

## Festival Activity: Riparian Ramble

**Subject:** Science

**Concept:** Nature appreciation

**Key Vocabulary**

- Riparian
- Flora
- Fauna

**Skills**

- Wildlife observation
- Sensory awareness
- Interpretation

**Materials**

- Sturdy shoes
- Appropriate clothing for weather
- Binoculars optional

Through a multi-sensory safari your students will explore creature clues, forest **flora** (plant life) and **fauna** (animal life) and wetland wonders along the Icicle River Interpretive Trail.



**Grade Level Expectations (GLEs) or Evidence of Learning**

Science

1.2.3 Know that substances are made of small particles.

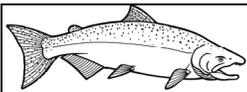
2.1.5 Understand how to report investigations and explanations of objects, events, systems, and processes.

**Objective**

Students will observe and learn to interpret their natural surroundings during a walk on the nature trail.

**Suggested Procedure**

A Salmon Festival activity leader will lead your students on a hike through a **riparian area** (transition zones between land and water environments) along Icicle Creek. Students will encounter biologists at field stations and observe the natural world around them.



## Pre-Work: Blue Ribbon Niche

**Subject:** Science, The Arts

**Concept:** Riparian habitat

### Key Vocabulary

- Predator
- Prey
- Producer
- Consumer
- Decomposer
- Herbivores
- Carnivores
- Omnivores
- Riparian
- Ecosystem
- Habitat

### Skills

- Analysis
- Communication
- Discussion
- Identification
- Inference
- Observation
- Reporting
- Research

### Materials

- Variety of art materials (paints, clay, glue, wire, string, brushes, construction paper)
- Nature magazines for photos and book references about riparian habitats and wildlife
- Teacher Reference, "What are Riparian Areas"

Discover a riparian area! Students create a variety of representations of animals that live in riparian habitats.

### Grade Level Expectations (GLEs) or Evidence of Learning

#### Science

2.1.5 Understand how to report investigations and explanations of objects, events, systems, and processes.

#### The Arts

Essential Learning 1. The student understands and applies arts knowledge and skills.

Essential Learning 3. The student communicates through the arts.

### Objectives

Students will: 1) identify different organisms that live in riparian ecosystems, 2) describe the ecological role of some organisms in riparian habitats, 3) describe some basic characteristics of riparian habitats, and 4) evaluate potential positive and negative effects from changes in riparian habitats.

### Background

**Riparian** habitats are the green ribbons of life found on the edges of water courses. These transition zones between land and water environments are important and valuable areas supporting a variety of plant and animal life. Each plant and animal in the riparian **ecosystem** has an important role to play. Some are **predators**, some **prey**. Some are **producers**, some **consumers**. Some are **decomposers**. Some are **herbivores**. Some are **carnivores**, and some **omnivores**. The plants and animals in the riparian **habitat** are interdependent, with each species contributing to the functioning of the overall system.

Riparian areas have unique plant and soil characteristics, often much different from the land and water environments they connect.

Many animals that live here cannot survive without the special conditions that the riparian area provides. Riparian areas often provide different and more abundant vegetation than surrounding areas: higher percentage of shade; higher humidity; and more

diversity in animals and plants. The width of a riparian area depends on the amount of available water, soil types, minerals, water table, geologic structures, and many other factors.

Riparian habitats are both aquatic and terrestrial and are characterized by a wide diversity in life forms. For example, frogs are commonly found in areas of calm waters of the riparian area. Frogs are predators, once they mature beyond their algae-eating tadpole stages. They need moisture, sunlight and grasses or other vegetative shelter. Their eggs must be deposited in water that is permanent enough to allow a year-long period to hatch, grow into gilled tadpoles, and finally transform into insect-eating, air-breathing frogs. Fish, wading birds, raccoons, foxes and other animals eat both tadpoles and frogs. It is this interrelatedness of all these animals that contributes to the importance, uniqueness, and beauty of riparian zones.

