TEACHER OVERVIEW

Water Conservation and Wildlife Ecosystems

3rd – 5th 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, safe field exploration, and kinesthetic activities.

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 life cycle of salmon and their importance as a keystone species. The following lesson focuses on amphibians and their unique relationship to our water resources, including how native plant species help create healthy ecosystems and support water conservation. The unit is finished with a focus on stewardship and what we as members of the community can do to support both our water supply and the amazing plants and animals they learned about over the course of two weeks.

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

Grades 3-5
Supports NGSS Performance Expectations: 3-LS3-2, 3-LS4-3, 4-LS1-1, 4-ESS3-2, 5-LS1-1, 5-LS2-1, 5-ESS3-1.

Grades 3-5
Day 1 / Day 2 - Salmon Life Cycles
Day 3 / Day 4 - Ecosystems, Habitats, & Keystone Species
Day 5 / Day 6 - Amphibians & Local Water Connection
Day 7 / Day 8 - Native Plant Ecosystems
Day 9 / Day 10 - Stewardship

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CASCADE WATER ALLIANCE

Nature VISION

PARENT/CAREGIVER OVERVIEW

Water Conservation and Wildlife Ecosystems

3rd – 5th 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 two weeks, 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 @WeNeedH20 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: 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.

CASCADE WATER ALLIANCE

Nature VISION

PARENT/CAREGIVER OVERVIEW: DAY 1 / DAY 2

Salmon Life Cycles

Background Information: Salmon are amazing animals that are some of the most recognizable members of the natural communities in the Pacific Northwest. Many of us already know that salmon are a delicious and healthy food for people, but they also connect our entire region through their incredible journey from streams to the ocean and back again.

Learning Objectives: Students will begin their Nature Vision lessons with an introduction to one of Washington's most important animals: salmon. They will learn ways to remember all 5 species of salmon along with details on their life cycle and the difficult journey they go through. Along the way, we will highlight the importance of having plenty of fresh, clean water available for these animals and so many more.

Activity 1: Salmon Life Cycle Spinner

- ***Overview***: After learning about the life cycle of a salmon, students create a spinner wheel that shows all the stages of their development
- ***Parent/Caregiver Tasks***: Assist with cutting out pieces and joining them together

Activity 2: The Perfect Redd

- ***Overview***: Students design a river scene that will be an ideal nesting habitat for spawning salmon
- ***Parent/Caregiver Tasks***: Guide students towards including trees, shade, and rocks, while removing obstacles and harmful items in the salmon's way

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 the student post their #WeNeedWater challenge on social media

Optional Activity: Salmon Hands

- ***Overview***: Students trace their hand and name each of the 5 salmon species that correspond to each finger
- ***Parent/Caregiver Tasks***: None

Optional Activity: Become a Salmon

- ***Overview***: Students act out each stage of the salmon life cycle
- ***Parent/Caregiver Tasks***: Supervise the child to ensure they are moving about in a safe space; help them avoid any obstacles

Optional Activity: Salmon Coloring Sheet

- ***Overview***: Students color salmon and their environment, making sure to design salmon with matching patterns to indicate that they are the same species
- ***Parent/Caregiver Tasks***: None

PARENT/CAREGIVER OVERVIEW: DAY 3 / DAY 4

Ecosystems, Habitats, and Keystone Species

Background Information: Salmon are a recognizable and culturally significant species that also help hold multiple ecosystems together. Because salmon move from mountain streams to the ocean and back to the streams again, they are an important nutritional resource for many different species like birds, people, orcas, and the forests in which they spawn and fertilize. Our water use directly impacts salmon because our drinking water comes from the same streams in which salmon spawn. Also, the water that enters storm drains after leaving our cities flows directly into the fresh water where salmon live. Without strong salmon populations, we see a decline in the health of each ecosystem they move through and interact with.

Learning Objectives: Students will learn about the connections between plants, animals, humans, and water. Specifically, they will learn the integral role salmon play in the environment, because without adequate clean water for the survival of this species, mountain, river, and ocean habitats would be negatively impacted.

Activity 1: Ecosystem Connections

- ***Overview***: Students draw connections between various parts of the ecosystem with salmon at the center, linking predators, prey, water and decomposers
- ***Parent/Caregiver Tasks***: Help students make more abstract (i.e. not just that bears eat salmon, but that decomposing salmon help trees grow)

Activity 2: Ecosystem Story Creation

- ***Overview***: Students write a story connecting human and natural elements from the perspective of one part of the ecosystem
- ***Parent/Caregiver Tasks***: Help students think about how a salmon, bear, eagle, or tree might be impacted by and interact with other aspects of the environment

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 the student post their #WeNeedWater challenge on social media

Optional Activity: Videos

- ***Overview***: Students watch short videos that help illustrate the role salmon play in connecting different ecosystems
- ***Parent/Caregiver Tasks***: Provide technical support

Optional Activity: Stream Coloring Sheet

- ***Overview***: Students locate and color “producers”, “consumers” & “decomposers” related to salmon in a stream ecosystem
- ***Parent/Caregiver Tasks***: Help students differentiate between ecosystem roles

Optional Activity: Ecosystem Word Search

- ***Overview***: Students locate vocabulary words related to ecosystems
- ***Parent/Caregiver Tasks***: None

PARENT/CAREGIVER OVERVIEW: DAY 5 / DAY 6

Amphibians and Local Water Connection

Background Information: Amphibians are incredible animals that undergo an amazing change during their lifecycle. Because they spend part of their lives in the water and part of their lives on land, they help to connect these two separate habitats. Our water use and management are critically important for the survival of these animals because they are sensitive to changes in both the quality and quantity of water in an environment. Globally, we have seen drastic changes in amphibian populations, which also harmed many other species that rely on them for survival. By helping to keep water clean and plentiful, we help support these amazing animals.

Learning Objectives: Students will continue their investigation into local waterways and meet a new group of animals that live here in Washington: amphibians! They will learn what makes these creatures unique before diving into their life cycle and discovering the many adaptations that amphibians use to survive.

Activity 1: Match the Habitat

- ***Overview***: Building off the previous day's habitat lessons, students match animals (including amphibians) to the place that they each call home
- ***Parent/Caregiver Tasks***: Remind students that there can be many correct answers, while emphasizing how amphibians need a clean water source

Activity 2: Design an Amphibian

- ***Overview***: Students create a unique and customized amphibian by combining different adaptations on a single animal
- ***Parent/Caregiver Tasks***: Encourage students to include each of the requested kinds of adaptation (i.e. hunting, protection, movement)

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 the student post their #WeNeedWater challenge on social media

Optional Activity: Origami Jumping Frog

- ***Overview***: Students follow instructions to create an origami frog that can jump
- ***Parent/Caregiver Tasks***: Help cut out a square piece of paper and assist in following the printed instructions as needed

Optional Activity: Hop and Leap Game

- ***Overview***: Students test out their own legs to see how they compare to a frog's
- ***Parent/Caregiver Tasks***: Make sure the student is in a safe environment and has the space to hop, leap, and move around — *if possible, try to measure the height or distance that your child is able to jump*

Optional Activity: Amphibian Coloring Sheet

- ***Overview***: Students will color in the amphibians and their environment by using colors that help camouflage and/or bright colors that warn predators to stay away
- ***Parent/Caregiver Tasks***: None

PARENT/CAREGIVER OVERVIEW: DAY 7 / DAY 8

Native Plant Ecosystems

Background Information: More plants and green spaces help solve common stormwater-related problems (e.g. flooding, pollution). If stormwater can soak into the ground where it is naturally filtered, it can help support living things. Native plants help with this because they have evolved and adapted over time to survive in the specific climates and environments where they naturally grow. In addition, animal species have evolved and adapted to use these species for food and homes as well. Native plant species are important for water conservation for multiple reasons. First, they adapt to grow with the amount of water available in that area, which means they ensure adequate water for other living things. Second, when native plants are planted, grown, and cared for by people, they require less water to be maintained and less intensive care to ensure their survival. For example, growing native bushes like Salal or Oregon Grape near an apartment building in our geographical region provides food and habitat for wildlife, helps manage stormwater problems, and requires less additional water from humans than other decorative plants.

Learning Objectives: Students will discover the role native plants play in supporting our environment, learn how to identify common species, and map the area around their home to learn how water moves over—or is absorbed by—the ground. By ensuring that we have adequate green space and appropriate plants, we keep our water clean and our environment healthy.

Activity 1: Neighborhood Mapping

- ***Overview***: Students test where water flows in their immediate surroundings, how and how well it is absorbed by the environment, and where problems like flooding and pollution may occur
- ***Parent/Caregiver Tasks***: Supervise student tasks

Activity 2: Native Plant Scavenger Hunt

- ***Overview***: Students use native plant ID cards to locate common native plants in their immediate surroundings and consider how increasing the amount of green space can improve water quality and quantity for wildlife
- ***Parent/Caregiver Tasks***: Supervise student tasks and help with identification

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 the student post their #WeNeedWater challenge on social media

Optional Activity: Drain Rangers Video Series

- ***Overview***: Students watch a series of short videos that illustrate the importance of green space and impact of stormwater
- ***Parent/Caregiver Tasks***: Provide technical support

PARENT/CAREGIVER OVERVIEW: DAY 9 / DAY 10

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 should focus on water conservation by thinking carefully about natural resource use.

