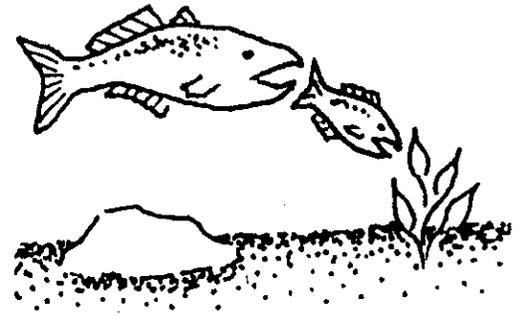


# The Food Web

## Grades 2-3



### Overview

The students will play a **Food Chain Game** and make a **Food Web** to help them understand how plants and animals interact.

### Objectives

- To help students understand that plant and animal life depends on one another for survival.
- To help students understand the importance of protecting all plant and animal life.

### Materials

*For the presenter:*

- 1 small piece of candy for each student (Tootsie Roll etc.)
- butcher paper - about 6' x 6'
- glue
- wide black marking pen

*For each pair of students:*

- nature word glued on a 6" x 9" piece of white art paper
- crayons

### Getting Ready

Hang the butcher paper up in front of the class where the students will be able to see and reach it. Hide 5 pieces of candy in one area of the classroom. Don't make it too difficult to find. You want the students to be able to find it in about 1-2 minutes. Divide the students into four groups. Glue the nature words on to 6" x 9" pieces of white art paper. Make sure you have enough words so each pair of students has a different word to illustrate.

