

TEACHER OVERVIEW

Watersheds

6th — 8th Grade

Nature Vision Student Packet

The materials contained within this packet for students have been created by Nature Vision, an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. This curriculum is designed to foster an understanding of the importance of water and its integral role in supporting life and shaping our planet. Packets can be completed by students either independently from home, or with the help of an adult caregiver. Materials for each day of the week build on the previous days' learning by offering a variety of activities that involve art, writing, and safe field exploration.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

This unit supports NGSS Performance Expectations across various disciplines, as well as supporting K-12 Integrated Environmental and Sustainability Standards. These are listed at the bottom of this page. Teachers will be supplied with PDF formats of materials to be emailed to families, or teachers may print and send to students to complete at home.

In this packet, students begin with an introduction to the concept of a watershed. After learning about watersheds and our place in them, they continue with an exploration of soil and erosion. Next, they will round out their watershed knowledge by investigating the living and non-living things found all around us in nature, including human-made objects. They will see examples of different habitats and ecosystems found within our local watersheds before completing their lessons with a focus on stewardship and water conservation.

If you have any further questions or concerns regarding this packet, please email our Office Coordinator at info@naturevision.org.

Grades 6-8

Supports NGSS Performance Expectations: MS-LS2-2, MS-LS2-5, MS-ESS3-3, MS-ESS3-4.

Grades 6-8
Day 1 - Watersheds 101
Day 2 - Soil and Erosion
Day 3 - Life in the Watershed
Day 4 - Watershed Connections
Day 5 - Stewardship

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PARENT/CAREGIVER OVERVIEW

Watersheds

6th — 8th Grade

Welcome to Nature Vision's student packet for home use. Nature Vision is an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. We are excited to be offering this version of our programming directly to students at home!

This packet is designed to be completed over the course of one week with each day focusing on a different aspect of environmental science and stewardship. The majority of these materials can be completed independently, but we thought it would be important to provide background information for any adults that may be helping to complete or answer questions. We've included the basic learning objectives for each day along with some vocabulary.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

Another great resource to learn about saving water and how to help our salmon and watershed is weneedwater.org. Check out the We Need Water webpage or on Instagram @WeNeedH2O to see how you can be part of this campaign! Challenge yourself to use #WeNeedWater to post all the things you are doing with your friends and family to conserve and protect water!

*Please contact info@naturevision.org with any questions or concerns
Stay connected with Nature Vision! Follow us for updates @naturevisionorg*



NOTE: Students may require support in reading directions and/or completing some tasks. While many activities in this packet are creatively oriented and open ended, you may consult the answer key located at the back of the packet for additional assistance or guidance.

Unless otherwise noted, images courtesy of freepik.com

PARENT/CAREGIVER OVERVIEW: DAY 1

Watersheds 101

Background Information: Watersheds are all of the land that water falls on and flows down to one low point. Everywhere you go on this Earth, you are in a watershed. From the bit of land that drains water into a tiny puddle, to all of the areas across the planet that eventually drain into the Pacific Ocean, water is always moving. Even person-made objects like buildings, cars, and roads are a part of watersheds and can have a big impact on the water they come into contact with.

Learning Objectives: Students will learn to define a watershed and identify the local watershed to which they belong. Students will make predictions about the impact of human activities on watersheds. They will discuss how their actions at home and school can have a negative or positive impact on the health of their own watershed.

Main Activity: Map Your Watershed

- **Overview:** Students map landmarks and answer questions based on their local watershed
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help your student post their #WeNeedWater challenge on social media

Optional Activity: Videos

- **Overview:** Students watch additional video resources to further their understanding of watersheds
- **Parent/Caregiver Tasks:** Watch with student and provide technical support as needed

PARENT/CAREGIVER OVERVIEW: DAY 2

Soil and Erosion

Background Information: Soil is an incredibly important part of the natural world, providing a home and nutrients to countless living things. Soil can be broken down into its individual parts: water, air, organic materials, and mineral particles. We can also categorize the mineral pieces based on their sizes into sand, silt, and clay, each of which interacts with water in different ways. When learning about water and soil, it is also important to consider erosion- when water scoops up loose soils and deposits them in another location.

Learning Objectives: Students will understand the significance of healthy soil in nature and will be able to identify the individual pieces that make up the soils around them. They will review images of both healthy and disturbed soil systems while learning to identify issues and come up with solutions.

Main Activity: Soil Problems

- **Overview:** Students compare healthy and unhealthy soil systems, identifying what went wrong and how to fix issues
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help your student post their #WeNeedWater challenge on social media

Optional Activity: Videos

- **Overview:** Students watch additional video resources to further their understanding of erosion
- **Parent/Caregiver Tasks:** Watch videos with student and provide technical support as needed

PARENT/CAREGIVER OVERVIEW: DAY 3

Life in the Watershed

Background Information: Our watersheds are home to countless living and non-living things, all of which come together to form what we call an ecosystem. Unfortunately, humans often have a negative impact on ecosystems and can cause severe damage. One seemingly small action can result in a series of issues for the environment, so we must be careful about how we affect the world around us. In order to address these issues, we can come up with plans and restoration projects that can help return the ecosystem to its natural, healthy state.

Learning Objectives: Students will review the concept of an ecosystem and the importance of all the living and non-living things that are a part of it. They will consider the impacts and results of human development in the watershed, and will be able to come up with effective solutions for addressing these issues.

Main Activity: Designing a Restoration Plan

- **Overview:** Using information provided on an assortment of native plants, students create their own designs for restoring various damaged ecosystems
- **Parent/Caregiver Tasks:** Assist with research or internet access if your student desires more information about the listed plants

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness of the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help your student post their #WeNeedWater challenge on social media

Optional Activity: Restoration Success Story

- **Overview:** Students watch a video detailing the reintroduction of wolves to Yellowstone, and think about similar situations here in Washington
- **Parent/Caregiver Tasks:** Watch video with student and provide technical support as necessary to find video links

PARENT/CAREGIVER OVERVIEW: DAY 4

Watershed Connections

Background Information: The watershed is not one single, uniform place. It is made up of multiple different habitats and ecosystems, each with its own complex network of biotic and abiotic elements. As water flows and living things move, they connect these different locations to one other. What happens in one environment high in the watershed can end up having significant impacts on a different environment elsewhere in the region. Therefore, it is incredibly vital that we consider the possible consequences of our own actions no matter where we go.

Learning Objectives: Students will become familiar with three significant ecosystems found in our local watersheds: wetlands, riparian zones, and estuaries. They will think about all of the ways that these separate environments are connected to each other within the watershed and will understand the importance of water in all of these various ecosystems.

Main Activity: Watershed Stories

- **Overview:** Students answer a writing prompt, telling the story of something in the watershed and how it travels between habitats and ecosystems, connecting to other parts of the environment as it moves
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness of the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help your student post their #WeNeedWater challenge on social media

Optional Activity: Watershed Community

- **Overview:** Students add natural and human made elements to a drawing of a watershed and consider how water flows through an environment and what things it may interact with it
- **Parent/Caregiver Tasks:** None

PARENT/CAREGIVER OVERVIEW: DAY 5

Stewardship

Background Information: Stewardship is how we care for the natural world. Environmental stewardship includes conserving natural resources (e.g. water) that all living things need to survive, thinking and acting carefully about how we interact with the world around us and doing our best to ensure that we positively impact the environment. Specifically, stewardship activities center around what students and families can do to save water and keep it clean for the rest of the environment.

Learning Objectives: Students will combine their knowledge gained throughout the week to consider ways they can support the environment. They will learn to focus on water conservation by thinking carefully about natural resource use.

