Directed Activities for Junior Rangers

Introduction

The directed activities included in this section were chosen for their usefulness in the Junior Ranger Program. They require little or no equipment and can be used alone or as part of the regular program presentation. By capturing some of the boundless energy of the children and channeling it toward the educational goal, you can help the children benefit even more from the program.

The activities have been arranged in the following categories: Activities to Start or End With, More than One Topic, California Indians, History, Safety/Survival, Ecology, Geology, Animals, and Plants. The section concludes with instructions for making the tools and equipment required for some of the activities and a list of further references.

Sources for Activities

The number in front of each source corresponds to the number after the title of each activity. If a source number is not given for the activity, it was contributed by a Department employee. Activities compiled by Eileen Hook, supervised by Douglas R. Bryce.

1. *Cowstails and Cobras*. Karl Rohnke. Project Adventure, 775 Bay Road, Hamilton, Massachusetts, 91936. 1974.

2. *Environmental Concepts Through Questions*. Josh Barkin, Supervising Naturalist, East Bay Regional Park District, 1969.

3. "Games, Rattlesnakes, and Ice Cream." Workshop organized by Bob Flasher and Paul Ferreira. Sponsored by the Bay Area Chapter of the Western Interpreters Association. September 27, 1980: Alexander Lindsay Junior Museum, Walnut Creek, California.

4. *The Green Box*. Humboldt County Office of Education, Environmental Education Program. 901 Myrtle Avenue, Eureka, California, 95501.

5. *A Guide for Conducting Outdoor Field Experiences*. Cortland/Madison BOCES Outdoor Environmental Education Program. Bruce Matthews, Coordinator. New York: February 1978.

6. *Indoor-Outdoor Natural Learning Experiences—A Teacher's Guide*. Sacramento County Office of Education. 9738 Lincoln Village Drive, Sacramento, California 95827: 1978.

7. *My Backyard History Book*. David Weitzman. Boston: Little, Brown and Company, 1975.

8. *The New Games Book*. Andrew Fluegelman, editor. New Games Foundation, The Headlands Press, 1976.

9. *Outdoor Biology Instructional Strategies (OBIS)*. Lawrence Hall of Science, University of California, Berkeley, California 94720. Sets I, II, and III.

10. *Project Learning Tree, Grades K-6*. Western Regional Environmental Education Council and the American Forest Institute. 1619 Massachusetts Avenue NW, Washington, D.C. 20036, 1977.

11. *Sharing Nature With Children*. Joseph B. Cornell. Ananda Publications. 900 Alleghany Star Route, Nevada City, California 95959, 1979.

12. *Spaceship School*. Mollie Rights and Barbara Steinberg. Marin Museum of Natural Science. P.O. Box 957, San Rafael, California 94902, 1978.

13. *Teacher's Guide: The Coast Redwood and Its Ecology*. California Department of Parks and Recreation. P.O. Box 2390, Sacramento, California, 95811, 1974.

Activities to Start or End With

Becoming a Plant[3]

Number of Children: 1 or more

Environment: Outdoors, sunny area

Equipment Needed: None

Purpose of Activity: A start-up activity for a plant talk, and an exercise in frustration

Activity: After talking about the basic elements needed by plants to live (soil, water, air, and sunshine), form a circle and try this.

"Did everyone have something to drink today? Good."

"Now plant your feet firmly in the ground, take a deep breath, and stretch your hands up toward the sunlight."

"Do you feel full?"

"Shucks. We aren't plants then."

Gift Box[3]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To stimulate the imagination

Activity: (For younger groups, explain the activity first)

With the group seated in a circle, the leader walks in ceremoniously, carrying an imaginary box. He lifts the lid off and takes out an imaginary creature. Acting as if he is holding some small animal, he passes it to any person in the circle. That person reshapes the animal into any other animal and passes it to the next person. When it returns around the circle, put it back in the box and close the lid. Guess what each animal was.

Sherlock Snout[3]

Number of Children: 1 or more

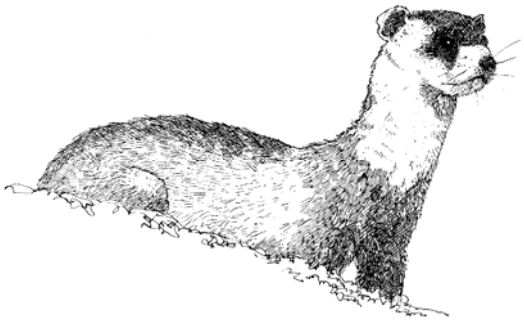
Environment: Any

Equipment Needed: None

Purpose of Activity: To use the sense of smell to locate objects

Activity: If you pick up a strong scent while outdoors, challenge the children to locate it using their noses and eyes. The smell of tobacco, flowers, dog scat, freshly cut lawn, skunk, etc., will do. This is a good game to play because it refocuses our attention to senses that are weaker than our eyes.

Variation: Bring along bags with different scents and pass them around for players to guess what they are.



Silent Walk[11]

Number of Children: 1 or more

Environment: Any natural area

Equipment Needed: None

Purpose of Activity: To heighten awareness of the world around us

Activity: This is a good way to calm down after the more energetic games. Take a hike in total silence for 5-10 minutes. Suggest at the beginning that everyone pay attention to the sounds around them and to the feelings inside them. Sit in a circle in silence for several minutes at the end of the hike. Then share your experiences, feelings, and opinions.

Try to develop appreciation of the diverse experiences the group has had during this hike. (The Silent Walk is often used as a nighttime activity.) Make it a game by seeing who can count the most sounds.

Hawk and Dove[1]

Number of Children: 3 or more

Environment: Open area

Equipment Needed: None

Purpose of Activity: To begin or end a bird walk

Activity: Place your hands and feet apart and chase one of your hands with the other (the hawk chasing the dove). Try to fly everywhere your body and arms can reach without moving your feet. After warming up individually, get into a group, form a V-shaped flying pattern of ducks or geese, and fly your hands south for the winter, quacking as you move forward in formation. This is a good activity to use after taking a group on a bird walk.