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## **Procedures**

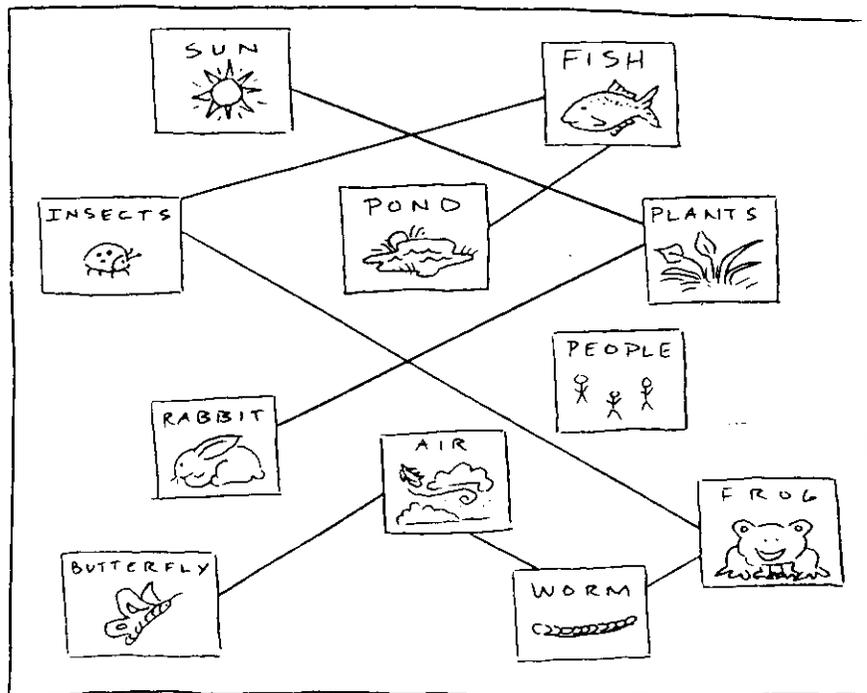
### **Activity 1: The Food Chain Game**

1. Tell the students that they are going to play a river game and today the front of the classroom is the river. Show them where the boundaries are.
2. The students should be divided into 4 groups. Assign each group a name: insects, small fish, large fish and people.
3. Tell the insects to move around and find a plant to eat (candy). Show them what a plant looks like and the area that they will find one. When they find a piece, they pick it up and hold it.
4. When 5 plants are found, say: "The river does not have enough food for all the insects; those who do not find food, did not survive and must return to their desks."
5. Tell the insects to stay in the river. Direct the small fish to swim up and touch an insect. If they catch an insect, the insect returns to his desk and the small fish takes his place in the river. The small fish who do not catch an insect do not survive and must return to their desks.
6. The large fish, pretending to swim, will try to catch a small fish. Those who do not catch a small fish do not survive and must sit down. The small fish that are caught sit down and the large fish take their place in the river.
7. The people do the same as the above. The children should begin to see how all living things depend on each other for food. When there was not enough plants, some fish died, etc.
8. Give all the students a plant (candy).
9. Ask: "What would happen to the small fish if all the plants were gone? What would happen to the large fish if the small fish were gone? What would happen to the people if the large fish were gone? Why is it important to take care of our rivers, streams and lakes?"

## Activity 2: Making a Food Web

Explain that they are going to make a Food Web that will show what they just learned playing the Food Chain Game.

1. Hand out a nature sheet to each pair of students.
2. Explain that they will need to draw a picture that illustrates the word on their sheet.
3. As the students finish, glue their pictures on the butcher paper.
4. Ask: "Can you see any pictures that need each other to live? (*sun and the plant*). Why?"
5. Draw a line between the two pictures that interact.
6. Continue to discuss all the pictures, drawing lines between the ones that interact.
7. Remove one picture, ask: "What would happen if this was no longer here?" (*plant - the rabbit would not have anything to eat.*)
8. Pretend that you sprayed an insecticide that kills insects. Ask: "What would happen to the food web without insects?"



**Closure**

Have each pair of students tell each other the answers to these questions. “What kinds of things can we do to help our environment? Why is it important that we protect it? What will happen if we don’t take care of all plants and animals?” Ask a couple of students to share their answers with the whole class.

**Nature Words**

**Sun**

**Air**

**Fish**

**Pond**

**Plants**

**Raccoon**

**Ants**

**Ducks**

**People**

**Rabbit**

**Beaver**

**Frogs**

**Trees**

**Birds**

**Worms**

**Butterflies**

**Bald Eagle**

**Clover**

**Mice**

**Flies**

# Life of the Salmon

Grades 2-3

## Overview

The students will discuss the Life Cycle of the Salmon using a display model and chart. The students will use *The Story of the Pacific Northwest Salmon* to review the concepts they learned.

## Objectives

- To help students understand the life cycle of the Northwestern Pacific Salmon.
- To help students understand the importance of protecting the habitat of the salmon.
- To help students understand what they can do to help protect the salmon's habitat.

## Materials

*For the presenter:*

- *Salmon Life Cycle Display* - available at BPA (optional)
- *Backgrounder - The Magnificent Journey* (BPA booklet)
- 1 copy of the *Life Cycle of the Salmon* (attached)
- *Journey of the Oncorhynchus* (BPA booklet)
- white or light blue butcher paper - about 4' x 4'
- colored marking pens or crayons
- glue

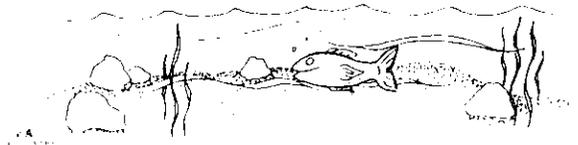
*For each student:*

- copy of *The Story of the Pacific Northwest Salmon*
- 1 crayon

## Background

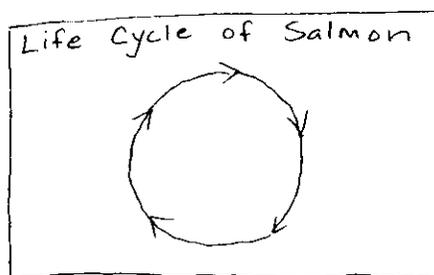
Salmon, known as the king of the fish, are one of the great natural resources of the Pacific Northwest. For Northwest Native American tribes, they hold special religious meaning. For all of us in the Northwest, they are a part of our culture and recreation.

