Activity 12 **Habitat Lap Sit**

Skills: Discussion, generalization, kinesthetics, working in groups

Objective(s) Students will be able to identify components of habitat, recognize how humans and other animals depend on habitat, and interpret the impacts from loss of habitat.

Materials: None Required (animal pelt or wildlife sign is useful)

Procedure: Begin exercise by asking students to describe the things that are absolutely necessary for plants, animals and people to survive. At the end of the discussion you should arrive at the four basic habitat components: Food, Water, Shelter, and Space. Explain that every living thing requires suitable habitat in order to live. In this activity students will represent these four components of habitat. Perform the activity by following the steps below:

Step 1. Assign students to represent either food, water, shelter, or space and have each habitat representative go to a corner of an open space you have chosen for the activity (outdoors is best). When all students have been assigned and are standing together in groups you are ready to begin. Leftover students, physically impaired, or otherwise unable to participate can be used to represent wildlife in the center.

Step 2. Have students form a line within their groups and call one from the front of each line to come to the open center space to form an expanding circle of food, water, shelter, and space. At the center of the habitat circle are the representative wildlife, the circle forming around them is their habitat. Students who are reluctant to do the activity make good representative wildlife for the center. Call students four at a time to keep the activity orderly.

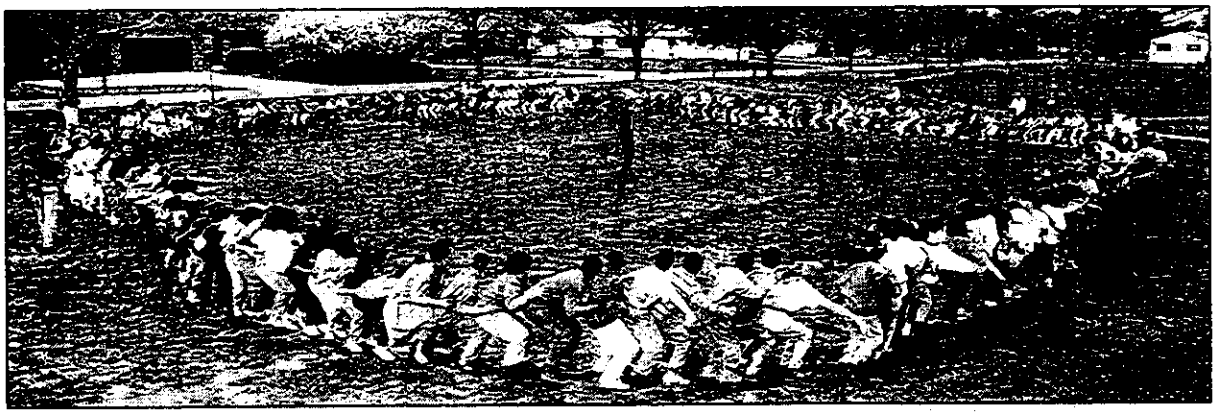
Step 3. Once students are in a large circle, ask them to face the center of the circle and move inward until they are all standing shoulder to shoulder. Next, ask them to turn a quarter turn to the right and take a step in toward the center of the circle. Students may need to take a second step in toward the center if they are not in a tight circle.

Step 4. At this point, each student should be looking at the back of the head of the student in front of them. Ask students to place their hands on the shoulders of the person in front of them. Then tell them on the count of three to sit down on the knees of the person behind them (it does work, but you may want to demonstrate the process before you begin the activity).

Step 5. The teacher points out that food, water, shelter, and space in the proper arrangement are what is needed to provide proper habitat for living things. If the students have collapsed ask them to stand and repeat the lap sit, then continue to step 6.

Step 6. As students are formed in the lap sit circle, identify a student who represents water or other habitat component and say that this component has been lost due to drought, pollution, overcrowding, or other calamity. Remove that component and observe the impact on the habitat circle. Alternatively, remove one each of the four components. The circle will either completely collapse or be seriously disrupted.

Step 7. Point out to students that all parts of the habitat are interrelated and when part is impacted the entire structure suffers the consequences.



Food, Water, Shelter, and Space are the 4 main parts of habitat
(picture copied from Project WILD by permission)

Conclusion: Relate this activity to the habitat requirements of fish by asking questions similar to these:

1. What would good fish habitat be like?
2. If there is not enough habitat, what will happen to a fish population?
3. Describe some possible effects of pollution on fish habitat?

4. What would have a greater long term impact on fish habitat, a drought or poisons draining from a factory into a river?

5. How do habitat and the water cycle relate?

Activity 13 **How Many Fish Can Live in this Stream**
- adapted from Project WILD "How Many Bears" and "Deadly Links"

Skills: Analysis, computation, discussion, evaluation, generalization, kinesthetics, listing, observation, pyschomotor development

Objective(s): Students will be able to describe a major component of habitat and identify a limiting factor.

Materials: Paper Cups or Envelopes, Five different Colors of Construction Paper, Posterboard, Handkerchief or Stick-on Labels, Plastic Sandwich Bags, Rubber Bands

Procedure: Begin exercise by telling students that they are going to represent fish seeking food (one component of habitat) in this activity. They will simulate salmon smolt looking for food as they head down river to the sea. In order for the smolt to survive, grow, and reproduce they will need to find a suitable amount of food. Each student represents one smolt. Some smolt have advantages over others and predators may eat them while they are looking for food. Follow the steps below to do this activity:

Step 1. Make food coupons to represent a salmon smolt's diet (a hole punch works well). Four different colors are needed to reflect the diet of a typical salmon. One color represents insects (50%), one color represents plant life (30%), one color represents organic detritus (leaves and twigs) - (10%), and one color represents other fish (10%). Make sure that there is not more food than the minimum requirement listed in the table for the numbers in the simulation. You should mark 10% of the food to indicate toxins. **Note that a smolt's diet is dependent on species and available food. Coho in particular, are opportunistic feeders, even eat small twigs (source: Jim Lichiteowich, University of Washington - 1995)**

Step 2. Label half of the student population as hatchery fish (not efficient feeders) who have to hop on one leg looking for food. Label 2 or 3 students in a class of 30 as predators (birds, etc.), Label 2 other students as sensory impaired who will collect food with plastic bags on their hands.

Step 3. Conduct the exercise in a boundaried area (preferably outside) with the food supply spread throughout the specified area. After the smolts have gathered all of the food coupons, the predators are sent into the area to feed on the smolts. Predators must eat (tag) up to 3 smolt to satisfy their food needs. Dead smolt are taken to the sidelines and turn over their food coupons to the predator.

Step 4. Surviving smolt add up their food coupons and place them in the four categories listed in the table below.

Step 5. Students then compare their amount of food gathered to the food required to see if they survived the exercise

Step 6. The toxic food will kill smolts and predators if they collect three or more toxins per smolt and 10 or more toxins per predator as a result of eating smolt.

Live or Die **48 coupons needed**	**Plants** **12 coupons**	**Insects** **20 coupons**	**Fish** **8 coupons**	**Detritus** **8 coupons**
Totals needed for a class of 30	**360**	**600**	**120**	**120**

Conclusion: Focus on the following types of questions to bring closure to this activity.

1. Did you gather enough food to meet your habitat needs?
2. If not, what prevented you from getting enough food?
3. Did any of you get contaminated or toxic food?
4. Predators, did any of you get toxic food from the smolts you ate?
5. What limits the population of surviving smolts in this simulation?
6. How could you change the rules to allow more smolts to survive?
7. Besides food, what are some other limiting factors that would affect the smolt population?

Closure Bring closure to the day's camp by having students describe in writing or by drawing everything they learned in camp today. Collect journals for review and comment to return to students on day four.

3:00 p.m. **Camp Ends for Students**

3:15 p.m. **SOLV Activity**

Procedure: The Stop Oregon Litter and Vandalism (SOLV) is explained to students. The SOLV bags are given to teams of two students who work with their counselors in groups to pick up litter. Caution students not to pick up hazaroudous materials like syringes or broken glass. The group with the greatest amount of litter by weight wins an award.

3:45 p.m. **Load buses and return to camp**

PETS - Dogs and other pets must be kept on leash except when waterfowl hunting. A good retriever will help locate and retrieve downed waterfowl that otherwise might be lost.

BOATING - Lake River, Bachelor Slough and the Columbia River offer opportunities to boat along the refuge boundaries. Boat launch facilities are available at the Ridgefield Marina.

BICYCLING AND HORSEBACK RIDING - These activities are permitted on public access roads on the River "S" Unit only.

For more information, contact:

Ridgefield National Wildlife Refuge
P.O. Box 457
Ridgefield, WA 98642
Telephone (206) 887-4106
Monday - Friday 7:30 a.m. to 4:00 p.m.

Ridgefield
National Wildlife Refuge
Washington

U.S. Department of the Interior
Fish and Wildlife Service

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2-152

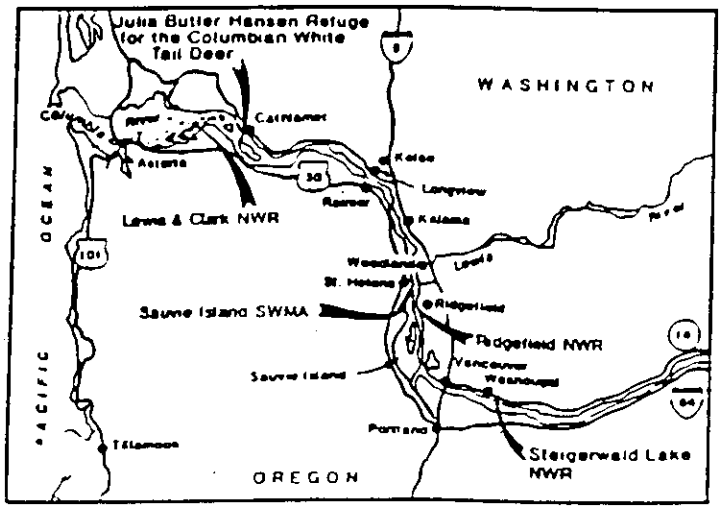
A PARADISE FOR WATERFOWL

al winter climate and environment - The mild, rainy winter ...mate of the lower Columbia River Valley is an ideal environment for migrating and wintering waterfowl. Each fall, ducks, geese and swans leave their northern nesting areas and migrate down the Pacific Coast to escape the Alaskan winter. They find resting and feeding areas on the many sloughs, ponds and shallow lakes bordering the edges of the lower Columbia River.