Main Activity: Water Habits

- **Overview:** Students evaluate their daily water habits to discover if their choices have been a wise way to conserve water
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness of the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help your student post their #WeNeedWater challenge on social media

Optional Activity: Water Calculator

- **Overview:** Students calculate the amount of water they use in an online water footprint calculator quiz
- **Parent/Caregiver Tasks:** Provide technical support and supervision while helping to estimate the average amounts of water use

PARENT/CAREGIVER OVERVIEW: VOCABULARY

DAY 1

Estuary: The point where a freshwater lake or river meets saltwater

Precipitation: Falling rain, snow, hail or sleet

Water Cycle: A cycle that circulates water between our waterways, atmosphere, and land, it involves precipitation falling as rain or snow, accumulation of water, evaporation of water vapor back into the atmosphere, and condensation into clouds

Watershed: An area of land that allows water to flow off and drain into rivers, lakes, streams, and oceans

DAY 2

Clay: Super-fine mineral particles in soil

Erosion: The process by which water and weather move soil or rock from one place to another

Humus: The organic material in soil (comes from once-living things)

Minerals: Small pieces of rocks

Sand: Large mineral particles in soil

Silt: Small-sized mineral particles in soil

DAY 3

Ecosystem: A community of organisms and their environment

Habitat: The home of a plant or animal

Restoration: The act of repairing or fixing a damaged ecosystem

DAY 4

Abiotic: Something that is not and never was alive

Biotic: Something that is alive or came from a living thing

Diversity: Variety, in terms of traits of an organism or species of organisms present in an ecosystem

DAY 5

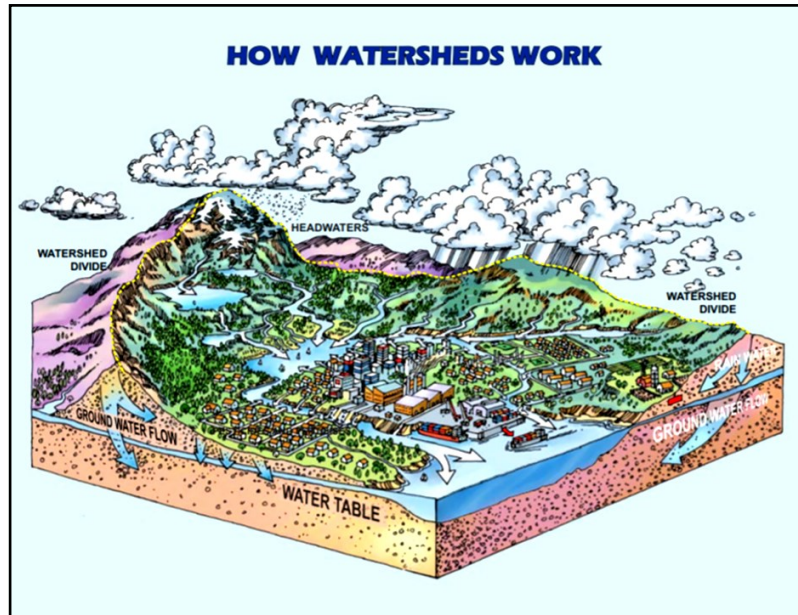
Conservation: Protecting the natural world, especially by making smart choices about what humans use and do with things in nature

Stewardship: Taking care of something; being a protector

DAY 1

Watersheds 101

A **watershed** is an area of land where water moves from a high source of land to drain and collect into lakes, streams, rivers, and oceans. A watershed is named as such to describe water *shedding* off the land and moving into bodies of water.



Watershed Model from Drain Rangers Curriculum

A watershed exemplifies how water is always moving! The **water cycle** is how the water in a watershed is naturally replenished. The rain and snow falls onto our mountains and moves from there in different ways. That **precipitation** is eventually absorbed into the ground, at which point it becomes groundwater. The precipitation also feeds our surface water such as rivers and lakes. Groundwater and surface water are both important parts of a watershed. The water becomes our drinking water, connects with smaller and greater watersheds, and flows through our cities.

A watershed not only defines how our rivers, lakes, and oceans collect water – it defines our home. We all live in a watershed! Our cities, and everything within our cities, belong to a specific local watershed. Our local watersheds all begin as rain and snow melt flowing downward from the Cascade Mountains.



There are six different watersheds in King County, Washington:

1. Snoqualmie - Skykomish River
2. Lake Sammamish
3. Cedar River – Lake Washington
4. Green – Duwamish River
5. White River
6. Puget Sound



All of these watersheds are connected as they all start in the Cascade Mountains and will eventually drain into the same place: the Puget Sound. The Puget Sound is the inland sea of Washington and is also called the Salish Sea. The Puget Sound is categorized as an **estuary**, where freshwater lakes and rivers meet saltwater. Puget Sound is the third largest estuary in the United States and is an important place for many species of plant and animal life. The Puget Sound is the great watershed that encompasses our entire region, joining the smaller watersheds together so all that live within this diverse area can benefit from the land and water. Even if you might not live next to Puget Sound, your daily actions have an impact to the health of our connected watersheds.

Vocabulary:

Estuary: The point where a freshwater lake or river meets saltwater

Precipitation: Falling rain, snow, hail or sleet

Water Cycle: A cycle that circulates water between our waterways, atmosphere, and land, it involves precipitation falling as rain or snow, accumulation of water, evaporation of water vapor back into the atmosphere, and condensation into clouds

Watershed: An area of land that allows water to flow off and drain into rivers, lakes, streams, and oceans

Main Activity

Map Your Watershed

Identifying the local watershed you live in will help better your understanding of the different watersheds in our region but also build a connection to your own. Using the King County Watershed maps on the next pages, answer the following questions.

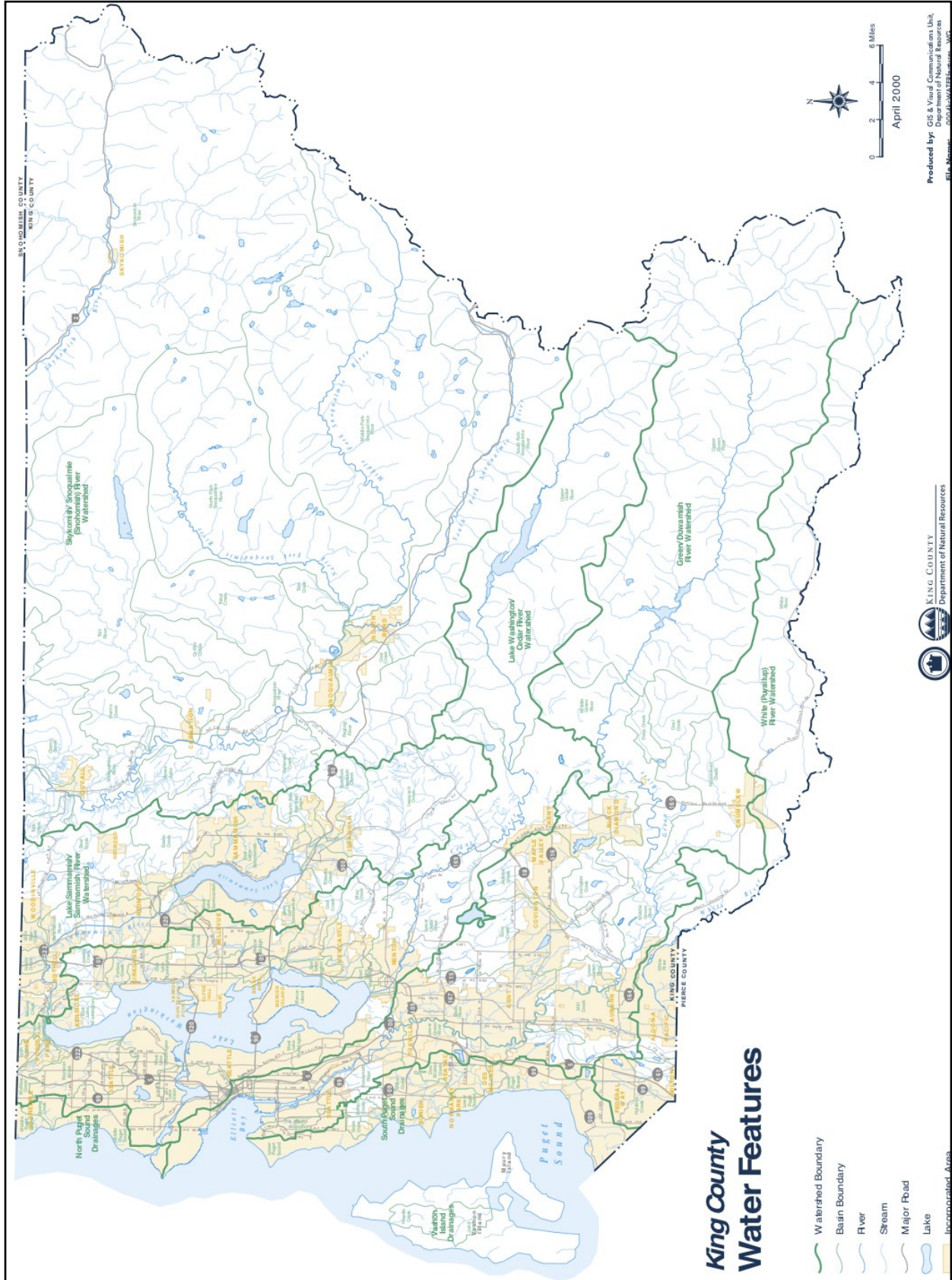
Materials Writing utensil

1. Circle your city on the map.
2. In which watershed do you live? _____
3. Is your school part of a different watershed? *Circle one:* Yes No
4. Why do you think your watershed is named the way it is?

