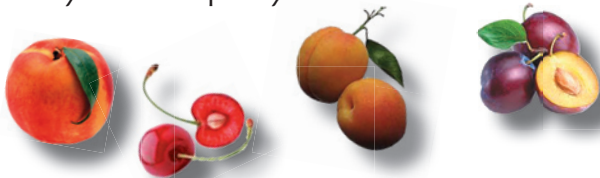
3. If WA harvests 9,600 acres of red raspberries and the yield is 8,070 pounds per acre, the total harvest will be _____ pounds.

How many tons? _____

STONE FRUIT

No, they don't grow out of rocks! **Stone fruits** have a large, hard seed called a pit. Cherries, apricots, peaches, nectarines, plums and prunes are all stone fruits produced in our state. Weather is very important to a stone fruit grower. Rain and hail can damage the tender fruit and destroy an entire crop in the blink of an eye.

Even gentle rain on cherries is bad. A water drop collects in the dimple where the stem is attached and causes the cherry's skin to split open. This ruins the fruit. If it rains a grower might pay a helicopter to hover over his trees to blow the water off and dry the fruit quickly.



2. Comparing weather across the state, why would most stone fruit be grown in Eastern Washington?

GRAPES

The grape industry has grown to become Washington's 10th most valuable crop. We lead the nation in production of Concord grapes (used for juices and jams) at 42%. We also produce 25% of the nation's Niagra grapes and are second nationally in the production of wine grapes.

Nearly all our grapes are raised east of the Cascades.



4. Which is your favorite – grape juice, grape jelly, or fresh grapes? _____

Which one is better nutritionally?

FIRE

Did you know that fire can be beneficial? Prescribed or controlled burning of land is planned, monitored, and has a specific purpose. Controlled fires are used to reduce the buildup of fuel which could lead to uncontrolled, more serious, and possibly devastating fires. Fire is a natural part of the forest and grassland ecology. Controlling the extent and intensity of a fire can better promote the growth of trees, wildflowers, and other plants. **Controlled burning** also benefits the soil by returning more readily available nutrients.

Uncontrolled fires are usually unplanned and threaten to destroy lives, property, or natural resources. **Wildfires** are uncontrolled fires that destroy large areas of land and can cause damage to the soil and the environment. Wildfires burn so hot that they kill organic matter in the soil. Wildfires can be started by humans or by nature. Think of three ways people could be responsible for starting a wildfire and three ways nature may start a wildfire.



Earth Day is Every Day for Farmers & Ranchers!

Earth Day was first celebrated on April 22, 1970, and has been celebrated on the 22nd of April each year since. Farmers and ranchers celebrate the earth every day by protecting and conserving the Earth's resources all year round. Farmers and ranchers know that without plants - all humans, animals, and agriculture could not exist. Caring for the environment allows the needed renewable resources to continue to be produced now and into the future.



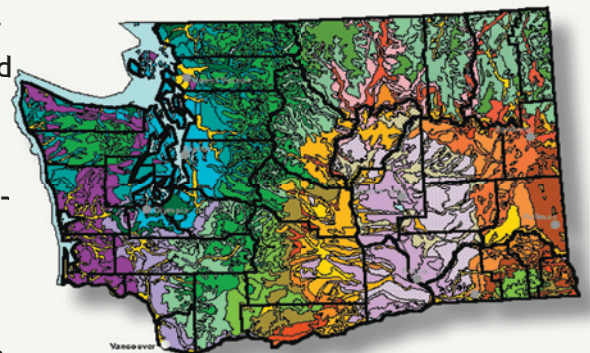
More than 90% of US farms are operated by individuals or families. Maintaining and improving the environment is necessary to keep the family business going. Today's farmers are restoring wetlands, reducing soil erosion, protecting wildlife, and generating far less waste than ever before. Every day is Earth Day for agriculture!

Tokul -- Washington State Soil

You probably already know that Washington's state flower is the Western rhododendron, the bird is the Willow goldfinch, and the tree is the Western hemlock, but did you know that we also have an official state soil, named Tokul? The name Tokul comes from a small community and creek in King County. The State of Washington has more than 1,000,000 acres of Tokul soils located on the western side of the Cascade Mountains, from south of Seattle north to the Canadian border.