Abundant wildlife - Winter is the season of greatest wildlife activity, with up to 200,000 waterfowl wintering between Portland, Oregon, and the mouth of the Columbia River. The most abundant species are mallard, northern shoveler, American wigeon, green-winged teal and northern pintail ducks; the dusky, cackler, western and Taverner's subspecies of Canada geese; and tundra swans.

Long history - The mild climate and abundant wildlife made the Ridgefield area attractive for human occupation long before recorded history. Archaeological evidence indicates that Native Americans were living along the banks of the Columbia more than 2,000 years ago. When explorers Lewis and Clark visited the Ridgefield area on their homeward journey in 1806, they found the prosperous village of Cathlapotle, which contained 14 large wooden houses and some 900 inhabitants.

Lands protected - In addition to Ridgefield Refuge, the Lewis and Clark National Wildlife Refuge near Astoria, Oregon; the J Butler Hansen Refuge for the Columbian White Tail Deer ne... Cathlamet, Washington; the Steigerwald Lake National Wildlife Refuge near Washougal, Washington; and the state-owned Sauvie Island Wildlife Management Area near Portland, Oregon (see map), also protect and manage habitat to provide feeding and resting areas for waterfowl.



WHY WAS THE REFUGE ESTABLISHED?

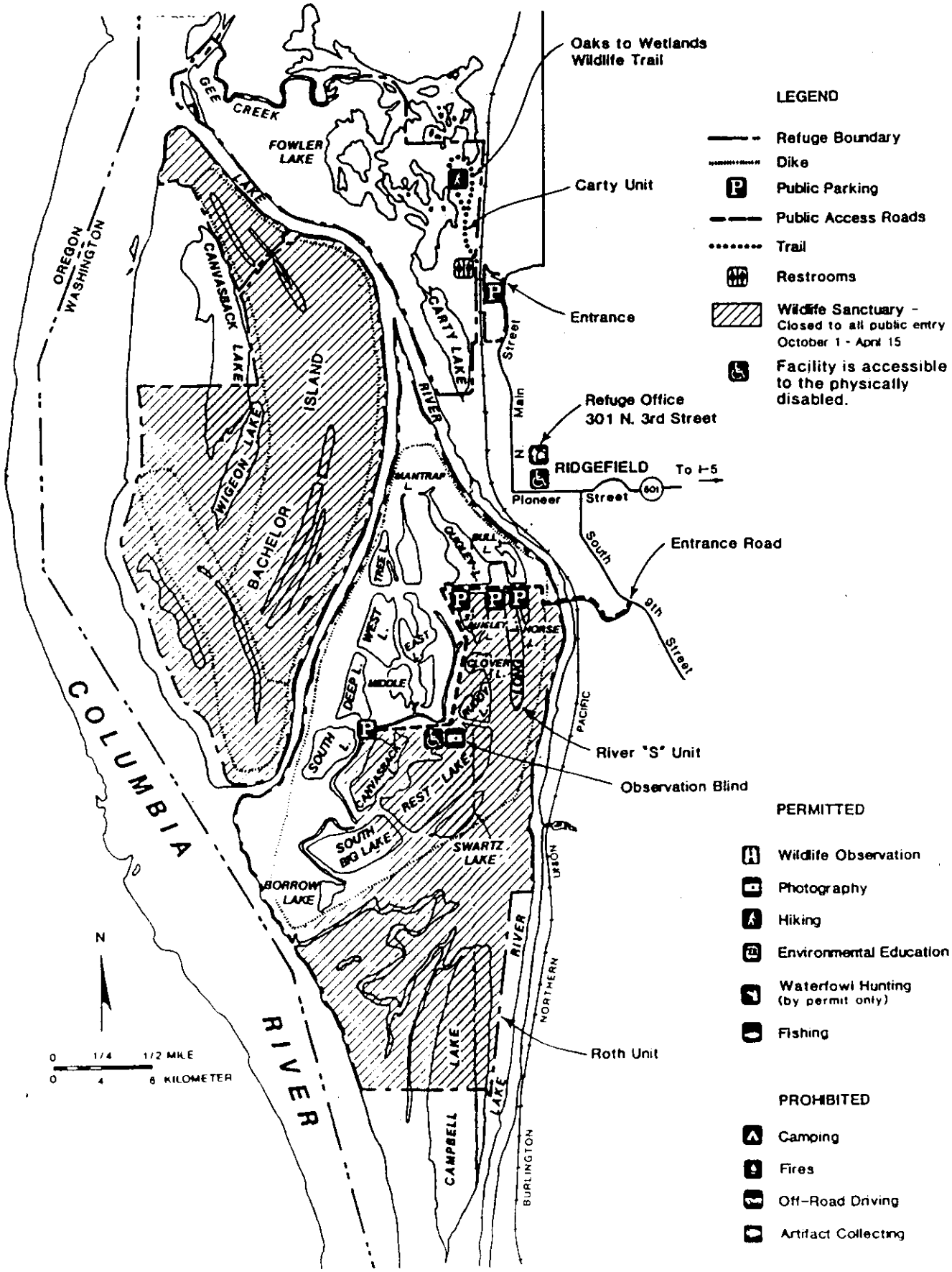
Waterfowl endure hardships - Migratory waterfowl must endure the good and bad years on wintering grounds and summer nesting areas. When either the winter or summer habitat is disrupted, the other becomes much more important. Along the lower Columbia River, diking, draining and filling of the floodplain wetlands are continually shrinking wildlife habitat. One o... the significant effects of these activities is the loss of habitat important to the dusky Canada goose. This large, dark-breasted Canada goose subspecies spends its winters only along the lowe... Columbia River and in the Willamette River Valley of Oregon.

Nature's crisis adds urgency - Nature created a crisis in 1964 when a violent earthquake rocked southern Alaska. Repeated shock waves lifted the Copper River Delta, the only area where dusky Canada geese nest, six feet. In a matter of minutes, the complex environment that had supported nesting geese for centuries was permanently changed.

Willow and alder trees invaded the higher, drier land, replacing the marshy meadows that had once been goose nesting habitat. The resulting shrub thickets provided perfect cover for hungry brown bears and coyotes, allowing them to approach nesting geese unnoticed. The altered habitat and increased predation greatly reduced the geese's ability to successfully hatch and raise their young, resulting in a declining population.

Although concerned people were unable to change the geolo... of the Copper River Delta, they could ensure that the geese had secure wintering areas. The Ridgefield National Wildlife Refuge was established in 1965, along with three other refuges in the Willamette Valley of Oregon, to protect vital winter habitat.

Many other wildlife species present - Stately sandhill cranes, shorebirds and a great variety of songbirds stop on the refuge during spring and fall migrations. A few waterfowl and some shorebirds and songbirds remain on the refuge to nest. Year-round residents include mallards, cinnamon teal, great blue herons and red-tailed hawks. Black-tailed deer are the largest mammal on the refuge. Coyote, fox, raccoon, skunk, beaver, otter and brush rabbit are occasionally seen. Nutria, a rodent native to South America and introduced into the Columbia River drainage in the 1930's, are abundant. Their burrowing activities damage dikes and ditch banks.


Oaks to Wetlands Wildlife Trail
Carty Unit
Entrance
Refuge Office
301 N. 3rd Street
RIDGEFIELD
To I-5
Entrance Road
River "S" Unit
Observation Blind
Roth Unit
LEGEND
Refuge Boundary
Dike
Public Parking
Public Access Roads
Trail
Restrooms
Wildlife Sanctuary - Closed to all public entry October 1 - April 15
Facility is accessible to the physically disabled.
PERMITTED
Wildlife Observation
Photography
Hiking
Environmental Education
Waterfowl Hunting (by permit only)
Fishing
PROHIBITED
Camping
Fires
Off-Road Driving
Artifact Collecting
GEE CREEK
FOWLER LAKE
CANVASBACK LAKE
WIGEON LAKE
BACHELOR ISLAND
CARTY LAKE
RIVER
MAINTRAP L.
BULL L.
CLARKEY L.
TRUE L.
WEST L.
EAST L.
MIDDLE
DEEP L.
GLOVER L.
HORSE
SOUTH L.
REST LAKE
SOUTH BIG LAKE
SWARTZ LAKE
BORROW LAKE
CAMPBELL LAKE
OREGON
WASHINGTON
COLUMBIA RIVER
Main Street
Pioneer Street
South 9th Street
PACIFIC NORTHERN RIVER
BURLINGTON
N
0 1/4 1/2 MILE
0 4 6 KILOMETER

MANAGED ENVIRONMENT AIDS BIRDS

More birds to the acre - The refuge's 4,627 acres of marshes, grasslands and woodlands are characterized by two types of management - natural and agricultural. Preservation of the natural Columbia River floodplain is the management objective on the Carty and Roth Units (see map). When snow melt from the mountains swells the Columbia each spring, these units are flooded until the river level drops again.

