

## Festival Activity: Kids in the Creek

**Subject:** Science

**Concepts:** Macro-invertebrates, stream habitat, and indicator species

**Key Vocabulary**

- Macroinvertebrates
- Indicator Species
- Larva/larvae
- Diversity
- Habitat

**Skills**

- Classification
- Identification
- Observation

**Materials**

- All materials will be supplied by the activity leader.

Your students slip on knee boots to investigate the Icicle River. With resource specialists, they explore stream habitat quality by determining which organisms live in the creek.



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

Science

- 1.1.6 Understand how to distinguish living from nonliving and how to use characteristics to sort common organisms into plant and animal groups.
- 1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.
- 2.1.3 Understand how to construct a reasonable explanation using evidence.
- 3.2.4 Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.

**Objectives**

Students will: 1) explore the stream habitat and discover which invertebrates live in Icicle Creek 2) Evaluate water quality based upon invertebrate presence/absence 3) Describe the elements of a healthy stream 4) Describe why healthy streams are important

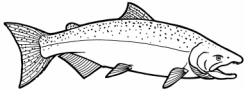
**Suggested Procedure**

From the banks of the Icicle Creek, students explore the stream habitat. With resource specialists they will determine where fish like to live, what they prefer to eat, and what insects are **indicator species** (a species whose presence or absence in an environment indicates particular conditions).

## Teacher Reference: Definitions

### Definitions:

Invertebrate –	animals without a vertebral (spinal) column. Often they have an exo-skeleton or semi-hard outer covering for physical support.
Macro-invertebrate –	an invertebrate seen without a microscope; visible to the eye
Benthic –	the bottom of the lake or river. Animals that live in the benthic zone live in the sediment at the bottom of a water source
Larva/larvae –	larva (singular) or larvae (plural) are the juvenile (young) form of an animal that transitions into another form as an adult.
Molting –	shedding an outer layer or covering to transition from young to an adult. Invertebrates often molt as they transition from larva to adult
Diversity –	the amount of variation in life forms in an ecosystem
Ecosystem –	a community of living organisms and how they interact with their non-living surroundings (air, water, soil, etc)
Habitat –	the physical environment that surrounds a living organism
Minnow -	Small fish
Scud -	An aquatic invertebrate with a laterally compressed body; also called a freshwater shrimp.



## Pre-Activity Work: Trout Treats

### Pre-Activity #1: Trout Treats

1. Teachers make copies of the Trout Treats handout. Read or review the text on the graphic with students. Consider discussing the following topics:
  - a. Name the animals you see in the picture. Which ones live under water vs. above water? Discuss the type of animal. For example, heron and merganser are types of birds. With the exception of the minnow, everything underwater are invertebrates. Note the Trout is not labeled, but the trout, bass, and minnow are fish.
  - b. Count how many animals are in the picture. Discuss the concept of diversity which is the number of different organisms (plants or animals) living within an ecosystem.
  - c. What else do you see in the picture (on the banks and under the water)? Rocks, plants, down tree, grasses, forest, etc. Discuss the concept of habitat which is where an organism lives. Typically, the more diverse the habitat (more structure provided by plants, rocks, and wood) then more organisms (plants and animals) can live there because there are more types of habitat.
  - d. How do the bugs hide from the fish and birds that eat them? (under the rocks, wood, and plants in the stream)
  - e. How do the fish hide from the birds that eat them? (under the rocks, wood, and plants in the stream)
  - f. What do the bugs eat? They eat little bits of plant material and other detritus or organic matter (fungi, bacteria, etc) in the stream bed or water column.
2. Students list what eats fish (trout) and what trout eat in the tables on the bottom right hand side of the page.
3. Once students are done, review what they wrote in the tables.
4. Wrap up the discussion by talking about habitat and healthy streams
  - a. What do the fish need for a healthy stream habitat (home)? Cover (shelter from predators where they can hide under rocks, wood, trees), food, air, and water.
  - b. What do the bugs need for a healthy stream habitat? Cover (shelter from predators where they can hide under rocks, wood, trees), food, air, and water.
  - c. What do students need for a healthy habitat (home)? Cover (shelter), food, air, and water.

