Threads In The Web

BIRDS OF A FEATHER

Focus To understand how feathers are unique adaptations which allow birds to thrive in their various habitats.

Group Size Small group to entire class

Time Required 20 minutes

Materials
A variety of feathers with different colors and shapes
A variety of study skins, as well as some individual wings
Hand lens (*1 per student*)
Small water bottle and dropper
Feather diagram

Physical Setting Wildlife room, with study skins .

Process

1. Hand-out a feather to each student, examine with a hand lens looking for shaft, barbs, and barbules. Use the diagram.

2. Discuss the attributes of each part. The shaft provides stability and is made of chitin. Barbs are hooked together by small hooks called barbules. Use a hand lens to see these and gently pull apart. Smoothing these tiny hooks together show how birds realign their feathers and preen to remain dry.

3. Place a droplet of water on the surface of the feather. Observe what happens. (It stays as a droplet, because of natural oil on the feather which the bird applies with its beak from an oil gland under the tail feathers.)

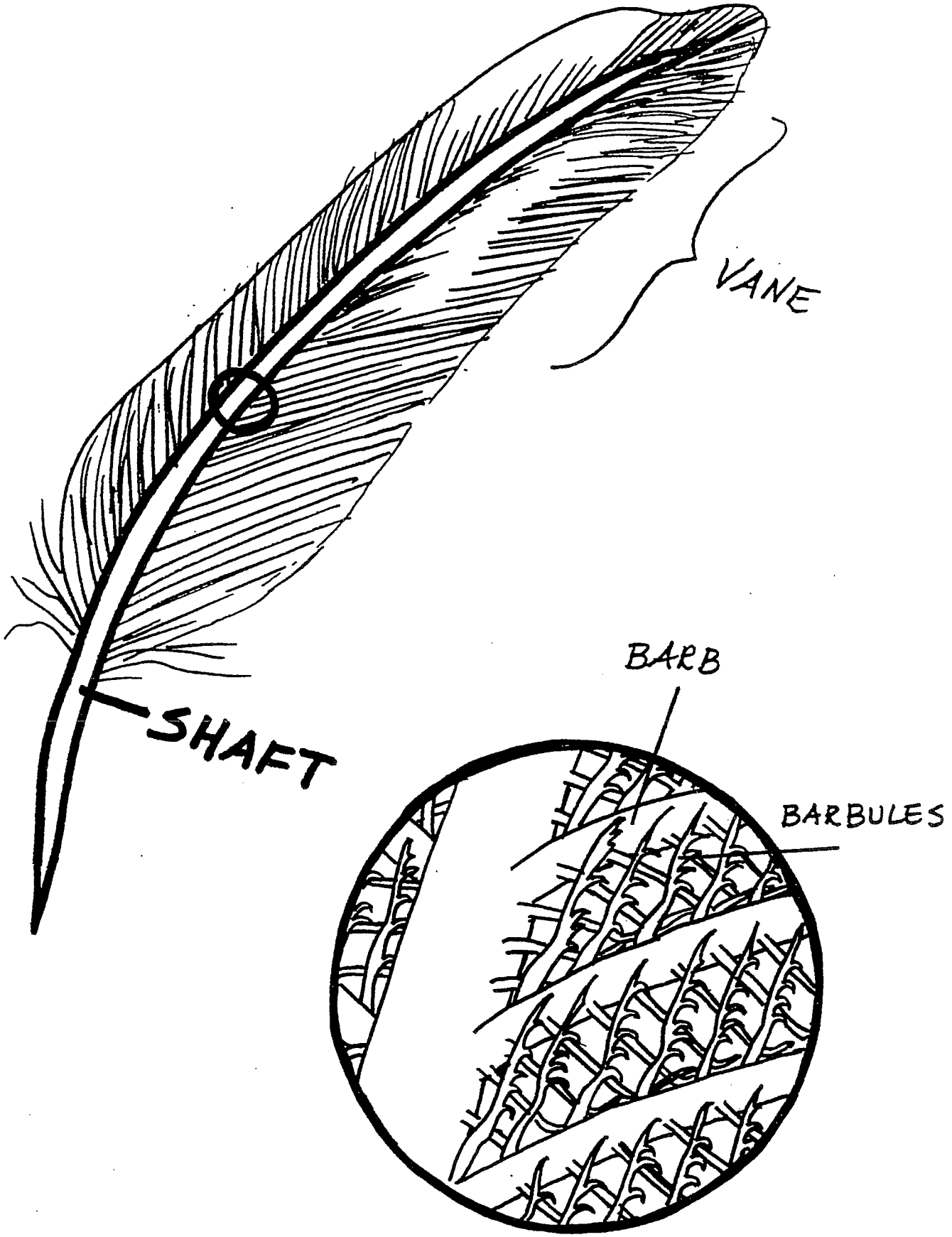
4. Compare the shapes of individual feathers. Primary flight feathers usually have more barbs on one side than the other and it should be obvious which side of the bird the feather came from. Tail feathers are more equally rounded each side. Contour feathers provide shape and downy feathers provide warmth. Have students guess the number of feathers on various birds - Hummingbirds (1500), Robins (3000), Swans (25,000) Show and discuss wings - and how feathers contribute to general aerodynamic shape. Compare to airplane wings.

5. Compare coloration of feathers. Discuss the adaptive needs for camouflage, flashy coloration for courtship, and color changes between mating and nesting seasons.

6. Show study skins - Be gentle since they are fragile

Extensions: Sketching feather after close observation

Background:
Birds are the only animals which have feathers and it makes them unique. Some things feathers do for birds include:
keeping them warm
providing them shape
increasing surface area for flight
providing color for courtship.
Feathers evolved 140 million years ago.


VANE
SHAFT
BARB
BARBULES

CRITTER COPING

Focus To understand how some animals cope/adapt to different environments, by examining their prints, pelts, skins, feathers, skeletons, and coloring.

Group Size 20 maximum

Time Required 1 hour, with discussion/review

Materials Pen/pencil
Notebook/writing surface
Handout: ***Critter Coping***

Physical Setting Wildlife and Water Resource Rooms

Process

Activity 1: CRITTER COPING

1. Take your group to examine the Cispus Wildlife and Water Resources Rooms located in the Education Building.
*Many exhibits are designed for handling or touching--just caution students to be careful not to drop or damage displays. No souvenirs may be taken from these rooms. Some items are on loan from federal agencies.

2. After about 5 minutes of excited observations, get your student's attention focused on the ***Critter Coping*** activity. You may want to separate students into smaller groups to work on the questions.

3. Review through larger group discussion when it seems most groups have completed the activity.

CRITTER COPING

Webster's Dictionary defines "coping" as: fighting or contending with successfully or on equal terms. "Adapt", is defined as: to adjust oneself to new or changed circumstances.

1. What does wildlife have to fight or contend with--not considering humans and their impact?

2. In what ways do humans affect wildlife survival? What coping techniques do some varieties of wildlife use to cope with, or against, humans?

3. Based on what you know and after looking at the fur pelts on the wall, how do these mammals...

cope with the cold of winter? (List two ways)

cope with hot summer weather?