Basalt outcroppings on the Carty Unit form knolls above the high water level. These knolls are wooded with ash, oak and Douglas-fir trees and are covered with brilliant wildflowers in the spring. The knolls become extremely dry in summer, in contrast with the lush greenery of surrounding marshes. The Roth Unit is flatter and forested with cottonwood, ash and willow. Cattle graze on parts of these units to maintain grasslands in suitable condition for wintering waterfowl, especially Canada geese.

The River "S" Unit and Bachelor Island, on the other hand, are protected from flooding by dikes around their perimeters. Crops such as corn, barley and potatoes are grown to provide food for waterfowl. Pumps provide the proper amount of water to each pond and lake to foster the growth of aquatic waterfowl food plants and to create resting areas for the birds. Grasslands are grazed by cattle, and grass, clover and alfalfa are cut for hay or silage. This leaves behind the short green browse preferred by Canada geese and wigeon ducks when they arrive in the fall.

With the combination of natural and agricultural environments, waterfowl populations on the refuge have peaked at 25,000 geese and 40,000 ducks.

ENJOYING THE REFUGE

Ridgefield National Wildlife Refuge invites you to explore and enjoy its environment and wildlife. The best time to visit and see large numbers of ducks, geese and swans is during the winter months.

WILDLIFE OBSERVATION - See and photograph wildlife in their natural habitats. More than 180 species of birds have been seen on the refuge. An observation blind overlooks Rest Lake, and waterfowl hunting blinds are available for wildlife observation and photography use on days when they are not in use by hunters.

HIKING - Much of the refuge is restricted to foot travel only. The two-mile **Oaks to Wetlands Wildlife Trail** on the Carty Unit follows the shoreline of floodplain wetlands and passes through oak and Douglas-fir woodlands to provide opportunities to see many species of wildlife.

Although formal trails do not exist, during late spring and summer you can walk along the banks of Bower Slough on the River "S" Unit or cross over the River "S" dike to Campbell Lake for views of wildlife away from roads.

Bachelor Island is accessible only by boat. Visitors to the island are restricted to foot travel BY PERMIT ONLY when not closed to public access during the winter.

CLOSURES - The River "S" Unit is closed to non-hunter access on waterfowl hunting days from October through December. Contact the refuge office for a calendar of hunting days.

A portion of the River "S" Unit, the Roth Unit and Bachelor Island are seasonally closed to all public entry to protect wintering waterfowl from disturbance. THE CLOSURE OF THESE AREAS EXTENDS FROM OCTOBER 1 THROUGH APRIL 15.

ENVIRONMENTAL EDUCATION - The refuge offers space and guidance to teachers and educational groups to conduct outdoor classroom activities. Groups planning to visit the refuge should make advance reservations.

HUNTING - Part of the refuge is open to waterfowl hunting in accordance with State and Federal regulations. Advance permits are required. Handicapped access is available. Contact the refuge office for current regulations.

FISHING - Fishing is permitted during daylight hours from March 1 to September 30 in accordance with State regulations. Areas on the River "S", Roth and Bachelor Island Units closed during the winter months to protect wildlife are open to fishing from April 16 to September 30. Carp, catfish, crappie and bluegill sunfish commonly are caught.

CAMPING - The refuge is open for DAY USE ONLY. Paradise Point State Park and several private campgrounds offer nearby camping facilities.

Activity 19 **The Food Chain Game (adapted from Project WILD's Deadly Links)**

Skills: Analysis, Classification, Comparison, Computation, Description, Discussion, Evaluation, Generalization, Kinesthetics, Synthesis

Objective(s): Students will be able to describe a simple food chain, give examples of ways toxins enter the food chain, and describe possible consequences of toxins in the food chain.

Materials: Multi-colored Pet Chow, Paper Cups, Large Rubber Bands, Colored Paper or Cloth

Procedure: In this activity students will represent parts of a young salmon's primary food chain of aquatic insects and zooplankton. Begin activity by explaining to students what represents a food chain (such as grasshoppers, shrews, and hawks) where one animal is eaten by a larger animal which is in turn eaten by an even larger animal. Ask students to provide an example of a food chain. Follow the steps listed below:

Step 1. Divide students into three groups to represent salmon smolt, herons, and insects. Use colored paper or cloth attached by rubber bands around their arms to distinguish the herons and insects. Whatever the number of students, have roughly 3 times as many smolt as herons and 3 times as many insects as smolt (in reality, this would be closer to a factor of 10). For example, divide a group of 39 to make 3 herons, 9 smolt, and 27 insects .

Step 2. Provide each insect with a paper cup or other container to collect food. The container represents the stomach of the animal holding it.

Step 3. Designate a space as the river feeding area and spread multi-colored pet food or similar material throughout this space.

Step 4. First instruct the insects to look for food by entering the river and capturing all of the food they can by placing it in their cups (stomachs). The smolts and herons meanwhile watch their prey as most predators do. At the end of about 30 seconds, signal the insects to stop collecting food.

Step 5. Instruct smolts that they have 30 seconds (varies by the size of the area) to hunt the insects. Herons remain on the sidelines as watchful predators. Any insect tagged by a smolt is considered eaten and must give up its container of food to the smolt. Dead insects move to the sidelines to watch the action. Allow enough time for each smolt to catch at least one insect.

Step 6. Herons are now instructed to hunt for smolts. Allow about 30 seconds for herons to try to catch smolts. When tagged, animals must give up their container of food to the larger animal and move to the sidelines. In this phase all animals should be hunting for food: insects for pet chow, smolts for insects, and herons for smolts. When each heron has captured at least one smolt, stop the game.

Step 7. Ask all of the survivors to count the number of food pieces they collected and separate the colored pieces from the plain pieces.

Step 8. Tell students that some poisonous materials called pesticides and herbicides were washed into the river because of rainfall and that a particular color(s) of food pieces represent poisons. The poisons were used by farmers to keep insects and weeds out of their crops. Any insect with the colored pieces of food is now considered dead, due to the poisons. Any smolt with over half its food supply colored would also be dead, due to eating poisoned insects. Any heron with the colored food will not die, but the eggs it lays will not hatch because of defects caused by the poisons. Herons without colored food will be considered healthy.

Conclusion: Bring closure to the activity by focusing on questions similar to those listed below:

1. How do food chains seem to work?
2. What happens to toxic materials that enter the food chain at the beginning?
3. Could a food chain containing a salmon affect humans?
4. Provide some examples of how a poison could enter a food chain.
5. How could we reduce or eliminate poisons in our food chain?
6. What are some possible long term effects of poisons in food chains?

Activity 20 **Classifying Wetland Plants**

Skills: Classification, Observation, Generalization, Comparing Similarities and Differences, Inference

Objective: Students will be able to identify wetland plant species by comparing specimens to a classification key.

Materials: Wetland Plant Samples, Identification Keys, Activity Sheets, and 2" Wide Clear Adhesive Tape

Background: *In soil that is normally wet or close by a water source, certain types of plants will grow. These plants are called "hydrophytes" or wetland plants. These plants are adapted by having divided leaves, little or no cuticle (layer covering the epidermis), air filled cavities, no vascular tissue, and reduced root systems.*

Procedure: Begin this activity by reminding students that during the previous day's field trip, samples of various types of wetland plant species were collected. Plants that live in or near water are usually different from those that are more distant. Tell students that their task today is to make a specimen book of aquatic plants and then try to identify them using the classification key provided. Show students how to tape their samples to their Activity Sheets and identify them using the key provided.

Step 1. Have students cut leaf or stem samples from the specimens collected in the field.
Step 2. Direct students to work with a partner to hold samples in place as clear tape is placed over the sample attaching it to the Activity Sheet.
Step 3. Ask students to name their samples, using the key provided.
Step 4. Encourage students to take their Wetland Plant Keys home to share with their families

Conclusion: Bring closure to this activity by discussing how wetland plants differ from upland flora. Ask students to describe differences they could expect to see in plants which do not live close to water.

Activity 20 **Classifying Wetland Plants** **Student Activity Sheet** _____
(your name)

Background: In soil that is wet or near a water source, certain types of plants will grow. These plants are called "hydrophytes" or wetland plants. On your field trip you collected some hydrophytes that you will attempt to identify using the picture keys provided. You will need to look at your plant sample closely and notice its shape, size, texture, and physical characteristics. Compare your sample with the descriptions or pictures in your key and decide which plant you have.

Vocabulary: Classification, Wetland, Hydrophyte, Texture, Characteristics

Directions:

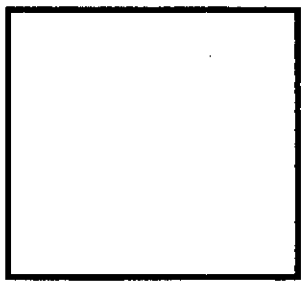
Step 1. Get a plant picture key and magnifying glass.
Step 2. Compare the numbered samples to the key.
Step 3. Write the name of plant listed on the key next to the correct number below and glue a small sample of that plant in the square.