At Salmon Festival, we will look for these bugs and indicators of a healthy stream habitat that provides food, air, water, and cover for bugs and fish.

You can watch a video of a similar Kids in the Creek activity done with high school students in the Entiat River online at:

<http://www.kidsinthecreek.com/>

# TROUT TREATS



Trout can only live in healthy waterways where there is plenty of trout food.

Many of the animals in this picture can be trout food - but which do trout like best?

Just like people, different trout like different foods. For example, huge trout on the Missouri River

drive anglers crazy because they sometimes won't eat anything but midges. Other trout love crunchy crayfish.

To get their food, trout have to compete with other fish, like smallmouth bass. Sometimes, they even have to compete with other trout!

Trout also make great treats themselves. Of course, people enjoy eating trout. But so do other carnivores (animal-eaters) and omnivores (plant- and animal-eaters) such as raccoons, hawks and bears.

COMMON MERGANSER



GRASSHOPPER



MAYFLY ADULT



CADDISFLY ADULT



RIVER OTTER



GREAT BLUE HERON



SMALLMOUTH BASS



SCUDS



LEECHES



MAYFLY LARVA



DRAGONFLY LARVA



CRAYFISH



CADDISFLY LARVAE



MINNOWS



## What eats What?

Some birds, like herons and mergansers (a kind of duck), eat trout. So do some mammals like otters and bears. Trout eat almost any smaller animal, including insects, crayfish, and tiny fish. Take a close look at this picture, and see if you can figure out what eats trout, and what trout eat. Check your answers at [www.streamexplorers.org/magazine/](http://www.streamexplorers.org/magazine/)

### Trout eat These

stonefly larvae

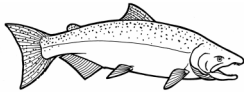

### These eat Trout

river otter




## GET WET

If you live near a stream or lake, you're in luck. You and an adult can actually check the health of your local waterways with nothing but two sticks, a net and a hand lens. Scientists use this method, and people like you can help monitor their local waterways and share their findings with the scientists. To find out how to build a real kick-net and become a citizen scientist, go to [www.streamexplorers.org/](http://www.streamexplorers.org/)