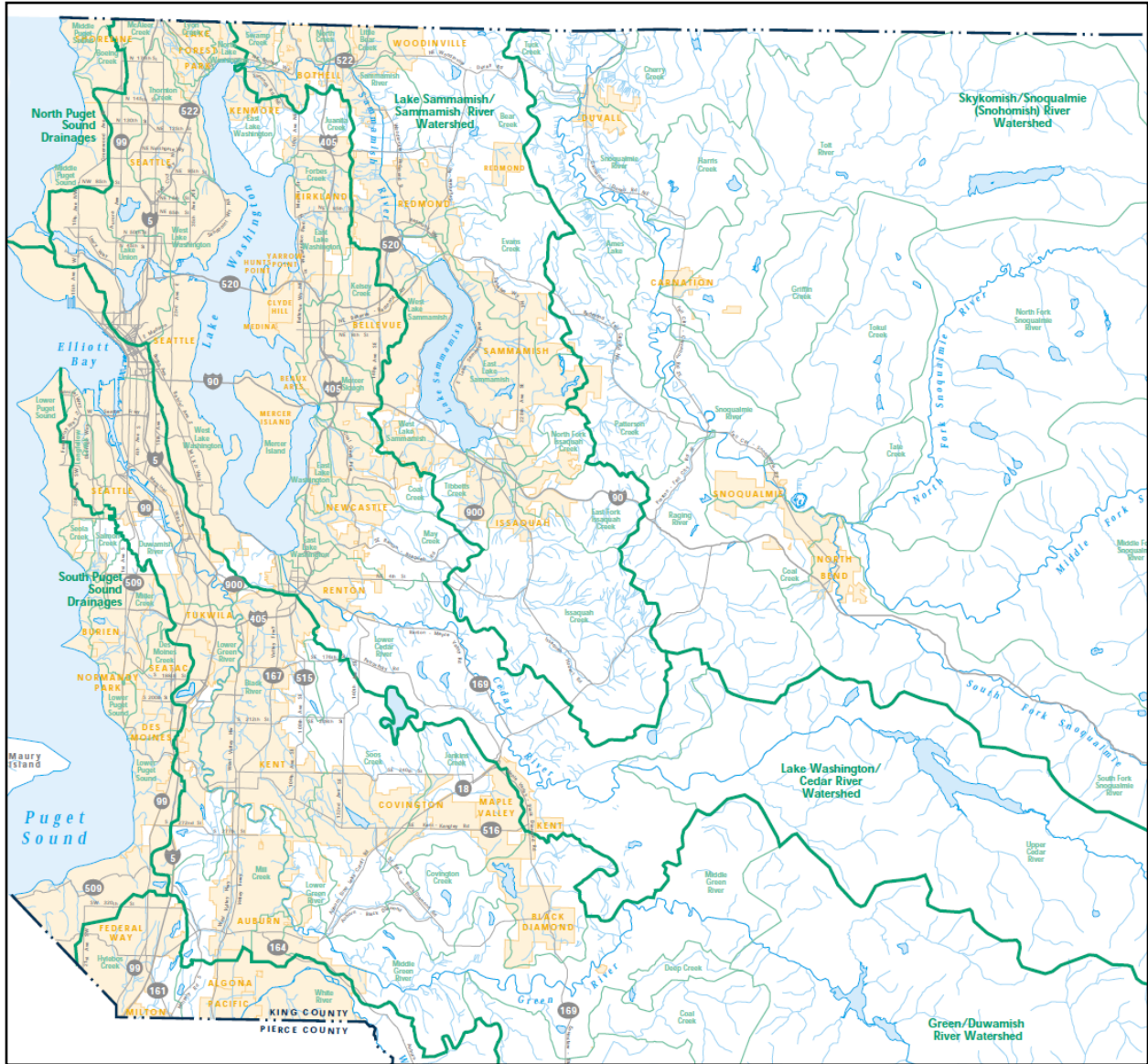
5. Are watersheds defined by city or county boundaries? *Circle one:* Yes No
6. What are the two closest watersheds to your watershed?
 - _____
 - _____
7. List three cities that also are part of your watershed.
 - _____
 - _____
 - _____
8. Locate and write an X on *Lake Washington*.
9. Which large river drains into Lake Washington? _____
10. Locate and draw a heart on *Green Duwamish River Watershed*.
11. Follow this watershed's large river, where does it drain into? _____
12. Is it connected to Puget Sound? *Circle one:* Yes No
13. Which one is a smaller body of water, Lake Washington or Lake Sammamish? *Draw a triangle over the smaller one*
14. Are all watersheds that same size? Why or why not?

15. **BONUS:** Label the location of the Cascade Mountains on your map.

Full King County Watersheds Map



Partial King County Watersheds Map: Local Watersheds



Optional Activity

We Need Water Challenge

Our watersheds provide the water that wildlife and people need for survival, and for exercise and recreation. Do you have a favorite place to enjoy the water near you? Sometimes we don't know where the closest body of water is, where the water comes from, where it goes, or how we might be affecting it.

Materials: Writing utensil, crayons/markers/colored pencils, computer/phone/tablet, internet

Do you know what the closest stream, river, pond, or lake near you is? Today's #WeNeedWater challenge is to find out about our local watershed! Watersheds are connected. Think about the impact you might have on the water as it moves through the watershed. With an adult, do some research on our local watersheds using a mapping website like this one: <https://www.kingcounty.gov/services/environment/watersheds.aspx>. The website takes you to a page that shows an interactive watershed map of the image below. Click on the specific watersheds and it will lead you to a webpage that tells you more about each watershed. Find your watershed and list two specific facts you learned about it!

- 1.
- 2.

If you can't go online, draw your own model of this watershed map below! Include all six watersheds in King county.



To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Videos

Please ask for an adult's permission to watch these videos.

There are lots of other resources online to complement your learning. Below are two videos that help you learn even more about watersheds!

Video #1: What's a Watershed?

This video can be found by doing a YouTube search for "What's a Watershed?" or by following this link:

<https://www.youtube.com/watch?v=f63pwrMXkV4>

Video #2: Watershed Address

This video can be found by doing a YouTube search for "Watershed Address" or by following this link:

<https://www.youtube.com/watch?v=f63pwrMXkV4>

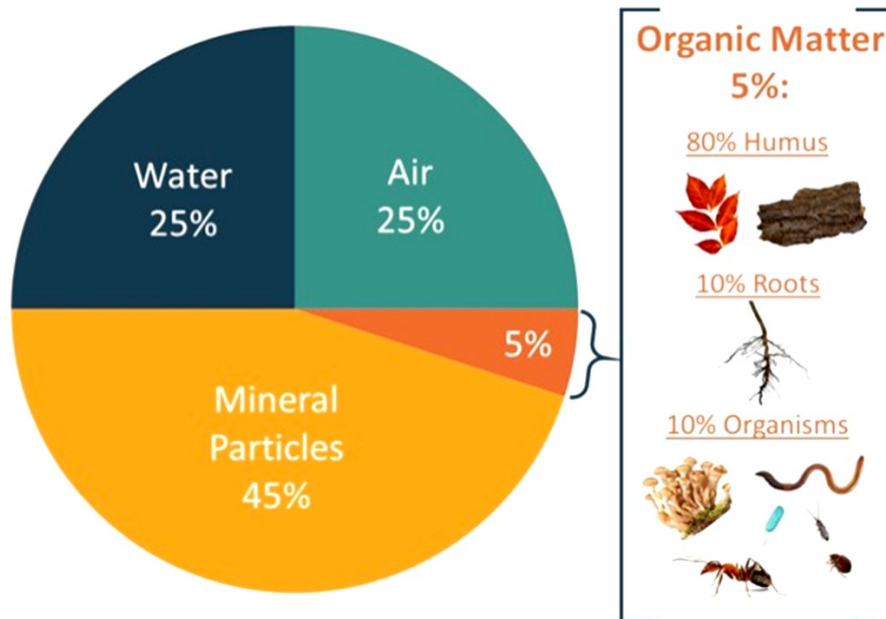
Materials: Computer/phone/tablet, internet connection

DAY 2

Soil and Erosion

What is a watershed actually made of? Water, rocks, plants, animals, and all kinds of other things that come together. One of the most important pieces, however, is soil. Soil provides the foundation for many of the living things in nature, and because of that it is extra important that we be able to keep it healthy. If we were to create a recipe for the best possible soil here in our local watershed, this is what it might look like:

Healthy Soil

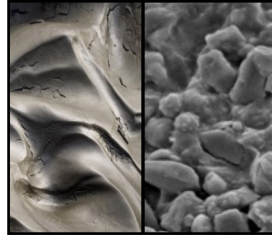


There are living things in the soil that need air and water just like the rest of us. If you were a worm, would you be happy if your soil was dried up and packed tight? Probably not! Most of the soil, however, is made up of **minerals**; for our purposes today you can think of minerals as tiny pieces of rocks that help provide the structure of soil. The last 5% of soil is made up of all things that are either living now or came from living things. **Humus** consists all of those pieces from once-living organisms, like fallen leaves, rotting fruit, or even dead animals and eventually will provide most of the food or nutrients for plants in the soil.