Riparian areas are easily affected by natural and human-caused changes. For example, vegetation and wildlife are dramatically affected by spring flooding and flash floods. Excessive use of riparian areas by humans, livestock, and wildlife can result in destruction of riparian vegetation and destabilization of the stream or riverbanks causing increased rates of erosion. In arid areas of the west, stream flows have been diverted from original channels to provide water for farming and livestock use. Development and recreational pressures also threaten this unique habitat. Riparian areas are fragile and can be destroyed easily. They are important in many ways: aesthetic, ecological, scientific, social, economic, recreational and intrinsic value. By learning about the unique characteristics of riparian areas, people may have more appreciation for their importance.

The major purpose of this activity is for students to become familiar with some of the characteristics of riparian species and their habitats.

### **Suggested Procedure**

NOTE: This activity is designed to involve a visit to an actual stream site. If that is not possible, see the “Variation” for an alternative approach on page 83.

1. Select a local stream or standing body of water with which the students may have some familiarity. Tell the students that dozens of different animals and plants live in, around, above and below that aquatic habitat. Ask the students to generate a list of the animals that they think live in the water and its nearby environment. Consider the water and its bordering ecosystems a “riparian” area.
2. Assist the students in verifying which of the animals they list actually do live in your region and might live in this riparian area. For list of Washington wildlife refer to the website: [washington.edu/burkemuseum/fieldguide/index.php](http://washington.edu/burkemuseum/fieldguide/index.php)
3. Have the students each choose an animal. Ask students to create an art form representation of their animal. They can use drawing, painting, collage, sculpture, magazine images—or any other art form of their choice. Be sure to ask the students to make their work durable enough to be displayed outdoors. Each art form should have a hook, string or support to allow it to be hung on branches, stuck in the soil or placed on a solid surface.

4. The students should become familiar with how the animal they have chosen “makes a living.” That is, they should know its “occupation” in the habitat. They should know what other animals or plants their animal depends upon and which organisms depend upon their animal. Discuss the concepts habitat with the students at this point for emphasis. Remember that, **habitat** is the animal’s “address” and includes the basic requirements for survival such as food, water, shelter, and space.

5. The next step is to visit the riparian habitat that was selected in the first procedure. Emphasize personal safety and regard for the habitat. Select a “central gathering place” where everyone can return for discussion. Choose this central place so that any area in which the students place their animals is visible.

6. Ask the students to disperse and place their “animals” in appropriate settings within the habitat— places in which their animals would live. If possible, the students can be alert to whether the real living animal is in the environment at this time as well. Remind the students to restrict themselves to a designated area so that all of the art form animals can be seen from the central gathering place. After each animal is placed in its appropriate spot in the habitat, have all the students return to the starting place.

7. Ask each student to go to his or her animal—one by one—to tell about the animal, its characteristics, and its habitat in three or four sentences. Make sure all of the students can hear and see one another clearly during this process.

8. Once each of the students has done this, gather the students together and discuss the concepts of habitats and the interrelatedness of all organisms in any ecosystem. Point out the effects the body of water has on the surrounding area. Emphasize the word “**riparian**” in the discussion. Have the students identify and discuss the characteristics of riparian habitats.

9. Now ask the students to consider things that might change this riparian area so as to affect how suitable the habitat would be for the animals living there. Here are examples of potential changes that could take place in some areas:

- draining to expand acres under cultivation on nearby farms;
- removing shade-producing trees or shrubs along the bank of a flowing stream;
- introducing an exotic plant;
- clearcutting a slope above a stream producing siltation from increased runoff;
- straightening or channelization of a stream, increasing the speed of flow;
- disturbing fish spawning beds by livestock moving through or people wading or hiking in streams
- planting vegetative cover on a previously bare slope above a riparian area; and
- regulating uses of the area that are compacting soil and creating erosion problems.

Identify and describe, if possible, changes that would have negative consequences for one or more kinds of animals. Identify and describe, if possible, changes that would have positive consequences for one or more kinds of animals.