These beautiful creatures have one of the most unusual life cycles in the animal world. They are born in freshwater streams many miles from the Pacific Ocean. When they are strong enough, they swim to the ocean, sometimes traveling hundreds of miles to get there. Fish that are born in freshwater and then migrate to saltwater are called anadromous fish.



Salmon spend their adult lives in the ocean, from one to five years depending on the species. During this time, they may swim as far north as the gulf of Alaska or south to the coastline of California. Then something amazing happens. In the vast ocean, they manage to find the mouth of the Columbia River. They enter the estuary and head up the Columbia River. With unerring instinct, these majestic fish leap water falls and jump up fish ladders at dams to get back to the exact stream where they were born. Once they reach their birth place, they build nests called redds. Here they lay eggs and spawn before dying. As the eggs hatch, a new generation of fish will take their place.

The Bonneville Power Administration is working hard to protect these fish at all stages of their life cycle so that future generations can enjoy our majestic salmon.



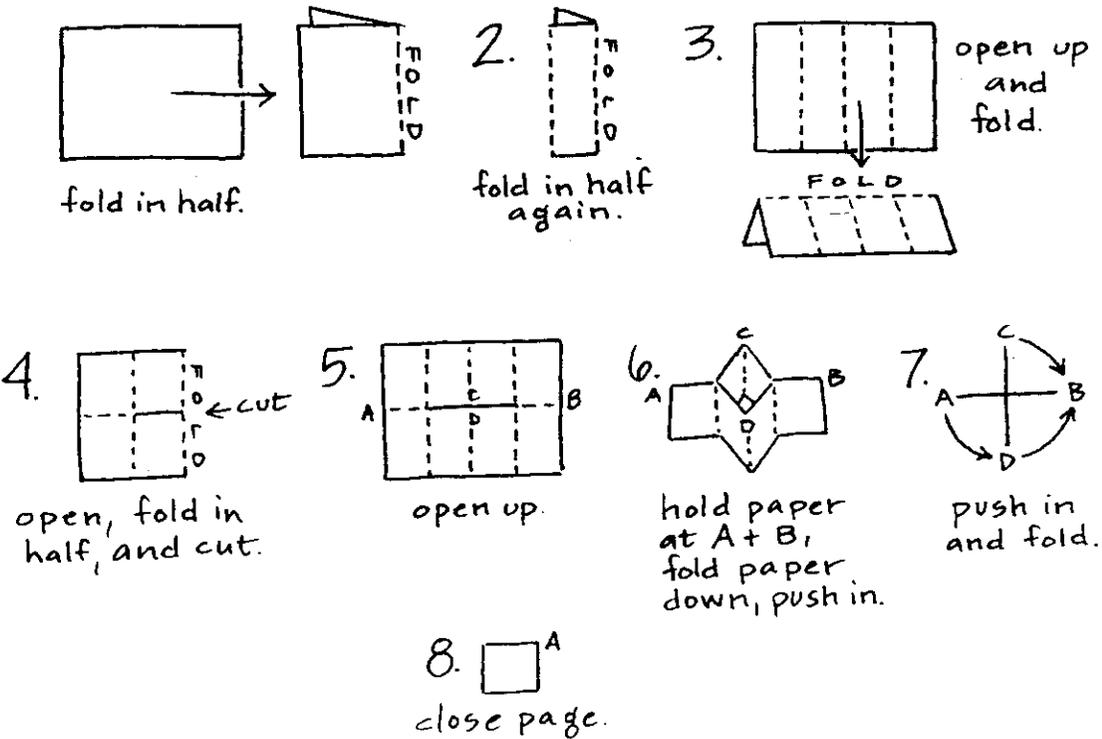
### Getting Ready

#### Activity 1

Read *The Magnificent Journey*, it gives background information on salmon that you might be interested in and would help with the class discussion. Draw a large circle with a black marker in the center of the butcher paper. Print - *Life Cycle of the Salmon* above the circle. You will be gluing the life cycle pieces on to the paper. Hang the blue butcher paper up in front of the class where all the students will be able to see it. Color each part of the *Life Cycle of the Salmon* and cut out the ovals.