Activity 1: Salmon Survival Board Game

- ***Overview***: Students will build and play a "Candyland" style board game that represents the life of a salmon
- ***Parent/Caregiver Tasks***: Assist in cutting out and assembling of the board game, playing the game with the student, and highlighting the many challenges that these animals face

Activity 2: Stewardship Ideas

- ***Overview***: Students will review images that show wise ways to use and conserve water
- ***Parent/Caregiver Tasks***: Help to explain any difficult or confusing water-saving ideas

Activity 3: Letter Writing

- ***Overview***: Students will take their new water conservation knowledge and write a letter convincing others to help make a difference as well
- ***Parent/Caregiver Tasks***: Read the student's completed letter and try to enact some of their suggestions, if possible

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 the student post their #WeNeedWater challenge on social media

PARENT/CAREGIVER OVERVIEW: VOCABULARY

DAY 1 / DAY 2
Alevin: Freshly hatched salmon, still with their egg yolk attached as a food source
Fry: Baby salmon that are still living in their home stream
Life Cycle: The stages that a living thing goes through as it grows
Parr: Young salmon that have developed stripes as camouflage in the river
Smolt: Young salmon transitioning from fresh water to salt water
Spawning: When a salmon returns home to mate and lay eggs
Redd: A salmon's nest, dug into the bottom of a stream
Chum/Sockeye/Chinook/Coho/Pink: The 5 species of salmon found in Washington

DAY 3 / DAY 4
Consumer: A living thing that must eat, or consume, other living things to survive
Decomposer: A special type of consumer breaks down dead or rotting material
Ecosystem: The living and non-living parts of an environment provide what plants and animals need to survive
Food Web: Connections of food chains, "what-eats-what" in an ecosystem
Habitat: The natural home of a plant or animal
Keystone Species: A species on which other species in an ecosystem largely depend
Organism: A living thing
Producer: A living thing like a plant that can produce its own energy from the sun, water and air

DAY 5 / DAY 6
Adaptation: A change to an animal species that allows them to more easily survive
Amphibian: A cold-blooded vertebrate with a water-based, gill-breathing larval stage and a land-based, lung breathing adult stage (e.g. frogs, toads, newts, salamanders, caecilians)
Larva: The first stage of development after hatching
Metamorphosis: A physical change in body structure after birth (i.e. changing from a tadpole to a frog)
Tadpole: An early stage of amphibian development after larva where the organism grows a tail and gills to survive in the water

DAY 7 / DAY 8
Infiltration: When water on the grounds surface enters the soil
Native Plant: Plants that occur naturally, or have existed for many years in an area
Pollution: Contamination to the natural environment
Runoff: The flow of water that occurs when excess water flows over the Earth's surface
Stormwater: Water that originates from rain

DAY 9 / DAY 10
Conservation: Protecting the natural world, especially by making smart choices about our natural resource use
Ecosystem: All of the living and non-living things in an area
Stewardship: Taking care of something; being a protector

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DAY 1 / DAY 2

Salmon Life Cycles

Here in Washington, we share our water with many different living things. One of the most important creatures around is the salmon! Salmon rely on the same water sources that we do. When they start to suffer, it can lead to many more problems for all kinds of plants and animals, including ourselves.

There are 5 different kinds of salmon that call Washington home, and each one of them is unique and special. Luckily for us, there is a *handy* trick to help us remember the names of each of these different salmon. Hold your hand up in front of you and wiggle your fingers – those fingers are going to help you remember each kind of salmon! Start with your hand in a fist. As we go, raise your fingers one at a time until all 5 fingers are up.

First, hold up your thumb… thumb rhymes with **Chum**, which is the name of our first salmon!

Second is your pointer, or poking, finger… if you are not careful you might accidentally poke yourself in the eye, which helps us to remember the **Sockeye** salmon!

Third is your middle finger, usually the largest and longest of all the fingers. It stands above the rest of your fingers like a king… that gives us the name of the largest salmon of all, the King salmon! This salmon also has another possible name: the **Chinook** salmon.

Fourth, we have the ring finger, where people often wear jewelry made of shiny metals… maybe something made out of silver? That's what we call this next salmon, the **Silver** or Coho salmon!

Fifth, raise your pinkie finger. This will remind of us our last kind of salmon, the **Pink** salmon!

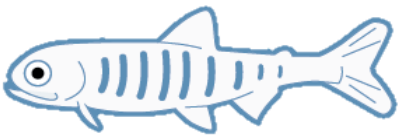
The Salmon Life Cycle

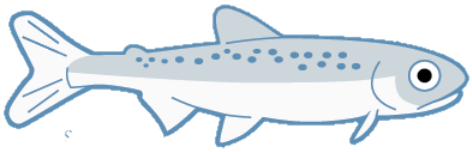
All living things have a **life cycle**. Throughout the life of a salmon, we can see incredible examples of transformations, excitement, danger, and a whole lot more! Let's take a look at all of the stages of a salmon's life, from egg to adult:

Salmon start their lives as tiny, orange eggs in a river or stream. When it is time to lay their eggs, female salmon use their tail fins to dig a small nest called a **redd** in the rocks at the bottom of the river. Salmon are not born alone, however; most salmon lay their eggs in batches between 2,000 and 4,000 eggs. That is a lot of siblings!

When they hatch, baby salmon are called **alevin**. At this stage they are still very small and weak, so they need a little extra something to help them grow big and strong. Do you see that bump on the alevin's belly? That is part of their egg, still attached to their body! That egg sac will feed the baby salmon; it is almost like a lunchbox that they can carry around.

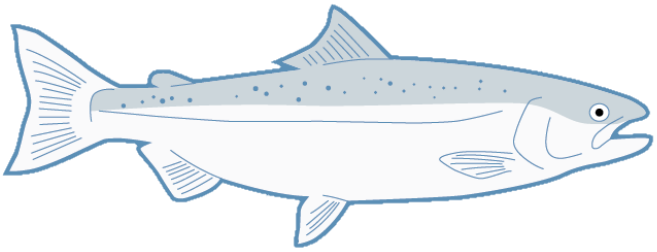
As the salmon grows and uses up its egg, it becomes a **fry**. The fry spends a few months in the safety of its home stream, before growing into a **parr** and starting its journey down the river and towards the ocean. In the parr stage the salmon's body is covered in dark brown stripes, perfect for camouflaging with all the mud, sticks, leaves, and more in the river.

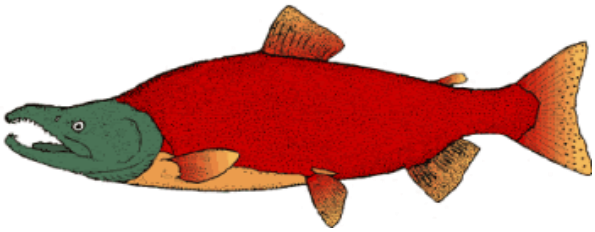




Now the salmon is on its way towards the ocean and becomes a **smolt**, kind of like a teenager salmon. It starts to lose its camouflaging stripes, turning a silvery-gray color instead.

Out in the open ocean, the salmon is now a fully-grown adult. The salmon can spend a few years at sea, feeding and growing as much as it can. One day, however, the salmon gets a feeling inside that tells it that it is time to return home and lay eggs of its own.





The final stage of the salmon's travels is also the hardest – the **spawning** salmon must retrace its steps all the way back up the river to the same spot it was born, battling currents, waterfalls, predators, and more. At this point the salmon also makes one last transformation, changing from its silvery ocean colors to a mix of bright colors, spots, and stripes. Each of the 5 kinds of salmon has a unique color pattern, helping them find and identify other members of their species to mate and lay eggs with.

Now the salmon's journey is complete! They have used up all the energy and strength they had, and die soon after laying their eggs. It is not all sad, however; as a final gift to nature, the bodies of the salmon are a source of food for hungry animals. They start to break down in the soil to provide energy for trees and plants, which helps the whole forest grow green and healthy!

Vocabulary

Alevin: Freshly hatched salmon, still with their egg yolk attached as a food source
Fry: Baby salmon that are still living in their home stream
Life Cycle: The stages that a living thing goes through as it grows
Parr: Young salmon that have developed stripes as camouflage in the river
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Spawning: When a salmon returns home to mate and lay eggs
Redd: A salmon's nest, dug into the bottom of a stream
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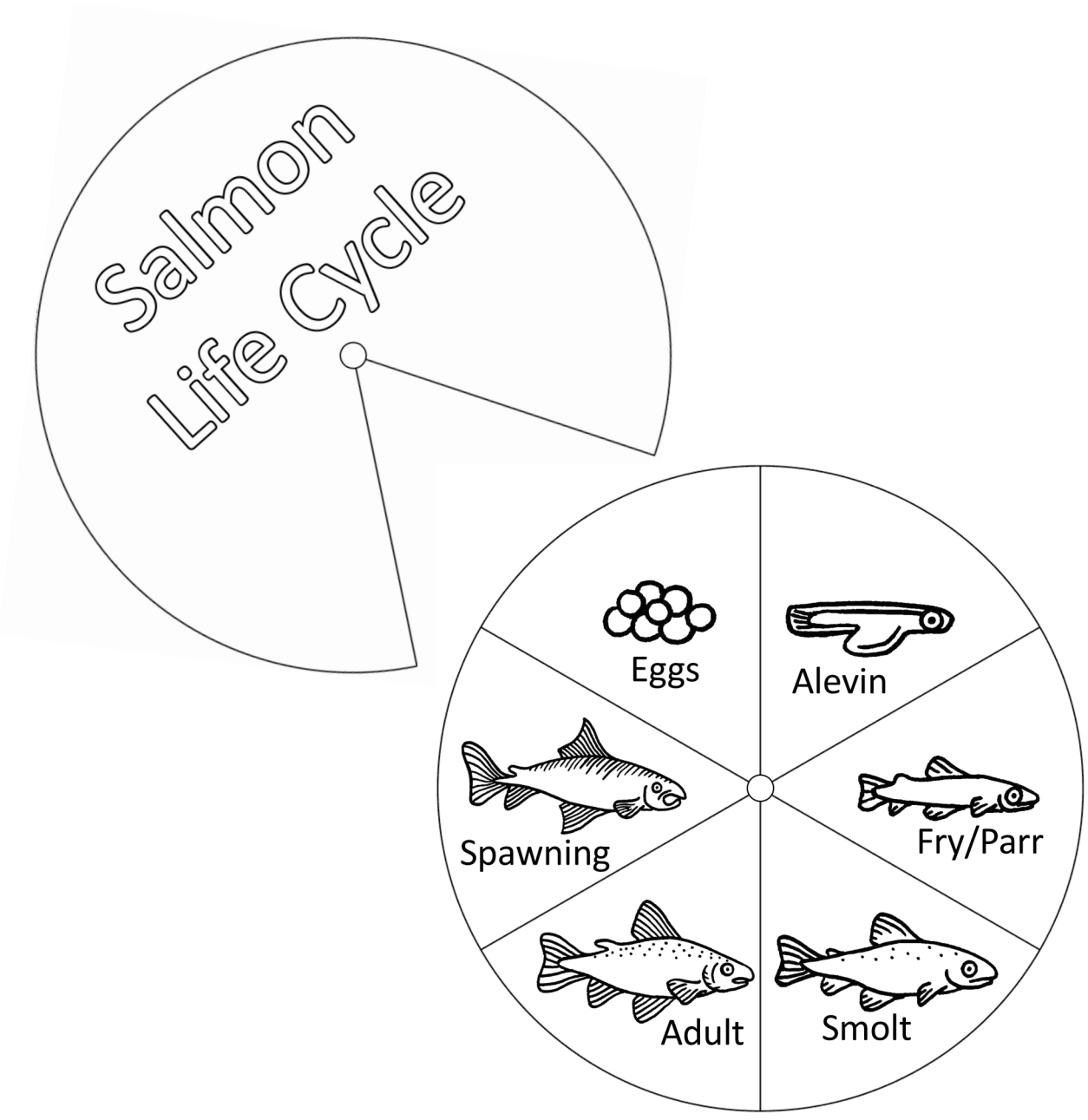
Activity #1