Let's take another look at the portion of soil that contains mineral particles because there are lots of different forms that this can be found in. We can create categories based on the size of these mineral particles:



Sand is what we call the biggest pieces of minerals that might be found in our soil; these particles are larger and poor at holding onto water as it flows through the watershed.



Silt is what we call mineral particles that are smaller, so tiny that we need a microscope to see the individual pieces of them. Silt is pretty good at holding water.



Clay is the term for the smallest possible particles, and it is incredibly good at holding water in place like a thick, heavy sponge.

While every plant is unique and some might prefer one specific kind of soil over another, most of the time the best soil has an equal mix of sand, silt, and clay. This lets the soil hold on to water like a sponge, without getting completely soaked and never letting the water drain away. But water doesn't just soak into soil; sometimes water overpowers it! When you have a lot of water flowing at once (as we often do here in Washington), that water can pick up soil and carry it along with it. We call this process **erosion**, and over time it can change the entire landscape of the watershed.

Plants can help fight erosion by holding the soil in place with their roots. This is just one of many ways that the living and non-living parts of a watershed work together to keep water flowing as it should.

Vocabulary

Clay: Super-fine mineral particles in soil

Erosion: The process by which water and weather move soil or rock from one place to another

Humus: The organic material in soil (comes from once-living things)

Minerals: Small pieces of rocks

Sand: Large mineral particles in soil

Silt: Small-sized mineral particles in soil

Main Activity

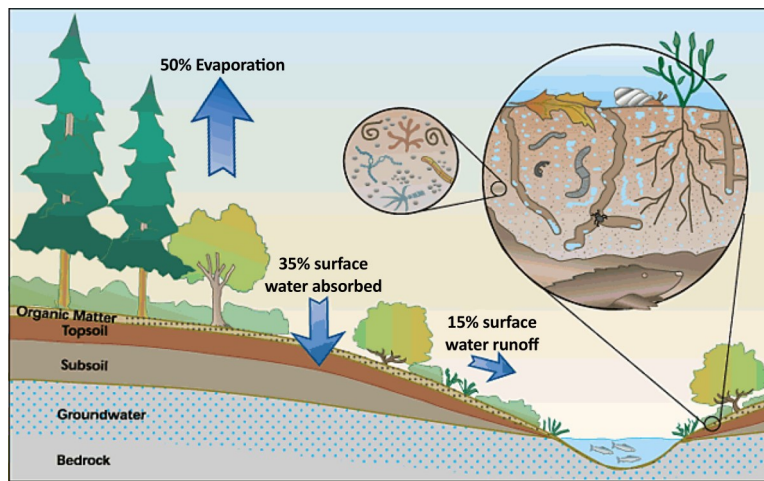
Soil Problems

You have seen how important soil is, but what exactly happens when things go wrong? The actions of people can have very large consequences on the soil around them in the watershed. As water flows, it passes through, over, and around the soils and changes everything as it goes!

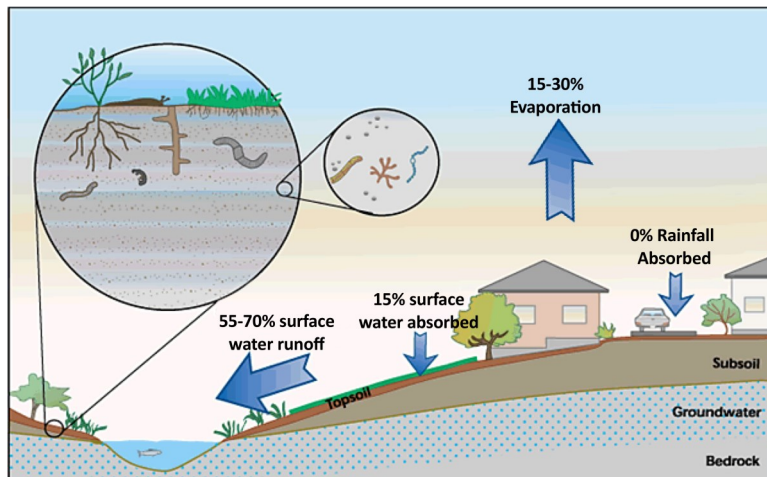
Materials: Writing utensil

Below you will see two pictures. One picture shows a healthy and natural area, while the other shows a disturbed or disrupted area. Review both pictures and answer the questions on the following page in order to figure out exactly what is going on with this soil.

Picture 1:



Picture 2:



Questions:

1. *How much of the water soaked into the soil in Picture 1?*

2. *How much of the water soaked into the soil in Picture 2?*

3. *How might this affect some of the living things (plants and animals) in the soil?*

4. *How much water flowed over the top of the soil in Picture 1?*

4. *How much water flowed over the top of the soil in Picture 2?*

6. *What could happen to the soil because of all that extra water flowing over it?*

7. *Which picture would have a greater and diverse population of aquatic (water-based) life? Why do you think this is?*

8. *Look at the zoomed-in portion of each picture that shows a close up of the soil. What changed from Picture 1 to Picture 2? Describe all of the differences that you notice.*

9. *You are now in charge of improving the water and soil quality in Picture 2. What are your recommendations for fixing the problems that you have identified so far?*

Optional Activity

We Need Water Challenge

Water is always on the move, but sometimes the things we build get in the way. For today's #WeNeedWater challenge, look for examples of human impact on your local watershed.

Materials: Writing utensil, crayons/markers/colored pencils

Have humans built anything that is harmful to nature or the way water flows? Have they built anything that is helpful for plants, animals, or water? You can search inside of your home, or you can look outside your window to find something. If you can go for a walk outdoors with an adult to look, please make sure you are safe, responsible, and respectful. Write down 3 objects that you find, and explain how they each are affecting the flow of water through the watershed:

1.

2.

3.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Videos

Please ask for an adult's permission to watch these videos.

There are lots of resources online to help you learn more about soil and the awesome power of water. Check out these videos!

Video #1: Erosion and Soil

This video can be found by doing a YouTube search for "Erosion and Soil" or by following this link:

<https://www.youtube.com/watch?v=im4HVXMGI68>

Video #2: How was the Grand Canyon Formed?

This video can be found by doing a YouTube search for "How was the Grand Canyon Formed?" or by following this link:

https://www.youtube.com/watch?v=-v_RLRT9930

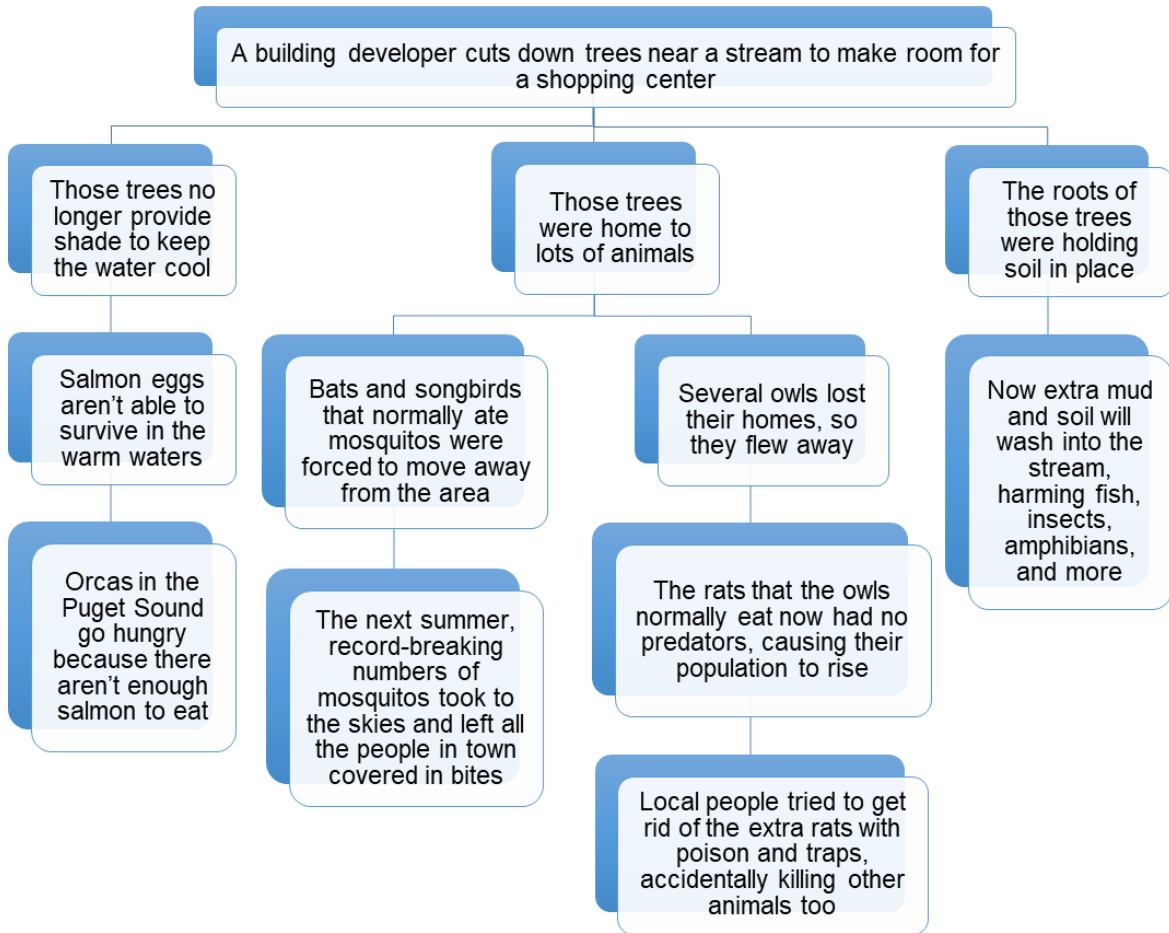
Materials: Computer/phone/tablet, internet access

DAY 3

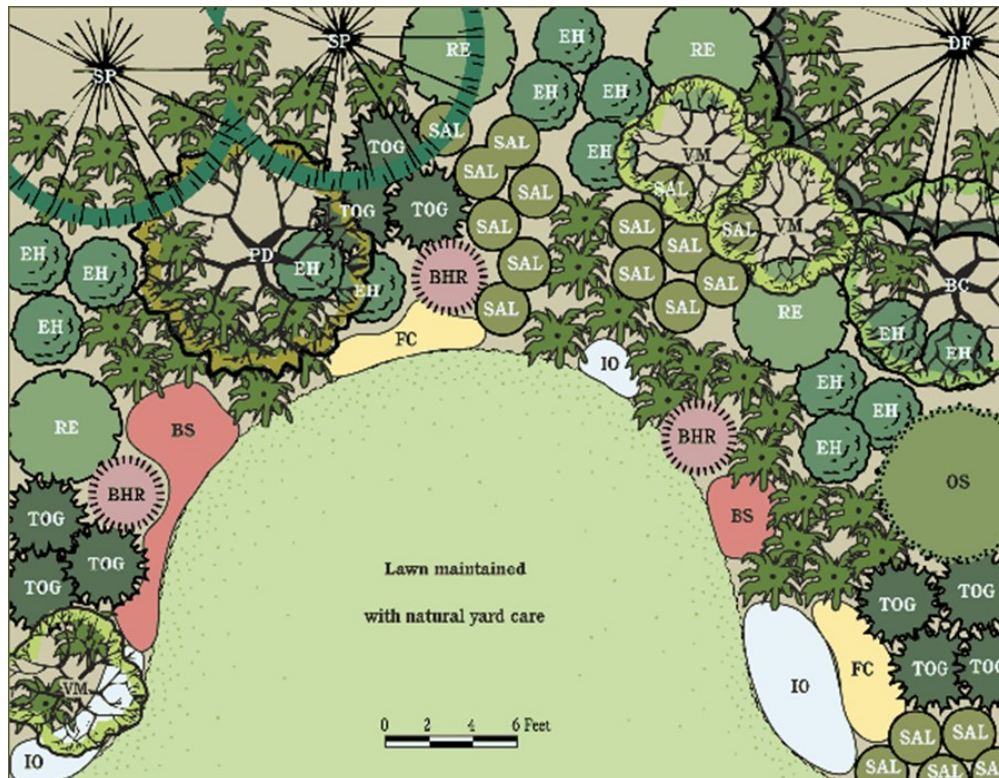
Life in the Watershed

It is important to remember that a watershed is much more than just a pile of rocks and dirt that water falls on; it is also a home and **habitat** for countless living things! Every organism in the **ecosystem**, from microscopic bacteria to gigantic trees, all play an important role in keeping the environment healthy, clean, and safe.

When everything is working as it should in the watershed, there is a natural balance between all of these living and non-living things. Because all of these organisms are connected in lots of different ways however, small actions can end up having big consequences. Let's take a look at one possible scenario:



When an ecosystem in nature gets damaged, it might be in need of **restoration**. Restoration simply means fixing up and repairing the natural environment, often by reintroducing native plants and animals to the area. There are lots of things to consider when choosing the right plants, however; we don't want to accidentally make things worse by putting the wrong plant in the wrong place! To help avoid this we can learn more about individual plants and use that knowledge to come up with a restoration plan, kind of like a map that shows us where each plant should go in the ecosystem. Here is an example of a professional restoration plan:



There is a lot going on there! Every item in this image is like one piece of a natural puzzle, with each item representing a single plant. For example, the small circle with 'TOG' refers to a plant called 'Tall Oregon Grape,' while the larger items labeled 'SP' refer to a tree known as 'Shore Pine.' Put together in one single location, these plants form the foundation for a healthy and wonderful ecosystem!

Vocabulary:

Ecosystem: A community of organisms and their environment

Habitat: The home of a plant or animal

Restoration: The act of repairing or fixing a damaged ecosystem

Main Activity

Designing a Restoration Plan

There are lots of living things in your local watershed, relying on plentiful water and everything else that the ecosystem provides. Sadly, not every location throughout the watershed is as healthy as we would like; some are in need of repair, or restoration. For this activity we will focus on the plants that are found in our area, and we will use that information to help us design some restoration plans!

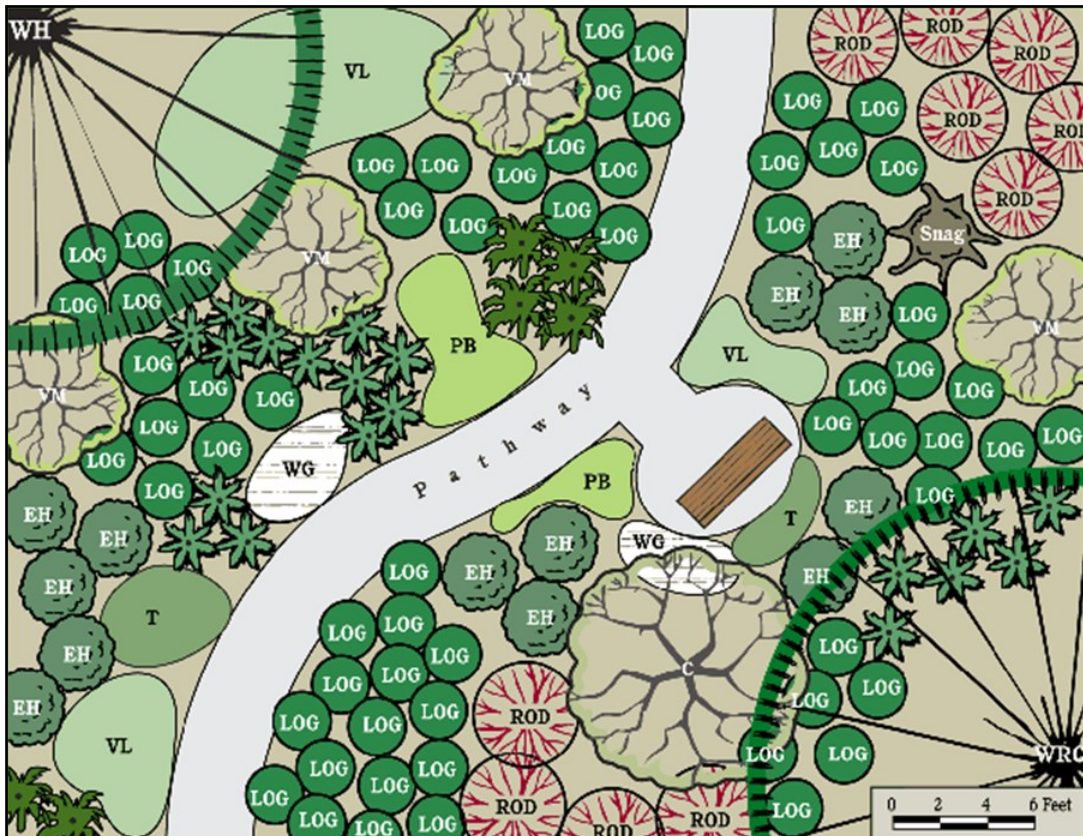
Materials: Writing utensil, crayons/markers/colored pencils (optional)

Using the information on the next few pages, you are going to come up with plans for fixing up or restoring a few different locations.