10. Have one or two students volunteer to demonstrate and evaluate the consequences of a change that would damage the habitat for one or more of the animals. They can use their riparian animal art form to illustrate. They could do this by

removing the animal art form that would be immediately affected by the change. For example, severe pollution would affect the aquatic dwellers—fish, frogs, etc. Ask the students to discuss the possible effects on the remaining animals in the area when one or more animals is removed. Repeat with a different change, such as fire, development, damming and stream diversion.

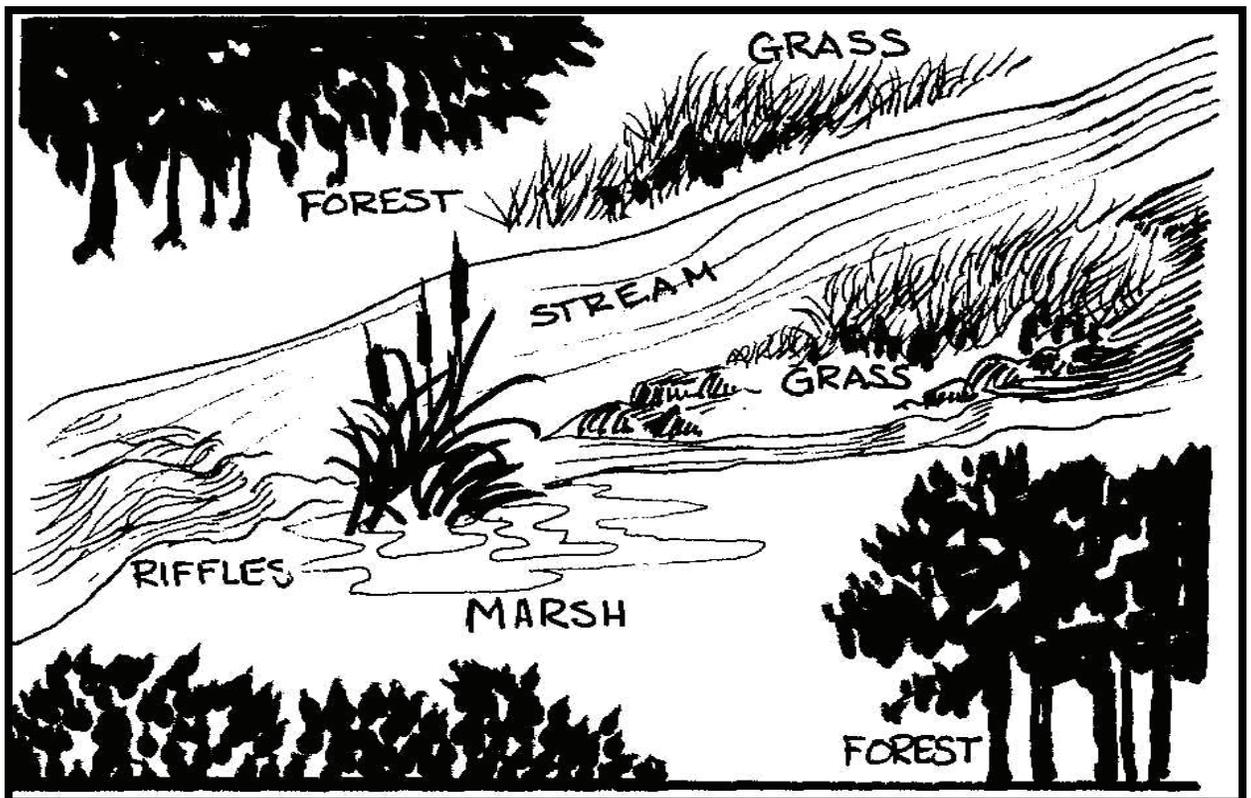
11. OPTIONAL: Invite the students to work in small teams to investigate the area for evidence and observation of actual animal life in this riparian area. List and quantify any species they observe. Ask the students to compare similarities and differences between the diversity of animals they actually find evidence for, and the diversity they represented in their art forms.