Salmon Life Cycle Spinner

With an adult, cut out and color in the shapes below. Once everything is colored, place the top wheel over the bottom wheel and push an unfolded paper clip through the center. Your life cycle spinner can now rotate around and show you all the stages of a salmon's life!

Materials: Scissors, pencils/crayons/markers/colored pencils, paper clip



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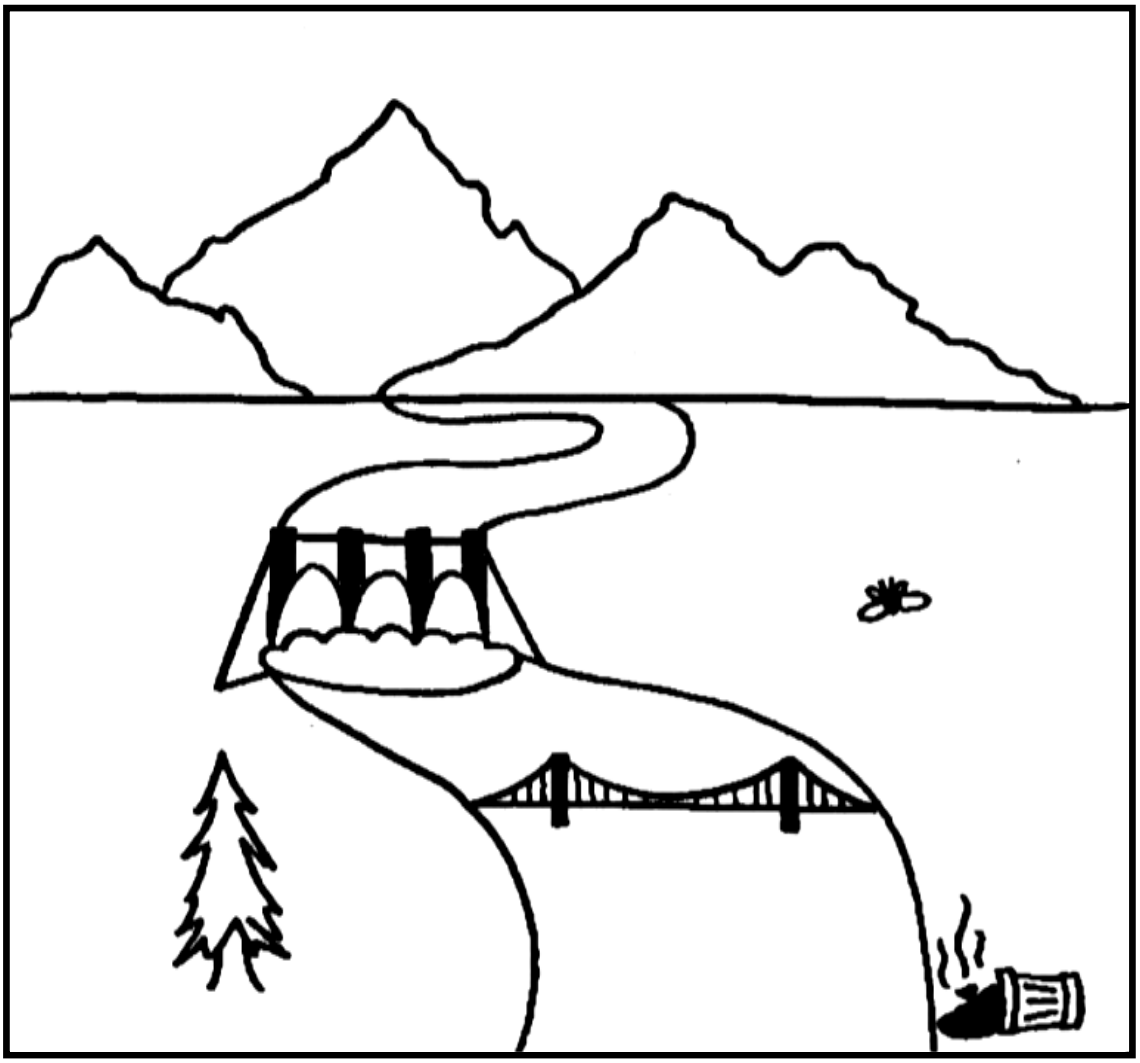
Activity #2

The Perfect Redd

Salmon parents are very picky when it comes to choosing the right place to spawn. If the water gets too hot from the sun, their eggs won't survive. If the eggs get buried in sand or mud, they won't be able to hatch. Even when the young salmon do emerge from their eggs, it is still a very difficult life! Let's see if we can help salmon out by designing the perfect river for them to lay their eggs in.

In the river scene below, design the most salmon-friendly river you can imagine. Are there things to remove? If so, draw a big "X" through them! Are there other things you can add to help build a healthy and happy ecosystem? Try to think about people, plants, animals, water, rocks, and more… then draw them into the habitat!

Materials: Pencil, crayons/markers/colored pencils



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: Pencil, colors, computer/phone/tablet, internet

Nature isn't somewhere far away, it's all around us! There are plants and animals everywhere if you look carefully, and they all need water to survive just like us! For today's #WeNeedWater challenge find a plant or an animal that you think is really cool, and draw a picture of it. Write a paragraph about what you observed this animal doing. Was it finding food, building a home, or taking a bath?

If you can go outside, remember to be safe, responsible, and respectful. ***Make sure to have an adult accompany you.*** If you can't go outside, you can still find nature by looking out a window, or staying on your balcony, porch, or front steps. Remember that bushes, birds, trees, ants, worms are all nature, and they all need water!

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

Salmon Hands

Here is a challenge for you: without looking back at the packet, can you name all 5 kinds of salmon on your own? If you forget one, use your fingers and try to remember each name!

Now you can draw your own version of the salmon hand trick. In the space below, trace the outline of your hand and label each fingertip with the name of the salmon that goes with that finger.

Materials: Pencil, crayons/markers/colored pencils (optional)

Optional Activity

Become a Salmon

This activity should be done with plenty of space or in a safe outdoor space with an adult. Please ask for adult permission to complete the activity.

It is tough being a salmon! They need to survive many different challenges, from predators to people to the environment. Here are some fun exercises and activities to help us think about the different things that salmon need to do to survive.

Going step by step, you will act out each step of the salmon's life cycle to be just like this amazing fish!

Materials: None

For each stage of the salmon life cycle, try out the following motions:

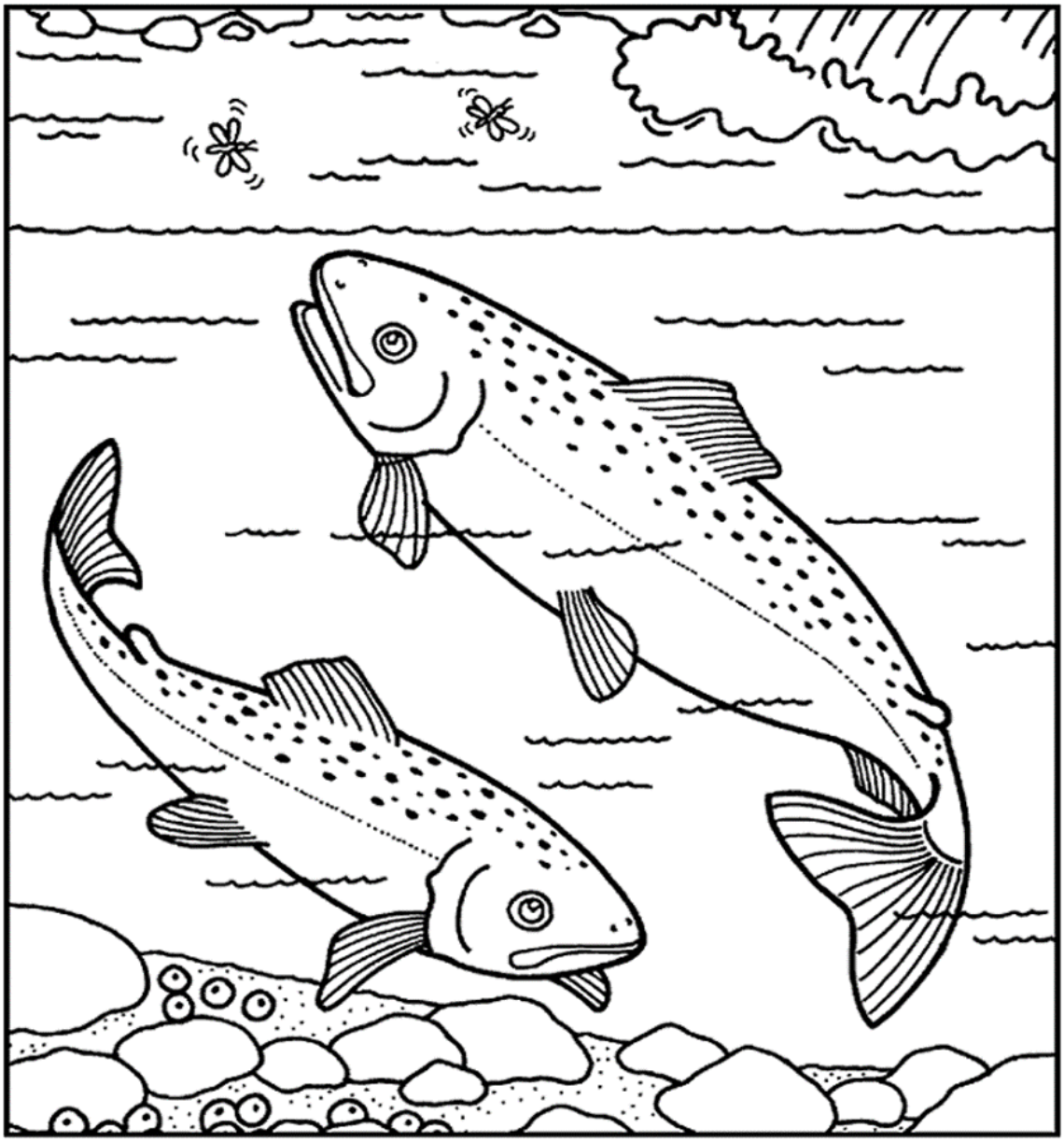
- Eggs: Salmon eggs are tiny, and need to fit in between gravel beds. Can you curl into a ball? Make yourself as small as possible!
- Alevin: Alevin hide in the gravel until they are big enough to survive in the stream. Where would you hide to survive predators? Find a place to stay safe!
- Fry/Parr: When fry and parr start going to the ocean, they let the current carry them and they actually travel backwards. Can you try to "swim" backwards?
- Adults: An adult salmon's life is all about stamina! They need to survive in the open ocean and can travel hundreds of miles. Do you have the stamina of a salmon? Can you jog for 5 minutes? 10 minutes? 15 minutes?
- Spawners: Salmon returning to spawn need to swim upstream, make their way over waterfalls, and avoid predators. Jog in place, imagining that you are trying to swim forwards while the current pushes you backwards!