Activities for More than One Topic

Sound Orchestra [3]

Number of Children: 6 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To encourage the children to listen to and identify the sounds around them

Activity: Talk about the sounds heard in the park area; listen closely and see what can be heard at that time, and identify the things that make the sounds. Pick a particular situation or area (frog pond at sunset, rookery at mating time, forest at night, etc.) and assign each child the sound for a particular animal. One child is the conductor, and points to each person in turn, who continues to make their sound until directed to stop by the conductor. The conductor can motion for the sound to rise and fall, make one sound louder, etc. Have separate groups make up their own symphony and challenge the other groups to guess what they are.

Variation: Contrast the natural sounds with man-made sounds. After practicing a natural symphony, pick a man-made environment (kitchen, freeway, downtown area), and make the sounds heard there. Which does the group prefer?

Role Playing [11]

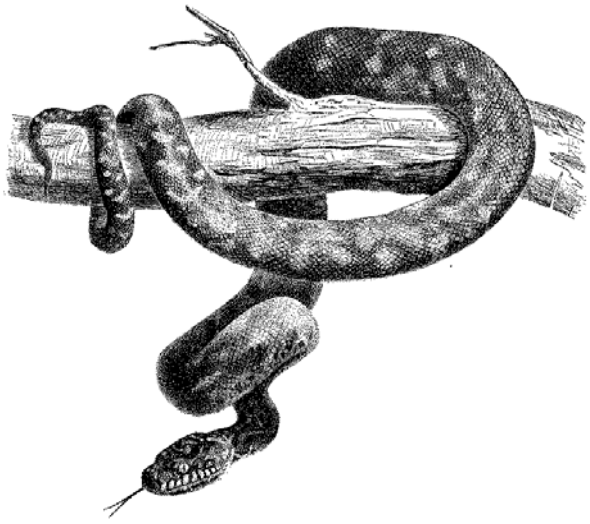
Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To increase observation of plant and animal behavior

Activity: Choose an animal, plant, tree, etc., and become it. React as it does to its surroundings. As a tree, how does a thunderstorm feel? How does a fox feel when it trails a mouse? Slither like a snake, be a seed growing into a tree, etc.



Nature Near and Far [5]

Number of Children: 3 or more

Environment: Trail

Equipment Needed: List of objects on trail and corresponding scores (one copy for each participant), paper and pencil for leader

Purpose of Activity: To encourage the children to listen to and identify the sounds around them

Activity: List 20-30 items to be found on the trail. Give a score to each item (bird's nest=10 points, butterfly= 5 points, etc.). Give each child a copy of the list and explain its use. The first player to observe an item and report it to the leader gets the score. The total score at the end of the game determines the winner.

This is a good activity to use up excess energy before taking a more serious look at the environment.

Microdiscovery [4]

Number of Children: 1 or more

Environment: Natural area

Equipment Needed: Paper or light cardboard

Purpose of Activity: To discover objects and living things close to the ground

Activity: Give everyone a piece of paper or cardboard, and have them roll it into a viewing tube. Find a place where everyone can crawl around a little. Using the viewing tubes to look through, have everyone crawl around and search for a micro-discovery, a scene or object that looks really neat to them and is very small. Mark the spots of the micro-discoveries.

Everyone chooses a partner and shows their discovery, trying to figure out what that is and how it relates to the environment.

Be prepared to help the children identify what they have discovered. A variation of this is "Tom Thumb's Jungle," on the next page.

Tom Thumb's Jungle [4]

Number of Children: 1 or more

Environment: Natural area

Equipment Needed: Pieces of string 100 inches long, one for each child

Purpose of Activity: To observe the world around our feet

Activity: Go on a 100 inch hike. Cut a piece of string into 100 inch-long pieces. Have each child lay out the string in a straight line, or curve it. Follow the string, carefully observing everything along the path. Hunt for little creatures, feel the earth, find evidence of humans.

Discuss how these items are interrelated, and help the children identify their discoveries.

Waste Not… [4]

Number of Children: 1 or more

Environment: Campground, near garbage cans

Equipment Needed: Trash, latex gloves, arts and crafts supplies

Purpose of Activity: To demonstrate that things that are thrown away can be used again, and to explain the value of recycling

Activity: Wearing latex gloves, go to a garbage can and fish out three items that have been thrown away. Invent something using the garbage and arts and crafts supplies. Discuss how items can be recycled and why it is important to do so. Explain some simple ways recycling can be done around the house—separating aluminum cans, saving newspapers and bottles, and finding a recycling center in your town.

The Fallen Log [10]

Number of Children: 1 or more

Environment: Forested area

Equipment Needed: None

Purpose of Activity: To explain interdependence among living things

Activity: Locate a rotting log, and observe the plant growth on and around the log. Look for signs of animals in and around the log. Discuss how the log benefits the plants and animals of the surrounding community. Find an area without rotting logs; observe the ground, plants and animals. What differences are apparent between the two areas? Are there more animals in one area than another? Are the plants and animals gaining anything from the log?

Did You Ever Eat a Pine Cone? [10]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explain the food chain in relation to the foods people eat, and to explain where the foods come from

Activity: Make a list of foods people eat, with the children's help. Explain how these foods are linked to plants, and how they became human food. Relate this to how animals are linked to plants by what they eat, and by what eats them. Is there any food you can think of that is *not* linked to a plant?

California Indians

The Native Way: A Natural Lifestyle [10]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To relate the lives of California Indians to those of children today

Activity: Give a brief description of the lives of California Indians in your area, then discuss the children's current lifestyles and correlations with the lives of California Indian children in the area in the past. Have the children imagine how they would live and learn if they were a California Indian 250 or more years ago. What food would they eat, and how would they gather it? What kind of transportation would they use?

Variation: This cultural comparison can easily lead to a discussion of "needs" versus "wants." Example: What kinds of communication did the native people use? (Is an I-Pod a "need" or a "want"?)