12. Ask the students to summarize what they have learned about **habitat** and **riparian** environments. Ask the students to gather their artwork animals from the environment and return to the classroom.

### Variation

There is no substitute for the quality of experience gained from an actual site visit. If, however, a site visit is impossible, here is a suggested alternative:

1. Create a simulated riparian area on the school grounds using chalk, paper cutouts and other materials. An example is shown below.
2. Follow the suggested procedure for the activity.



## **Vocabulary Words**

**Predator** - animals that kill and eat other animals.

**Prey** - animals that are killed and eaten by other animals.

**Producer** - green plants utilize energy from the sun to make food.

**Consumer** - animals that eat either the plants or other animals; they can't make their own food.

**Decomposer** - those organisms (bacteria, fungi) which convert dead organic materials into inorganic materials.

**Herbivores** - animals that eat plants.

**Carnivores** - animals that eat meat.

**Omnivores** - animals that eat both meat and plants.

**Riparian** - transition zones between land and water environments.

**Ecosystem** - all living things and their environment in an area of any size with all linked together by energy and nutrient flow.

**Habitat** - the arrangement of food, water, shelter, and space suitable to animal's needs.

## **Extensions**

Investigate what kind of repairs can be done to riparian areas after extensive damage has occurred. If it seems useful and appropriate, explore the possibility of a riparian restoration team working in your community to reinstate the health of any riparian areas that have been degraded. Before you start a project like this, consult an expert for advice. (Washington Department of Fish and Wildlife or Department of Ecology)

From Project WILD Aquatic Education Activity Guide © 1992 Council for Environmental Education



## Teacher Reference: What are Riparian Areas?

Riparian areas are the transition zones between land and water environments. When healthy, these narrow strips of land along streams, rivers, and lakes are usually covered with dense vegetation, including trees, shrubs and grasses.

The abundance of water and unique plant communities make riparian areas different from the drier uplands. Riparian areas are a productive and valuable resource. They play a crucial role in the ecological health of our surface water. Yet, riparian areas are very fragile and must be managed carefully if we wish to retain their vegetation, soil, and the many social, economic, and environmental benefits they provide.

### Why are riparian areas important?

Although riparian areas are relatively small compared to the surrounding area, they perform a number of very important functions. These functions include:

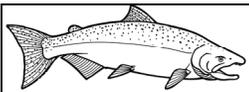
- **Stabilize banks** – Shrubs and trees hold the soil along streams and lakes. This prevents banks from collapsing during periods of high water.
- **Reduce flooding and sedimentation** – Trees and shrubs help retain runoff longer, which improves water infiltration into the soil and holds sediment that would otherwise be carried downstream.
- **Improve water quality** – Trees, shrubs, and grasses along streams and lakes catch sediment, nutrients, pesticides, pathogens, and other pollutants before they enter the water.
- **Enhance wildlife habitat** – Trees and shrubs provide habitat and travel corridors for many wildlife species. Wildlife must be able to travel to and from areas of quality habitat.
- **Keep water cool** – Riparian vegetation shade streams and small lakes during the warm summer months. This increases the food and oxygen available for fish.
- **Regulate stream flow** – Vegetation along streams improves water absorption and storage. Instead of flowing directly into streams, runoff is absorbed into the soil and groundwater reserves are recharged. This water flows underground into the stream much more slowly.
- **Improve scenery** – Trees and shrubs along streams add diversity and beauty to the landscape.

### What makes a healthy stream?

- Deep-rooted native plants along the banks, including large bushes and trees, with no exposed soil in the riparian area.
- A stream channel that meanders from side to side, with overflow channels and a healthy floodplain.
- Channels with a balance of flow, sediment, and large limbs and root wads that have fallen in the water from the riparian zone.

Large trees can help stabilize banks and provide food for water creatures. Wood that drops into the stream creates shade, hiding places, and nurseries for fish and other aquatic life.

Many water bodies leak both sideways and down, into underground sand and gravel deposits called the hyporheic zone. Here water flows more slowly. Biological and chemical activity takes place in hyporheic zones. They host diverse invertebrate communities and provide another important connection in the transition between land and water environments.