Plant #1 _____

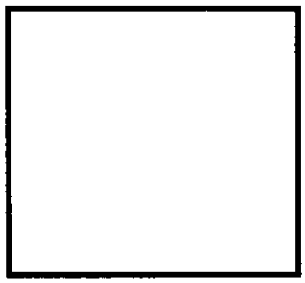
Plant #2 _____

Plant #3 _____

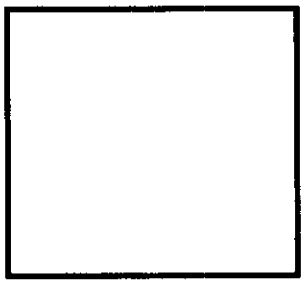
Plant #4 _____



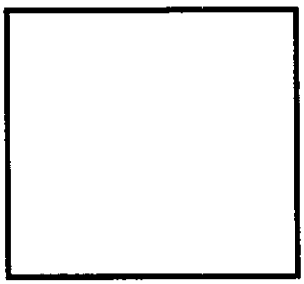
Plant #5 _____



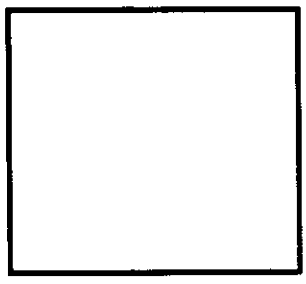
Plant #6 _____



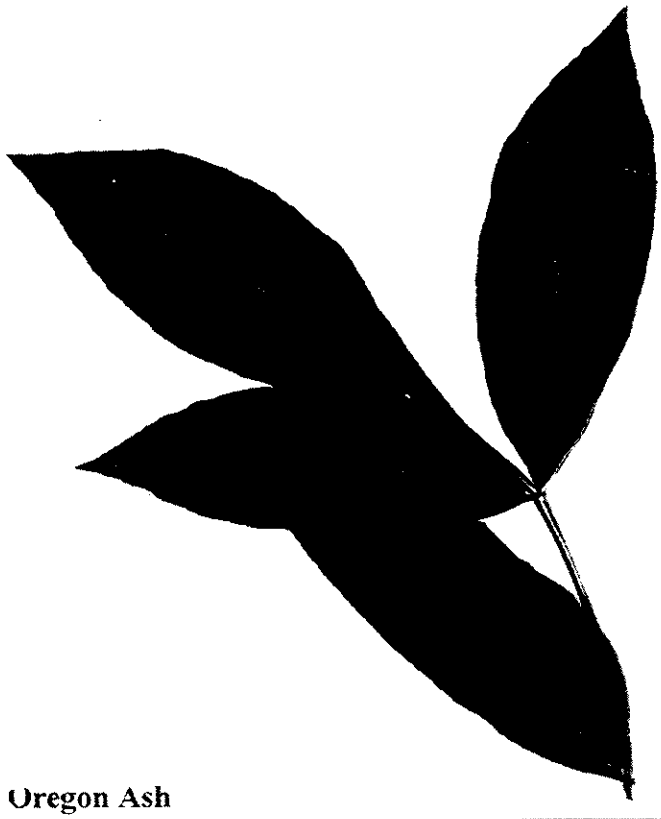
Plant #7 _____



Plant #8 _____



Plant Picture Key



Oregon Ash

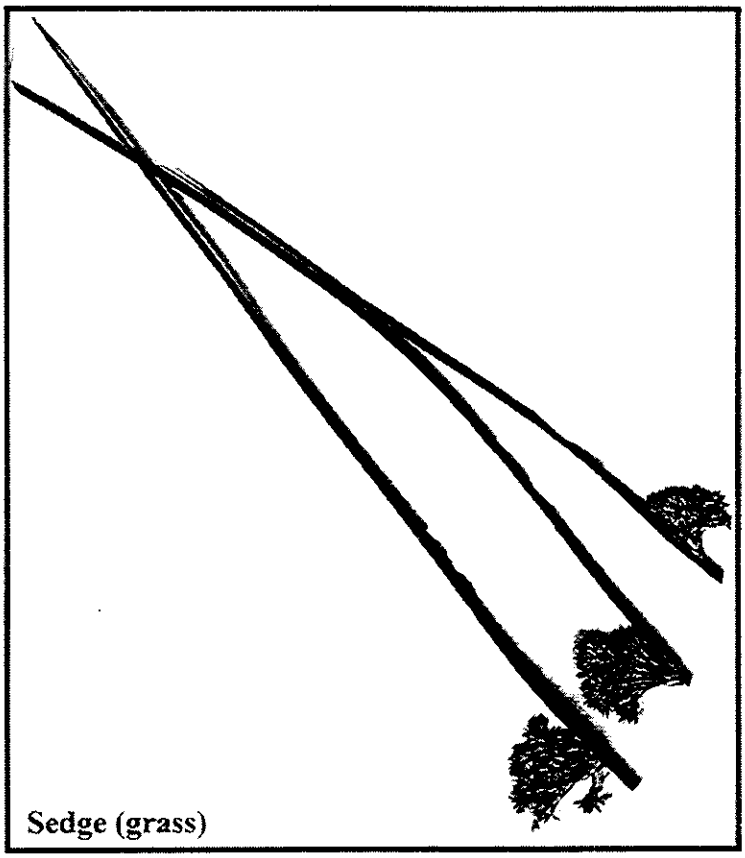
Stinging Nettle

Vetch

Barnyard Grass

Plant Picture Key

Buttercup (flower)



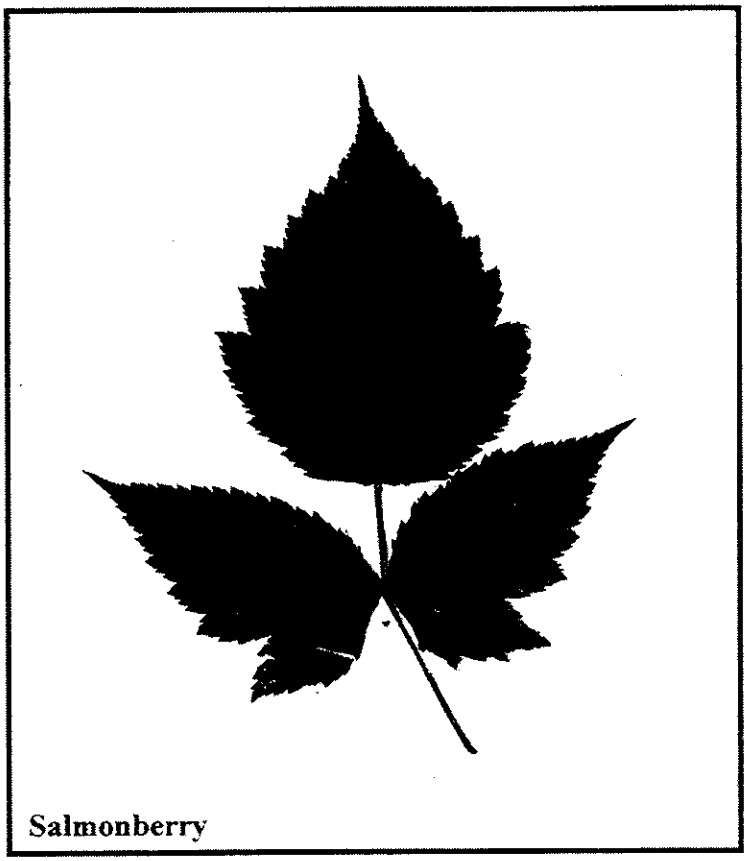
Sedge (grass)