Woven History [10]

Number of Children: 1 or more

Environment: Natural area

Equipment Needed: Baskets indigenous to the park area

Purpose of Activity: To explain how California Indians used the environment

Activity: Using baskets indigenous to the area, talk about the plants used to make the baskets. Identify any of these plants growing in your park, and discuss why these plants were used instead of others. Talk about the uses for each basket, and why they were constructed in that manner. Compare these containers to other containers used for the same purposes today. How are they similar?

If possible, have a partially completed "twined" basket ready. Allow the children to try their hand at twining.

Variation: Show pictures of California Indian dwellings from your area, and explain the plant materials used. Identify any of these plants growing in your park, and talk about why they were used instead of others.

Grass or Hand Game [10]

Number of Children: Groups of 2-4

Environment: Any

Equipment Needed: 2 sticks or bones—one marked in some way, one unmarked—for each turn (Several pairs of sticks can be used for scorekeeping)

Purpose of Activity: To demonstrate one of the games played by Indians in many parts of California

Activity: A player takes two sticks or bones, one marked, and shifts them from hand to hand, hiding them behind his back. The opponent tries to guess which hand the marked stick is in. If the opponent is wrong, he must give the winner a stick from his pile of counters. After he misses, the other player may guess until he loses. The game continues until an agreed number of sticks is won.

California Indians played many other games, according to the tribe they belonged to. These games are still popular among native groups. Reference works on Native Californians in your area may give information on the games played by those people.

Clothing [10]

Number of Children: 3 or more

Environment: Any

Equipment Needed: Examples or pictures of California Indian clothing indigenous to the area, samples of the materials used to make the clothing (optional)

Purpose of Activity: To draw a correlation between the traditional clothing worn by Native Californians and that used by people today

Activity: Compare today's clothing with the traditional clothing of California Indians. Where did each type come from? How was it made? How was it decorated? In the past, different areas required more or less clothing, depending on the climate. Is this true today? Draw correlations between the different items of clothing worn by Indians in the past and those worn today. How are they similar? Do they serve the same purpose? Are they made the same way?

California Indian Supermarket

Number of Children: 10 or more

Environment: Trail

Equipment Needed: None

Purpose of Activity: To explain the ways in which native people lived off the land, using many of the plants as food, medicine, and basketry sources

Activity: Take the group for a nature walk in a California Indian's "supermarket." Explain the uses of the plants on the trail.

Reference: *Early Uses of California Plants*, Edward K. Balls, University of California Press, 1982.

History

Rubbings [4]

Number of Children: 1 or more

Environment: Historic area with plaques, tombstones, or other metal or stone markers

Equipment Needed: Lightweight paper, charcoal pencils or dark crayons, masking tape

Purpose of Activity: To encourage children to take a closer look at the signs, plaques, and other objects that tell the history of the area

Activity: Fasten paper over surface and rub firmly with crayon or charcoal until a picture appears. Using the pictures made by the children, discuss the history of the area and how it relates to these signs or markers.

Did You Notice? [10]

Number of Children: 1 or more

Environment: Any

Equipment Needed: Old photographs of the park area

Purpose of Activity: To explain the history of a park unit and some of the changes that happen to places through time

Activity: Using old photographs, show how the area looked in the past. Ask the children to talk about what has been changed, and the reasons. Which changes are beneficial and which are detrimental? Has opinion changed as to whether the changes are good or bad ones? *Note: Enlarge the photographs as much as possible to make them easier to see. Lamination allows them to be used for other programs.*

Teach a Historic Skill

Number of Children: 4 or more

Environment: Any

Equipment Needed: Equipment needed for the skill chosen

Purpose of Activity: To demonstrate a skill that early Californian settlers used in order to live here

Activity: Some skills to teach: candle making, gold panning, splitting shakes, making a corn husk doll, weaving, basket weaving, etc. Some of the older residents in your area may know how to do these crafts, and can help you get started. Reference books are available at your local library to explain many of the crafts. As safety permits, allow hands-on participation for the children in the activity.

If I Were Going to Cross the Plains…

Number of Children: 3 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To demonstrate the self-sufficiency the early settlers needed to reach California

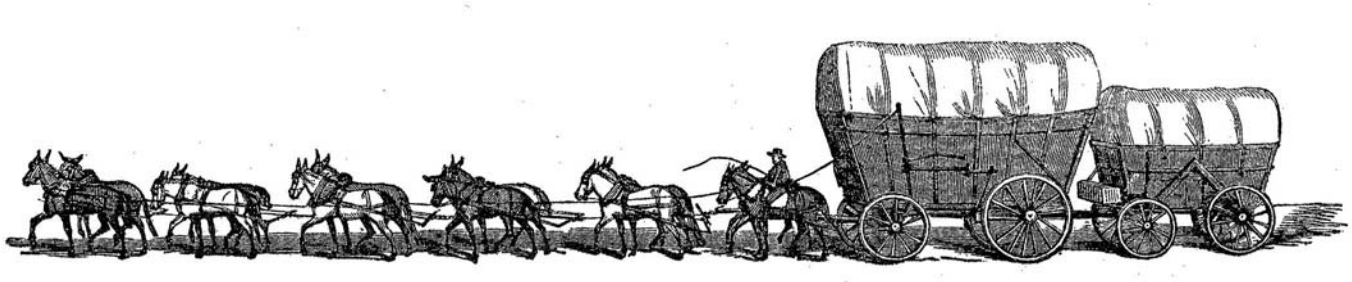
Activity: Using the old "If I were going on a trip" game, adapt it to crossing the plains in the 1840-1850 era. In a wagon traveling from St. Joseph, Missouri to California, what kind of things would you need to survive while crossing the plains?

Examples:
If I were going to cross the plains, I would take a barrel of water.

If I were going to cross the plains, I would take a barrel of water and a bedroll.

If I were going to cross the plains, I would take a barrel of water, a bedroll, and a fishing pole.

Etc.