4. After examining the pelts and identifying the original owners, which animals do you think spend a lot of their time in the water? Why do you think that?

5. What do some of the fur bearing, plant eating animals do to get them safely through the coldest part of winter?

6. Identify the skulls from meat-eating (carnivorous) animals? How can you tell?

7. In comparing carnivores to plant-eaters (herbivores), what changes do you note in their skull structure?

8. How do some birds and mammals hide from those animals who prey on them?

9. How are birds that rely on speed and maneuverability to capture their prey different from seed and insect eating birds?

10. Birds of prey have no hands to hold their food, how do they do it?

11. Which birds of prey hunt primarily at night and rely on their sense of hearing a great deal? They have good eyesight also, but it's different from birds that hunt in daylight, how is it different?

12. In what other ways is this bird (q.11) specially adapted to night hunting?

13. How do some birds adapt to live out the winter without migrating? Name some. Which animals adapt to winter without hibernating?

14. Examine the sample paws and paw prints and print casts shown in the Wildlife Room.
Which mammals spend a good deal of their time in the water? How can you tell?

Which animals might use their feet to dig through snow to find food? How do you know?

Which animals might climb a tree? How can this be determined?

Name the mammals that rely on their paws to manipulate food. How is this shown, based on observation of mounted samples and paw prints?

15. If a bird cannot cope with changing seasons, what is it forced to do?

16. Why is the male of most bird species much more brightly colored than the female? Why is the female coloring usually so plain in comparison?

17. What part of coping and adapting of animals do you find most interesting and why?

EVERYBODY'S GOTTA EAT

Focus To help students understand the dynamic nature of food chains and interdependence of living organisms.

Group Size Entire class (fewer will work, minimum of 15)

Time Required 30-45 minutes

Materials Large bag of popped popcorn, fir cones (*would be more environmentally sound*), or fir needles
Small, plastic sandwich bags (*one per student*)
Identifying tags (*3 colors, paper or material*)

Physical Setting This activity is best done outdoors in a flat, grassy area, or inside if necessary on a spacious, uncarpeted floor as in a gym. An area 20' X 20' will work, depending on numbers of participants. The area should be marked off with rope, traffic cones, masking tape for floors, etc. --whatever is handy.

Process 1. Discuss the concepts of food chains and interdependence. Have students brainstorm animals and insects that might live in the Cispus area. Cispus Guides to Mammals and Birding might be helpful, but try using reasonable suggestions from students. Next ask students to suggest predator-prey relationships or links in a food chain from their lists of animals and insects. Rotted Wood--Insect--Sparrow--Hawk or Microorganism--Water Insect--Trout--Fisherman are examples, let the group think up their own ideas.

2. Spread out popcorn/fir cones/piles of needles within the marked-off area. This is the food for, let's say, the stonefly larvae, which would be eaten by trout, which might be caught by an angler. Each of three different colored tags (these can be held or attached in some manner to clothing or arms) are given to approximately a third of the students, so that one third might become stonefly larvae, one third trout, and the remaining third anglers. Practice with the students by calling, "Orange!" and have the orange group respond "trout!" so that each group knows what they are and what they will eat.

3. Each student will have a bag that has been marked at approximately one-fourth the available volume. Permanent markers will work well for either plastic or paper bags. Stonefly larvae, when allowed to begin to eat, must fill their bags to the one fourth level in order to survive. Trout, when allowed to move into the game area to eat, must tag the stonefly larvae, thereby "eating them." When they are tagged they must give the contents of their bag to the trout. Trout must fill their bags to the half full level in order to survive. When anglers are allowed into the "eating area" they will tag only the trout, whereupon the trout must surrender the contents of their bags to the anglers. Anglers would probably survive without any trout, as they could simply stop at McDonald's on the way home, or raid the refrigerator!

4. To begin, allow all the creatures to move into the game area at once and begin "eating." In this situation, it will seem as if the game is failing miserably, as it will be likely for all the stonefly nymphs to be eaten up before they have any real chance to forage for food. This will leave some of the trout starving, and probably no anglers with any fish.

5. Vary the conditions of the game by varying the amounts of food available, the numbers of animals that are allowed to eat and the times they are allowed into the game area. Be sure to follow up each trial with discussion of the results (What will happen if the game area size is changed?). Have students make all suggestions to try and change the results.

IN THESE ANCIENT TREES

Focus To understand importance of biodiversity in management decisions for "old growth" and National Forests, and highlight problems from past management practices.

Group Size Entire class

Time Required 1 hour

Materials
Pen/pencil
Writing surface
Film: *"IN THESE ANCIENT TREES" (35 minutes)*
Handout: ***In These Ancient Trees***

Physical Setting Forestry/Logging Room *(for film viewing)*

Process

Activity 1: IN THESE ANCIENT TREES

1. View the film.

2. Discuss the concept of "bias" with the students, and from what viewpoint (bias) this film was made (produced by the National Wildlife Federation).

3. Discuss change in society and technology (as the blacksmith changed with the coming of the car, and full service gas stations are now all virtually self serve).

4. Have your students answer questions on the activity in groups, then discuss responses with the entire class.

Extensions:

1. See the films:
   "The Lorax," (24 min.)
   "Rage Over Trees," (50 min.)
2. Do activity:
   Endangered Species: Whose Fault?

IN THESE ANCIENT TREES

1. What does "old growth" mean?

2. In what two states is the "old growth" controversy centered?
   1. _____ 2. _____
3. According to this report, how much of our nation's old growth forests are already cut?

4. A natural forest has "biodiversity," what does this mean?

5. Assuming "biodiversity" is desirable, because of the relationships between plants and animal, what has been the problem of restoring lands and forests following a clear-cut?

6. Describe the standard clear-cut practice in effect into the early 90's.

7. How is the U.S. Forest Service supposed to manage our forest lands?

8. Some of the controversy in old growth forests centers on the continuing survival of some animals that can only live in that habitat. Name one of these animals.

   _____

9. One tree species that grows in a natural forest is a promising anti-cancer drug. Name this tree.

   _____

10. How was this (answer for # 10) tree treated before the early 90's by logging companies on our federal lands?

11. How are salmon affected by clear cuts? (2 ways)
    1.
    2.
12. Many logging mill workers have lost jobs, not to bans of logging old growth forests, but from WHERE the logs are milled. Explain the problem.

13. In what way can old growth forests be considered a finite, non-renewable resource like oil?

14. In the space below DRAW what a forest would look like with healthy biodiversity.

15. In the space below DRAW what a forest looks like when logging companies have "restored" (replanted) forest lands.

KNOWN CONES :
A KEY TO CONIFERS

Focus To use a simplified dichotomous key to correctly identify local evergreen trees.

Group Size 20-25 students

Time Required 30 minutes

Materials
Diagram or labeled drawing of the parts of a cone
A variety of cones to use to identity cone parts
Sample cones with small pieces of needle bearing twigs
Teacher's information page or field guide to evergreeens.
Handouts:
Conifer Questions
A Key to Conifers

Physical Setting Any outdoor area where evergreens are growing, or indoor classroom.