Optional Activity: Coloring Sheet

Spawning Salmon

These salmon are getting ready to spawn. Be sure to color in the eggs in the redd, the flowing river, and the salmon themselves! Remember, these salmon are looking for partners with the same matching colors and patterns as themselves.

Materials: Crayons/markers/colored pencils



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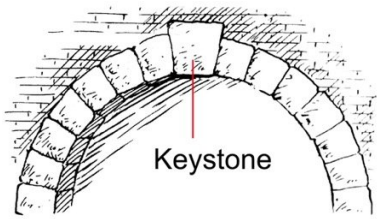
DAY 3 / DAY 4

Ecosystems, Habitats, and Keystone Species

We spent yesterday learning about salmon because they are tremendously important to our **ecosystem** and the **habitats** in which they live. An ecosystem is all of the living and non-living things that work with one another to help plants and animals survive, while a habitat is the natural home of a plant or an animal. An ecosystem starts with energy from the sun, air, and water that plants need to grow. We call plants **producers** because they can make (*produce*) their own energy. We call animals **consumers** because they need eat (*consume*) plants, other animals, or both to get their energy. There are also special consumers like insects, slugs, and bacteria we call **decomposers**. They break down (*decompose*) the material from things that were once alive to return that energy to the soil for plants to grow and to keep the ecosystem healthy. These are all connected in what we call a **food web**, which is a connection of "what eats what" in an ecosystem.

Salmon are a **keystone species**, which means that without salmon, the rest of the ecosystem begins to collapse. They are at the center of the food web, like the keystone is at the center of an arch. To help you understand, take a look at the picture archway below!



A "keystone species" is based on building an archway. If you remove the keystone, the arch falls down. In the same way, if you remove a keystone species—like salmon—the ecosystem will not be stable anymore.

Humans are a really important part of the ecosystem because we need all of the same things that plants and animals need to survive. The way that we use things like water affects the rest of the species we share the environment with. Today we will explore ecosystems, keystone species, and human connections to the environment.

Vocabulary

Consumer: A living thing that must eat, or consume, other living things to survive
Decomposer: A special type of consumer breaks down dead or rotting material
Ecosystem: The living and non-living parts of an environment provide what plants and animals need to survive
Food Web: Connections of food chains, "what-eats-what" in an ecosystem
Habitat: The natural home of a plant or animal
Keystone Species: A species on which other species in an ecosystem largely depend
Organism: A living thing
Producer: A living thing like a plant that can produce its own energy from the sun, water and air

Activity #1

Ecosystem Connections

Salmon help hold our ecosystem together! Explore their connections to people, plants, and animals by drawing a line from the salmon (the alive salmon outlined in Red and the decomposing salmon outlined in Green) to their predator, prey, or environment. Think about the following questions: How do all of these different things impact each other? How does our water use impact salmon? How does that impact the rest of the environment?

Materials: Pencil

Bald Eagle

Fishing

Decomposing Salmon

Krill

Salmon

Storm Drains

Stormwater Pipes

Water Strider

Heron

Forests

Black Bear

CASCADE WATER ALLIANCE

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Activity #2

Ecosystem Perspective Storytelling

Now that you have learned about a salmon's life cycle, food webs, and ecosystems, think deeply about how all of these things work together and how humans can impact them. In the space below and on the following page, write a short story about salmon and their environment. You might choose to write from the perspective of a salmon travelling from a stream to the ocean and back, a person or bear who relies on salmon for food, or even a tree who needs the salmon to build a healthy forest. Include at least 3 ways your characters interact with people and/or human made objects and 3 ways your characters interact with the natural environment. Think about where they get their food and water, challenges they might face, how they survive, and what effects they have on the world around them.

***Helpful hint**: Use the pictures on the previous page to help you think of characters, aspects of the natural environment, human-made objects, and their interactions!*

Materials: Pencil

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: Pencil, colors, computer/phone/tablet, internet

You are part of nature! Did you know that humans are animals, just like salmon and bears and all the rest? Humans have a very big impact on the world around them, sometimes in good ways and sometimes bad. Either in your home or outdoors with an adult, search for 1 way that people are helping nature and 1 way that people are harming it.

If you can go outside, remember to be safe, responsible, and respectful. ***Make sure to have an adult accompany you.*** If you can't go outside, you can still find nature by looking out a window, or staying on your balcony, porch, or front steps. Remember that bushes, birds, trees, ants, worms are all nature, and they all need water!

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.

"Salmon in the Trees": This short video was created in conjunction with Amy Gulick's book of photo journalism published by Mountaineers Books titled *Salmon in the Trees*. It shows the connection between the life cycle of salmon and the forest. This sets the ground work for discussion of salmon as really important part of the environment in addition to detailing some of the ways that salmon impact the forest beyond just being a food source for other animals.

This video can be found by following this link: https://www.youtube.com/watch?v=8K87F2lABbE or by a YouTube search for "Salmon in the Trees".

"Salmon: Healthy Dinner, Healthy Forests": This short video from The Nature Conservancy shows how important salmon are, not only as a food source for humans and other animals, but for helping to bring nutrients to the plants of the forest as well. What is really amazing is that salmon are connected to the environments they live in in lots of different ways, some of which are simple and some of which are complicated.

This video can be found following this link https://binged.it/31xzAtu or by doing a YouTube search for "Salmon: Healthy Dinner, Healthy Forests"

Materials: Computer/phone/tablet, internet connection

Optional Activity:

Ecosystem Coloring Sheet

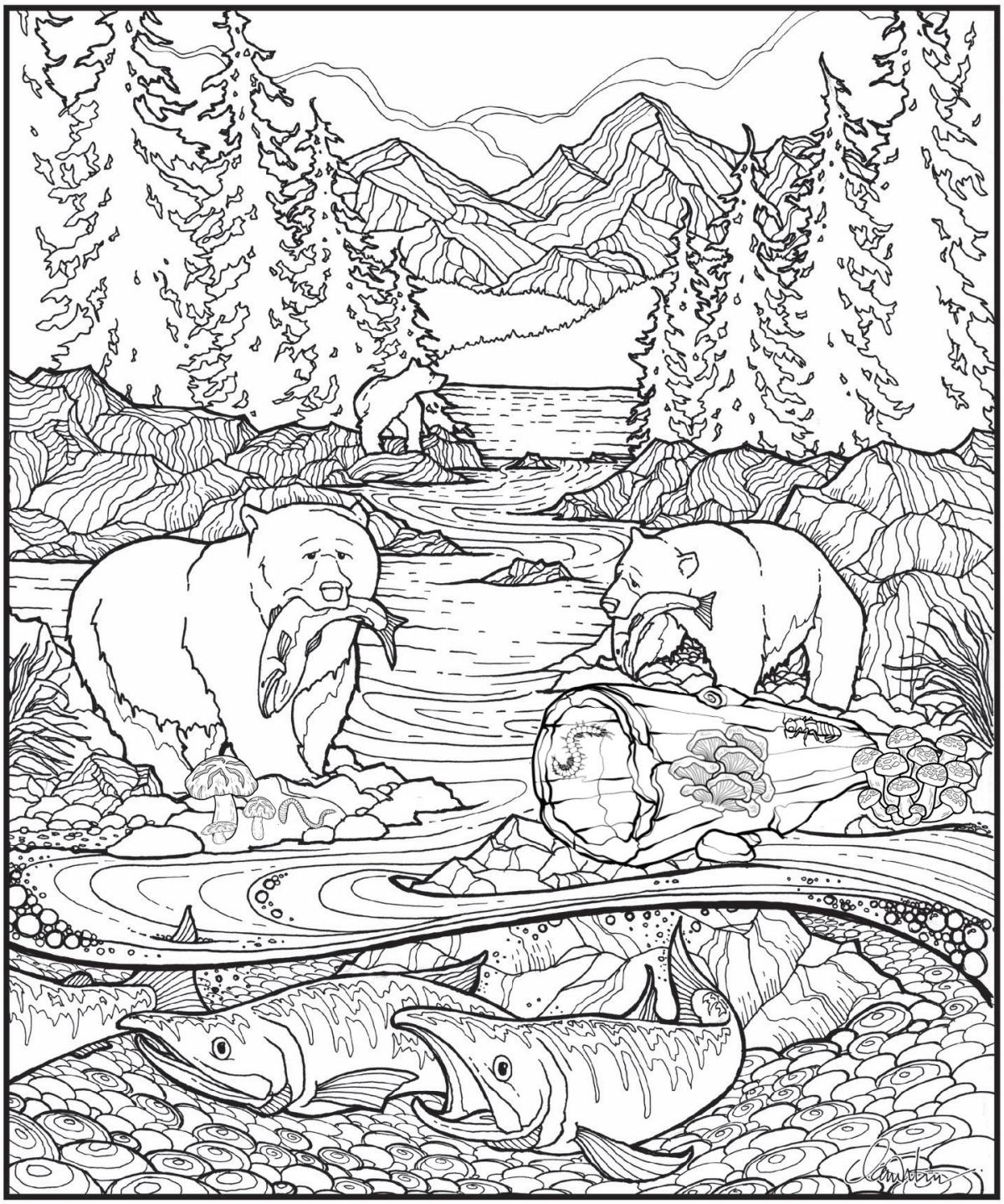
Salmon help connect the producers, consumers, and decomposers of an environment. The picture of a stream on the next page has producers, consumers, and decomposers that all rely on salmon.