Hanging Around Old Town [7]

Number of Children: 3 or more

Environment: A historic area with buildings to be viewed by the children

Equipment Needed: None

Purpose of Activity: To show the various ways the date of a structure can be determined

Activity: Take the group on a tour of the historic area. While walking, tell the children to watch for dates engraved on cornerstones, around doors, on plaques, on the sides of buildings, on old sidewalks, and on metal items—manhole covers, fire hydrants, lampposts, fences, etc. How old is this part of town? What kinds of businesses were located here? From the names on the buildings, can you tell if the town was mostly of one nationality? Encourage the children to do the same in their own town with their parents.

Safety/Survival

Planet Strange [4]

Number of Children: 2 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explain what things are needed for survival

Activity: You are shipwrecked on an island where no other person lives. No other islands are around you. There is no way to send for help. The island is shaped like a horseshoe; it has a cove, a beach, and mountains. It is hot and damp, with storms from the sea. A fresh water stream is available. There are fruit trees, birds, monkeys, and larger animals available. How will you survive? What will you need?

It *Is* Necessarily So [4]

Number of Children: 1 or more

Environment: Natural area

Equipment Needed: None

Purpose of Activity: To find out what is necessary for survival

Activity: Walk around outside and find 6 things that are alive. Look at them and try to figure out what is necessary for the survival of each. What do people really need to survive on this earth? How do people's needs compare with the needs of the other things you found? Do people, plants and animals ever use the same things in different ways? Do people, plants and animals use something in the same way?

Ecology

Resource Recipe [4]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explain how natural resources are used in everyday life and how their loss affects us

Activity: The food you eat, the clothes you wear, and the house you live in are all created from natural resources. Name one natural resource, and have the children name at least 10 products that would not be around without that resource. Continue, using other resources. Which of the resources you identified are renewable, and which are non-renewable? What could be substituted for these resources if they were not available?

Historical Hap [4]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explain the interdependence of people and animals in the environment

Activity: Preliminary: Explain how birds, bats, and insects affect our world and our lives.

The planet Zarkov in the Alpha Centauri solar system is a great deal like the earth. It has air, water, plants, minerals, animals, and people. There are a couple of differences, however. Zarkov has no birds, bats, or insects. How would these facts affect the Zarkovian development?

*Variation***:** Make your own world! Choose a site and pretend that it is your own world. Think about what you would need to survive here. What would you want to bring here and what would you take away? What would be the most important thing to do first?

The Web of Life [2]

Number of Children: 7-15

Environment: Any

Equipment Needed: 5 x 7 cards with the names or pictures of some part of the environment, ball of string, scissors

Purpose of Activity: To explain the interrelatedness of all plants, animals, and other elements of the environment

Activity: Players form a circle. Each is given a "name" card (or a card with a picture on it) which identifies them as some part of the environment—sun, air, water, soil, plants, animals, humanity, etc. Sun holds one end of the string and starts the game by handing the ball of string to one thing that is dependent on the sun to survive. That person passes it on to something that needs his or her card to survive, etc. After each player is connected to at least one other player, cut the string between two players to show that their link is broken. Follow the cut string from player to player to show how this affects the entire web of life. *Note: select local examples of plants and animals*.

Food Chain Game [6]

Number of Children: 6 or more

Environment: Any

Equipment Needed: 3 x 5 cards with pictures of some living things in the park area

Purpose of Activity: To explain the food chain and how animals and plants interact

Activity: On small file cards, make pictures of the living things in your area. Have all players sit in a circle, then distribute the cards, one to a person. Explain how a food chain works, who is on top, who is on bottom, etc. The remaining cards go to the reserve pile. Choose someone to start the game by challenging another player to a showdown. The two players lay down their cards; if one preys upon the other in some way, that player takes the card from the eaten opponent. The turn lasts as long as the person can find other cards to eat. If the person challenges and loses, the card and the turn are lost. Whenever a player is eaten, that person draws a replacement card from the reserve pile. In the case of a challenge where neither organism eats the other, it's a standoff, and the game continues as the player next to the challenger takes a turn. Continue until everyone has had a turn and the survivors are all at standoffs. Each counts their cards; the one with the most cards wins.

Un-nature Trail [11]

Number of Children: No more than 10

Environment: Trail

Equipment Needed: 10-15 man-made objects (clothes pins, pencils, combs, mirrors, toys, etc.)

Purpose of Activity: To sharpen observation skills

Activity: Place the man-made objects just off a 20- to 30-foot-long section of trail. Use some bright objects and some well hidden ones. People walk the trail one at a time, silently, trying to see as many objects as possible. At the end, they whisper to you how many they have seen. If not all were spotted, tell them "there's still more," and let them start over. Finish up by walking the trail as a group, pointing out and then removing each object in order. Make a point about keeping unnatural objects where they belong while hiking, then practice your new observation skills on a nature hike. *Note: Make sure all park staff is notified that this is an interpretive activity—not litter!*

Knots [8]

Number of Children: 6 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To try and untangle the complex web of relationships between animals and plants

Activity: Explain that every animal and plant is connected in many ways to the other plants and animals around it. The soil, the amount of water, exposure to the wind, and many other factors affect all living things as well.

The object of the game is to try and untangle a complex web of relationships to see the cycle involved. Give each player an animal or plant name before the knot begins. Tell them to remember their name. Stand in a circle, shoulder to shoulder. Everybody reaches across and grabs two other hands (not the same person's or the person next to you). Now that you are all interconnected, try to untangle the knot without letting go of any hands. Do you end up in a circle? Two circles?

After the knot is untangled, ask the players about their names, and talk about the relationships between their neighbors on each side of them in the circle. Would they be eaten or eat their neighbors? How is this going to affect the food chain they are a part of?