Process

Ativity 1: THE NAME GAME

1. Use the diagram or drawing to identifier cone bracts, scales, spike, and winged seeds.

2. Identify parts of cones provided or picked up.

3. Discuss or develop vocabulary on key as needed.

Activity 2: UNLOCKING THE KEY

1. Locate tamarack at the bottom of the key.

2. Trace the path of information about tamaracks back to the heading "Green Plants"

Optional:
Generate a list of "yes and no" questions for using the key similar to:

Does this plant reproduce with seeds?
Does it have regular flowers?
Does it have functional leaves and resins?
Are the cone scales well-developed?
Do the cone scales over lap?
When the cone was ripe were the scales persistent, or did

INSTRUCTOR KEY:
Fill-ins for "*A Key to Conifers*"
Abies: True Fir
Pinus: Pine
Picea: Spruce
Tsuga: Hemlock
Pseudotsuga: Douglas fir

it fall apart, leaving only the spike?
Are the needles clustered?
Are the needles evergreen?
Are bracts shorter than the scales?
Are the needles flat?

4. Starting with "Green Plants" work through the key to compare tamaracks with other evergreens.

Activity 3: ALTOGETHER NOW, INSIDE
Distribute sample cones and twigs for a guided group experience of using the key to identify the tree.

Activity 3: ALTOGETHER NOW, OUTSIDE
Meet in a forested area where students can easily find cones of one type and the trees on/from which they grew. Use the key to identify the tree as a spruce, hemlock, or Douglas fir.

Activity 4: KNOWING CISPUS, THE BIG 3
Identify the species.

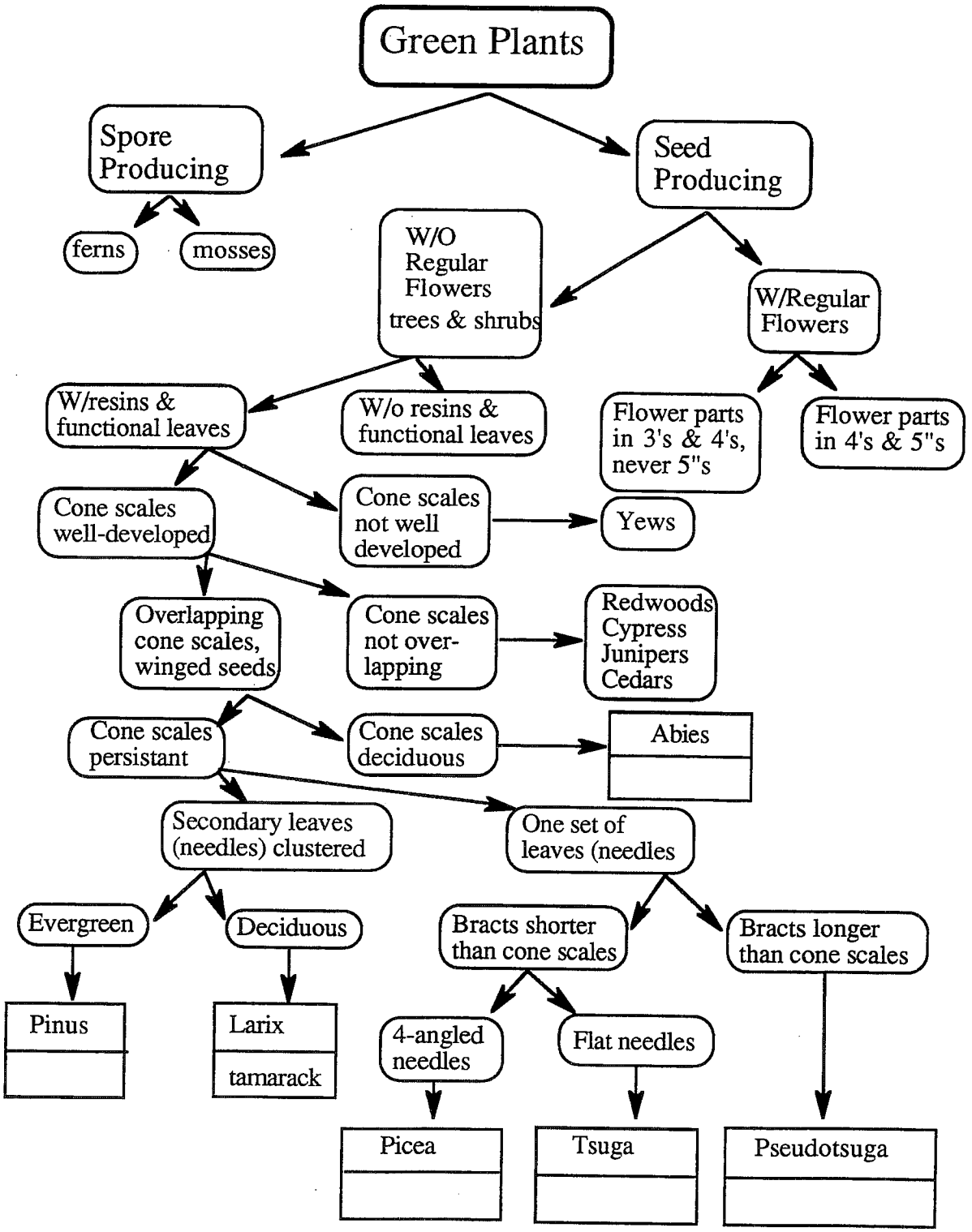
Western Hemlock is shade tolerant and is known for its "flop top."

Sitka Spruce has sharp pointed needles and crackly bark.

Douglas fir has pitchfork shaped cone bracts, thought by some to look like the back feet and tail of small mice, and thick cork-like bark.

A Key to Conifers

Scientific & Common Names



Conifer Questions

1. The Western Larch or _____ is in a "class" by itself. It loses its clustered needles. Its scientific name is _____occidentalis.

2. A Western Hemlock has a floppy top and short, flat needles. It's scientific name is _____heterophylla.

3. Western Yellow Pine has needles in groups of three. Its scientific name is _____ponderosa.

4. Noble Fir has tall, showy cones in the summer, but they fall apart in the fall. Its scientific name is _____procera.

5. Sitka Spruce has rigid 4-sided needles. Its scientific name is _____ Sitchensis.

6. If a pseudonymn is a false name, and only one group of trees has deciduous cones, a Douglas Fir is a false_____ Its scientific name is _____Menziesii.

Just for Fun:

Common Name:	Scientific Name:
Engelmann's Spruce	_____Engelmannii
Western White Pine	_____monticola
Grand Fir	_____grandis
Lodge Pole Pine	_____contorta
Mountain Hemlock	_____Mertendiana

Common Names
what do the common names tell you about the following plants? Why do you think they were given these names?

Devils Club:

Sword Fern/Christmas Fern:

Miner's Lettuce:

Rattlesnake Plantain:

ME AND YOUR SHADOW

Focus To understand how access to direct sunlight and tolerance/intolerance to shade impact a plant community.