- Color the producers Green
- Color the consumers Red
- Color where the decomposers would be Blue

Check the vocabulary box on the first page of today's lesson for help!

Materials: Crayons/markers/colored pencils (green, blue, red)

SPAWNING SALMON - COLOURING PAGE



CLAIRE WATSON ILLUSTRATION | www.clairewatson.com | @clairewatsonart

CASCADE WATER ALLIANCE

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Optional Activity:

Ecosystems Word Search

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

Word Bank

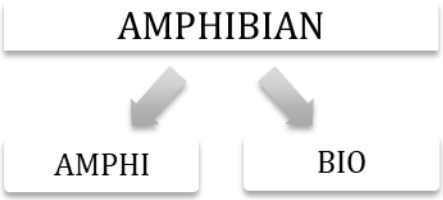
AIR, CONSUMER, DECOMPOSER, ECOSYSTEM, FOODWEB, HABITAT, KEYSTONE, LIVING, NON-LIVING, PREDATOR, PREY, PRODUCER, SPECIES, SUN, WATER

DAY 5 / DAY 6

Amphibians and Local Water Connection

Today we are going to look at some more animals that live here in Washington! We will also learn what makes these animals so special and what amazing **adaptations** they have that help them survive.

Have you ever heard of a kind of animal called an **amphibian**? There are lots of different creatures that are part of the amphibian family. To help us understand what an amphibian is, let's take a look at the word itself:



In Ancient Greek, the word *amphi* means 'double' or 'both,' while the word *bio* means 'life.' When we combine those two words together, we get a word that means '*double life.'* For amphibians, this means that they spend the first part of their life in water before going through a big change so they can spend the second part of their life on land.

Now that you know the meaning of the word amphibian, can you think of any animal that is born in the water and later gains the ability to move around on land? In the space below, draw a picture of that animal:

Just like we learned about with salmon, amphibians have their own unique life cycle. For frogs and other amphibians, this life cycle involves going through huge changes and transformations, which is a process that we call **metamorphosis**. During metamorphosis, the animal must change its body in amazing ways in order to adapt to its habitat. The frog will go from a tiny egg to an adult in these stages:

Frogs, like all amphibians, start their lives as soft, clear, squishy eggs in the water. They look and feel like Jell-O! At this stage, they are called **larva**.

The eggs hatch and all of the baby frogs emerge as **tadpoles**. At this stage, the frog has a long tail, but no legs. In order to move onto land one day, the tadpole will need to grow some big, strong legs.

As the young tadpole swims, feeds, and grows, its body begins to change. Now it has one set of legs!

The tadpole continues to change, eventually growing yet another set of legs! With all of its legs ready for land, the frog's tail begins to shrink. Inside its body, its lungs are growing so that it can soon breathe in the open air above the water.

The metamorphosis process is now complete! The frog is a fully grown adult who can hop a round freely on land, but they still need plenty of clean, healthy water in order to survive. One day, this frog might return to its pond and lay eggs of its own, so the life cycle will continue!

There are some other things that most amphibians have in common:

- They have soft, squishy toes (no claws!)
- They have smooth, wet skin (no scales!)
- They are cold-blooded, meaning their body doesn't make its own heat
- They breathe with gills (like fish!) when they are young

Can you identify an amphibian now? Take a look at these animals and put a check mark next to any that are amphibians and an X next to any that are not amphibians:









Amphibians have lots of useful **adaptations**, meaning something that helps a living thing survive in its habitat. This could be a behavior (i.e. something special that the animal does) or a trait (i.e. something special that the animal has as part of its body). Some examples of adaptations from around the animal kingdom include shells for protection, wings for flying, teeth and claws for hunting, and so much more! Check out some of these awesome adaptations from the amphibian world:

Eyes: Most amphibians have big, round eyes near the top of their heads. This lets them keep an eye out for both predators and prey by giving them the ability to see almost all the way around.

Bright Colors: Some amphibians are poisonous! Any animal that touches or eats them might get sick or even die. In order to warn other animals to stay away, these amphibians can have very colorful skin. Even some non-poisonous amphibians have adapted to copy those same colors so they can trick predators.

Strong legs: As adults, frogs, and toads grow big, strong back legs. This gives them the power and strength to leap and hop huge distances—the world record for a frog's jump is over 33 feet!

Camouflage: Amphibian colors are not just about being bright and beautiful; some of them have adapted to be very good at hiding in plain sight!

Vocabulary

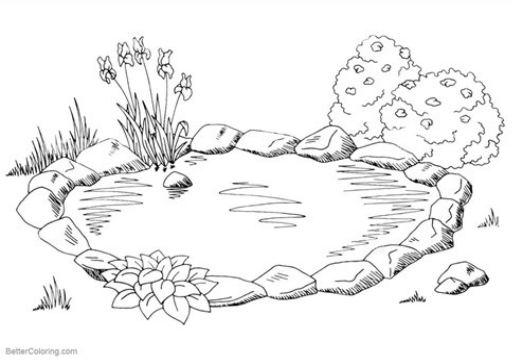
Adaptation: A change to an animal species that allows them to more easily survive
Amphibian: A cold-blooded vertebrate with a water-based, gill-breathing larval stage and a land-based, lung breathing adult stage (e.g. frogs, toads, newts, salamanders, caecilians)
Larva: The first stage of development after hatching
Metamorphosis: A physical change in body structure after birth (i.e. changing from a tadpole to a frog)
Tadpole: An early stage of amphibian development after larva where the organism grows a tail and gills to survive in the water

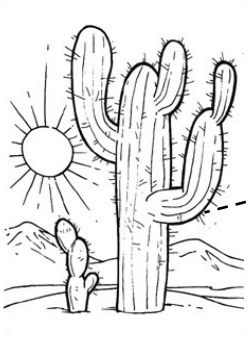
Activity #1

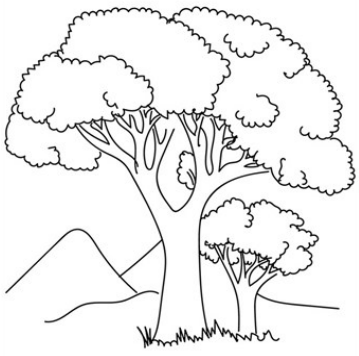
Match the Habitat

You learned about ecosystems in yesterday's lessons, but do you know where amphibians like to live? Using the sketches below, try to match each animal with the habitat it can be found in. Some of them are amphibians, but some are not. Draw a dotted line to connect the animal to its ecosystem and put a check mark next to every amphibian that you find. Remember, many animals can survive in more than one kind of habitat!

Materials: Pencil







Activity #2

Design an Amphibian

With all of those awesome adaptations, amphibians come in all kind of shapes, sizes, and colors. There are salamanders the size of an adult human and frogs so small that they can sit comfortably on a penny! Now, you have the chance to create your own unique amphibian and give it all the adaptations it will need to survive.

Materials: Pencil, crayons/markers/colored pencils

In the space below, you can design your own amphibian. You will need to add some very special adaptations so that your amphibian can survive and be successful!

In your drawing, be sure to include:

- At least 1 adaptation to help your amphibian find food
- At least 1 adaptation to keep your amphibian safe from predators
- At least 1 adaptation to help your amphibian move around on land and in water

In addition, try to draw some of the other stages of your amphibian's life cycle.

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: Pencil, colors, computer/phone/tablet, internet

For today's #WeNeedWater challenge, make a sign for your yard or a street-facing window that will teach or remind neighbors to water their lawns either in the early morning or in the evening to save water. You can also make a sign with another water smart saving idea that you like! Saving water is the best thing we can do to make sure there is enough water for animals, plants, and humans.

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!