HINTS:

- It is usually a good idea to group small plants together with others of the same kind.
- If you want to be able to see all of your plants, make sure to put the small ones in front and the big ones in back!
- When choosing plants to put near a big tree, try to find ones that don't need much sun. Some trees can act like a giant umbrella, creating a lot of shade!

When you're finished it might look something like this, but with fewer plants:



PLANT LIST

	Plant Name	Sun Needs 1=Little 2=Some 3=LOTS	Water Needs 1=Little 2=Some 3=LOTS	Size S=Small M=Medium L=Large	Flowers?	Fruit?
Trees	Vine Maple (VM)	☀	6	M	No	No
	Bigleaf Maple (BM)	☀☀	6	L	No	No
	Madrona (MAD)	☀☀	6	L	No	No
	Paper Birch (PB)	☀☀	66	L	No	No
	Pacific Crabapple (PC)	☀☀☀	666	M	Yes	Yes
	Douglas Fir (DF)	☀☀☀	66	L	No	No
	Shore Pine (SP)	☀☀	66	M	No	No
	Quaking Aspen (QA)	☀☀☀	66	M	No	No
	Western Red Cedar (WRC)	☀	66	L	No	No
Shrubs/ Bushes	Beaked Hazelnut (BH)	☀☀	66	M	No	No
	Oceanspray (OS)	☀☀	66	M	Yes	No
	Tall Oregon Grape (TOG)	☀☀	66	M	Yes	Yes
	Low Oregon Grape (LOG)	☀	66	M	Yes	Yes
	Bald Hip Rose (BHR)	☀☀	66	M	Yes	No
	Black Cap Raspberry (BCR)	☀☀☀	66	M	Yes	Yes
	Rhododendron (RHO)	☀	66	M	Yes	No
	Thimbleberry (THM)	☀☀	66	M	Yes	Yes
	Salmonberry (SB)	☀☀	666	M	Yes	Yes
	Red Huckleberry (RH)	☀	66	M	Yes	Yes
Small plants/ Groundcover	Columbine (COL)	☀☀☀	666	S	Yes	No
	Douglas Aster (DA)	☀☀☀	66	S	Yes	No
	Salal (SAL)	☀	66	S	Yes	Yes
	Camas (CAM)	☀☀☀	66	S	Yes	No
	Bleeding Heart (BLH)	☀	66	S	Yes	No
	Swamp Lantern (SL)	☀	666	S	No	No
	Cattail (CAT)	☀☀☀	66	M	No	No
	Trailing Blackberry (TB)	☀☀	66	S	Yes	Yes
	Dagger-leaved rush (DLR)	☀☀☀	666	S	No	No
	Sword Fern (SF)	☀	66	M	No	No
	Goldenrod (GOL)	☀☀☀	66	S	Yes	No
	Wild strawberry (WS)	☀	66	S	Yes	Yes
	Silverweed (SIL)	☀☀☀	666	S	Yes	No
	Foam flower (FF)	☀	666	S	Yes	No
Stream Violet (SV)	☀	666	S	Yes	No	
Yellow Monkey Flower (YMF)	☀☀	666	S	Yes	No	

Site 1:

This site was once a pasture filled with native plants. Cows were brought in to graze. Now the pasture is empty as the cattle ate all of the native plants and there is a lot of exposed soil. There is a small stream running along the side of the field, but all of the uncontained soil keeps washing into it and harming the organisms in the water. Using the plant information on the previous pages, come up with a design for turning this empty field into a healthy watershed ecosystem full of different native plants! Be sure to include:

- Large plants for shade and shelter
- Small plants for covering the ground and holding soil in place
- Water-loving plants near the stream

Site 2:

The owner of this property wants to create an animal-friendly garden space. They want to include plants that can provide shelter and homes for birds, berries and fruits for visiting creatures, and lots of flowers for bees and butterflies. Check your list of plants, and make sure to include:

- At least 2 large plants for shelter and habitats
- At least 3 plants that produce fruit or berries
- At least 3 plants that produce flowers

Site 3:

The local city council has asked you to design a new park! They want to have some wide-open grassy areas, with plenty of trees for people to rest under. They also want a border made of bushes and smaller plants to go along the side of the path that passes through the park, as well as some plants around the edge of a small pond. Be sure to include:

- At least 3 kinds of trees for shade
- At least 3 smaller plants or shrubs for the side of the trail
- Water-loving plants for the edge of the pond

Optional Activity

We Need Water Challenge

Did you know leaks can waste hundreds of gallons of water a week in your home? Leaky toilets are usually the reason why! Leaky toilets sometimes go unnoticed so they are less likely to be fixed. Testing your toilet for a leak is easy.

Materials: Writing utensil, crayons/markers/colored pencils, computer/phone/tablet, internet access, food coloring or powdered drink mix

With an adult, go and check your toilet for a leak by following these 5 steps. You will need food coloring or powdered drink mix.

**Make sure you are doing these steps with an adult and have permission!*

1. Carefully remove the toilet tank lid and place it somewhere sturdy like the ground. *It can be heavy!*
2. Place 10 drops of food coloring or powdered drink mix into the tank water. *Do not flush.*
3. Carefully pick up the lid and place it back on the tanks. *Do not flush*
4. The image below says wait till next morning but usually 15 minutes is enough time to tell if your toilet has a leak
5. If you see color in your bowl, then your toilet has a leak!



Take a video or picture of you and an adult testing your toilet for a leak. For your caption you could write; "Testing our toilet for a leak was easy! A leaky toilet wastes hundreds of gallons every week. Test your own toilet by putting 10 drops of food coloring into the tank water. Don't flush and wait to see the color in your bowl. If there is color in the bowl, your toilet has a leak!"

A leaky toilet can be easy to fix as well! The toilet flapper might be old and needs to be replaced. This is a great video showing you how to "Replace Your Leaky Toilet Flapper" on Youtube. **Check the following video out with an adult** if your toilet is indeed leaking!

<https://www.youtube.com/watch?v=TPeViXlgOPE>

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Restoration Success Story

Let's take a look at one amazing restoration success! All around the world, small changes to the environment are leading to amazing results.

Materials: Writing utensil, computer/phone/tablet, internet access

Wolves in Yellowstone

This video tells us all about the reintroduction of wolves into Yellowstone National Park, showing us how the addition of one kind of animals was able to restore the entire ecosystem to a much healthier status. You can find this video by doing a YouTube search for "How Wolves Change Rivers" or by following this link:

<https://www.youtube.com/watch?v=ysa5OBhXz-Q>

Think about our own ecosystem here in Washington. Salmon, bears, bald eagles, orcas, and more all call our region home. Choose a local animal and explain what would happen if one of them became locally extinct.

Salmon are very important to our environment. If the salmon in our state all disappeared, how would you go about reintroducing them to the ecosystem?

DAY 4

Watershed Connections

A watershed is not one single ecosystem but it is made up of many different **abiotic** (non-living) and **biotic** (living) factors. We learned on Day 1 that water continually moves through a watershed. Yesterday we learned that the water interacts with the soil in a watershed. The water, land, and soil, these are examples of abiotic components of a watershed. The living or biotic components are the animals and plants that rely on the water that is held by the watershed. The water is held in various ecosystems, such as wetlands, riparian zones, and estuaries. We will discuss each of these ecosystems, explain their similarities, differences, and how they connect with one another in a watershed.