Group Size Small group to whole class

Time Required 1 hour

Materials
Paper
Clipboard
Pencil

Physical Setting
Trailer area
Any trail containing stand of Douglas Fir
Playfield

Process

1. Students observe and describe appearance of Douglas Fir trees in various areas of the Cispus campus. The major difference noted should reflect that those in open spaces or on edges have foliage from top to near bottom. Those in stands or in areas cleared in recent years will have foliage only near the top. Note that branches in lower reaches of these trees have no foliage and are dead.

2. Students brainstorm factors that could cause this effect. Water, soil, elevation, temperature, sunlight: which factor(s) accounts for this phenomenon? The factors are evaluated as to possible impact. Conclusion reached that foliage on Douglas Fir survives only in direct sunlight.

3. Teach terms: shade intolerant (plants that cannot live in the shade) and shade tolerant (plants that thrive in the shade).

4. Compare plant communities in a meadow or other open environment with plant communities in a forested (shady) environment. List plants that live in shade and those that live in sunny environment. What will happen to most of the plants on the forest floor if the trees are cut down? Explain.

5. FIND THE MYSTERY TREES THAT WILL TAKE OVER THE FOREST AROUND CISPUS! Identify the small evergreen trees in the forest around Cispus that are growing in the shade (Western Hemlock). Why will these eventually take over the place of the Douglas Fir if nature is allowed to run its course? (The Western Hemlock are readily observed at beginning of lower Covell Creek Trail near the road).

6. How would knowledge of whether a plant is tolerant to shade affect decisions about where to plant it?

7. If you see Douglas Fir trees along a road with foliage only near the top, would this mean that the trees or the road had been there first? Explain.

MOWITSH, SALAL, PISH
Deer, Salal Berry, Fish

Focus To learn how the Indians of the Plateau Region of Washington used the natural environment to satisfy their basic physical need for food.

Group Size Entire class

Time Required 1 .5 hours

Materials
Pencils
Clipboard
Paper (*may be included in a booklet of resource information for students*)
Forest Pharmacy: Medicinal and Edible Plants at Cispus
Handouts:
Indians of the Plateau Region
Cispus Trails sheet

Physical Setting Group may hike the River Trail and stop along the way to locate food sources.
Once at the river, worksheets and artwork may be completed or return to a classroom to do so.

Process
1. Read with the students the" ***Indians of the Plateau Region:***"
2. Discuss the relationship between physical needs and environment (land and water) as sources of food.
3. Identify edible plants, (i.e. roots, berries, greens, trees) along the trail (**CAUTION**: students should be told to neither pick nor taste plants) Handouts for identifying Cispus plants are available in the office.
4. Look for presence of animals (i.e. tracks and sign) along the trail and at the river.
5. Discuss how water can provide a food source. How would the Indians catch the fish in the streams and rivers ?
6. Students may do the worksheets at the river or return to a classroom to do them.

Indians Of The Plateau Region

Topography: Characteristics of the Plateau include an upland plain and a rolling basaltic area from the central to the eastern region. The Columbia-Snake River system flows from the region to the Pacific Ocean.

Climate: Heavy rains alternate with drought; hot summers, cold winters, and periodic high winds in open areas are common in the Plateau Region.

Vegetation: This is mainly grassland, with sparse coniferous and broadleaf forests in the more mountainous areas. Edible berries and root vegetables are often found.

Human beings in all times and places shape their beliefs and behavior in response to the same basic human needs and problems. The choices made by people in adapting to or adapting in their environment depend on: characteristics of the physical environment, knowledge, skills, cultural values and social organization.

Physical need for food is satisfied in this region by the fish, game, vegetables, and fruits available. The fishing, hunting and gathering techniques and the preparation and preservation of the food by the Indians of this region sustained them.

Vegetation in the Plateau Region includes edible berries and root vegetables. Berries were picked and eaten fresh and dried for use when not in season. There were annual runs of salmon up the major rivers. Deer, elk, mountain goat, bear, wolf, beaver, mountain lion, mink, land otter and antelope were found in this region. The salmon and meat was preserved by drying for future use also.

What do we use from our natural environment?

List the ways that each resource below can be used as a means of providing food (acquiring, preserving, preparing, storing, etc.).

Salmon	Bear	Wild berries	Water
Cedar bark	Stones	Cattails	Fir tree
Horn	Ferns	Roots	Oxalis
Deer/Elk	Dirt/Earth	Skins	Nettles

SMALL AQUATIC ANIMALS IN THE CISPUS

Focus To discover the distribution of insect larva in the Cispus River drainage.

Group Size Entire class, 6-8 per station, 3-4 stations

Time Required 1.5-2.5 hours

Materials

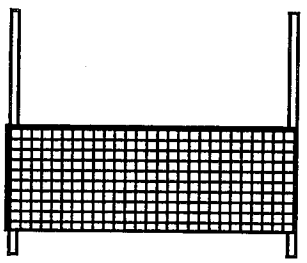
Screens*
Plastic cups w/ lids
Eye droppers (*optional*)
Microscopes (*in water room*)
Data sheets
1 yard square frame
A Learning Guide to Aquatic Insects of the Cispus Region (*available at the Cispus Learning Center*)

Physical Setting Riffle area of either Yellowjacket Creek or Cispus River for taking samples
The water room, set-up with stereoscopic microscopes and insect guides.

Process

1. Choose an area of stream that is shallow, has moving water and plenty of rocks.
2. Lay the frame in the water to define a sample area of one square yard.
3. Have one child hold the screen downstream of the frame and have another student turn over all of the rocks in the framed area. Any insects in the frame area will flow with the stream into the net.
4. Students use the eyedroppers to 'capture' samples of the insect larva present and place them in sample cups. Other students count the number of insects caught in the screens. This takes patience. You have to look very closely to find all of the insects.
5. Estimate the width of the stream and share with the students that the Cispus drainage is two hundred square miles. Have the students speculate on the insect population of the entire drainage and whether it would support a population of consumers. Also have students speculate on what a small amount of petroleum or other pollutant would do to the population of insects and aquatic animals dependent upon them.
6. Take samples captured to the water room and identify the types of insects found using the stereoscopic microscopes. Have the aquatic insect guides available. (The choice of stereoscopic microscopes is so samples can be viewed alive and then returned to the stream.)
7. Samples may be drawn or simply identified and listed.

***Screens**
-4ft standard-width nylon screen
-2, 3' long, 1" dia. wood dowels
Wrap each screen end around one wooden dowel and staple in place. This should leave you with a seive about 3.5 ft long.



TAKE A LIKEN TO LICHEN

Focus To introduce the importance of fungus and lichen in the forest ecosystem.This will be accomplished through observation and a guided dramatization

Group Size Small group or entire class

Time Required 20 minutes

Materials Examples of Goats Beard Lichen, encrusting lichen (*on rocks*)
Hand lens
Optional -Signs to hang around the neck of 2 students - "Allie Algae","Frankie Fungus" (*These names allow for boys or girls*),

Physical Setting A forested trail with a wider area for discussion, or in a classroom with examples of different types of lichen brought in.