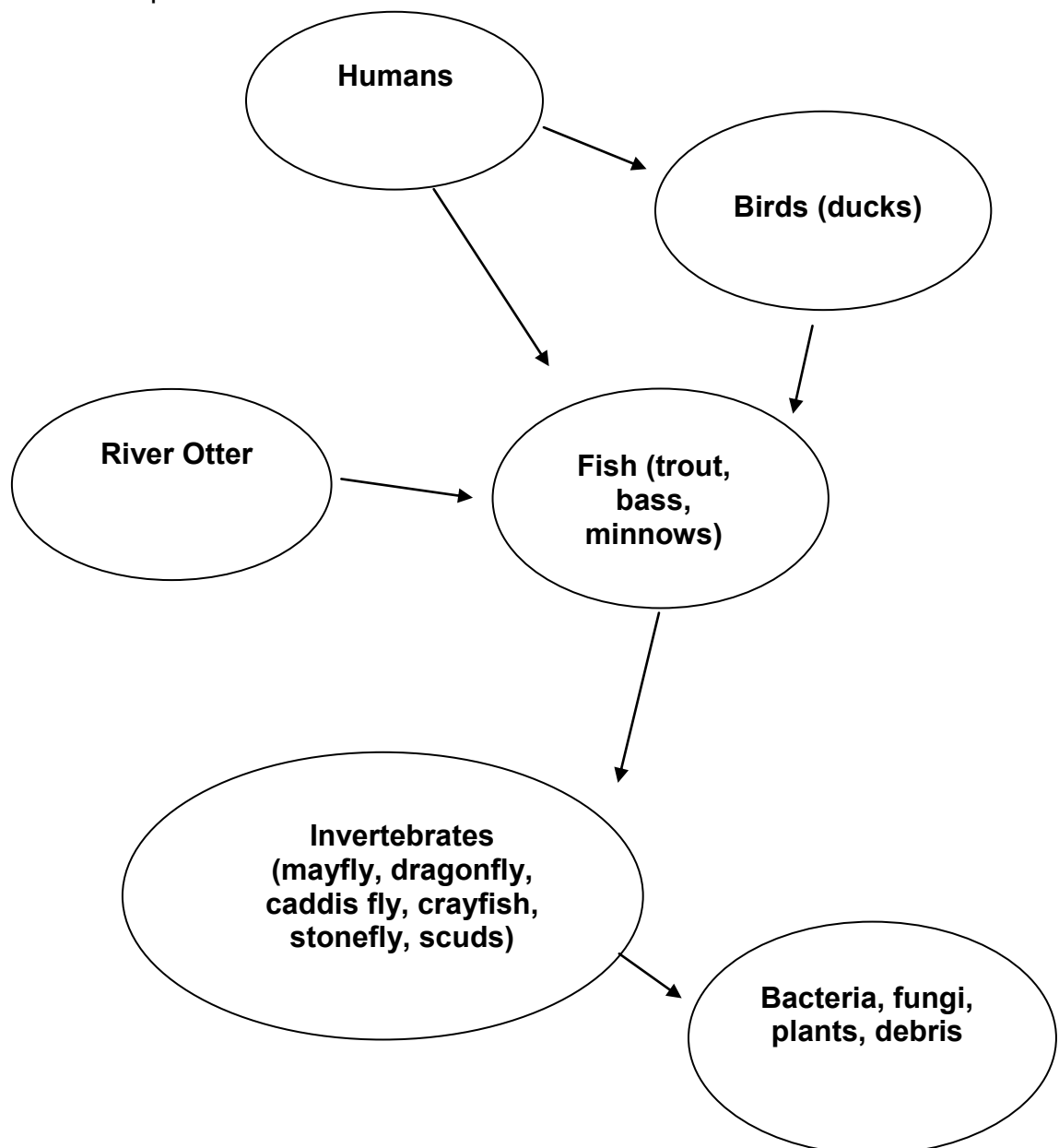
## Pre-Activity Work: Food Web

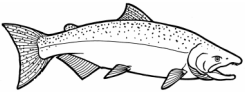
### Pre-Activity #2: Food web

Have students convert the organisms on the Trout Treats handout into a food web showing what eats what in a diagram using bugs, fish, and humans.

Students can either draw the organisms or just write in the names.

See the example below.





## Pre-Activity Work: Larva to Adult

### Pre-Activity #3: Larva to Adult

1. Refer back to the Trout Treats diagram. Review the difference between larva and larvae. Larvae is plural for larva.
2. There are two organisms (bugs) that are listed on the Trout Treats diagram twice. Can you find them? Answer: both the mayfly and caddis fly are on the photo as a flying bug and in the water. The larva is the early life stage (the child) of the adult (flying) mayfly. Sometimes the baby (larva) stage doesn't look at all like the adult stage of the same animal.
3. Do you think the fish eat the larva or adult? Answer: both – many times the fish eat the bugs when they are at the water surface transitioning from larva to adult (molting) or when the adult is laying eggs on the surface of the water.
4. What do the adult caddis fly and adult mayfly have in common?  
Answer: wings
5. Make a copy and cut out the picture cards on the next page (laminated, if possible) to see if you can group all of the adult life stage with their youthful counterpart.