Geology

The Missing River [4]

Number of Children: 1 or more

Environment: Any

Equipment Needed: Aquarium or wooden box lined with foil, various soil elements from the park area, watering can, water

Purpose of Activity: To demonstrate and explain a water table and how it affects human lifestyles

Activity: Using an aquarium or a wooden box lined with aluminum foil, make a gently sloping hillside of the soil elements. Use the kind of subsoil, topsoil, duff, and ground cover you find in your area. Gently sprinkle the top of the hill with rain (very slowly, so it will sink in—not a cloudburst), using a watering can. Observe where the water eventually becomes visible. When you have a pond about an inch deep, let your hillside stand until the upper hillside dries out. Dig down to find out whether all the water has drained into the pond. You may find a water table buried down there. Explain what a water table is. How is the water table important to people, wherever they live? How is it affected by human patterns of living?
Note: to speed up the process, prepare a "hillside" earlier, and let it dry out. (Use it for the latter half of the experiment, preparing another hillside while the children watch.)

Water Holding Capacities [13]

Number of Children: 1 or more

Environment: Any

Equipment Needed: Two (or more) funnels or similar containers with different types of soil from the park area in them, equal-size clear glass jars for the funnels to drain into, stopwatch or wristwatch with second hand, water in equal amounts

Purpose of Activity: To explain soil's water-holding capacities and how this capacity affects the plants that live in it

Activity: Pour equal volumes of water through several different soil samples (clay, sand, loam) from different parts of the park. Let the water drain through the soil into separate containers for each sample. Compare the water holding capacities of each soil by comparing the rates at which the water pours through each sample, and the amount of water collected in the containers. Explain how soil holds water. Discuss why the holding rates of the soil samples are different, and relate this to the park's geology and the plants that grow in different parts of the park.

*Variation***:** Examine the runoff water and the particulate matter in each jar. Discuss which soils might be more susceptible to erosion.

Holding Power [10]

Number of Children: 1 or more

Environment: Hilly area, partially eroded

Equipment Needed: Water

Purpose of Activity: To explain the waterholding benefits of plants on hillsides and how they prevent erosion

Activity: Select two equally sloping sites; one with bare soil only, one with plants. Pour an equal amount of water on each slope. Which slope has the most water runoff? Why? Were any mini-check dams created? Talk about erosion and how plants prevent it.

Sand, Silt and Clay [10]

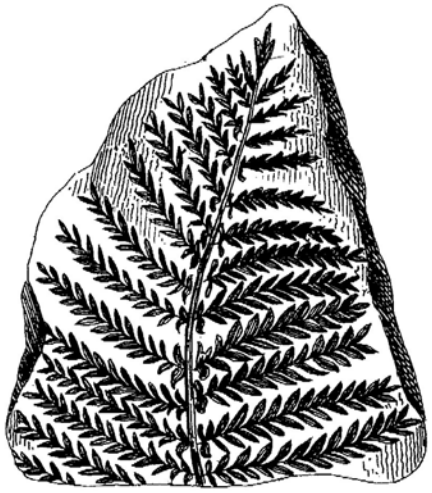
Number of Children: 1 or more

Environment: Any

Equipment Needed: Tall jars with lids, soil samples, water softener, wristwatch

Purpose of Activity: To demonstrate the varieties of soils in a given area

Activity: Have children collect soil from different areas. Fill tall jars ¼ full of soil, add water to 2/3 full, and add a small amount of water softener. Shake each jar vigorously for 2 minutes, then let settle for 15 to 20 minutes. Observe the variety of soil textures in each jar—silt, sand, and clay.



Rock Classification [3]

Number of Children: 4 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explore how things, especially rocks, are classified

Activity: Players each find a rock. Sitting in a circle, share what attracted you to that rock. Then line up according to who has the biggest rock at one end and who has the smallest rock at the other end. Brainstorm other ways to divide the rocks into other categories (like color, texture, shape, sparkles, type, etc.), and form those groups. Discuss how animals, plants and rocks have been classified in a similar way by scientists.

Volcanic Eruption

Number of Children: 10 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To explain the workings of a volcano

Activity: Before beginning the game, introduce the terms: magma, cinder cone, cinders, ash, lava, and caldera, and explain how they relate to a volcano. Four people, the magma, crouch down in a tight circle. They are surrounded by the others, the cinder cone, who stand around the magma with their hands in the air to form a sloping cone. The magma starts bubbling, sending out cinders and ash (pieces of grass). The magma rises higher and higher, hissing and bubbling. The cinder cone begins shaking and rumbling. Part of the cone breaks away, and the magma (now lava) explodes out and quickly solidifies. As the lava leaves, the cone crumbles, leaving a caldera in the center.

Animals

Sticklers [9]

Number of Children: 1 or more

Environment: Any natural area

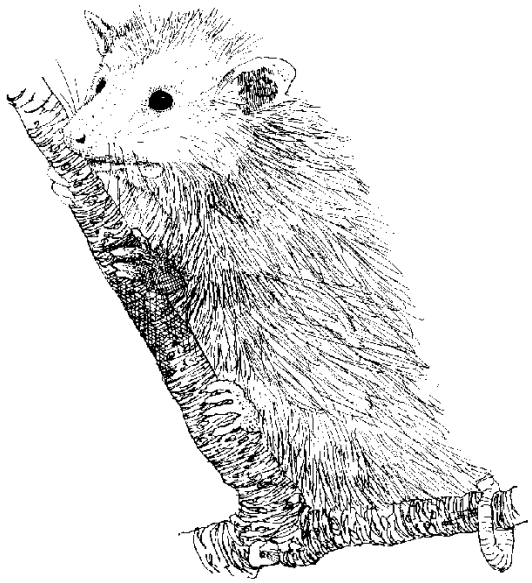
Equipment Needed: 100 sticklers (colored toothpicks work well)

Purpose of Activity: To introduce the terms "habitat" and "distribution," and to explain them

Activity: Use a simulated lawn (or forest, field, etc.) animal—a stickler—to demonstrate habitat and distribution. A stickler can be a toothpick, or other material that will not contaminate the area if left behind. Select a habitat and a distribution manner, place the sticklers on the ground and study them as if they were actual animals.

Use one of three kinds of distribution: uniform, random or clumped. Uniform is evenly spread out, random is scattered here and there with no pattern, and clumped is a number of organisms bunched together in several places in the habitat. Distribute the sticklers before the group arrives; use the habitats available to give the stickler its own habitat (under certain plants, in the shade, sun, etc.). Use at least 100 sticklers.