Wetlands: A wetland is an area of land that is wet for majority of the year. Wetlands can be known by many different names: sloughs, marshes, ponds, or swamps to name a few. Though each type of wetland may have differing qualities, these wetlands all share three similarities:

1. A wetland needs to, of course, have water!
2. A wetland needs to have wet soil.
3. A wetland needs water tolerant plants. Plants that love water will be found growing from wetlands. Plants such as willows, cattails, and skunk cabbage are all common wetland plants.

Wetlands provide food and habitat for wildlife. They also act as a sponge! Like a sponge, wetlands soak up extra rainwater so it doesn't flood our waterways at once and increase erosion.



Riparian Zones: A riparian zone is where trees and plants line the sides of rivers and streams. A riparian zone serves many functions in a watershed. A variety of aquatic animals travel through the rivers and streams spread out in our watershed in search of an adequate food supply and proper nesting space. The roots of trees and plants hold the soil in place to prevent erosion of the river and stream bank. The vegetation hanging over the moving water will provide shade and keep the water cool for the many fish and other aquatic life that depend on low water temperatures.



Estuaries: As a reminder, an estuary is where freshwater meets saltwater. Wetlands and riparian zones of our watersheds contain freshwater. An estuary will be a mix of saltwater coming in from the ocean with the freshwater coming down a watershed from rivers and streams. Puget Sound is the largest estuary in Washington, and it is also the third largest estuary in the United States. There are over 2,000 rivers and streams that flow into this giant estuary. In Puget Sound, you will find marine plants and animals, and 211 fish species alone! Iconic animals like the Southern Resident Orcas and Pacific Salmon also travel through Puget Sound. Most of our rivers and streams drain into Puget Sound. What happens in our upper watershed, in our wetlands and riparian zones, will have a deep impact on the health of our great estuary.



Wetlands, riparian zones and estuaries are vital ecosystems that can be found sustaining the **diversity** of life in our watersheds. Each of these ecosystems are found throughout our watersheds. These places may be defined differently, but they all connect the water that flows down our watershed. Wetlands, riparian zones, and estuaries define how water moves and is stored for all to use in our watershed.

Vocabulary

Abiotic: Something that is not and never was alive

Biotic: Something that is alive or came from a living thing

Diversity: Variety, in terms of traits of an organism or species of organisms present in an ecosystem

Main Activity

Watershed Stories

There are a lot of interesting things happening all around the watershed that we don't often think about. Both living and non-living things are constantly on the move in nature. Plants spread their seeds, animals migrate and hunt, water flows, and rocks tumble and break. They travel from ecosystem to ecosystem, from wetlands to riparian zones to estuaries and back again; they may even wind up in areas or ecosystems that we haven't even talked about!

Materials: Writing utensil

Write a short story describing the journey between the different ecosystems in our watershed. For your main character, think about all of those things that travel and move around in nature. You can choose something living or non-living, natural or human-made; it's entirely up to you!

If you're having trouble thinking of what to write, you might find inspiration by asking yourself the following questions:

- *Who or what is your main character?*
- *How are they able to move from ecosystem to ecosystem? Do they stay in the same form the whole time, or do they change?*
- *Why is your main character moving? Do they move on their own, or are they carried and pushed by some other force?*
- *What other parts of the ecosystem do they interact with along the way? How are they connected to the rest of the watershed?*
- *Do they fit in well in one particular ecosystem? Why or why not?*

Feel free to use the writing space on the next pages to compose your story.

A large rectangular area with a black border, containing 25 horizontal lines for writing.

A large rectangular area with a black border, containing 25 horizontal lines for writing.

Optional Activity

We Need Water Challenge

We have learned that wetlands are an important ecosystem of watersheds. Wetlands are areas of land that are wet for the majority of the year. They can be called ponds, marshes, sloughs, swamps, and bogs. Wetlands might be named differently but they all have the same three components: wet soil, water tolerant plants, and water.

Materials: Paper, writing utensil

If you can, with an adult go and find a wetland in your neighborhood or at a nearby park that is walking distance. Together, find and identify at least one of these three water tolerant plants below. Make sure you and your adult watch from the trail or pavement and you don't bother plants or wildlife. Remember, a wetland is their home. Be safe, responsible, and respectful when outdoors.



Cattail



Skunk Cabbage



Duck Weed

If you can't go outside, draw a simple model of a wetland. In your model, include the three components of a wetland: wet soil, water tolerant plants, and water. Think of the components as layers. What goes at the bottom of a wetland? What would in the middle? Where would the water go? Remember that a wetland is land that is wet, has wet soil, and water tolerant plants.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

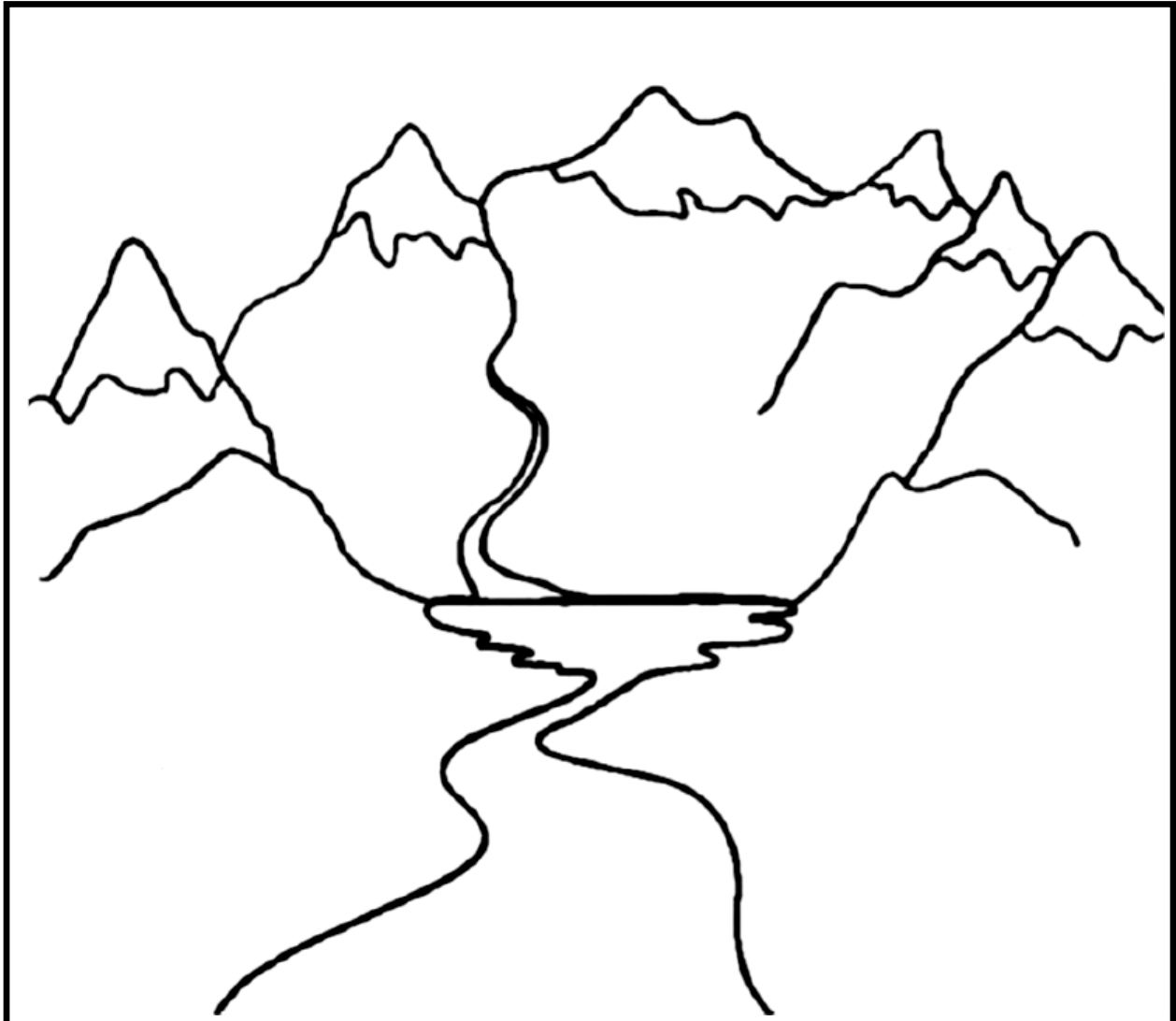
Optional Activity

Watershed Community

You've spent time thinking about how water moves through a watershed, and how it interacts with plants, animals, and people. Now you can create your own watershed community!