#### Adult

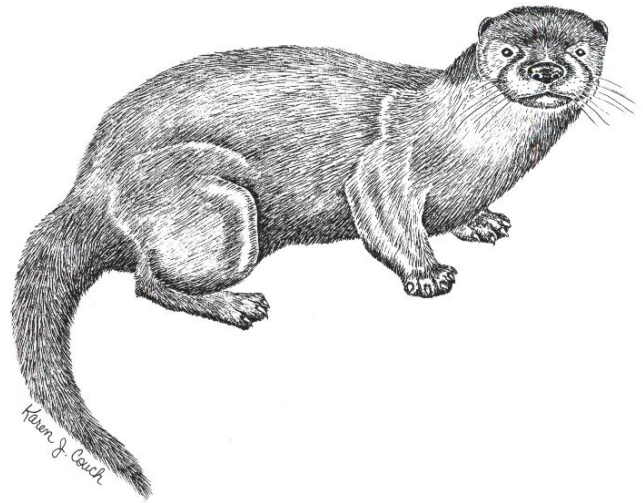
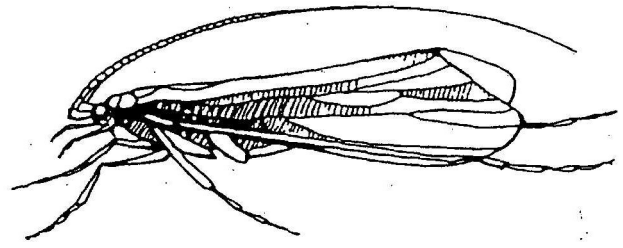
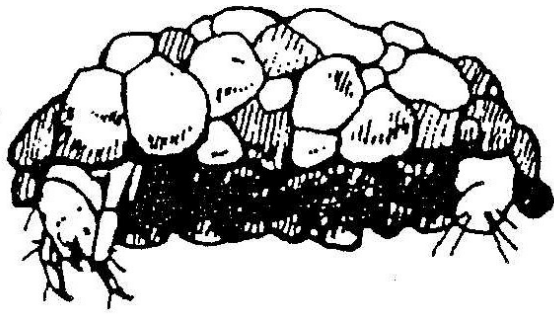
Caddis fly  
River otter  
Blue heron  
Salmon  
Dragon fly  
Duck