Show the group the stickler, and tell them they must search for this "animal" and find out where it likes to live. Give them time to find the sticklers and observe them. Call the group back, and ask where the sticklers live and how they are spread out. Introduce the terms *habitat* and *distribution* as they pertain to the sticklers. Which type of distribution and habitat does the stickler prefer? Use this discussion to talk about the actual plants and animals in the area.



Centipede Race (Bug Tag) [8]

Number of Children: 6 or more

Environment: Open area

Equipment Needed: None

Purpose of Activity: To find out how well an animal with several legs moves

Activity: What animals have only one foot, and how fast do they move (snails, clams)? Do our two feet help us move faster than one-footed animals? Can four-legged animals move faster than we do? Does having more legs always mean the animal will move faster? How about birds and insects?

How fast do centipedes move with all their feet? Let's become a centipede and find out. Line up in two lines, back to back. One line then takes a small step to the right, so the people in the line behind them are just over their right and left shoulders instead of directly behind. Then everyone bends down, crosses their arms between their legs, and reaches behind them for the wrists of the two people behind them on both sides. Decide which end will be the head, and start to walk. Race another centipede. Is a centipede faster with all its legs?

Survival of the Fittest (Smaug's Jewels) [8]

Number of Children: 4 or more

Environment: Any

Equipment Needed: Handkerchief or Frisbee

Purpose of this Activity: To demonstrate the effect of scarcity of food on animals

Activity: When food gets scarce, animals may be forced to fight over it or steal it from each other. Wolverines may steal a kill from a coyote. Birds and squirrels may steal acorns a woodpecker has stored in holes in a tree.

In this game, a coyote tries to keep a kill for itself. The other hungry coyotes try to steal it away. With the coyote standing over its kill (handkerchief or Frisbee), the others try to sneak up and steal it. If the coyote tags the others, they are dead or have to step back until the food is stolen, or all the others are tagged too. The successful thief is the next coyote. Did the pack cooperate, or was it every coyote for itself?

People Roll [8]

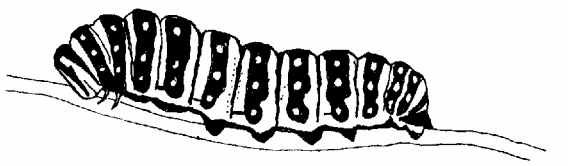
Number of Children: 6 or more

Environment: Grassy area

Equipment Needed: None

Purpose of Activity: To imitate the movement of a caterpillar

Activity: After observing how a caterpillar moves by sending a ripple moving along its body, all participants lie face down in the grass, arms at their sides, shoulder to shoulder. The player on the end rolls up onto the next player, keeping arms at sides and head in the same direction as the rest of the players. The player keeps rolling over the other bodies, then drops off the end. The other players follow, and drop off at the end of the line after the leader. Keep rolling, but don't bump heads!



Support to Survive (The Lap Game) [8]

Number of Children: 12 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To demonstrate how survival depends on cooperation, not just individual effort.

Activity: Think of the different ways that animals support and cooperate with each other (kangaroo babies in pouches; monkey, opossum, and scorpion mothers carrying their babies on their backs; dolphins pushing their newborn to the surface for their first breath; ambulance crews carrying injured people in stretchers).

Here is a new way we can support each other and relax at the same time. Form a close circle standing shoulder to shoulder. Turn 90 degrees to the right. At the same time, everyone should sit down on the knees of the person behind them. Now, try waving your hands and walking forward in a circle.

Ants on a Twig [3]

Number of Children: 6 or more

Environment: A fallen log sturdy enough to hold all the children

Equipment Needed: None

Purpose of Activity: To demonstrate cooperation between animals

Activity: Observe ants on a twig or other narrow space. What do they do when they meet? They touch feelers and pass each other. All the players become ants, and line up on a fallen log. Half the group turns around and faces the other half. One line is returning from the food source, the other is going out from the anthill to find food. Both lines must pass each other on the log without falling off. Touching and holding on is totally permissible. Use skinny (one-foot diameter) logs for skillful players, and bigger diameter logs for beginners.

If players get too hurried, you'll lose some ants, so use ant techniques: touch any player coming toward you, and after secure contact is made, proceed cautiously.

Amoeba Tag (The Blob) [8]

Number of Children: 6 or more

Environment: Large, open space

Equipment Needed: None

Purpose of Activity: Explain how an amoeba feeds, and what it is (amoebas are tiny one-celled animals that grow by surrounding their food and soaking it up through their "skin;" they reproduce by dividing in half)

Activity: Agree on boundaries for a game of tag. "It" is the amoeba, which chases its food. When its food is tagged, this becomes part of the amoeba. Holding hands, they pursue the next meal. Everyone tagged joins the amoeba and continues to chase its prey, which it can tag with outside hands only, or by surrounding it completely. If the amoeba gets too big to catch all the food, it can divide in half and continue to chase. The last morsel eaten becomes the amoeba for the next game.

Variation: Allow the amoeba to grow to only four people; then each amoeba must divide into two-person amoebas. This solves the crack-the-whip problem at the end of the line.

At the end of the game, talk about the best way the amoebas found to tag their food. Did they try to corner it? How did the last food morsel left manage to survive for so long?

Burrows [3]

Number of Children: 6 or more

Environment: Open space

Equipment Needed: 3-4 frisbees or similar objects

Purpose of Activity: To explain the predator-prey relationship

Activity: Three or four frisbees are thrown out on the ground, about 10-15 feet apart. The "ground squirrels" are safe when they have one foot on their "burrow." One or two predators chase the squirrels when they are out looking for food or visiting neighbors. Every squirrel that is eaten becomes a predator, and joins the hunt. The last squirrel alive is the first predator in the next game. Or, if your group is timid about leaving the safety of their burrows, the squirrel with the most points (one for each burrow visited) wins.

Preface this game with observation and discussion of the squirrels in the park area, how they move about, what they eat, where they live, what their predators are, etc. This can also be a good opportunity to touch on problems with feeding the squirrels—concentration, overpopulation, dependence on people for food, etc.