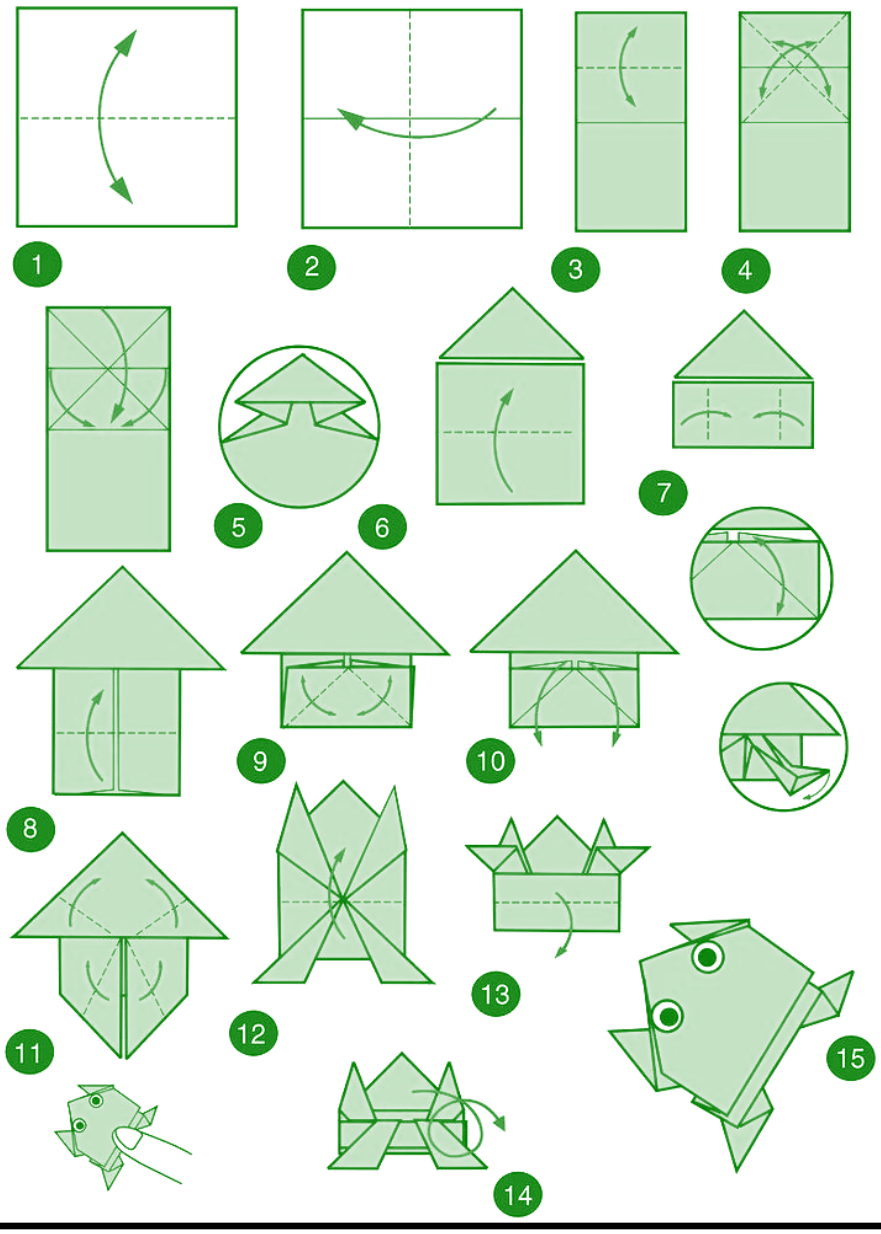
Optional Activity:

Origami Jumping Frog

Frogs are such amazing jumpers. Now, you can create your own!

Ask an adult to help you cut out a square piece of paper then follow the step-by-step instructions in green below in order to fold your own jumping paper frog!

Materials: Paper, scissors



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Optional Activity:

Hop and Leap Game

You have seen how special the legs of a frog or toad are; strong legs are one of the many adaptations that helps these animals survive. How do human legs compare to those of a frog or toad? Go find out!

With an adult and permission, find a safe and open area to test out how good your own legs are at jumping.

Materials: None

Hop like a toad

Bend your knees and do 10 tiny, short hops like a toad.

Would you be able to move very fast like that?

Leap like a frog

Squat down and do 5 giant leaps straight into the air!

How high were you able to get?

Optional Activity: Amphibian Coloring Sheet

Amphibians at Home

These frogs and salamanders in the sketch below are enjoying life in a pond. While coloring them in, try to color at least one animal with camouflage and at least one other animal with bright colors so we know it might be poisonous! If you have space, try to draw in some other animals at other stages of the amphibian life cycle swimming in the water.

Materials: Crayons/markers/colored pencils

msodanoillustration.com

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DAY 7 / DAY 8

Native Plant Ecosystems

When we want to care for our water and the environment, it is important for us to also think about how plants impact our water and our environment.

Native plants are plants that have been growing in an ecosystem for thousands of years, before people came from other places bringing new plants and animals with them. Native plants are important because they have evolved to survive the climate of their ecosystem. They also help to make sure that we have healthy forests, which means that salmon and other animals in the ecosystem are healthier, too. They require less care from humans when grown around our homes, schools, and businesses. They help us save water because we do not need to add much more to the environment to keep them alive. Their roots also provide a place for rainwater to be absorbed by the environment to help with flooding, and can help filter water as it soaks into the ground.

More native plants can help reduce problems related to **stormwater**, which is the water that originates from rain (e.g. flooding, pollution). As this stormwater falls on the land, it will either move over the surface of the land, which is called **runoff**, or be absorbed by the soil, which is a process called **infiltration**. Runoff can carry things like dirt, litter, and **pollution** into our storm drains and streams. This affects the health of salmon and other animals. Soil infiltration is affected by many things, including different types of ground materials and the amount of water currently being used by the soil. We can help the ground absorb more water by planting native plants to give the water a place to be absorbed by the land.

Vocabulary
Infiltration: When water on the grounds surface enters the soil
Native Plant: Plants that occur naturally, or have existed for many years in an area
Pollution: Contamination to the natural environment
Runoff: The flow of water that occurs when excess water flows over the Earth's surface
Stormwater: Water that originates from rain

Activity #1

Neighborhood Mapping

Today we'll get a chance to experiment with how water moves through our environment, and see runoff and infiltration in action. ***You MUST have an adult join you before going out-doors!***

Materials: Pencil, paper, bottles of water

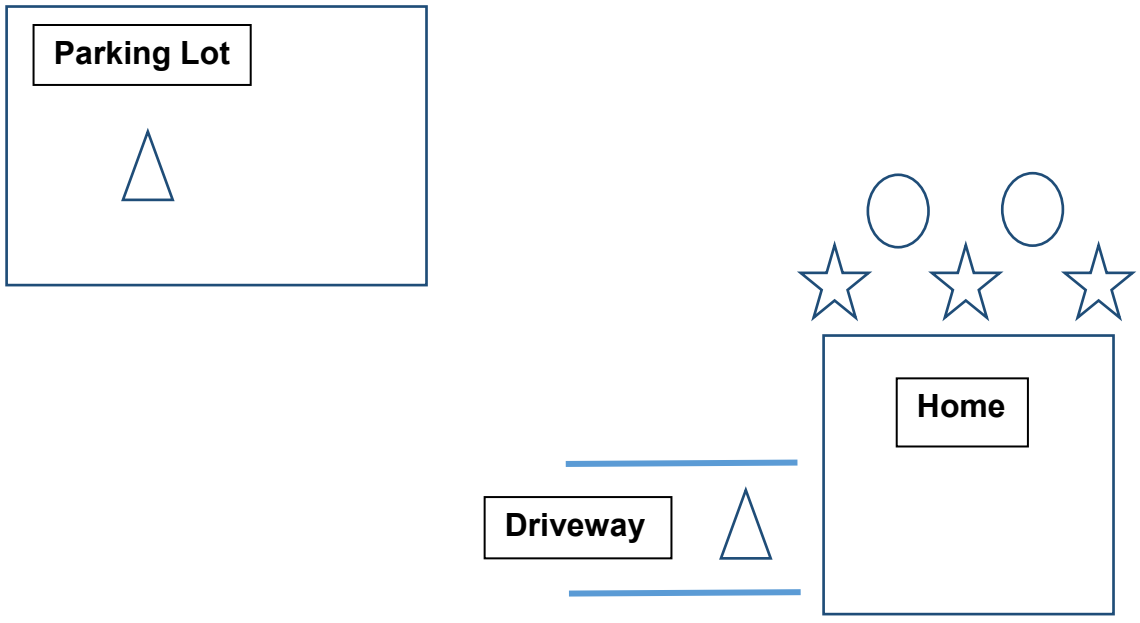
We want to get an idea of what kinds of surfaces absorb water and what surfaces create runoff. First, you will make a basic map on the next page of the places near your home and test where we find water soaking into the ground and where we find it flowing over the surface. As you explore, be sure to draw the areas you interact with or go to a lot. For example, when you create your map, be sure to add the entrance to your home or apartment. Then, you can pour some water to test where water goes when it rains. Once you have drawn your map, you can test whether or not the water is absorbed into the ground in each of the places on your map. Follow these steps to mark your map:

- Mark a triangle on areas where the water does not absorb
- Mark a circle on areas where the water soaks in to the ground
- Mark a star where you find trees and other plants

While working on this activity, think about these questions:

- How do you think these surfaces affect our ability to use them?
- Have you ever noticed any large puddles forming around your home?
- How might this affect water that enters our streams?

Example Map



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Neighborhood Map

 — Where water does not soak in (runoff)

 — Where water soaks in (infiltration)

 — Where plants are growing

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Activity #2

Native Plant Scavenger Hunt

Native plants are plants that have been growing in an environment before people brought new plants from other places. Native plants are important because they provide food and homes for animals, clothing, medicine, food and materials for people, and help support the ecosystem where they grow. You can find some of these important plants around your neighborhood!

Can you match any of these native plants to the plants you found growing while making your neighborhood map?

Materials: ID Cards (found below and on the next 3 pages)

Western Red Cedar

Western Red Cedars are common in the forests of the Pacific Northwest. They are one of the most typical features of a healthy forest.

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Red Alder

Red Alders are a thin tree with grey outer bark. Their name comes from the red color of their wood and inner bark. They are the first trees to grow in parts of the forest that are disturbed by things like wildfires. Alder trees help to get the soil ready for other trees like Cedars and Douglas Firs.

Douglas Fir

Douglas Firs can grow to be 250 feet tall and live for over 500 years! These are the trees that brought many people from Europe and other parts of the world to the Pacific Northwest. They were logged in great numbers for their wood, like to create masts for sailing ships.