Process

1. Have some Goats Beard lichen in hand for them to look at closely. Examine with hand lens.
2. In order to explain that lichen is two plants growing together in a mutually beneficial relationship, choose two kids to portray the parts of the lichen - algae and fungus.Explain that "Frankie Fungus" is an organism which cannot make its own food (no chlorophyll) and has to get nutrition from decaying materials (dead logs, roots ,etc.). Fungus does have a solid structure and provides the home or place for the two plants to live. It is also capable of holding moisture. "Allie algae" on the other hand, is a green plant which contains chlorophyll, so it is the part of the partnership which provides the food. Usually algae must live in water, but because of the water-trapping ability of the fungus it can thrive on land.
3. Have the students link arms, thus Allie algae and Frankie fungus "take a lichen to each other". A silly way to remember that algae and fungus team up to form a partnership beneficial to both. *There is some evidence that over time the fungus will secrete a weak acid which will weaken the algae so the mutual partnership may benefit one side more than the other.
4. On a hike along Covell Creek or other forested trail tell students they will be looking for one of the forces important in the decomposition process in the forest. Have them look for Goats Beard lichen in the trees and encrusting lichen on rocks. This is an early stage in the successional process of breaking the rock down into soil. Over time the fungus causes an acidic chemical reaction and rock breaks down.

THE INBETWEEN PLACES

Focus To understand concepts of diversity, plant succession, and the effect of elevation on the type of vegetation in area by examining some inbetween places/transition zones

Group Size 15 - 20 students

Time Required 2.5 hours

Materials Good walking shoes,
Plant/tree identification manuals
Handout: ***The Inbetween Places***

Physical Setting The trail and immediate surroundings, from the Cispus Center to Angel Falls.

Process 1. Walk to Angel Falls and observe changes in vegetation along the way. Begin at the Covell Creek trail just outside the entrance to the Cispus Center. The trail generally follows the creek, but does weave its way sometimes right adjacent to the creek and other times as much as 100 yards away. There are many observable changes or "transitions" in the kinds of vegetation. These changes are mostly due to the available light and soil moisture, not elevation (There is only an 800 foot difference in elevation between the Center and Angel Falls--despite what the fatigue in your legs tells you!).

2. Going up, observations should be focused on the effects changes in soil moisture make on the kinds and amount of vegetation. There will be a temptation to return too fast because it's easier, but now look to see changes that can be attributed to variations in light during the growing season.

THE INBETWEEN PLACES

1. During the growing season what are the two main needs of all plants?
   1. 2.

2. On the way, about 75 yards up the path stop and look left into the forest. Note the number and kinds of trees. Now allow your vision to move towards the creek.
   a. Which area would seem to have more available soil moisture?

   b. In which area are there more kinds of plants growing?

3. Write a general rule relating numbers and kinds of plants and soil moisture:

4. Continue up the trail, making visual comparisons to test your rule.
   Stop at the third bridge to rest and to make a more detailed look at your surroundings. Is your rule still true?

5. You have only gone up about 100 feet at this point. What changes have there been in the kinds of plants nearer the stream?

6. The trail will begin to climb at a steeper rate now. Pay attention to the major changes in areas of high soil moisture. After walking for five minutes stop and observe the surroundings. How does local relief (steepness) affect the amount of water stored in the soil?

7. Where are most of the low plants growing in relation to the creek?

8. Proceed on to the falls, while continuing to make these comparisons. Then start considering a new element affecting plant growth--available sunlight. How does that affect plant growth going from the stream and into the forest?

9. As you look at Angel Falls, allow your vision to make these comparisons as you glance first at the falls, then gradually in stages away and into the forest. With the change in available sunlight and soil moisture what changes do you note?

10. Take the same path back to the Cispus Center. As you go look to see how these three elements--relief, soil moisture, and sunlight--interact and affect the variety and amount of plant growth. Consider these questions:

    a. In what area are most plants found?

    b. Where is most soil moisture found?

    c. In what area does most sunlight reach the ground?

    d. When steepness is greater what happens to variety and kinds of plants found?

When reaching the trail's end be sure to find a tree, lean into it and hold down your heels.

TRANSITION WALK

Focus To observe changes in the forest in relation to water proximity.

Group Size Entire class

Time Required 1.5 - 2 hours

Materials Drawing paper
Pencils
Oil pastels

Physical Setting Start at the Cispus river and walk to the Burley Mt. trailhead

Process

1. Have children sit on the bank or on logs along the river and observe the types of plants present near the shore. They are primarily deciduous. Have students speculate on the types of animals that might utilize these species. Look for evidence of animals. Discuss the role of these plants in stabilizing the shoreline after the 1978 flood of the Cispus and Yellowjacket.

2. Make drawings of the plants and evidence of animal life found. There should be tracks and beaver cuttings where they have felled willow, cottonwood, and alder. There should also be some stored boughs in the water, for later consumption. Have the students look at the way beaver do their harvest, leaving enough of a stump to develop multiple new trunks and therefore fostering additional new food.

3. Move to the area immediately behind the deciduous plants and look at the plant life that predominates there. It is mixed cottonwood and cedar. However, if you look at the stumps around the area you will find primarily cedar stumps.

Debriefing:
Have the students define what factors control the types of plant life in each of the areas you have observed. Speculate on man's impact on each of the areas and nature's response to it.

4. Look for evidence that is making the transition back to what would be the climax forest for the river bottom. (There are cedar. Cottonwood are great for providing nitrogen to the soil though dead leaves and wood decay.)

5. Make drawings of the plant and evidence of animal life. Be sure to include man's use of the area as a source of building material.

6. Move to an area a level up from this one (behind the gym is fine). Look at the canopy plants that predominate this area. Have the students discuss why there are few low level branches. Look at the plants that provide ground cover.

7. Make drawings of plants and any evidence of animals that are utilizing this zone of the woods

UNIFORMITY AND DIVERSITY

Focus

To demonstrate that plant communities display both uniformity (*sameness*) and diversity *(differences)*.

Group Size

Small group to entire class

Time Required

30 minutes

Materials

Paper (*or journal*)
Clipboard
Pencil

Physical Setting

Covell Creek Trail from road to bridge.

Process

1. Teach concept of "uniformity" (how things are alike) and "diversity" (how things are different). Students brainstorm examples.
2. Walk into Covell Creek Trail about 30 to 40 meters from the road. Ask students to observe the plant community in this location. They should note and remember trees, shrubs and ground cover plants. Students may make a list of plants at this location.
3. Proceed another 75-80 meters along the trail (make sure that the plant community is the same as at the previous stop). Ask students to observe the plant community in this location. Again, they should note plants from all three layers of the plant community. Students may make a list. Ask students if the plants in this location are the same as the plants at the first stop or if they are different. The conclusion is that they are the same. Ask, "Does this plant community demonstrate 'uniformity' or 'diversity'?" Require that they give evidence for their conclusions. Students record conclusions and evidence or reasons in their journals.
4. Proceed to the first bridge across Covell Creek. Ask students to observe the plant community in this location. They should note plants in all three layers. Students may make a list. Ask students if the plants in this location are the same as the plants at the first two stops or if they are different. The conclusion is that a great number of the plants are different. Ask, "Does this plant community demonstrate 'uniformity' or 'diversity'?" Require that they give evidence for their conclusions. Students record conclusions and evidence or reasons in their journals.
5. Ask, "Is it possible for a plant community to demonstrate both 'uniformity' and 'diversity'? Discuss. Students record their conclusions and rationale in their journal.