Call of the Wild (Cows and Ducks) [3]

Minimum Number of Children: 4

Environment: Large room or outdoor space

Equipment Needed: Enough blindfolds for the group

Purpose of Activity: To heighten perception of the sounds of a forest or other natural area

Activity: Discuss the animals found in the park area and the sounds they make. Select 2 or 3 animals to use. Blindfold participants. The leader whispers the name of one of the animals to each participant or the child draws a folded name/picture out of a hat. At a signal, everyone moves around making their sound until they find others making the same sound. Watch to make sure that no one gets hurt. Note: use native species, not those exotics we don't want to find in a park.

Patterns and Vision [3]

Number of Children: 1 or more

Environment: Various

Equipment Needed: Red, transparent plastic or cellophane masks for each participant, paper animal cutouts of two types: 1) realistic and 2) marked with disruptive coloring like bars, dots, and other patterns

Purpose of Activity: To explain the purpose of disruptive coloring in animals

Activity: Give participants masks, so they become color-blind predators who see everything in shades of red. Place paper animal cutouts in a varied environment, so they are visible but not obvious. Participants then search for the animals. Talk about how the animals had to be recognized by their shapes. Now, place the other batch of paper animals—the ones with disruptive patterns on them—in the same area, and hunt for them. Talk about the difference in the hunts, and about animals the players know that have disruptive patterns, like fawns, birds, and butterflies.

Hug Tag [8]

Number of Children: 7 or more

Environment: Open space

Equipment Needed: None

Purpose of Activity: To demonstrate how safety and comfort are important to animals

Activity: Boundaries are determined, and an "it" is chosen. Have a short discussion of how baby animals run to their mothers for protection and comfort when pursued by a predator. The person who is it tries to tag the other players, who are only safe when they are hugging in pairs. Everyone who gets tagged becomes it, too. See if it is harder for a mother to protect more babies by requiring three or four players to hug each other at the same time. Have a time limit for hugging to prevent the players from staying in hug groups; counting to three is good. After hugging one person, you must hug someone else before returning to the first person you hugged.

Noah's Ark [11]

Number of Children: 8 or more

Environment: Open area

Equipment Needed: 3 x 5 cards, pictures of animals in your park area

Purpose of Activity: To explain to the children the types of animals in the park area and how they live

Activity: Preface the game with a discussion of the kinds of animals in the park area and their activities.

Write the names of animals in your area on 3x5 cards (or use pictures). Make 2 cards of each animal (if there is an odd number of children, make three cards of one animal). Pass the cards out, one to a person. Each child reads the card to himself and becomes that animal, keeping his/her identity a secret. Collect the cards. On a signal, everyone begins acting out their animals' sounds, shapes, and movements, trying to attract their mates. No human talking is allowed.

Animal Parts [11]

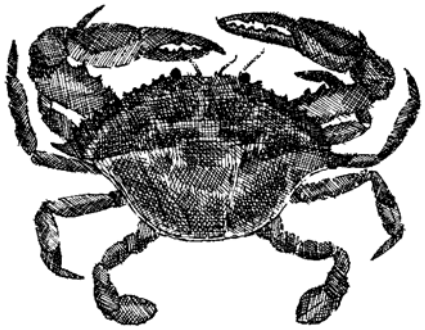
Number of Children: 8-10

Environment: Any

Equipment Needed: None

Purpose of Activity: To examine the characteristics, behavior, and body movements of animals in a park area

Activity: Divide into groups of 4 or 5 children. Each group selects an animal common to the area. They then imitate the body of the animal for a panel of experts—the rest of the group. Each child is allowed to be a part of the animal. No noise is allowed. The panel of experts tries to guess what animal they are, and what they are doing. Try a scorpion—one person for the head, two for the body, and one for the long curving tail, with a stinger on the end. Or a crab, with enough arms and legs to make up all eight legs and the claws in the front.



Wild Animal Scramble [11]

Number of Children: 4 or more

Environment: Any

Equipment Needed: Cards on loops of string, with animal pictures on them

Purpose of Activity: To study animal characteristics

Activity: Hang or pin a picture of an animal on the back of each child, but don't let them see the picture. Then they ask each other questions to discover their identities. The questions can be answered only by a yes, no, or maybe.

Preface the activity by giving examples of the kinds of questions to ask. "Do I live in the (forest, ocean, desert…)? "Can I fly" "Am I brightly colored?"

Nature's Kaleidoscope [2]

Number of Children: 6 or more

Environment: Any open area with a variety of ground covers (grass and soil, leaves on the forest floor, etc.)

Equipment Needed: 100-200 colored toothpicks, an equal number of each color

Purpose of Activity: To demonstrate camouflage

Activity: Spread the toothpicks over the ground. Players have 30 seconds to collect as many as they can. Divide toothpicks found into groups, according to the colors. Which color was found least? Use this to discuss camouflage in animals.

Variation: A variation of this game is called "Birds n' Worms." Instead of toothpicks, it uses pieces of colored pipe-cleaners. The children form the pieces into "worms," and the leader scatters them around the area. The children, as birds, "fly" out over the area and pick up worms until the leader calls out the name of a predator that eats birds—fox, coyote, owl, etc.

Silent Stalking [9]

Number of Children: 5 or more

Environment: A clear area with a noisy walking surface—gravel, twigs, brush, etc.

Equipment Needed: Blindfold

Purpose of Activity: To explain how a predator stalks its prey, and what it must do to keep the prey from being aware of it

Activity: Choose a fairly level, open site with a noisy walking surface. Mark off a stalking circle at least 10 meters in diameter for the group. Introduce the terms predator and prey. One member of the group is the prey; the rest are predators.

The prey stands in the center of the circle, and puts on a blindfold. The predators walk out to the edge of the circle, while the prey spins around in place. After spinning 4 times, the prey yells "stop," and all the predators freeze. The predators stalk the prey by trying to tag him before he hears them. Each predator must pause between steps to see of the prey has heard him. If the prey hears a predator, he points at him. The leader should determine if the prey is pointing at the predator in case of close calls.