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Oregon Grape

Oregon Grape is not a grape and does not only grow in Oregon, BUT it does produce fruit and grow all around the Pacific Northwest. Today you will often find Oregon Grape planted by people in public places like in and around schools, playgrounds, parks, and apartment buildings.

Salal

Salal grows in the understory of the forests and is commonly used in landscaping, just like Oregon Grape, where it is often planted near schools, playgrounds, hospitals, and apartment buildings.

Cattails

Cattails grow in wet soil near the edges of ponds where they help filter water and keep the pond clean.

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: Pencil, colors, computer/phone/tablet, internet

Sometimes there is pollution on our streets, sidewalks, driveways, and parking lots. This pollution mixes with rain and goes down stormdrains. From the stormdrains, the pollution will go straight into the closest river, stream, lake, or Puget Sound – into wildlife habitat! This pollution makes wildlife habitat very unhealthy. We know all plants, animals, and humans need clean water! With an adult, go for a walk to see if there are any stormdrains in your neighborhood! Please be careful when walking through your neighborhood! Make sure you and an adult are looking for the stormdrains together. Always walk on the sidewalk or off the road to avoid cars and other forms of traffic. Be safe, responsible, and respectable when outdoors!

If you can't go looking for a stormdrain, that's okay! Here's an example of a real stormdrain that's been painted by an artist!

You don't have to go too far! With an adult, you can also go to the edge of the front of your house or apartment. Count how many stormdrains you can see from the edge without walking away from your home. Do you see any in the parking lot? At the end of your driveway? Next to a sidewalk? How many did you find?

<u>Make Your Own Stormdrain Art!</u>

Draw or write an animal that needs clean water in the space next to the stormdrain below.

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!

CASCADE WATER ALLIANCE

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Optional Activity:

Videos

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

These short videos from Drain Rangers and Puget Sound Starts Here show some of the major differences in what can occur when water is allowed to soak into the soil or when it moves over impervious surfaces. Each video shows how this can affect our homes and the environment. By ensuring that water can soak into the ground, we can ensure that water will be available for plants, animals, and humans.

"When It Rains, It Pours": https://www.youtube.com/watch?v=hqmyQtNN3I0

"Stormwater Pollution Solutions": https://www.youtube.com/watch?v=e2QpoCs0arw

"Engineering Solutions: Stormwater Runoff": https://www.youtube.com/watch?v=e5t2YsmIpbA

"Dirty Stormwater Runoff: Advanced Engineering Solutions": https://www.youtube.com/watch?v=31GXdY5nfm0

You can also find these videos by doing a YouTube search for "Drain Rangers".

Materials: Computer/phone/tablet, internet connection

DAY 9 / DAY 10

Stewardship

We have learned so much this week about animals, **ecosystems**, water, and more. Now it's time to combine everything that we learned and try to find a way to help make a difference!

All of the animals we have seen this week need water to survive, just like us. In fact, every living thing on this planet needs water! Sadly, people do not usually think about other living things like salmon, amphibians, or native plants when thinking about water. If we are not careful, we can sometimes take too much from nature. By thinking very carefully about the water and other natural resources we use, we can learn to practice stewardship and conservation.

Stewardship means watching over or taking care of something. As humans living in Washington, we want to be good protectors of the land by caring for the plants, animals, and water that share an ecosystem with us.

Conservation is one of the many ways that we can help our environment, by limiting or reducing the impact that people have on nature. Today, we will brainstorm some ways that we can make that happen!

Vocabulary
Conservation: Protecting the natural world, especially by making smart choices about our natural resource use
Ecosystem: All of the living and non-living things in an area
Stewardship: Taking care of something; being a protector

Activity #1

Salmon Survival Board Game

Provided by the National Oceanic and Atmospheric Administration (NOAA)

You have learned all about different animals this week, including a lot about salmon. Because they are a keystone species, we know how important it is that we keep salmon safe and healthy.

Now, you can build and play a special board game that takes you on the incredible journey of a salmon's life. There will be lots of challenges and hardships along the way, but if you succeed, you will be able to travel back to your salmon's home river so it can lay eggs of its own!

Materials: Scissors, glue or tape, one 6-sided die (or 6 coins), small items to be game pieces

Assembly Instructions: (*ask an adult for help*)

1. Print out the next 3 pages with the "Salmon Survival" game on them
2. Cut along the black lines on the sides of Page 2
3. Paste or tape the blank flaps of Page 1 and Page 3 to the bottom of Page 2

Gameplay Instructions:

1. Each player will place their game piece on the starting "EGG" space
2. Starting with the youngest player, roll the dice and move that many spaces forward
    - If you do not have any dice available, you can flip 6 coins and move one space for every coin that landed on 'Heads'
3. If you land on a space with a '**+**' you move that many spaces forward
4. If you land on a space with a '**—**' you move that many space backward
5. If you land on a space that says "start over" you must place your game piece back on the "EGG" space and begin your journey again
6. The first player to make it all the way around the board and back to the "EGG" space is the winner!

CASCADE WATER ALLIANCE

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CASCADE WATER ALLIANCE

Nature VISION

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CASCADE WATER ALLIANCE

Nature VISION

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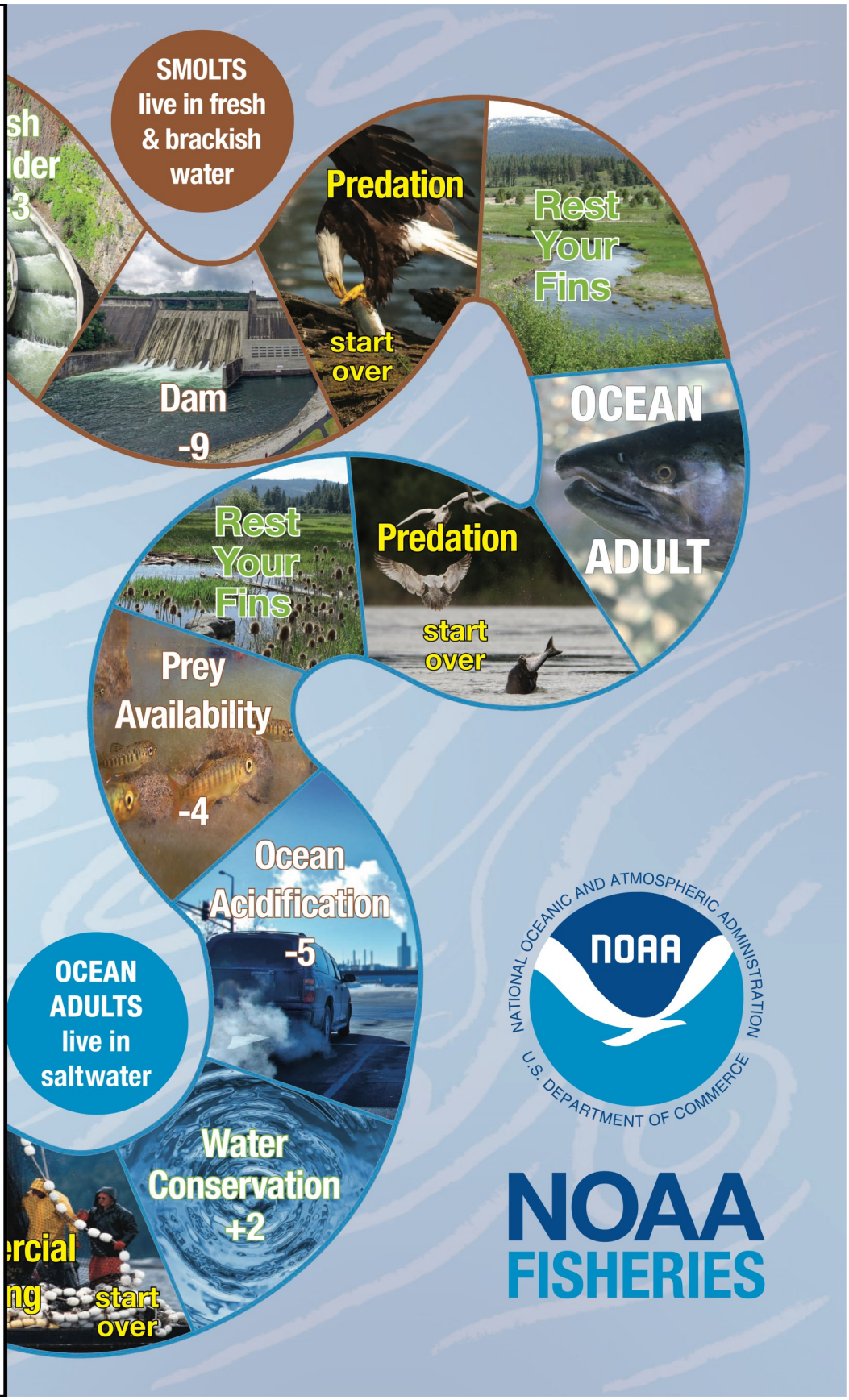

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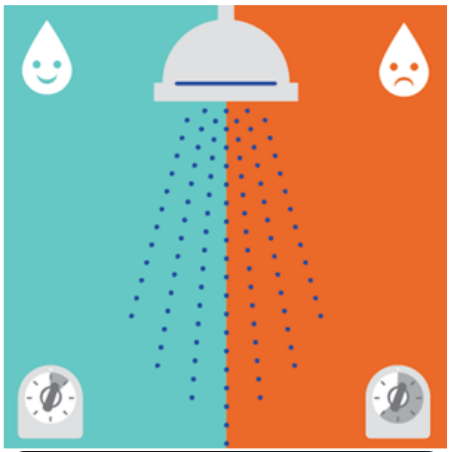
Activity #2

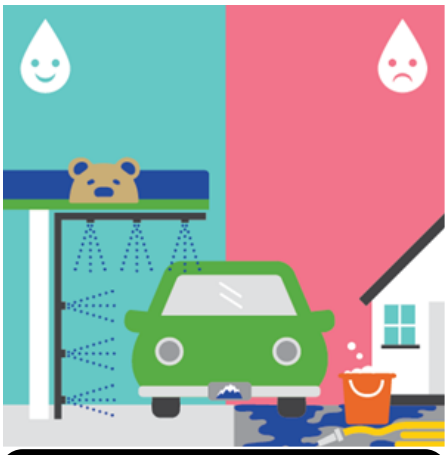
Stewardship Ideas

Do you want to know how you and your family can help protect water today? Check out the ideas below! Each picture is split into two pieces, separated by color: one side with a smiling face showing a good and smart way to use water, and one side with a frowning face showing a bad and wasteful way to use water.