Tokul soils are among the most productive soils in the world. These soils support conifer trees, which are the source of Washington's nickname, the Evergreen State.

Washington was the first state to recognize a soil that formed in volcanic ash (Andisols) as a state soil. Volcanic ash is one common feature of the soils throughout the state. These Andisols are used for crop production, timber production, livestock grazing, recreation, and watershed.





Learning about the Natural Resources Conservation Service together

By Ian Carver

NRCS-WA Public Affairs Specialist SPOKANE, Wash. – In the United States there's a little government agency that loves to help people help the Earth!

We are the Natural Resources Conservation Service! We work every day to help farmers, ranchers, and people who own forests by providing information and money they use to take better care of the Earth.



We focus on many important projects. One of our main jobs is to stop soil from washing away, a process called erosion. To do this, we teach farmers how to plant cover crops and use special harvesting styles that leave a part of the crop intact so it protects the soil from heavy rain and wind that could wash or blow it away.

Water conservation is another important part of what we do. We help farmers and ranchers use water better. One of the ways we do this is by replacing old sprinkler systems. New systems work better and save water, which is great for everyone!

We also care a lot about wildlife and the land and waters they call home. We help protect them by buying "easements", which is a fancy word to say we pay landowners money that protects the land for a certain period of time – or forever! This safeguards the homes of animals like salmon, birds, and large and small mammals. This is very important to us here in Washington, where salmon are a big part of our culture!

NRCS has offices all over Washington to make it as easy as possible for people to get the help they deserve. The goal is to work with all the good people across Washington to help the Earth, so future generations will be able to enjoy as beautiful a place as we have today.



Food is for Tasting Not for Wasting



Americans throw away about 25% of the food they bring home every month. And 40% of all food grown and produced in the US is never eaten. This includes food lost at the farm, food spoiled at the grocery store, leftovers on plates at restaurants and food thrown out in the trash at home and school.

HOW CAN YOU HELP?

Only take as much food as you can eat. Start with small portions and take more if you're still hungry

Pledge to eat fresh fruits and vegetables before they spoil

Donate food or volunteer at a local food bank or pantry

Participate in (or start) a school food waster reduction plan.

American Farm Bureau Foundation for Agriculture



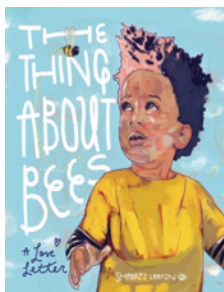
KIDS CORNER

We are Rylee (16), Nolan (10), Paislee (7), and Porter (5), and we live in Toutle in Cowlitz County. We enjoy raising and showing beef cattle and pigs. We raise mostly Hereford cattle with our family and we work together to feed and care for them. It's fun to watch the calves grow! Each of us have a beef animal and a pig we are training to show this year. For each animal we show we have to train them to cooperate in the show ring and make sure they are getting the best feed. Nolan bought his first breeding gilt and is looking forward to having piglets soon! Raising and showing the animals can be a lot of work but it is fun to show off our animals to other people and raise a good meat animal.



LIBRARY CORNER

The Thing About Bees



A love poem from a father to his two sons, and a tribute to the bees that pollinate the foods we love to eat.

"Sometimes bees can be a bit rude.

They fly in your face and prance on your food."

And yet... without bees, we might not have strawberries for shortcakes or avocados for tacos! Shabazz Larkin's *The Thing About Bees* is a Norman Rockwell-inspired Sunday in the park, a love poem from a father to his two sons, and a tribute to the bees that pollinate the foods we love to eat. Children are introduced to different kinds of bees, "how not to get stung," and how the things we fear are often things we don't fully understand.

Soil! Get the Inside Scoop

This book will help get kids excited about the living world of soil. Targeted for children aged 9-12, this 36-page, full-color book



explores how soil is part of our life—the food we eat, the air we breathe, the water we drink, the houses we live in, and more. Along the way, readers learn about different kinds of soil and meet the scientists who work with soil every day.