Optional:
Ask the students to observe the plant community along the creek, both up and downstream from the bridge. Ask them to observe what happens to the plant community on either side as one moves away from the creek (The upper canopy changes from deciduous to coniferous). Ask students to identify reasons for the changes.

The Kitchen Sink

BIRD ON A STICK

Focus To allow road and window killed birds to be salvaged for use as study skins. Permit for salvaging is required, contact Cispus for information.

Group Size For instructor use

Time Required 3 hours minimum (*varies with specimen*)

Materials

Metric ruler	Vernier-type calipers	Scale
Display Tags	Dissecting pan/pad	Blunt scissors
Dull blade	Dissection scissors	Blunt probes
Forceps	Cleaning sink	Mild soap
Carpet thread	Low-intensity hairdryer	Suturing needle
Dissection pins	non-absorbent cotton	Mist pins
Bird I.D. Bood	Bird anatomy book	Wooden dowel*
Spray bottle**	Styrofoam drying pad	

Slides of the dissection steps may also be available from Cispus
**Diameter and length depend on specimen*
***filled with water*
(Clipped nails are helpful, even a very short length has the tendency to tear the specimen's skin)

Physical Setting Classroom with sink and good lighting

Process

Activity 1: RECORDING INFORMATION

To have an actual scientific specimen you'll need this information. Otherwise, all you have is a stuffed bird.

1. *Body Measurements*
   - •wing cord (wing-bend to longest primary)
   - •length (beak to longest tail feather)
   - •weight (dead and/or live)
   - •tail length
   - •tarsus length
   - •culmen length
   - •wing extension
2. *Physical Descriptions*
   - •color of soft parts (iris, cere, fleshy eye ring, inside of mouth, tongue)
   - •color of feet, claws and bill
   - •is culmen exposed
   - •amount of body fat
   - •male or female
3. *Collecting Information*
   - •common and scientific name
   - •manner of death
   - •where and when collected
   - •collected by
   - •prepared by

Activity 2: DISSECTION

1. Plug mouth and damaged eyes with non-absorbent cotton.

2. With the body facing left, make an incision from the base of the sternum to the vent, without cutting through the abdominal wall (Dampen the chest feathers and part them if you are unsure where to start the cut). The skin here is usually very thin, which makes it difficult to determine how deep to make the initial cut. If you do cut into the abdominal wall, separate the chest skin from the flesh and continue the process, cutting the skin only, and being careful of the damaged area.

3. Using borax to absorb moisture, loosen the skin from around the chest on one side of the body and down to the abdomen to expose the hip (tibia and femur) joint.

4. Grasp the leg and push it up through the hole, to better expose the joint.

5. Place a probe behind the joint, then with blunt scissors or a scalpel, cut the joint, detaching it from the body (when your instrument hits the probe you know when to stop the cut).

6. Repeat on the other side.

7. Work the skin loose around the back of the bird.

8. Separate the tail from the body by cutting the "parson's nose", leaving the tail feathers attached to it.

9. Peel the skin down the back and sides until the base of the humeri are exposed.

10. Place a probe behind the shoulder joint, then with blunt scissors or a scalpel, detach the wing from the body.

11. Repeat on the other side.

12. Pull the skin over the neck and to the base of the skull.

13. Detach the head and neck from the body, by cutting at the joining of the neck and shoulders.

14. Detach the ears from the skull by using forceps to pull out the membranes.

15. Remove the body from the skin. Set aside for sexing and to use as a size model for stuffing.

16. Pull the skin to expose the eyes, taking care not to stretch the eyeholes.

17. With a scalpel, carefully cut the membrane joining the skin and the eyeball. Make the incision far enough back to avoid cutting the skin on the eyeball.

18. Peel the skin over the eye and remove the eyeball with forceps.

19. Using blunt scissors, sever the head from the neck at the extreme base of the skull.

20. Peel skin the remainder of the way up to expose the skull. If the skin begins to dry out or is stiff, moisten it with water. Strip the brains (you will need to cut a small hole in the back of the skull to do this), tongue, and all removable flesh from the skull (be careful not to let the beak cut through the skin).

21. Loosen the skin around the legs, working down to the knee joint and strip all removable flesh off of the bone.

22. Loosen the skin down the wings as much as possible. Detach secondary feathers from the ulna, and strip all removable flesh from the ulna and radius.

23. Remove the flesh of the parson's nose, be sure to get the oil gland too.

24. Wash the skin with mild soap and water. Gently removing any remaining fat and flesh. Don't let the skin soak, or you may spend an hour or two patting dry the feathers!

25. Pat dry with a paper towel, then gently blow-dry skin and feathers, taking care not to dry out the skin.
25.a If you had a tough time getting the skin over the skull you will want to concentrate on the head first. Go through steps 24-26; once the SKULL is treated with borax, stuffed, and turned right-side-out continue drying and treating the rest of the skin.

26. Work the inner skin and bones with Borax to preserve them.

27. Put cotton balls into the eye sockets, and pull the skin carefully back over the head.

28. Tie the ends of the humeri together and place in the mid-back of the opened skin.

29. Twirl enough cotton onto the display dowel to approximate the birds body (use the original body as a model). There should be little or no cotton at the neck area. The display dowel is sharpened at one end and it is about eight inches longer than the specimen. This will allow the bird to be held by the beak and dowel handle between it's feet, keeping the specimen in good shape even with extensive use.

30. Blowing open the neck hole, place the body-stick (with the head-end sharpened) into the skull. Anchor it firmly into the base of the bill and nasal area, but without sticking it out through one of the nostrils. The bird's head should be positioned so that the bill points in the opposite direction of the feet (up), allowing it to lie flat and fit into a drawer.

31. Place the body stick into the opened skin and work the skin closed around it. Sew up using a baseball stitch. Leave the stitches loose, then "draw up" on the end threads to pull the skin closed.

32. Cross the tarsus of one leg over the other, and tie them in position over the stick.

33. Attach the identification tag.

34. Sex the bird and label tag appropriately. If the bird was not recovered in the spring the sexual organs may be shrunken and unidentifiable . If that is the case, you may be able to determine sex by the plumage or size. If you have no way to identify the sex, state the reasons on the identification tag.

35. Set the bird, stomach-side up, on the drying pad. Using a pin, gently fluff and pat the feathers into the position they would hold naturally. You may wish to consult nature magazines, or other detailed photos and illustrations. Pins and paper can be used to keep feathers in place while they set. Let the specimen dry undisturbed for several days.

36. Check the specimen, re-arranging feathers as necessary. Let dry for another three days. Then, store carefully until needed.