## Activity 2

Fold enough copies of The Story of the Pacific Northwest Salmon, so each student in the class has one.



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## Procedures

### Activity 1

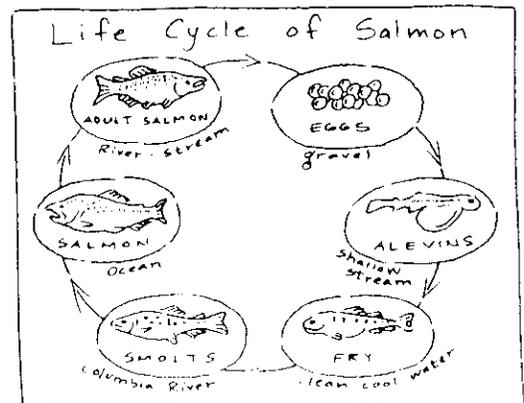
Begin by using the questions below to spark the student's interest and start them thinking about salmon.

## Questions

“Have you every gone fishing? Do you know where the Columbia River is? What kinds of fish would you find there?” If the students do not respond with salmon, share with them that salmon can be found in the Columbia River. Use the poster in the back of *The Magnificent Journey* to show them different kinds of salmon. Ask: “Do you know any facts about salmon?” (*This will give you an idea how much they already know.*) After the students have shared what they know, share with them some of the interesting facts about salmon.

Tell them that they are going to learn about the life cycle of the salmon. Share with the students BPA’s Life Cycle Display model. As you talk about each stage, show the pictures that you colored and glue them on the blue paper. Discuss where each stage occurs (*stream, river, ocean*). Write on the butcher paper where each stage takes place (*eggs - gravel in a stream*).

1. **Eggs** - adult salmon lay their eggs in gravel. The water is shallow, cool and clear. The female salmon covers her eggs with fine gravel.
2. **Alevins** - the eggs hatch and grow into tiny fish, a little more than 1 inch long. They are called alevins. Each has an orange pouch on its belly. The pouch is a yolk sac that provides food during the first few weeks of the salmon’s life.
3. **Fry** - the young fish slip up through the gravel. The yolk sacs are gone. The young fish now called fry are hungry and ready to eat, but do not stray far.
4. **Smolts** - the young fish continue to grow in the fresh water for up to 2 years. They are called smolts now and are ready to make their journey to the ocean.
5. **Salmon** - the salmon live in the ocean from 2 - 5 years and continue to grow larger.
6. **Adults** - the adult salmon find their way to the mouth of the Columbia River and swim up river to the stream where they were born. Here they lay their eggs and the cycle starts over again.



## Activity 2:

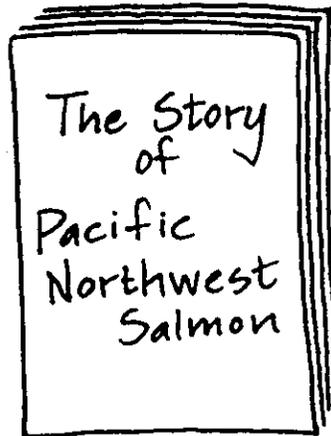
Hand out a copy of *The Story of the Northwest Salmon* to each student. As you read through it together, take time to review at each stage what is important for the salmon to survive. When you get to the last page, ask: "What kinds of things can we do to help?" Things to emphasize:

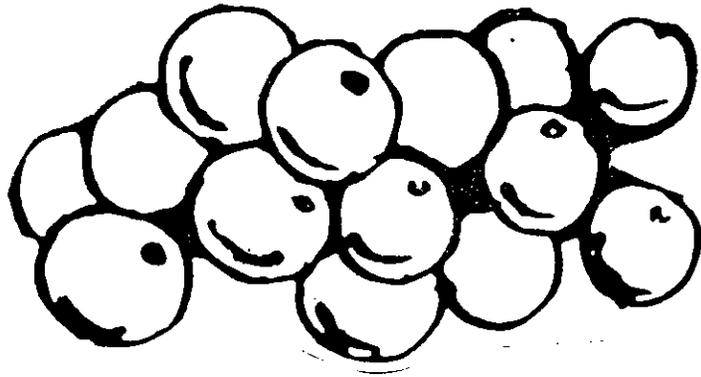
1. **Conserve Water** - Use less at home to save more for fish.
2. Do **NOT** dump any waste in streams or ditches.
3. **Use less chemicals**. Fertilizers, bug and weed killers, detergents and drain cleaners are all poisonous to fish and wildlife.
4. **Use less electricity**. The Northwest uses rivers to make hydroelectric power which is our main source of electricity. Using less electricity leaves more water for fish in the rivers.
5. **Plant trees beside streams**. Salmon and trout need cool shady water to survive. Trees also stop erosion and provide more food for fish.
6. **Ask others to help**.

On the last page, have the students record what people can do to help salmon.

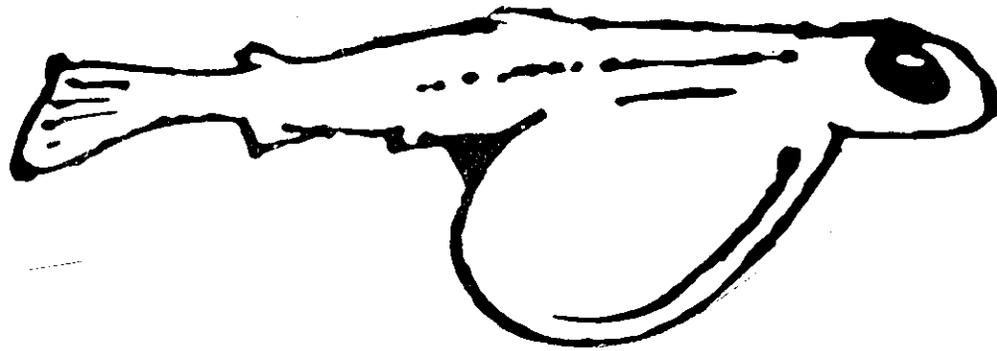
## Closure

Have each student share with their neighbor two important facts they learned about salmon. Ask a couple of students to share with the whole class.