Materials: Writing utensil, crayons/markers/colored pencils

Using the template below, include natural elements such as plants and animals. Also include human elements, such as buildings, vehicles, streets – they are also a part of a watershed! Try to include things you've observed and experienced in your everyday life, or things that you know are a part of your watershed, like salmon, even if you've never personally seen them. Include at least 5 different natural elements and 5 different human elements. Think about how these would impact water and one another.



DAY 5

Stewardship

A lot has been covered this week on watersheds! It is important to put that knowledge into action. Now is the time to combine everything that we learned and to find a way to make a difference.

Water is a shared resource. Which means it is something that humans, wildlife, plants, and all living things in our watersheds rely on to survive. When we use water wisely, it positively impacts the water in our watershed. To use water wisely we must think of **stewardship** and **conservation**.

Stewardship means to take care of our natural resources, such as water. A steward is someone who is responsible for the care of our natural resources. Conservation is one of the many ways that we can help our watershed, by limiting or lessening the impact that people have on our natural resources.

One way we can be stewards for our watershed is to be mindful of water conservation in our daily habits!

Vocabulary

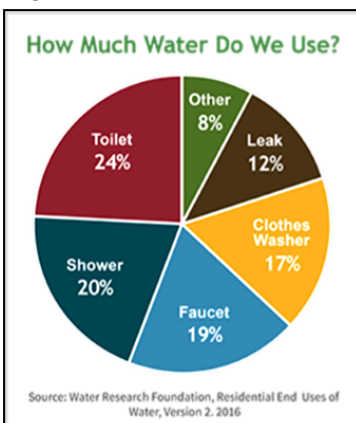
Conservation: Protecting the natural world, especially by making smart choices about what humans use and do with things in nature

Stewardship: Taking care of something; being a protector

Main Activity

Water Habits

On average one American household uses around 100 gallons of water every day inside their homes for their daily needs. 100 gallons is a large amount of water. We use this water for different purposes – such as the 24% of this 100 water gallons just for flushing the toilet! Using water wisely with our daily habits will make sure we do not waste any of this water. We all know water is an important resource that comes from our **watersheds** and is shared with all living things.



Materials: Writing utensil

Let's see how your water habits align with wise water conservation habits.

1. Place an X on the line next to the statement if that is a wise water conservation habit that you follow
2. When you finish answering all the statements, add up the number of X's
3. The number of X's determines your wise water conservation habit score!

____ You take short showers between 5-10 minutes.

Long, hot showers waste five to ten gallons of water every minute. If you've never tried, time yourself taking a shower and see how long you take.

____ You have an efficient showerhead

Changing out a standard showerhead for an efficient showerhead can save almost 150 gallons a month if your family takes one daily 10-minute shower.

____ You turn off the faucet while brushing your teeth.

There is no need to keep the faucet running while you brush your teeth. You could be saving around 2 gallons of water every minute you are brushing.

____ You only run the dishwasher when it's fully loaded.

Dishwashers use less water than washing by hand. Making sure it's full will not only save water but electricity too.

_____ You have a faucet aerator

A faucet aerator is a mesh screen that you screen onto the end of your faucet. The aerator mixes air into the water so that less water flows out of the faucet.

_____ You check for faucet and toilet leaks

Leaks add up! A leaky toilet can waste around 200 gallons a day. Don't ignore that dripping faucet, if you let it run for the entire year – one drop every 2 seconds wastes more than 1,000 gallons per year. Fix those leaks!

_____ You water your lawn or garden in the morning or at night

Watering your plants when the sun is low makes sure that the water doesn't all evaporate with the heat. The cool temperature of the morning or night will allow the water to stay on the ground longer.

_____ You water your plants close to the roots

Your plants' roots are where they absorb water. Watering their leaves, flowers, or anywhere else besides close to the ground where the roots are wastes water.

_____ You use drip irrigation to water your plants

Drip irrigation tubes are thin hoses that can be placed right next to the roots in the ground or run on the surface close to the ground. This type of hose drips water slowly into or onto the ground so that the plant is able to absorb water more efficiently.

_____ You add compost or mulch to the your garden and plant beds

Mulch or compost is natural material you add on top of your plants to help keep the moisture in the soil. The more moisture there is in the soil, the less water you need to water your plants.

How many X's?

1-3 X's = Your water conservation needs a little work. What a great opportunity to discuss with your family and friends what you all can adapt to help save water!

4-7 X's = You know many wise water conservation habits. What are some wise water conservation habits did you miss and could start thinking about doing today?

8-10 X's = You are a water conservation expert! Share your expertise with your family and friends to make sure they practice wise water conservation habits!

Optional Activity

We Need Water Challenge

There are so many ways to save, protect, and care for our water. At the end of every daily lesson, we will be giving a challenge to help you show off what you've learned.

Materials: Writing utensil, colored pencils/markers, computer/phone/tablet, internet connection

Using what you've learned this week, and the other #WeNeedWater challenges you've done, it's time to get creative! Create a challenge you can pose to those in your household, to your friends, to your community, or to a broader audience on the internet through social media. Think about each topic the packet covered this week and try to incorporate at least one aspect of it in your challenge.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Water Calculator

We've discussed how the conservation of our water supply is important. We know that one American household uses a lot of water every day for a variety of purposes. Let's take a closer look at how much water we use – not only through indoor and outdoor activities at home – but also with the goods we buy. This overall water use is your *water footprint*. Your water footprint includes the water you use that comes out of the faucets, toilet, shower and hose, and the water that is used to make your food, personal items, and all your home goods.

Materials: Writing utensil, colored pencils/markers, computer/phone/tablet, internet connection

Please ask for an adult's permission to access this website.

Go to <https://www.watercalculator.org/> and determine your water footprint by taking the *water calculator* quiz! It's okay if you don't know all of the answers, just do your best answering as many as you can. Once you finish the quiz, check out your results and answer the questions below:

1. What is your personal daily water footprint in gallons?
2. What is your household's daily water footprint in gallons?
3. What indoor activity do you use the most water for?
4. What indoor activity do you use the least amount of water for?
5. How about "virtual water" – which "virtual" activity do you use the most water for?
6. Which "virtual" activity do you use the least amount of water for?
7. Share three "tips" you learned from the water footprint calculator. *The "tips" are located on your results page. There is a tip for each question under the "learn more" column.*

Answer Key

Day 1 Main Activity

- 1) Circle your city on the map. **Depends on student**
- 2) In which watershed do you live? **Depends on student**
- 3) Is your school part of a different watershed? Circle one: Yes No **Depends on student**
- 4) Why do you think your watershed is named the way it is? **The watershed is named after the major waterway that flows through the watershed**
- 5) Are watersheds defined by city boundaries? Circle one: Yes No
- 6) What are the two closest watersheds to your watershed? **Depends on student**
- 7) List three cities that also part of your watershed. **Depends on student**
- 8) Locate and write an X on *Lake Washington*
- 9) Which large river drains into Lake Washington? **Cedar River**
- 10) Locate and draw a heart on *Green Duwamish River Watershed*
- 11) Follow this watershed's large river, where does it drain into? **Elliot Bay**
- 12) Is it connected to Puget Sound? Circle one: **Yes** No
- 13) Which one is a smaller body of water, Lake Washington or Lake Sammamish? **Draw a triangle over the smaller one**
- 14) Are all watersheds that same size? Why or why not? **No the are not. Watersheds cover different areas of varying sizes where water gathers to form bodies of water.**
- 15) **BONUS:** Label on your map the location of the Cascade Mountains.



Answer Key

Day 2 Main Activity

1. How much of the water soaked into the soil in Picture 1?
35%
2. How much of the water soaked into the soil in Picture 2?
15%
3. How might this affect some of the living things (plants and animals) in the soil?
Less water in Picture 2 could mean plants dry up and die, or that worms and insects living in the soil wont be able to survive.
4. How much water flowed over the top of the soil in Picture 1?
15%
4. How much water flowed over the top of the soil in Picture 2?
55-70%
6. What could happen to the soil because of all that extra water flowing over it?
It could be washed away (erosion).
7. Which picture would have a greater and diverse population of aquatic (water-based) life? Why do you think this is?
Picture 1, because they are living in clear, clean water. In Picture 2, all of the extra runoff can carry pollution and soil into the water, making it harder to survive.
8. Look at the zoomed-in portion of each picture that shows a close up of the soil. What changed from Picture 1 to Picture 2? Describe all of the differences that you notice.
Picture 1 shows more living things, more water, healthier plants, and thicker roots.
9. You are now in charge of improving the water and soil quality in Picture 2. What are your recommendations for fixing the problems that you have identified so far?
Open ended; answer depends on student.