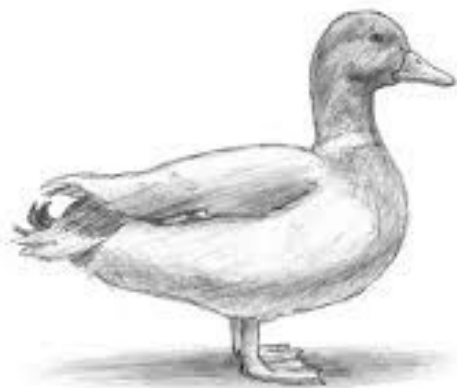
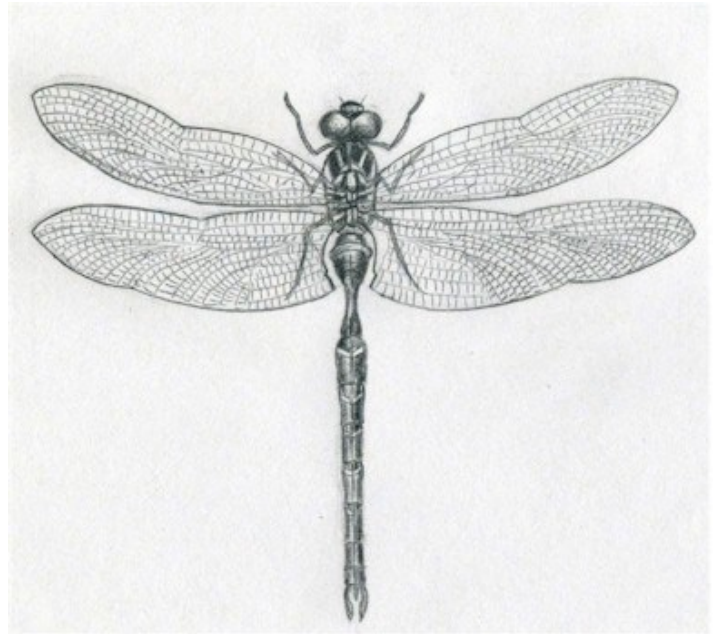
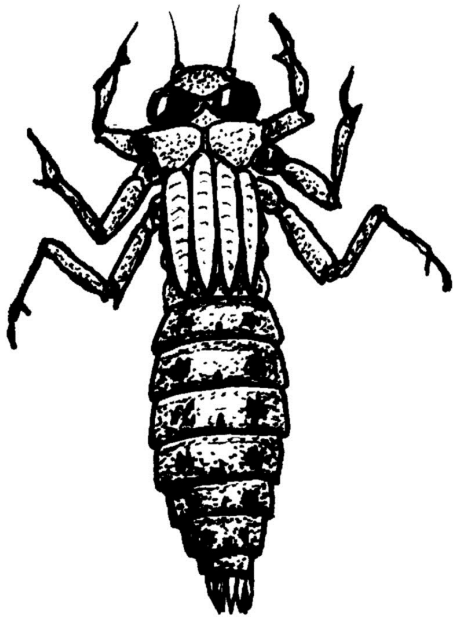
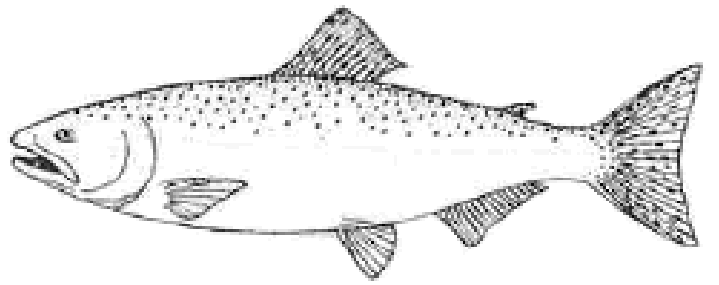
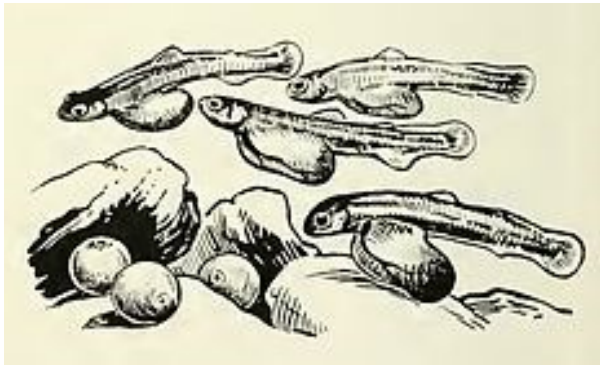
#### Young

Caddis fly larva  
River otter pup  
Blue heron chick  
eggs and alveoli (juveniles)  
Dragon fly larva  
Duckling

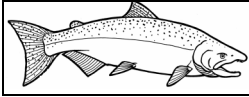
5. How can you tell the different larvae apart? Make a list of ways to tell the larvae apart. For example:
  - Number of legs
  - Number of tails
  - Antennae?
  - Size
  - Color

At Salmon Festival, we will look for the larva and look at Icicle Creek. We will try to decide if Icicle Creek is a healthy stream based upon the stream habitat and the bugs found in the stream. We will need to be able to tell the bugs apart based upon the list of characteristics or traits you made in the classroom. So bring your observation skills out into the field!









## Pre- or Post-Work: Build A Bug

**Subject:** Science

**Concept:** Macroinvertebrates

**Key Vocabulary**

- Macroinvertebrates
- Adaptations

**Skills**

- Classification
- Identification
- Observation

**Materials**

- Water noodle with hooks on the end
- Garland or rope
- Sunglasses with craft eyes glued on
- Wig or furry hat
- Feather boa
- Antennae; store bought or homemade
- Balloon
- Straw
- Fake vampire teeth
- Fishing net

By watching a presentation where one of their classmates is dressed up in costume, students will learn what adaptations macroinvertebrates have in order to live in a water environment.



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

Science

1.1.6 Understand how to distinguish living from nonliving and how to use characteristics to sort common organisms into plant and animal groups.