Hawthorne

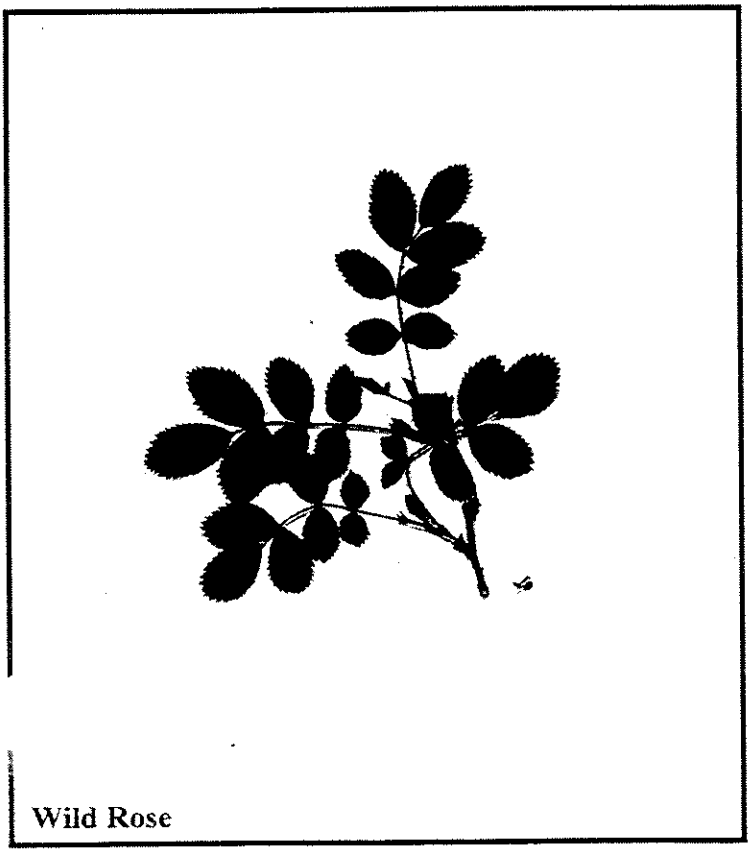
Cottonwood

Plant Picture Key

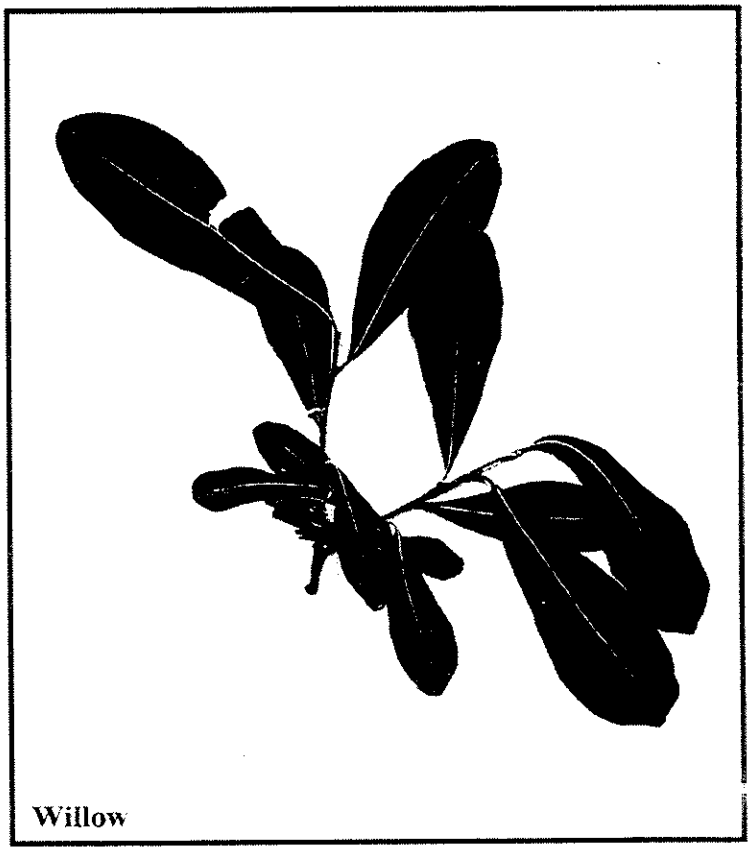
Horsetail



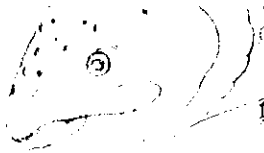
Salmonberry



Wild Rose



Willow



Chinook Salmon
Oncorhynchus tshawytscha

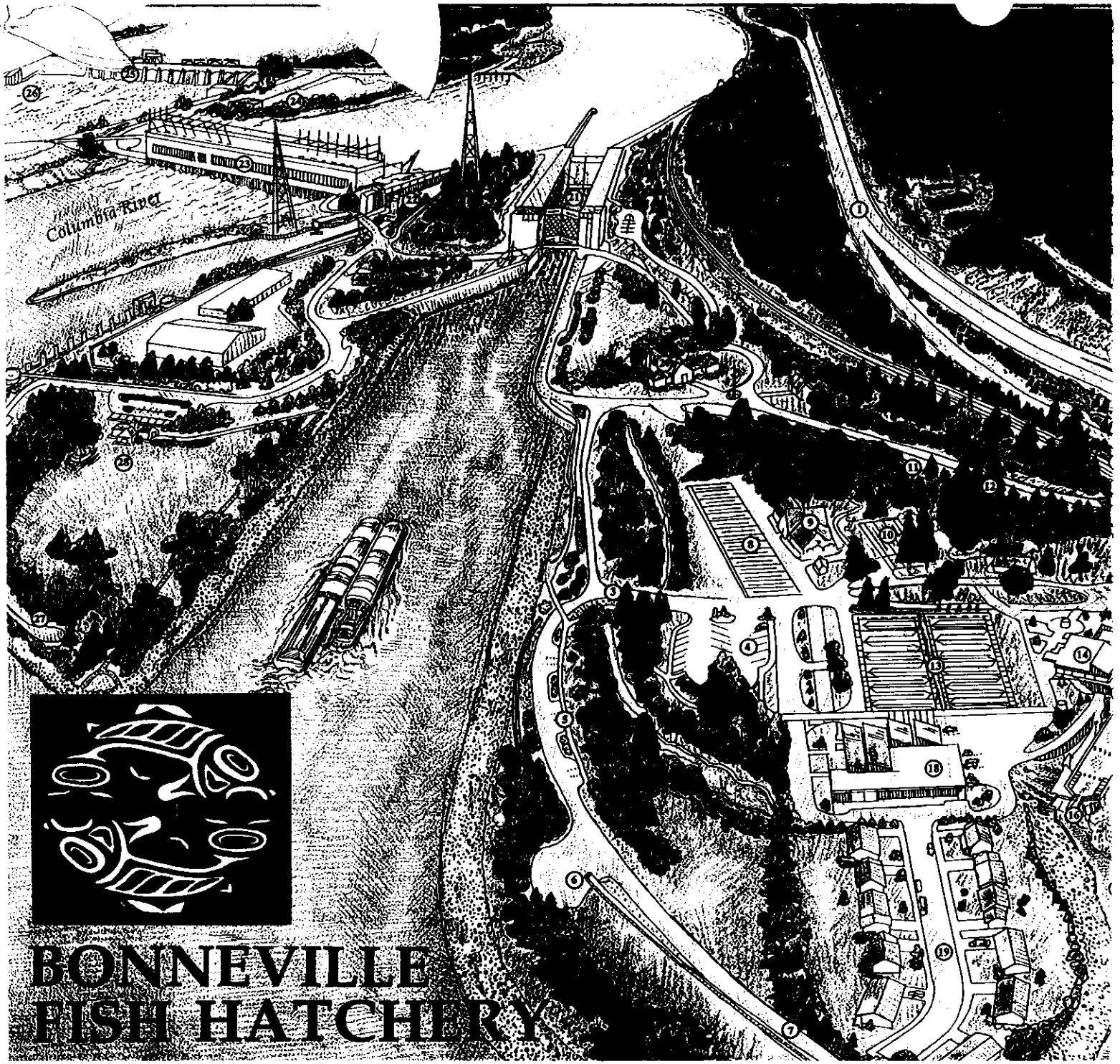
Coho Salmon
Oncorhynchus kisutch

Sturgeon
Acipenser transmontanus

SELF GUIDED TOUR

2-166

1 Interstate 84
2 Union Pacific Railroad
3 Entrance To Bonneville Fish Hatchery
4 Hatchery Visitor Automobile Parking
5 Hatchery Visitor RV Trailer Parking
6 Vehicle Turn-A-Round Area
7 Tanner Creek Fishing Access Road
8 Battery "A" Fish Rearing Ponds
9 Egg Incubation Building
10 Battery "B" Fish Rearing Ponds
11 Sturgeon Display Ponds
12 Trout Display Pond
13 Battery "C" and "D" Fish Rearing Ponds
14 Hatchery Office and Visitor Center
15 Adult Fish Holding Ponds
16 Fish Ladder
17 Tanner Creek
18 Mechanical Building
19 Hatchery Employee Housing
20 Corps of Engineers Auditorium
21 New Bonneville Navigation Lock
22 Original Bonneville Navigation Lock
23 Bonneville Dam First Powerhouse
24 Bonneville Dam Visitor Center
25 Bonneville Dam Spillway
26 Bonneville Dam Second Powerhouse
27 Columbia River Fishing Access Road
28 Visitor Day Use Area



BONNEVILLE FISH HATCHERY

Day 8 Teacher's Guide

9:00 a.m. Serve breakfast to campers in their groups

9:10 a.m. **Properties of the Atmosphere Demonstration**

Demonstrate atmospheric properties of pressure and weight by using a clear acetate film and a water basin to demonstrate the pressure of air holding an inverted column of water (a long clear plastic tube sealed at one end is required). Fill the tube completely with water and place the flat acetate film on the open end, being careful not to have any large air bubbles. Quickly invert the tube and film; the water will remain in the tube due to outside air pressure. Inverting the same tube without the acetate film in a saucer of water will demonstrate the same phenomenon.

Other simple demonstrations of air pressure and weight include: Breaking a wooden stick by placing it partially beneath a newspaper and then striking the exposed end with a swift hammer blow. Blowing back through a funnel with a ping pong ball placed in the enlarged portion.

Activity 27 **Model of the Earth's Atmosphere**

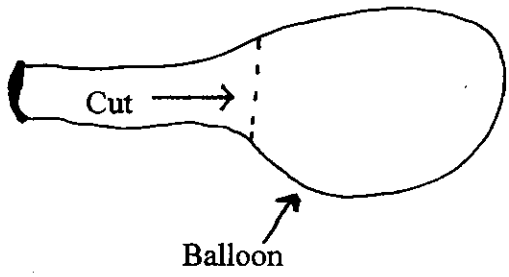
Skills: Measurement, Construction, Modeling, Observation, Evaluation

Objective(s): Students will be able to correctly show the troposphere and stratosphere in the proper relationship to the earth.

Materials: Medium Size Oranges, Cellophane Wrap, Clear Tape, Prepared Stick-on Labels, Balloons

Procedure: Explain to students that they will be making a model of the earth's lower atmosphere containing layers called the troposphere and the stratosphere which represent 99% of the atmosphere by weight. Tell students that the troposphere is where our weather takes place and extends upward from the surface about 6-11 miles. The troposphere only extends up about 6 miles at the poles due to the denser cold air and up to 11 miles at the equator because of lighter warm air. The stratosphere continues outward from the troposphere to about 30 miles. The stratosphere contains the ozone (O_3) layer, which blocks out deadly ultraviolet rays from the sun. Show and discuss the model of the earth's atmosphere found in the Teacher's Materials section. Ask the students to follow the steps below to make their model.

Step 1. Take a medium size orange and cover it with a balloon by cutting the open end away as shown in the following diagram.



Balloon Cutting Diagram

Step 2. Attach the Troposphere (weather layer) label to the balloon. This represents the approximate thickness of the atmosphere compared to the solid earth. Note that the area not completely covered by the balloon represents the polar area where the atmosphere is thinner.

Step 3. Next, have students wrap the balloon covered orange with clear plastic wrap to represent the stratosphere. Have them attach the correct label for this layer. The stratosphere extends out about 3 times the distance of the troposphere, but is many times thinner as suggested by the clear plastic wrap. The stratosphere contains most of the ozone found in our atmosphere

Step 4. Students may keep their models and save them for Thursday's display or eat the oranges if they choose.