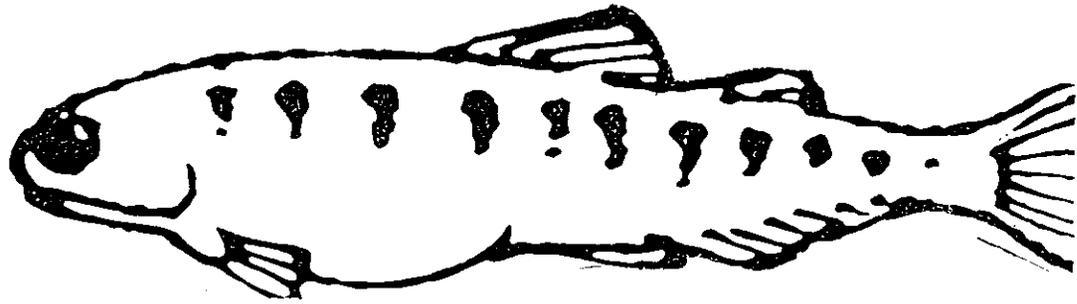




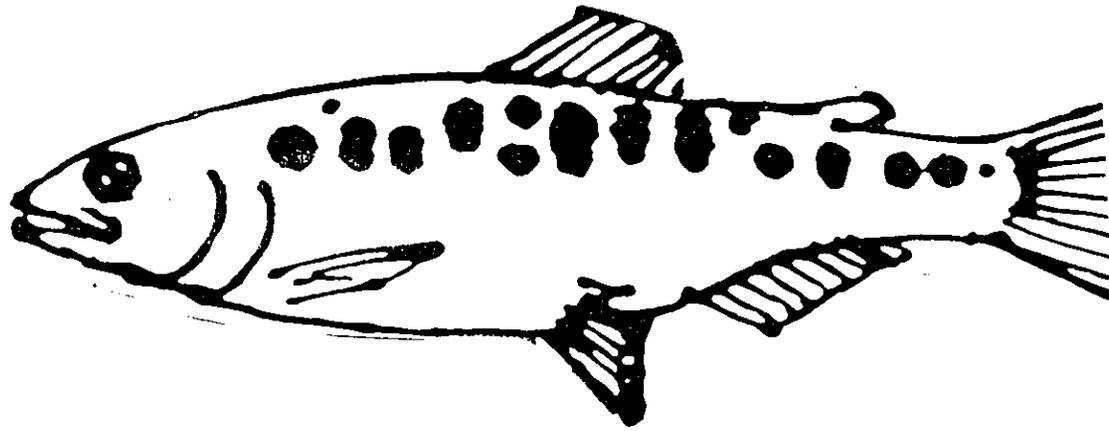
**Eggs**



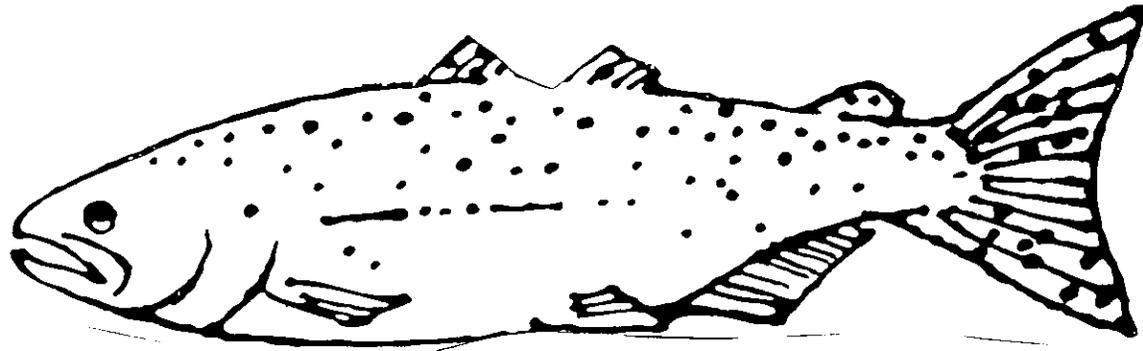
**Alevin**



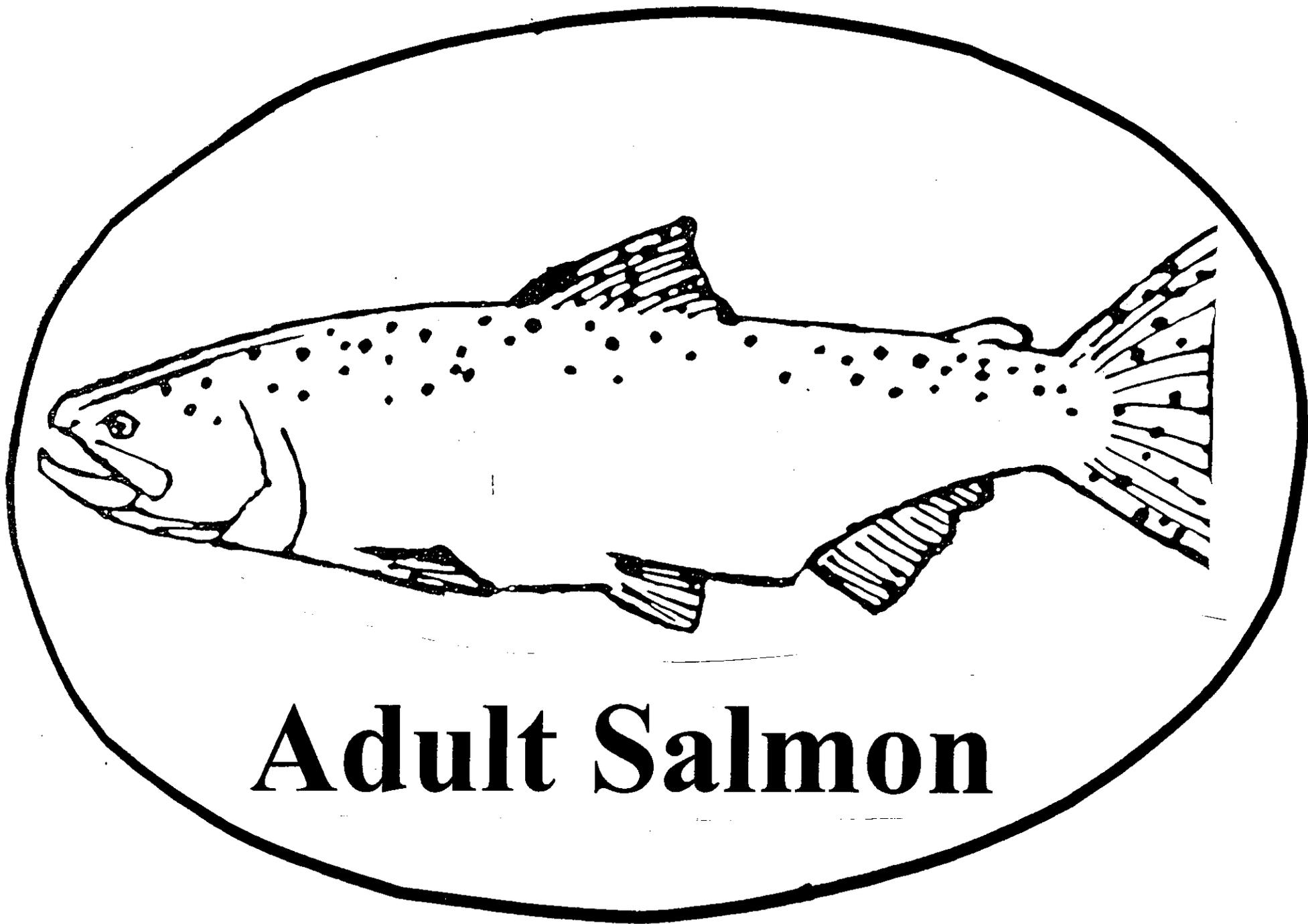
**Fry**



**Smolt**



**Salmon**



**Adult Salmon**

# The Soil

Grades 2-3

## Overview

The students will observe air bubbles forming on soil when water is poured on it. In groups, the students will investigate different soils to see if a plant's root hairs would survive there. Each group will plant bean seeds to see if their soil has enough air for the seeds to grow.

## Objectives

- To help students understand that soil has air.
- To help students understand that air is important in soil.
- To help students understand how soil affects plants and animal life.

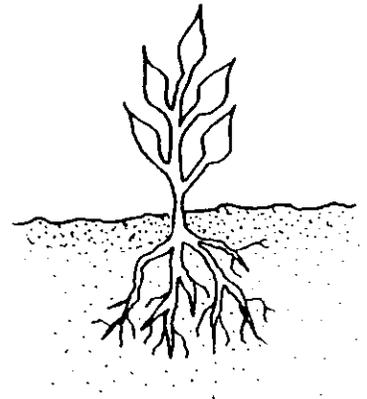
## Materials

*For the presenter:*

- large, wide-mouthed jar
- 3 types of potting soil - enough to cover the bottom of the jar with about 4 inches
- a cup
- water
- a small potted plant - needs to have roots large enough for the class to see

*For each group of 4 students:*

- magnifying glass
- brown lunch bag
- spoon
- pint jar with lid
- container of water
- cup for pouring water- about 2 cup capacity
- newspaper
- 8 oz plastic cup
- 2 bean seeds
- 3 cups of one kind of soil - (soil: sandy, clay or loam)
- 1 tub to hold all materials for each group



## Getting Ready

### Activity 1

Put 4 inches of potting soil loosely in the large, wide mouth jar. Place it and a cup of water on a table where all the students will be able to see.