In the space under each picture, write the lesson that you learned from that image. If you see any ideas that you already practice, then put a check mark next to that image.

Materials: Pencil





Activity 3

Letter Writing

Now that you have so many more great ideas for how to save water and protect the environment, we want to teach others to do the same!

Materials: Pencil

In the space below, write a letter to your friend, parent, principal, city council member, or any other person that you think could help make a difference in taking care of our water. Try to convince them why it is so important to care for nature. Lastly, share with them at least 3 new ways that they can help you achieve that goal.

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: Pencil, colors, computer/phone/tablet, internet

Using what you've learned this week, it's time to make your own #WeNeedWater challenge! Think about all of the things we learned about ecosystems, native plants, stormwater, soil, water, salmon, amphibians, and more. What new thing can you do to share what you now know or new ways you've learned to save water? If you'd like, feel free to add whatever you think of to your letter-writing activity (Activity #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!

ANSWER KEY

Day 1 / Day 2 Activity #2

The Perfect Redd

Things to get rid of:

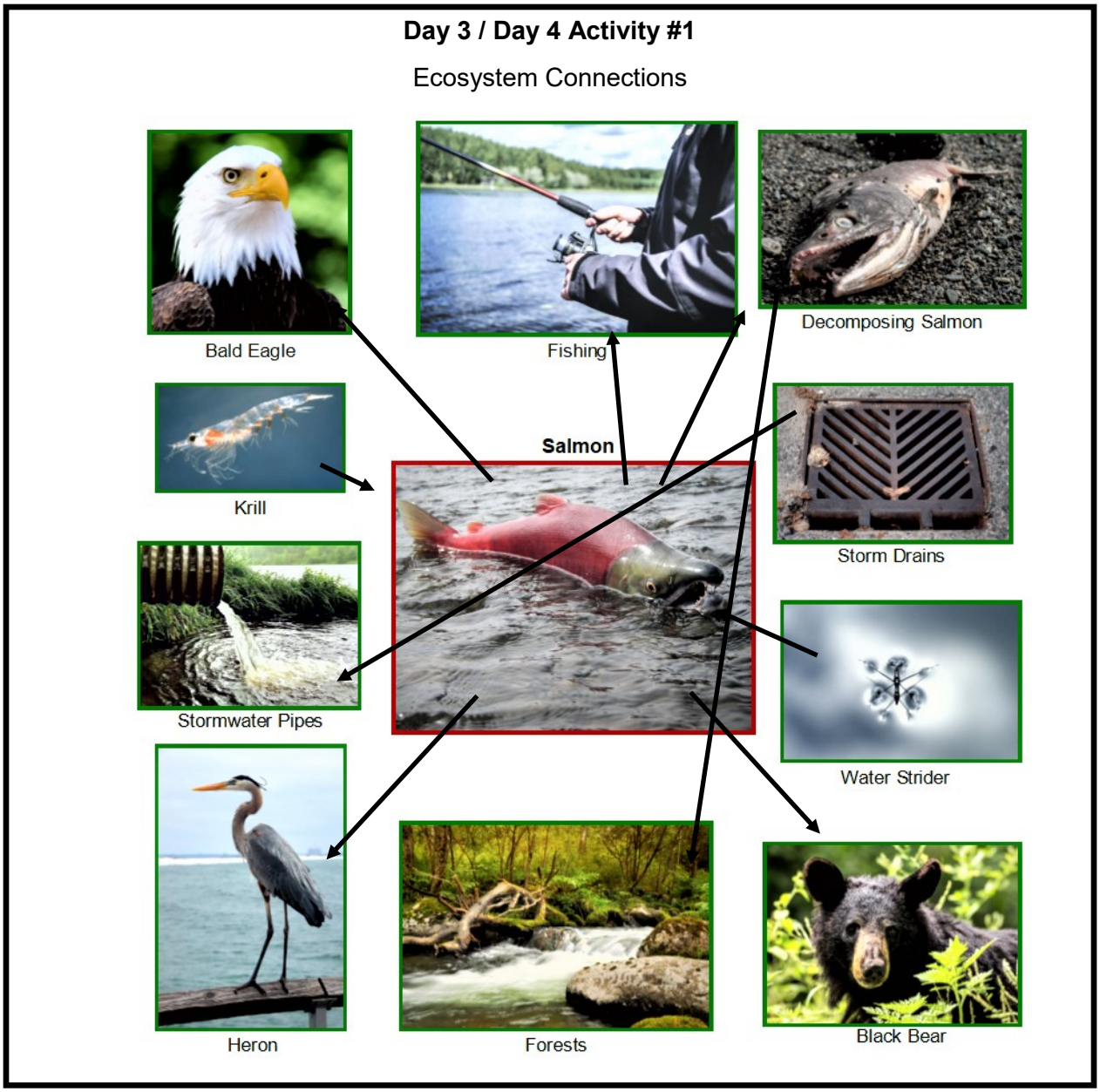
- Remove the dam: it was preventing salmon from getting up the river to spawn
- Remove the bridge: it disturbed salmon habitat during construction, and all of the cars driving on it are producing lots of pollution
- Remove the spilled trash can: all of the litter and garbage is not healthy for salmon

Things to add:

- Trees along the riverbank to provide shade and keep the water cool
- Bushes and grass to hold the soil in place, preventing the water from getting too muddy and murky
- Rocks and gravel to give the salmon a safe place to build their redd
- Lots of insects and animals to provide food for salmon

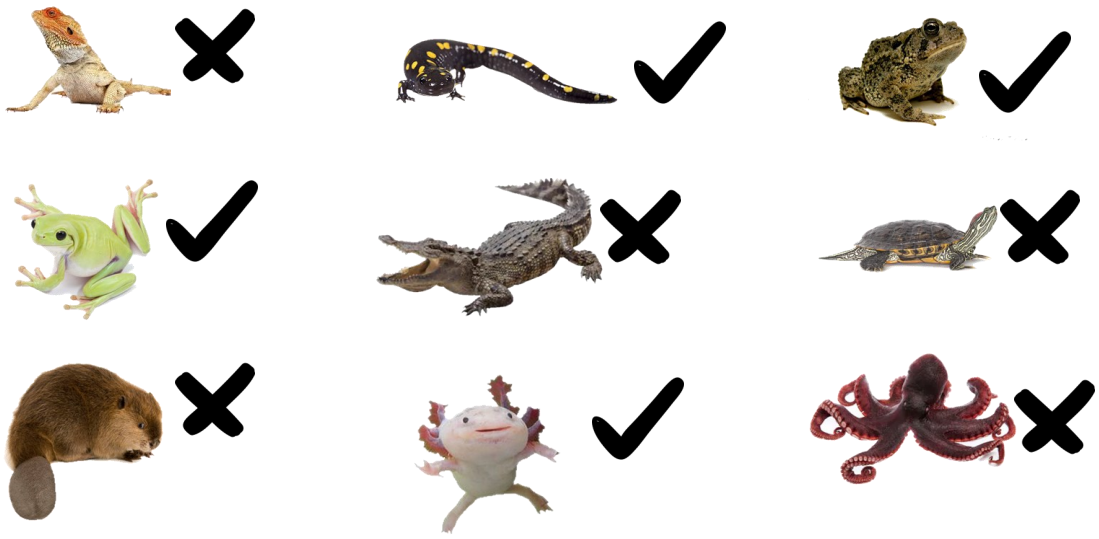
Day 3 / Day 4 Activity #1

Ecosystem Connections



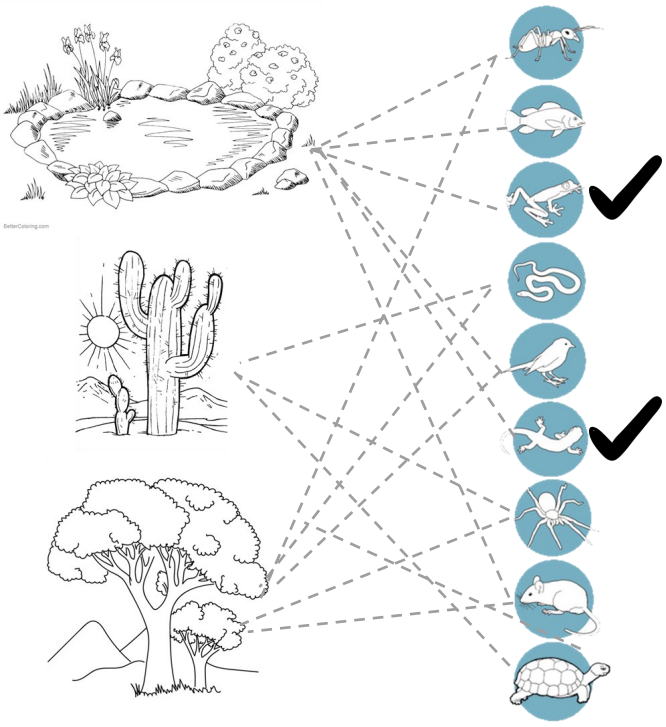
Day 5 / Day 6

Identifying Amphibians



Day 5 / Day 6 Activity #1

Match the Habitat



Day 9 / Day 10 Activity #2

Stewardship Ideas

1. Turn off the faucet while brushing your teeth
2. Take shorter showers
3. Always do a full load of laundry
4. Always fill the dishwasher all the way
5. Go to a commercial carwash instead of washing your own car at home
6. Keep storm drains clear of trash and litter
7. Water your lawn or garden when the sun is low, so that the water doesn't evaporate too quickly
8. Water at the base of the plant, not the leaves, to prevent water from evaporating into the air
9. Find and fix leaks around the house