Conclusion: Bring Closure to this activity by focusing on items similar to the following:

1. How does the thickness of the troposphere and stratosphere compare to the distance between the center of the earth and the crust?
2. Considering how relatively thin the atmosphere is, do you think we should be concerned about polluting it?
3. One half of our atmosphere by weight is found in about the lowest 3 miles of the troposphere, above that height, people can not survive for long.
4. Who or what will be affected by a polluted atmosphere? How?
5. Can you think of some things that pollute our atmosphere?

Activity 28 **Why Not Smoke a Cigarette?**

Skills: Measurement, Observation, Evaluation, Prediction, Measurement, Synthesis

Objective(s) Students will be able to observe the material that goes into a person's lungs and our atmosphere from cigarette smoke.

Materials: 4 oz Syringes, Filter Paper, Rubber Tubing, Matches, Activity Sheets

Background: *Pollution of the air we breathe comes from many sources. The dictionary definition of pollution is "Contamination of air, soil, or water by the discharge of harmful substances." Cigarette smoke is one such harmful substance that contaminates our air. The smoke from cigarettes has been linked directly to a variety of health problems caused by smoking or getting smoke second hand from others that smoke around you.*

Cigarette smoke is a minor pollutant overall in our atmosphere. However, when it is concentrated in a room or building it can become a major contaminant. Simple tests can be done on the smoke from cigarettes to show the nature of the contamination. In this activity students light a cigarette and draw the smoke through a filter to collect the residue that would otherwise go into the lungs of the smoker. This activity should help convince students that smoking cigarettes is not a good idea for many reasons.

Procedure: Assign students to work in pairs to do the following steps:

Step 1. Students cut a filter paper in fourths.
Step 2. The quarter piece of filter paper is wrapped around the end of a cigarette filter.
Step 3. Have one student stretch out or roll back a 2 inch piece of gum rubber tubing as the other student inserts the filter end of the cigarette into the tubing.
Step 4. Connect the free end of the tubing segment to a large syringe with plunger completely pushed in.
Step 5. Gently pull the plunger back as the instructor lights the cigarette.
Step 6. Disconnect the rubber tubing from the syringe and push the plunger in to exhaust the smoke.
Step 7. Re-connect the tubing to the cigarette and repeat steps 5 and 6 until cigarette is smoked.
Step 8. Remove the filter paper from the end of the cigarette and examine the residue.

Conclusion: Provide closure to this activity by discussing the following:

1. Since your lungs act much the same as a filter does, where does the cigarette smoke residue end up for people that smoke?
2. Smoke and other pollutants that enter the atmosphere are part of the air we breathe. Do you think these things get into our lungs if we live near the sources?
3. You have probably heard of smog. Where do you think it comes from?
4. Once pollutants go into our air, how do we get them out?
5. Should we be concerned about polluting our atmosphere?
6. What could you do to help clean the air we breathe?
7. Provide a list of the toxic materials found in cigarette smoke.

Snack Break

Acid Rain Video **Show 15-20 minute video on Acid Rain**

Background: *Acid rain forms when precipitation falls through polluted air and combines with some pollutants to form weak acids. These weak acids enter the water cycle to cause harm to lakes, rivers, wildlife, plants, and even buildings. Two major sources of acid rain are the sulfur dioxide and nitric oxide (forms nitrogen dioxide in sunlight). These two gases are soluble in water, forming sulfuric acid and nitric acid. These pollutants are primarily the result of burning fossil fuels. Aquatic organisms can only tolerate a narrow range of pH, as students learned in a previous activity.*

Lunch Break

Activity 29 **Making Acid Rain**

Skills: Measurement, Observation, Synthesis, Discussion, Comparison, Evaluation, Analysis

Objective(s): Students will be able to physically form and measure the pH of acidified water and explain how acid rain forms.

Materials: Straws, Plastic Cups, pH indicator, Color Charts, Activity Sheets

Background: ***Pure water can be made acid by bubbling different gases through it. Sulfur dioxide and nitrogen dioxide are common culprits in our atmosphere. The carbon dioxide in our air also causes acid rain to form. The carbon dioxide (CO_2) combines with water in the atmosphere to form a weak carbonic acid (H_2CO_3). Blowing air from our lungs through water has the same effect - forming a weak carbonic acid.***

Procedure: Begin activity by explaining to students that they are going to make acid rain in a different way than it occurs naturally. Instead of rain passing through polluted air, they are going to pass the air that they exhale through water by blowing on a straw. Their breath contains waste products from their bodies much the same as our atmosphere contains waste products from human and natural activities. Ask students to complete the following steps.

Step 1. Have students get a small clean jar or beaker and fill it 1/4 full with tap water.
Step 2. Two clean test tubes are set up in a test tube rack
Step 3. Fill one test tube with water from the cup.
Step 4. Leave the other test tube empty for the time being.
Step 5. Take a clean drinking straw and blow gently into the water that remains in your beaker for at least three minutes.

Step 6. Pour 5 milliliters of this water into the second test tube.
Step 7. Carefully add 6 drops of universal indicator to each test tube. Swish the test tubes until the indicator color is uniform.
Step 8. Find the pH of the liquid in both test tubes by comparing the color with the pH color wheel provided.
Step 9. Record the pH for each liquid in the spaces below:

_____ _____
pH for plain water pH for the water you bubbled

Step 10. Have students explain why they think the water that they bubbled became acid.

Conclusion: Focus on the following types of ideas to bring closure to this activity.

1. What caused the water to turn to an acid?
2. The acid that formed should have been carbonic acid (H_2CO_3). Since you breath out carbon dioxide when you exhale, what do you think happened?
3. If the atmosphere contained a lot of carbon dioxide, would that make more acid rain?
4. Which living things need carbon dioxide to live?
5. How can we prevent acid rain from forming?
6. If we harm plant life with acid rain, what will happen to carbon dioxide levels?.

Activity 30 **Conservation Inventions**

Skills: Evaluate, Question, Application, Reporting, Description, Synthesis, Invention, Working in Groups

Objective(s): Students will be able to identify things we need to conserve and devise inventive ways to encourage conservation.

Materials: Construction Paper, Scissors, Glue, Marking Pens, Tape, Copper Wire, Idea Sheets, Aluminum Foil, Plastic Wrap, Straws, Brainstorm Guidelines, Patent & Trademark Gazettes, Miscellaneous Materials

Procedure: Introduce the nature of inventions by telling students that inventions are essentially products or processes that are useful. Talk about some familiar inventions such as the Television, Teflon, Velcro, and the Telephone. Note that inventions can be the sole property of the inventor if they are protected by a patent which gives the inventor ownership for a period of 17 years. No one may legally make, sell, or use an invention without the inventor's permission. Inventions have

earned their inventors millions of dollars. Inventions are not usually an accident, but a result of finding a need for something and creating or inventing that something. Inventive thinking is a skill that can be taught and learned.

Following the description of what inventions are, guide students through the following steps:

Step 1. Introduce the students to the idea generation technique called **BRAINSTORMING.** Post the steps so everyone can see and read them (see Teacher's Materials section).
Step 2. Introduce students to methods for identifying problems (included with Brainstorming Rules found in Teacher's Materials).
Step 3. Ask students to identify something that we use that needs to be conserved and brainstorm in their groups inventions or ideas that could help conserve that particular item.
Step 4. Ask students to design or make an invention that would help conserve our resources. They may use one of the group "brainstorm" ideas if the like.
Step 5. Provide each table with the materials listed above for students to use to make their inventions.
Step 6. Allow at least 45 minutes for students to work on their inventions. Students may work alone or with a partner. They may take their inventions home to work on if they choose.
Step 7. Tell students that their inventions will be put on display during the end of camp celebration Thursday afternoon.

Conclusion: Bring closure to the activity by asking students to share their ideas with the other campers and provide them a disclosure form if they would like to protect their idea from someone taking and selling it. Collect and save all completed inventions for display during the end of camp celebration.