Notes:

CISPUS DAWN

Focus To use sensory stimulation to aid in creative writing.

Group Size Entire class

Time Required 20-30 minutes

Materials
Cassette player
Cassette tape, "Dawn to Dusk"
Pen
Student notebook
Handout: ***Cispus Dawn***

Physical Setting Cispus Star/Mural Room

Process

Activity 1 : CISPUS DAWN

Preview "Dawn to Dusk," cassette #6, found in the Cispus Library. You will want to practice technique with lights and sound before presenting to your students.

1. Take your students to the Mural Room, also known as the "Star Room," located adjacent to the auditorium. Turn on regular lights only (push the button) and manipulate the dimmer to full light first. (Don't even try the light switch located just above the dimmer as this will engage the ultra violet light and you'll loose the focus of this lesson.)

2. Allow students time to pick out known Cispus sites, i.e., Tower Rock, or Covell Creek. Have the students sit down where they can see a favorite mural.

3. Turn on the tape player, softly at first, then a little louder. Discourage conversation.

4. Have students turn to the, ***Cispus Dawn*** activity in their workbooks. Review the basics of simile and metaphor. Guide them through the questions or have them respond spontaneously to their feelings. It may help to have them close their eyes for about 30 seconds and let the images just seen and heard come together.

5. Now, have the students respond to the questions without talking to their neighbors, or showing them what they've written.

6.After allowing time to complete the questions, call on specific students to share. This way some who normally wouldn't raise their hands will have an opportunity . Be ready for pleasing observations.

7.Ball point pen is suggested so students won't want to erase and start over; it encourages creativity. At a later time, back at the dorm or at school, grammar can be corrected.

Extensions:
1. Try other creative writing activities here, like cinquains or haiku. See poem templates in "**THE CISPUS EXPERIENCE**", p. CI-13.
2. Try the exercise, going dusk-to-dawn.
3. Change the mood by putting in a different tape, or turning on the ultra violet lights while leaving enough regular light to see and write.

Cispus Dawn

1. What are the feelings you have right now about this place? (Make use of similes and metaphors.)

2. Without using your senses of touch and smell, choose something in the mural and try to describe its feel and smell.

3. If you could be in one of the murals right now, where exactly would you like to be? Why? What would you like to be doing?

4. Become something shown in one of the murals or become something that might belong there, but isn't shown. (a) Describe yourself (you can be big like a mountain or small like a drop of water). (b) If it is spring how would your activities be different in the opposite season (fall)?

5. Draw yourself (from question 4).

HOW FAR DID YOUR BREAKFAST TRAVEL ?

Focus To emphasize the importance of locally or regionally grown foods by exploring the demand for out-of-season crops and many internationally grown foods. And to consider what these demands cause: the expansive centralization of distribution systems, which intensify the use of energy and the increase in distributive inequality.

Group Size Entire class

Time Required 1 hour

Materials

World Map	String or yarn
Washington Map	Pins
USA Map	Labels

Physical Setting Classroom or outside

Process

1. Ask the students to make a class list of the foods they ate for breakfast.
2. Use the world map to find out where these foods originated. Use yarn or string and labels to demonstrate this. Select foods that are not highly processed but composed of one main ingredient, i.e., bananas-South America; grapefruit-Texas, California, Florida; orange juice-Texas, Florida. Use yarn to connect the origins with the hometowns of the students.
3. Discuss with the class how far some foods travel to get to us, and how some foods can be found closer to home. What does this mean in terms of energy used? What are the various forms of energy used to transport food to our mouths? Discuss trucks, planes, trains, fuel, and human energy for production and distribution of food. Make a class list of jobs necessary to produce the desired food, i.e., graphic designers for advertising and pesticide companies, etc. Discuss natural resources expended for food distribution. Discuss growing terms "locally" and "regionally".
4. What are our favorite foods? Are they grown locally or regionally? Are there foods that we like or depend on that are not grown locally? Can we consider local or regional substitutes? Discuss peoples close relationship with the land and growing seasons prior to the centralization of food distribution.
5. Invite a local farmer or speaker to talk about what kinds of foods are available in this region and when they are in season.
6. Plan and prepare a meal using local foods. Preparation of a meal is optional.
7. Analyze a Cispus meal.

Reference:
This lesson was created with information from the Energy, Food, and You curriculum guide, a program of the Washington State Offices of Environmental Education (N.W. Section) and Health Education.

INDOOR CAMPFIRE

Focus To conduct campfire activities indoors when there is extreme weather outside.

Group Size Entire class (no more than 40)

Time Required 1-2 hours

Materials

- The Cispus electric campfire
- Songbooks
- Musical instruments
- Cassette player (opt.)
- Rocks for fire ring (opt.)
- Songsheets
- Skit materials

Physical Setting Cispus Center Star/Mural Room

Process

Activity 1: SETTING UP

1. You can set up the electric campfire almost anywhere in the room that you wish (all but one wall has electrical outlets), but be sure to tape the electrical cord to the floor only. Make sure that no tape, stickers, pins, or gum end up on the walls.

2. Respect room rules of no food or beverages.

3. For ventilation you might want to leave the door ajar or fully open, leaving the hallway light off to maintain a campfire mood.

4. The regular lighting can be turned off once your campfire is going, or the dimmer switch can be turned down to a comfortable level. You might also wish to turn on the ultra-violet lighting (light switches), charge up the stars, and have a star-lit campfire. Trying out the variations before-hand will have your evening running smoother.

5. Good campfire programs don't just happen, they're created with careful planning. Follow suggestions in "**THE CISPUS EXPERIENCE**" pp. CI-6,7 and CI-25,26 for songs, skits scripts, and short story ideas. Create a program to meet your needs. Activities planned for an outdoor campfire can usually be easily adapted for the indoor setting.

Activity 2: THE CLEAN-UP

1. You've all had a great evening singing and telling stories around the campfire. Now it's time for the assigned clean-up crew or staff members to make sure that everything is picked up, all the lights are shut off, and the room is locked; ready for the next group.

THE BIG PICTURE

Focus

To allow the student an opportunity to make connections between ideas and concepts and form a holistic understanding of what they learned about nature and the environment at Cispus.
To allow the student an opportunity to share his/her experience at Cispus with a parent.

Group Size

Entire class
Individual student and parent

Time Required

1 hour

Materials

Pencil
Brainstormed list of ideas, concepts and experiences
Handout: ***The Big Picture****

Physical Setting

Classroom and student's home

Process

1. After returning from the Cispus experience, a whole class activity is conducted where students brainstorm ideas, concepts, experiences, and understandings from their time at Cispus.

2. Ideas are recorded. Students classify ideas and define relationships between them. This can be done in an idea web or list format. The format is reproduced for student reference.

3. Students take the formatted document home. They use the document to share their experience at Cispus with their parent(s).

4. Parent and student together fill out ***The Big Picture*** form, summarizing the student's understanding of concepts and ideas. Students may illustrate concepts if they choose. The student and parent(s) sign the form before returning it to school.

5. Students return ***The Big Picture*** forms, which are then collated, published, and distributed to students and their families.