## Post-Work: I Remember a Riparian Retreat

**Subject:** Science

**Concept:** Nature appreciation

**Key Vocabulary**

- Riparian
- Habitat

**Skills**

- Sensory awareness
- Interpretation
- Analysis
- Comparing similarities and differences
- Description
- Discussion
- Drawing
- Writing
- Inference
- Interpretation
- Listening
- Visualization

**Materials**

- Water colors
- Acrylics
- Poster paints
- Crayons
- Writing materials

Students will remember their visit to a **riparian** area by participating in a simulated field trip and art work.



**Grade Level Expectations (GLEs) or Evidence of Learning**

Science

2.1.5 Understand how to report investigations and explanations of objects, events, systems, and processes.

**Objective**

Students will: 1) review **habitat** characteristics of riparian areas; 2) remember the animals that inhabit them; and 3) state the importance of riparian areas to wildlife and humans.

**Suggested Procedure**

1. Ask students to remember their visit to the riparian area during the Salmon Festival activity. What was it like? Were there plants growing there? What did the area look like? Was it hot or cool? Simply encourage the students to talk and share descriptions of their experience to the riparian area.

2. Reinforce the importance of riparian areas as natural areas for people and wildlife.

3. In order to remember and learn more about these special places, the students will need to close their eyes

and picture the things you will be describing. They will be picturing these things from their own point of view, as themselves, in the setting and circumstances you will describe. Invite the students to get in a comfortable position, close their eyes, and do their best to picture what they hear.

*“It is a hot summer day. You are walking in a meadow filled with knee-high grasses. Here and there are masses of tiny blue wildflowers. . . The ground beneath your feet is uneven, but you are in no hurry as you walk slowly toward a grove of trees. As you near the trees, you notice the changing colors of green. . breeze whispers through, showing first a shiny green, then a dull green underside of the leaves. . .As you step into the grove of trees, you are surrounded with a welcome coolness. . . You immediately feel the protection of the canopy of green above your head. . tap-tap-tapping sound breaks into your thoughts. Searching about among the rough-barked trunks, your eyes finally spot a bird, black and white with a touch of red on its head, clinging to a vertical tree trunk and bobbing its head in time to the rhythmic tapping. . . Your eyes fill with the beauty of the setting. . . Your skin welcomes the cool. . .As you breathe deeply, the very scent of green comes to you. . . The aroma of earth and growing things is strong and you detect here and there almost a memory of the sweet perfume of the flowers. . . Once in a while you smell the odor of wet soil and last seasons’ decaying leaves and grasses catches your attention.*

*As you explore further, you notice that the tree trunks are not as crowded and close as before. . . Grass, which earlier reached to your knees, is being overshadowed by chest-high bushes. Although these bushes have no thorns, they nevertheless snag your clothing. . . Your arms are lightly scratched by the twig ends. Several of the bushes are covered with small berries, pink and pale green, ripening into red in the warm sun. The bushes become taller. . . You find your-self pulling aside thick, tangled willows taller than your head. . . You carefully choose a safe path along the trail beneath your feet. Suddenly your left foot drops six inches and, looking down to examine the terrain more closely, you notice that, where you stepped, the tunnel of a burrowing animal collapsed from your weight. Moving on again you feel the whisper of an abandoned spider web touch the side of your face. . . Brushing it aside, you notice the slope of the land is steeper. . . You pause, listening. . .listening. You can hear the high drone of insects. . . It has come upon you so gradually, you are surprised that you didn’t hear it before. . . Now it seems almost frighteningly loud. And beneath the buzzing drone, and lower in pitch and volume, is the sound of water gently spilling over rocks. Above the place where the water must be, you see thousands of tiny spots milling before your eyes, the creators of that high buzzing sound. . . The spots are hundreds of swarming insects in a cloud too thick to picture. . .A dragonfly flashes by with its iridescent pinks and greens, darting here, pausing, darting there, pausing, snatching dozens of the dots, relishing a meal in an unending insect buffet. You step aside, ducking beneath the swarming insects. . . You smile as your eyes come to rest on the splashing waters of the stream a few feet below. As you proceed, you use your arms to open a space to walk between the graceful tan and green willows that bounce back undisturbed in your wake. As your eyes comb the scene for a place to rest, you notice a hip-high rock ahead of you—grey, warm, and not yet water-smoothed. . . You pause before reaching the rock and bend toward the water, gathering a handful of pebbles from the stream bed. One leg anchors itself on the ground between two willows while the other reaches over the water. With the pebbles in your hand, you swing up onto the dry perch of the rock. You settle down and look at the still wet pebbles. . .grey, pink, tan and cool in your warm hand. After you examine them*