Alternative Activity: ***Have students do Activity 30B Conservation Posters***

Snack Break

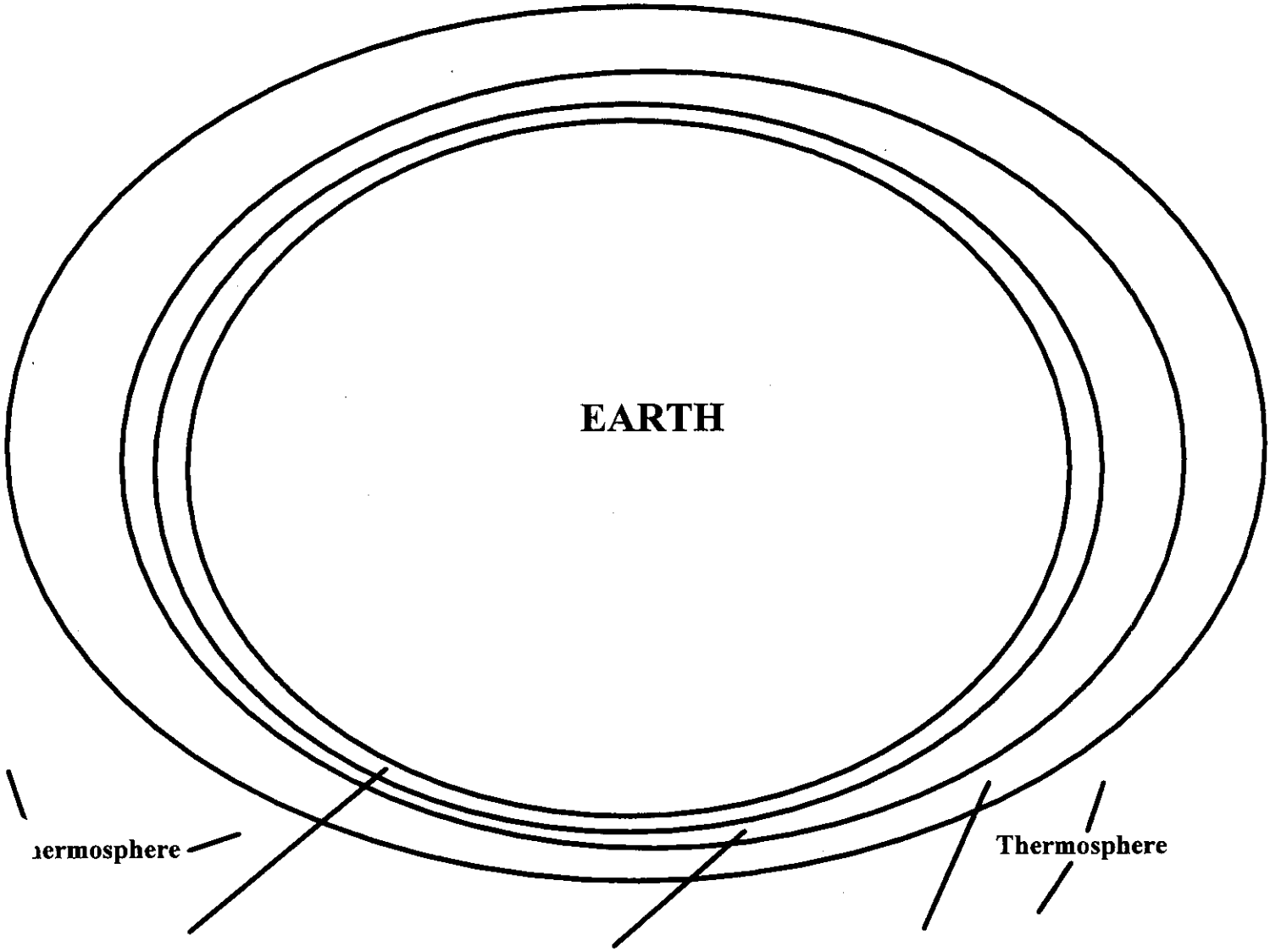
Native American Legends Continued

Select and read aloud the next Native American legend from the Appendix

Journal Writing

Ask students to write/draw in their journals what they learned in camp today.

3:00 p.m. **Camp Ends for Students**



Troposphere **Stratosphere** **Mesosphere**

Thermosphere

Layers of Earth's Atmosphere

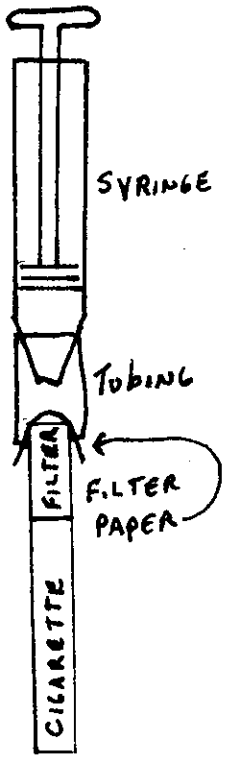
Activity 28 **Why Not Smoke a Cigarette?** **Student Activity Sheet**_____
(Your Name)

Background: Pollution of the air we breathe comes from many sources. The dictionary definition of pollution is "Contamination of air, soil, or water by the discharge of harmful substances." Cigarette smoke is one such harmful substance that contaminates our air. The smoke from cigarettes has been linked directly to a variety of health problems caused by smoking or getting smoke-second hand from others that smoke around you. Cigarette smoke contains many harmful materials.

Smoke from cigarettes is a minor pollutant overall in our atmosphere. However, when it is concentrated in a room or building it can become a major contaminant. Simple tests can be done on the smoke from cigarettes to show the nature of the contamination. In this activity you will be lighting a cigarette and drawing the smoke through a filter to collect the residue that would otherwise go into your lungs. This activity should help convince you that smoking cigarettes is not a good idea for many reasons.

Vocabulary: Contaminant, Second-Hand Smoke, Pollution, Atmosphere, Concentrated

Directions:



Step 1. Get a small piece of rubber tubing, syringe, filter paper, magnifying glass, and cigarette.

Step 2. Cut a piece of filter paper large enough to fold over the cigarette's filter

Step 3. Fold the piece of filter paper around the end of the filter and insert the cigarette and paper filter into a short piece of gum rubber tubing by rolling back one end of the tubing.

Step 4. Roll the tubing securely in place around the filter materials and insert a large syringe into the opposite end of the gum rubber tubing.

Step 5. Go outside and have your instructor light your cigarette.

Step 6. "Smoke" your cigarette three-quarters of the way by slowly pulling back and pushing forward on the syringe plunger.

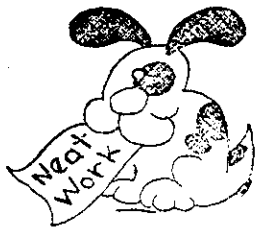
Step 7. Extinguish the cigarette according to directions from your instructor and remove the filter paper from the end of the cigarette.

Step 8. Examine the filter paper and describe what you found here:

_____

_____

Great Job! Do you wonder why people smoke cigarettes?



Activity 29 **Making Acid Rain** **Student Activity Sheet** _____

(your name)

Background: Acid rain is caused by pollution in the air we breathe which can cause rain to become acid as it falls through the air to reach the earth's surface. An acid is a substance that dissolves certain metals and as a liquid has an excess of positive ion (normally hydrogen). Different materials in our air can cause rain to form different acids. A material called sulfur dioxide which comes from many factories can make sulfuric acid rain. Carbon dioxide which is also produced by factories and by automobile engines can cause something called carbonic acid to form from rainfall. Acid rain is harmful to fish, trees, the soil, and even buildings. Simple tests can be used to find out if water in rainfall, lakes and rivers, or from our home faucets is acidic. The amount of acidity something is measured in units called pH.

Vocabulary: Pollution, Acid, Ion, Sulfuric Acid, Carbon Dioxide, Carbonic Acid, pH

Directions:

Step 1. Get a small clean container and fill with about 2 cm of tap water.
Step 2. Take a clear drinking straw and blow gently into your container of water for 2-3 minutes.
Step 3. Pour 5 milliliters of the bubbled tap water into a test tube.
Step 4. Add 6 drops of universal pH indicator to the test tube.
Step 5. Swish the test tube until the water color is uniform.
Step 6. Find the pH of the water by comparing the color to the color index provided.
Step 7. Repeat steps 4-6 with plain tap water.
Step 8. Record the pH for each liquid in the spaces below:

_____ _____

pH for plain water pH for the water you bubbled

Step 9. Explain why you think the water that you bubbled became acid.

_____

_____

Activity 30 **Conservation Inventions** **Student Activity Sheet**

_____
(your name)

Background: Inventions are normally not an accident, but the intended result of trying to find the solution to a problem. Anybody can learn to be inventive and have creative ideas with some practice. One group technique called "Brainstorming" allows you to define a problem and try to come up with as many solutions as possible. One person's idea often causes someone else to get a different idea. This in turn causes another person to come up with something different and so on. That is the nature of brainstorming. You will get some practice with your instructor before beginning this activity.

Finding a problem is sometimes the most difficult part of inventive thinking. A simple method is to start asking questions about your surroundings. For example, what things at home or in school do not work as well as you would like them to? What would really be handy to have, but no such thing exists? Is there something that would make a certain job faster or easier to do? What really bugs you?

These are the kind of questions you can ask yourself to find a problem that you can try to solve with an invention. In this activity, you will be trying to find a problem which relates to conservation of our resources and invent something that may solve the problem. Who knows, your idea may be useful enough to earn you millions of dollars. Good inventions are thought up every day and this could be your day! Have confidence in your abilities.

Vocabulary: Invention, Patent, Brainstorming, Conservation, Resources

Directions: **Step 1**. Write your answers to the following questions:

∇ What are some things that you use that need to be conserved, recycled, or saved to help prevent waste?

∇ Does the water that you drink taste, look, and smell as good as you would like it to?

∇ What kind of pollution do you see around your home or school?

∇ Is there something that you could make that would make it easier for you and others to recycle paper, glass, plastic, and metal?

Step 2. In your group, brainstorm possible ways to solve the problems that you wrote down in Step 1. List your ideas here.

Step 3. Select what you think is the best idea from your brainstorm list and show it on the construction paper provided by drawing with markers, taping, gluing, cutting, assembling or making using the materials you are given.

Step 4. Display and explain your invention idea to the other invention teams.

You are an inventive genius!

BRAINSTORMING RULES

Brainstorming is a way to come up with new ideas. Each idea triggers more new ideas and so on. This generally works best in a group when certain rules are used.

1. Individuals may not "put down" or criticize another idea

2. You want as many ideas as possible without considering if they are any good . Work for quantity not quality.

3. Encourage others to change your idea or use it in a different way.

4. Crazy, funny, or even non-sense ideas are fine.

IDENTIFYING PROBLEMS

A very good way to find a problem which could be solved by an invention is to ask some basic questions of yourself and others. Look at the following questions and see what you can come up with for a good problem to work on.

1. Is there anything around you right now that could be improved? For example: the tables and chairs, the lighting, the comfort, the design?

2. Around home or in school, is there something that you waste a lot of, is dangerous, or does not work properly?

3. Is there something that you could change to make you use it more often?

4. What would make your life easier?

There are many other questions that you can ask to help you find a problem which can besolved by an invention. Use a problem as the starting point for an invention idea and brainstorming new ideas.

Activity 30B **Making Conservation Posters** **Student Activity Sheet**_____
(Your Name)

Background: The air we breathe and the water we drink must be pure and clean or the living things that depend on these resources will either die off or suffer serious consequences. People can do much to help maintain and improve our air and water by helping others understand the problem and suggest ways to conserve and preserve these resources for the future.