* The form is a one page form with a scroll format printed on it defining the work space.

UNNATURAL OBJECTS TRAIL

Focus To help students be more observant of features along the trail by slowing down and really looking at surroundings. This is especially effective soon after arrival at camp.

Group Size Entire class or small group

Time Required 15-20 minutes

Materials 20 (or so) objects which would not naturally occur along a trail, ideas might include blocks of wood, yarn, strips of rubber, a house plant, plastic, hanger, anything - use your imagination!

Physical Setting Any section of trail where objects can be hidden. Covel Creek, Pond or River Trails would be appropriate.

Process 1. Before meeting the group the leader places the objects along the trail in areas visible from the trail, but not overly obvious. Placement could include: on the ground, in bushes and trees, wrapped around trees, hanging from above.

2. Students walk the trail silently in single file observing and silently counting and noting locations of objects. Counting on fingers is helpful. At the end of the trail students share the number of objects they observed without telling what the objects were. Walking back along the trail in the opposite direction students again observe and count objects. The trail is walked a third time as the students and leader point out the objects. They can also be collected at this time . A discussion of careful observation techniques for the trail is a good closing.

Be careful not to leave even a single "unnatural object" to spoil the quality of the trail for others.

Today is_____
(date)

UP TO NOW...

1. Today I learned...

2. The big idea for me today was...

3. The hardest thing for me today was...

4. I only wish...

5. Tomorrow I'll...

_____
(signed)

WEATHER SCAVENGERS

Focus To think about and find examples of how weather affects plants, soil, people and animals.

Group Size Entire Class, divided into small groups.

Time Required 1 Hour

Materials
Scavenger Hunt Clue Sheets
Bags
Pencils and paper
Clipboards

Physical Setting Cispus Trails -- Covell Creek or the Pond Trail are good.

Process

1. Tell your group that they will be going on a walk to see how many weather related things they can find.

2. Give each team a clue sheet, a bag, a pencil, 4 sheets of white drawing paper and a clipboard.

3. Explain that they can put some of their "weather finds" in their bags. The clues they can't collect they should draw or write a description of on their blank sheets of drawing paper.

4. Set a time for all the teams to meet back at the starting point. Have each team show and explain what they have found for each clue. Afterward, have each team return any "finds" to where the items were found.

Note:
Before sending the group out, make sure to set your scavenger hunt guidelines, such as "Do not pick flowers, reach under logs with bare hands, go down to the river or wander away from the rest of the group". Set boundaries for the scavenging area.

WEATHER SCAVENGER CLUE SHEET

1. Something bending toward the sun
2. Something hiding from sunshine
3. Something that may become part of a cloud
4. Something that tells you that the wind is blowing
5. Something left by the rain
6. A bad place for a person to seek shelter during a lightning storm
7. A place where icicles might form
8. A place where weather has damaged a building
9. A place to go where its cool
10. Sign of an animal that likes rain
11. A place where rain has moved the soil
12. A place that gets little sunshine
13. Something that won't bend in the wind
14. Something that reflects a lot of sunlight
15. Something that absorbs a lots of sunlight
16. Something that will soak up rain
17. Something that makes rain spatter
18. Something that protects people from rain
19. Something that uses sunlight or wind or water to work
20. Something that smells better after a rain shower
21. A good windbreak
22. Something shaped by wind or water
23. Something the color of the sky
24. Something the color of the snow
25. Something that would make snow melt
26. A sign of lightning damage
27. Something that bends in the wind

WEATHER WATCHING
by the chart

Focus To use field exploration and observations to explain how cloud types, wind direction, and air pressure can be used to forecast the weather.

Group Size Entire class, divided into groups.

Time Required 1/2 hour per day during your stay at Cispus.

Materials

		Cispus Weather Station:
Cloud chart		Barometer
Wind sock	or	Wind speed and direction guage

Handout: ***Weather by the Chart***

Physical Setting Cispus Weather Station

Process

To introduce weather forcasting to your group, they will need to know how clouds, wind, pressure, and temperature all interact. In this activity your group can practice forecasting using a simple weather forecasting chart that focuses on cloud types, air pressure, and wind direction.

For help with identifying clouds, pass out or mount, on a large sheet of cardboard, a Cloud Chart.

You can send for a full-color poster with photographs of cloud types. Send to:
Science Associates
P.O. Box 230-8
Princeton, NJ 18540
Tele: 609-924-4470

1. Divide your group into three teams: Cloud Team, Pressure Team, and Wind Team.

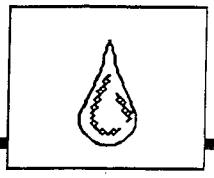
2. At a specific time each day, have each of the weather forecast teams take a "reading" on what's happening outside or at the weather station. (The Pressure Team will have to take one or two readings earlier in the day to find out if the pressure is rising, falling, or staying the same.)

3. After each team has recorded their data on the record sheet, have the teams compare their readings to the list on the Weather Chart. The student will write down the number that corresponds to their team's findings. For example, if there are cumulus clouds outside, the Cloud Team should write the word cumulus on the cloud list and then write down the number that corresponds to that cloud type. In the case of cumulus clouds, the number would be 7. Have the Pressure and Wind Teams take readings with their instruments and do the same thing.

4. Next have the teams add the three numbers to get a forecast number. By looking at the chart they can find the forecast that matches their number.

5. Each group of teams can take a day while at Camp Cispus and report a forecast for the next day's weather.

WEATHER BY THE CHART



CLOUDS

CUMULONIMBUS	1
STRATUS	2
LOW, THICKENING	3
HIGH CLOUD	4
CLOUDS RISING	5
CLEAR	6
CUMULUS	7

WINDS

N	2
NE	1
E	1
SE	1
S	2
SW	3
W	3
NW	4
VARIABLE	3
CALM	3

PRESSURE

VERY LOW AND DROPPING	1
LOW AND DROPPING	2
LOW AND FLUCTUATING	3
AVERAGE AND DROPPING	3
HIGH AND DROPPING	3
VERY HIGH AND DROPPING	4
AVERAGE, FLUCTUATING	5
LOW, RISING	6
AVERAGE AND RISING	7
HIGH AND RISING	8
VERY HIGH AND RISING	9

WEATHER FORCASTER

3	Heavy preciptation within six hours
4	Precipitation within 6 -12 hours, little temperature change
5	Brief precipitation withing 18 hours, rise in temperature
6 or 7	Precipitation within 24 hours, rise in temperature
8	Precipitation within 30 hours, no temperature change
9 or 10	Increase in clouds
11	Little precipitation in next 24 hours
12	Winds with possible showers
13 or 14	Immediate precipitation, then clearing and cooler
15	Showers or flurries, then clearing and cooler
16	Clearing in a few hours
17	Partly cloudy, no temperature change
18	Fair with little change in next 36 hours
19	Mostly fair with rising temperatures
20	Continued fair

WEATHER WIZARD
TEAM RECORD SHEET

PRESSURE TEAM _____

WIND TEAM _____

CLOUD TEAM _____

TOTAL _____

OUR FORECAST DATE