### Activity 2

The class should be divided into groups of 4. Fill the brown lunch bags with about 3 cups of soil. Give 2 or 3 groups sandy soil, 2 or 3 groups clay soil and 2 or 3 groups loam soil depending on the number of students you have in your class. They will be investigating which soil is better for growing plants. Place all the items for each group in a tub for ease in handing out and collecting materials.

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## Procedures

### Activity 1

1. Begin by asking the students to stand around the table with the jar and soil. The purpose of this activity is to show the students that soil has air in it and to start them thinking about soil and why it is important to all living things. Tell the students that in this jar you have placed soil.
2. Ask: "What is soil? "What can be found in soil?" Many of them may not realize that soil has air in it. If no one offers air as an answer, wait until you do the experiment to talk about it.
3. Slowly pour some water on top of the soil. Ask: "What is happening? (*Bubbles start to form.*) Where are the bubbles coming from?" (*The air that was trapped in the soil comes up to the top and forms bubbles in the water.*)
4. Have students return to their desks.
5. Ask: "Why air is important to soil? (*It helps plants and animals breathe.*) Can you think of any animals that live in the ground that need air to breathe? What would happen to plants if there was no air in the soil?"
6. Show the students the plant. Carefully take it out of the soil so the students can see the roots. Shake loose the extra soil. Ask: "What does this plant need to live? How does the plant take in water, food and air? (*roots*) Where does it get water, air and food?" (*soil*) As you discuss, walk around the room so all the students can get a close look at the roots. Explain that roots have little hairs called "*root hairs.*" The food, water and air go in through these hairs into the plant. Emphasize that soil is important to us. Plants will not live unless they get the things they need from the soil. What would happen to other living things if plants did not grow?

## Activity 2

1. Explain to the groups that they are going to investigate soils to see if root hairs would be able to get what they need. Remind them that they need to take turns and listen carefully to your directions before starting. Give directions 1 at a time, let the students complete step 1 before going on to step 2, etc.
2. Hand out the tubs of materials.
3. Each group should cover 1 desk with newspaper; this will be their work space.
4. Take one cup of soil and pour it on the newspaper.
5. Taking turns feeling the soil. With the magnifying glass examine the soil to see what is in it. As the students are working, have the groups share what they discover. Explain to the students that some groups will have different soil than theirs.
6. Fill the jar 1/3 full of soil.
7. Using the paper cup, slowly pour water into the jar until it is 2/3 full. Ask: "What is happening? Does your soil have air? How can you tell?"
8. Screw the lid on your jar. Pass the jar around your group and let everyone shake it. Put it down on the table and observe what happens.
9. Hold up different jars so the class has an opportunity to see the different soils. Ask: "What did you observe?" There is more air in soil that has more than one layer. Large amounts of decayed leaves, twigs, etc. are a good source of food for the plants. Ask: "Did you observe anything floating on the water?"
10. Ask each team to predict if their soil would be good for growing plants. Tell them they are going to plant bean seeds to see if their prediction is true or not.
11. Take a plastic glass and fill it 1/2 full of soil. Place bean seeds on the soil and cover them up with additional soil. Pour a small amount of water on the soil and place in a well lit area. Each day, have the students water their plants and record observations. As the seeds grow into plants, have the students decide which soil the seeds liked best.

## Closure

Have each group review the three things plants need to grow. Ask one team to share what they came up with. Have each team discuss why other living things depend on plants. Ask another team to share their answer.

## Clean Up

Set jar with water and soil in a place for further observation. Each group is responsible for cleaning up their area and putting materials in tubs.