In this activity you will be working in your group to make one or more posters which show a particular problem with our water or air and how we can help solve that problem. You will have construction paper, marking pens, glue, and scissors with which to make your poster(s).

Some ideas to get you started are:

- A freeway full of people bicycling and breathing clean air
- A factory polluting the air which causes acid rain to form which kills the trees and fish
- A fish swimming in polluted water in diving suit with air tanks
- People picking up debris along a river, creek, or lake which makes the wildlife smile
- Non-polluting power plants such as wind generators, solar cells, or water turbines
- Birds coughing rather than singing
- Planting trees to filter the air and produce oxygen

Directions: **Step 1**. Decide on a title for your poster and write the title you chose below:

_____

Step 2. Cut out and glue or draw the pictures and message that you would like to get across.
Step 3. Complete your poster and share it with your classmates by telling what it is showing about water or air conservation

Another Nice Job!

Remember! Completed worksheets count for points and prizes.

Activity 34 **Recycling (making) Glass (from DEQ Teacher Resource Guide)**

Skills: Measuring, Observation, Application, Synthesis, Experimenting, Handling Materials

Objective(s): Students will be able to understand the process by which glass is made and see how recycled materials can be reformed.

Materials: Sugar Cubes, Hot Plates, Cooking Pans, Aluminum Foil, Safety Goggles, Hot Pads (gloves), Paper Plates, Stirring Sticks, and Balances (with gram weights)

Procedure: Explain to students that glass is made by heating pure sand with lime and soda until the mixture melts. It is then poured into molds or forms to cool and form glass. They will be using a similar process to make glass out of sugar by following the steps below **exactly, do not change the proportions**:

1. Heat 25 milliliters of water in a cooking pan to boiling
2. Stir in 100 grams of sugar cubes, continue stirring for about five minutes while the sugar dissolves and the mixture begins to turn color and thicken.
3. Carefully pour the hot mixture onto a piece of unwrinkled foil on a paper plate.
4. Allow to cool for 1-2 hours (proceed to Activity 35 during cooling).
5. Hold up the piece of sugar glass and look through to observe the result.

Conclusion: Bring closure to this activity by asking students the following types of questions:

1. How could this type of method be used to recycle the glass we use?
2. What kind of things could be made from recycled glass?
3. What are some other recyclable materials that could use the same method?
4. How does recycling glass and other materials help save our environment?

Activity 35 **Recycling Paper** (making paper) **(from DEQ Teacher Resource Guide)**

Skills: Measuring, Observation, Application, Synthesis, Experimenting, Handling Materials

Objective(s): Students will be able to understand the process by which paper is made and see how recycled paper materials can be reformed.

Materials: Window Screen Material, Electric Blenders or Beaters, 3" Deep Pans, Newspaper, Paper Towels, Sponges, Scrap Paper (mixed colors), Small Wood Frames, Thumb Tacks, Ladles, Electric Irons, Miscellaneous Fibrous Scraps

Procedure: Explain to students that they will be making useable paper from scraps of paper that they will recycle. Students will need to follow the steps below to make their recycled paper. Small wood frames can be made by gluing large tongue depressors together then thumbtacking the window screen to the wooden frame.

Step 1. Make a paper frame by attaching window screen to a 4"x6" wood frame with thumb tacks. The paper will be made on the screen

Step 2. Tear scrap paper into small pieces and place in blender or beater until 1/3 full. Add water until the container is 2/3 filled.

Step 3. Blend for about 5 seconds. Add colored paper for desired color or leaves for texture and blend again.

Step 4. When the mixture has a consistency of mush, pour into a pan and add one inch of water and stir (do not dilute too much).

Step 5. Hold the frame screen side up and spoon the mixture evenly onto the screen. Allow the excess water to drip off.

Step 6. Place a piece of blotting paper on top of the mixture and flip the screen over, blotting paper down.

Step 7. Using paper towels or sponges, soak up the moisture that seeps up through the screen, especially at the edges.

Step 8. Carefully lift off the frame screen and cover the new paper with more blotting paper, sandwiching the new paper between the two blotters. Iron both sides until dry.

Step 9. Peel off the blotters. If they can't be peeled easily, the paper is not dry enough.

Step 10. Iron the paper to dry it completely. Use the paper to write or draw on.

Conclusion: Bring closure to the activity by asking students to discuss items similar to the following:

1. What kind of things could recycled paper be used for?
2. How does recycling paper help preserve our environment?
3. Do you presently recycle paper in your home?
4. Do you know where to take paper for recycling?
5. Save all waste paper in your home for one week to see the volume of material that you recycle or throw away.
6. Weigh the waste paper for one week and calculate how much that amounts to over a lifetime of 70 years.

Snack Break

Assessment	**End of Camp Post-Test**
	Administer the end of camp assessment which is identical to the pre-test given as Activity 2 on Camp Day 1. See Teacher's Materials for a copy of the Post-Test Form.
Awards	**Presentation of Camp Awards**
	Present camp awards to the top group(s) for participation, the individual awards for performance, and present all students with certificates of completion and a copy of the official Hydromania III Poster.
2:30 p.m.	**Set-up for End of Camp Celebration**
	Have student set up their displays and materials for their families to view during the end of camp celebration. Include Conservation Inventions, Student Posters, Glass, Paper, Safety Video Skits, Water Cycle Hexaflexagons, Wet Cell Batteries, Insulation Station, Journals, and have students sing Roll on Columbia.
3 - 5:00 p.m.	**End of Camp Celebration (Student Activity Displays, Lemonade, Cookies)**
	Parents of students are invited to see what their children have been doing in science camp.
5:00 p.m.	**Camp Ends**

Activity 34 **Recycling (making) Glass (adapted from DEQ's Teacher Resource Guide)**

Student Activity Sheet _____
(name)

Background: The glass that is used for making windows, bottles, and light bulbs is basically all the same material. Glass is made by heating and melting pure sand and mixing in other chemicals for special properties. The mixture is poured into a mold or form and cooled to form glass. Glass is actually not a true solid when it hardens because the molecules in it actually continue to flow, although very slowly.

Glass is a material which can be melted and reformed over and over again. This makes it very recyclable. Glass generally breaks easily because it is brittle, but it is also very hard, durable, and resists most chemical action. Recycling glass is one way to help save energy and our environment. Recycled glass only uses two-thirds the energy needed to manufacture glass from scratch. For every ton of glass made from scratch, 384 pounds of mining wastes are produced and 28 pounds of air pollutants are produced. When one ton of glass is recycled, water consumption is reduced by 50%, mining wastes by 79%, and air pollution by 14%.

In this activity you will be making some simulated recycled glass by heating and melting a mixture of sugar and water. When completed you will have a solid transparent material that you can see through. You will not be able to eat your glass unless your teacher gives you permission.

Vocabulary: Transparent, Molecule, Pollutants, Recycle, Properties, Chemical Action

Directions:

Step 1. Measure out 25 milliliters of water to pour into a cooking pan.

Step 2. Use a balance to weigh 100 grams of sugar cubes and add them to the water. How many sugar cubes did it take to make 100 grams?

_____

Step 3. Heat the mixture until all sugar dissolves (about 5 minutes). Break up to sugar cubes with your stirring spoon. Be sure to keep stirring while you heat the mixture.

Step 4. Place an unwrinkled piece of aluminum foil with edges folded over to hold the liquid on a stable flat surface.

Step 5. Ask your instructor to pour the hot liquid carefully onto the foil.

Step 6. Allow the mixture to cool at least 15 minutes and peal it slowly from the foil

Step 7. Hold your piece of sugar glass up to the light and compare it with real glass.

Step 8. Write down some ways your glass is like or unlike real glass on the lines below:

Like Glass	**Unlike Glass**
_____	_____

Activity 35 **Making Recycled Paper** **Student Activity Sheet** _____
(your name)

Background:

The average American uses about 600 pounds of paper each year. As a nation we consume more than 850 million trees each year to make the paper we use. We could save a half a million trees each week if we just recycled every Sunday newspaper that was sold in our country. Recycling paper not only saves trees, but it saves energy and waste.

Making new paper from recycled old paper produces 95% less air pollution than making the same paper from trees. About one-third less energy is needed to make paper from recycled materials rather than trees. Every ton of recycled paper saves 7,000 gallons of water and 2 - 3 cubic yards of landfill space that would otherwise be used for waste paper products.

Recycling paper makes sense and in this activity you will see that making paper from recycled materials is easy and produces a good quality paper for use.

Vocabulary:

Blotter, Texture, Waste Paper

Directions:

Step 1. Get a 4 " x 6" wood frame with screen attached to it.
Step 2. Tear pieces of waste paper into small pieces and place in a blender until 1/3 full. Add water to fill the blender to the 2/3 mark.
Step 3. Blend for a full 5 seconds. Add colored paper or leaves for texture and color if desired and blend again.
Step 4. Pour into a pan and stir.
Step 5. Place frame with screen side up over paper towels or sponges to absorb the exess water.
Step 6. Spoon or pour the blended mixture evenly onto the screen. Allow the excess water to drip off.
Step 7. Place a piece of blotting paper on top of the screen and flip it over, blotting paper down.
Step 8. Soak up the water that seeps up through the screen with paper towels or a sponge.
Step 9. Carefully lift off the the screened frame and cover the new paper with another sheet of blotting paper. The new paper should be sandwiched between two sheets of blotting paper.
Step 10. Iron both sides until dry.
Step 11. Peel off the blotters. If they can't be peeled easily, the paper is not dry enough and requires more ironing.
Step 12. Place the new paper in a place to dry it completely. Use the new paper to write or draw on if you like.
Step 13. Tear off a small sample of your paper and staple it to this sheet.

Terrific!