1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

**Objectives**

Students will be introduced to macroinvertebrates and the adaptations they have which allow them to live in an aquatic environment.

**Background**

The tiny animals that live in streams are called aquatic macroinvertebrates. These macroinvertebrates include many types of insects as well as other animals such as worms, mollusks, and tiny crustaceans.

Most macroinvertebrates make their home in the rocks, leaves, and sediment of stream beds. These organisms have many special adaptations that allow them to live in demanding environments. Macroinvertebrates that live in riffles and fast-moving areas may have features that

help them hold on to the substrate, such as hooked feet, suction cups, and flat bodies. Macroinvertebrates that live deep in the mud may have adaptations for a low oxygen environment. See the “Adaptations” column of the following chart for more examples.

<b>Adaptations</b>	<b>Items Representing Adaptations</b>
Legs/Claws	Water noodle with hooks on the ends
Tails	Garland or rope
Compound Eyes	Sunglasses with craft eyes glued on
Sensory hairs on head	Wig or furry hat
Gills	Feather boa
Antennae	Store bought or homemade antennae
Air bubble (plastron)	Balloon
Air Tube	Straw
Specialized mouth parts	Fake vampire teeth
Net for catching food	Fishing net

### **Suggested Procedure**

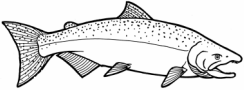
1. Ask students to brainstorm the different **adaptations** (the process of making adjustments to the environment) that a bug would need to live in an aquatic environment.
2. Choose a volunteer from the class. Explain that you will be preparing the volunteer so that he/she could live as a **macroinvertebrate** (aquatic organisms without a backbone which can be seen with the naked eye) in the water.
3. Ask the other students to tell you adaptations that the volunteer would need in order to live in the water.
4. As the students tell you their adaptation ideas, dress the volunteer in the items from the table above that represent the adaptations.
5. Discuss the adaptations as you go along. Why would a macroinvertebrate need them? How do they help the macroinvertebrate survive?
6. A good way to end this activity is with a photo. “Does our volunteer need anything else? I think he/she needs their picture taken!”

### **Wrap-Up**

Discuss the importance of macroinvertebrates. Do fish need them? Do we need them? How do they help us?

**Note:** An individual macroinvertebrate may not have all of the adaptations listed on the table. Your volunteer “bug” will have features found on many different types of macroinvertebrates.

Activity from Utah State University Water Quality Extension.



## Post-Activity Work: Healthy Streams

### Suggested Procedure (During Class After Salmon Festival)

#### Post-Activity: Healthy Streams

Once you are back at school, there are three different possible follow up activities. Choose one or more.

1. Visit a nearby stream and discuss the following topics:
  - a. How many different plants are growing on the bank?
  - b. What is the stream bed bottom made of? Rocks, mud, sand, a mixture of habitats?
  - c. Are there places for fish or bugs to hide? Is there a variety of structure like large and small rocks, overhanging plants, down wood, etc.
  - d. If you lift up rocks, do you find any bugs? Which ones? How many different ones? How is the diversity? How is the water quality?
2. Learn more about organizations trying to bring back more salmon by watching one or both of these 12 minute videos:
  - Salmon Recovery: Getting it Done <http://www.co.chelan.wa.us/nr/>
  - Power of Partnership <http://www.ucsr.com/videos.aspx>
3. Make a list of what you can do to help improve water quality or stream habitat. Use ideas from Salmon Festival and/or this web site:

<http://www.picturethewenatchee.com/the-solution/>

Here are some ideas that students might have for improving water quality and stream habitat:

- Don't remove native plants next to streams
- Install native plants next to streams
- Conserve water use in your home and yard
- Fence animals out of streams
- Don't use pollutants next to streams
- Wash cars at a commercial facility or where run-off doesn't drain to streams
- Minimize use of chemicals (fertilizers, herbicides, and pesticides) in the yard
- Pick up pet waste and dispose of it in the garbage