*carefully, you toss the stones one at a time into the stream, listening to the pleasing plop of stone on water. Then your eyes drift downward to the waters of the stream near the base of your rock. . . In an eddy you see a fish, hidden like an illusion in the stone and silt, waiting, waiting, unblinking and still, only the faint wave of a gill, a tail fin, showing any evidence of life at all.*

*As you continue to look downstream you notice all kinds of small insects are now dancing across and above the water. . . A small ripple occurs in the water, then another and another. . . You realize that fish are rising up from below and feeding on the surface insects. . . Birds dart in and out of the tangle of vegetation. . . Some fly through. Downstream a frog begins to croak. . . Much nearer, another frog offers a reply. You look around quickly to see if you can find the nearer frog. For a moment you think you spot it, but then realize that, unless it sings again, you may never find it. Your eyes search for a moment as more frogs telegraph their messages back and forth. But then it seems time to leave. . . You take one last sweeping look all around this beautiful setting. . . You slowly get up from your rock along the streamside and head back home.”*

3. Ask the students to continue to sit quietly with their eyes closed and review the whole experience. Ask them to pay particular attention to their favorite images. Tell them they are going to be asked to describe this setting as they saw it. Invite them to open their eyes.
4. Ask them to describe their favorite images. Once each student has done this, invite all of the students to select art materials or writing materials. Each should draw or paint or write about his/her favorite images. Once they are finished, have the students tape up their art work and writings on a bulletin board or display area.
5. Ask the students to identify some of the characteristics of riparian areas. What kinds of plants did they see? What kinds of animals? Was the environment different near the water than it was farther away from the water? If yes, what were some of the similarities and some of the differences? Ask the students to list, describe, and discuss some of the many reasons that riparian areas are important and how they have value to wildlife and humans.

## **Vocabulary Words**

**Riparian** - transition zones between land and water environments

**Habitat** - the arrangement of food, water, shelter, and space suitable to animal's needs.

## **Extension**

Generate a list of things that could be done to make it possible for people to visit a riparian area without damaging or destroying it.

Describe your position on a plan to develop a riparian habitat for recreational use by people that like to hike, bird watch, fish, and other “low impact” users. A parking area, restrooms, walkways, garbage removal and other needs must be considered.

## Teacher Reference: How Can You Help?

Whether you live in a city, on a farm or in a forest - especially if you live near the water - it is in everyone's interest to keep our riparian areas as natural as possible. When we neglect them or let them get cleared, paved, or split up, water quality and fish habitat suffer. Increased flooding and erosion may cause severe property damage.

One way to help is to create buffers of native vegetation along streams, lakes, and wetlands. On farms, this can mean fencing to limit access by livestock and diverting water to a stock tank.

Sometimes more sophisticated restoration methods are necessary. These include bank stabilization, in-stream structure, and meander construction. Permits are required for many activities in and around streams, lakes, and wetlands. For more information: Contact your local Natural Resource Conservation Service (NRCS) office or conservation district, the Washington Department of Fish and Wildlife, Washington Department of Natural Resources, or the Department of Ecology.

From Washington State Department of Ecology brochure "What are Riparian Areas? Artwork from Adopt-A-Stream Foundation from "Adopting a Stream: A Northwest Handbook."