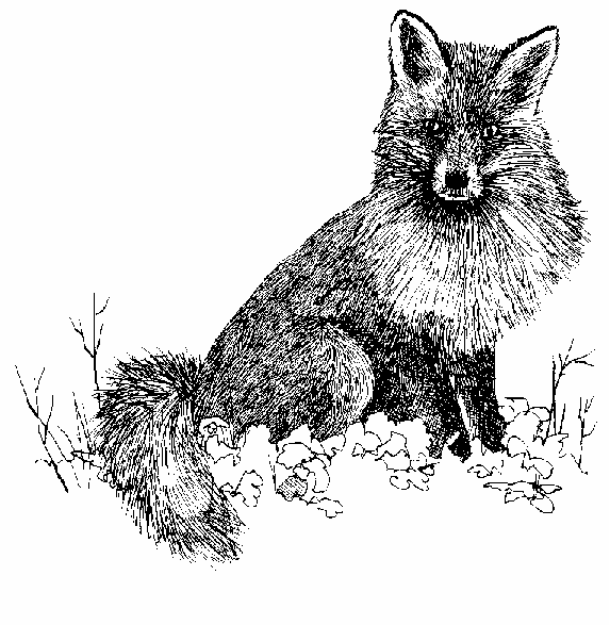
If a predator is caught, he is out of the game. The game ends when all the predators have tagged the prey, or the prey has used up all the available decision attempts (2 for each predator).

Questions for the group:

Ask participants how they would change their bodies to be more effective as predators or prey.

Ask the most successful stalkers to demonstrate their stalking skills to the rest of the group.

What kinds of adaptations help animals be predators, or to prevent being caught as prey?



Shake It [9]

Number of Children: 3 or more

Environment: Trail in brushy area

Equipment Needed: Shake-it container (see "Tools and Equipment" section)

Purpose of Activity: To examine the insect life in a brushy area

Activity: During a pause along the trail, introduce the shake-it game. Tell the children that lots of interesting animals are within arms' reach of either side of the trail. Challenge them to find some of these animals. Demonstrate the shake-it container, and offer it as a tool to help them get a closer look (see "How to Make Tools" section). When everyone has practiced the technique, challenge the youngsters with some of the following:

Pick one kind of plant to shake at different places along the trail. Which animals appear again and again on that kind of plant?

Show an animal to the group, and challenge them to find as many kinds of plants as possible that harbor that animal.

Questions for the group:

What kinds of animals were the most common?

Were many of the animals camouflaged?

Were there animals found on only one kind of plant? Why?

Sound Off [5]

Number of Children: 10 or more

Environment: Open area

Equipment Needed: Strips of paper, a box to hold them, blindfolds

Purpose of Activity: To find out how predators and prey find each other

Activity: Determine ahead of time the noises you wish to signify prey. The predator will be silent. Write the noises (or names of the prey) on the pieces of paper and distribute them. There will be two of each kind of prey and one predator. Blindfold everyone, and spread the group out in a defined area. Have everyone make their noises only while standing still or moving (determine which ahead of time). The prey must find each other, and stay together and away from the predator until the game is over. If they are caught, they must move to the capture area.

Variations:

Predators can only eat certain animals.

Predators must make noise when moving.

Increase the number of predators.

After the game, talk about how the predators and prey found each other.

Listen to the sounds in your area.

Rattlers [3]

Number of Children: 10 or more

Environment: Open space

Equipment Needed: Two blindfolds and two noisemakers (cans with rocks in them and plastic tops work well)

Purpose of Activity: To demonstrate how predators find their prey

Activity: Two players, a predator and a prey, go to the center of the circle formed by the other players. Each is blindfolded and is given a noisemaker of some kind. The predator tries to catch the prey. Each time the predator uses his/her noisemaker, the prey must respond immediately by returning the noise. Limits can be placed on how many times the predator can make a noise before he/she starves to death.

Variations:

Both players must stay silent and try to find each other by using only their hearing.

Either the predator or the prey makes the noise, but not both; or

Instead of noisemakers, have the children make a noise like an animal found in the area (coyote and squirrel, hawk and rabbit).

Animal Diversity [9]

Number of Children: 4 or more

Environment: Adjacent areas with different vegetation

Equipment Needed: Sweepnets (see "Tools and Equipment" section), plastic bags, rubber bands or twist ties

Purpose of Activity: To examine the diversity of insects in adjacent areas

Activity: Choose two nearby areas with different types of vegetation, such as a managed area (lawn, landscaped area) and an un-managed area (field, roadside area). Have the group use the sweepnets on each area, and then compare the number of different insects in each area and the total number of insects. The sweepnets should be swept over each area an equal number of times to make the comparisons valid.

Compare the numbers and varieties of insects in the two areas. Explain the term "diversity," and discuss the reasons behind the results of the sweepnet hunt. What are some of the differences between insects? How do humans affect the diversity? What are the advantages and disadvantages of each area to the insects?

Mystery Marauders [9]

Number of Children: 3 or more

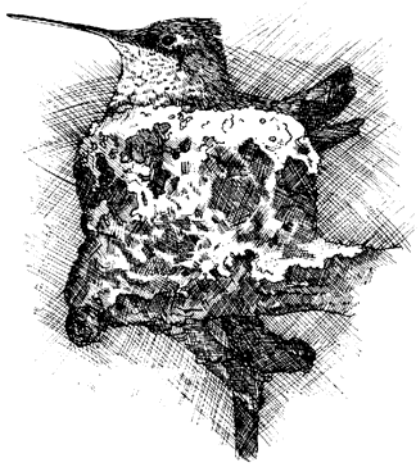
Environment: An environment with "holey" plants

Equipment Needed: Sweepnets or shake-it containers (see "Tools and Equipment" section), plastic bags, magnifying glasses

Purpose of Activity: To observe insects' feeding habits

Activity: Select a site with "holey" plants (ones with a lot of holes in their leaves). Introduce the activity as a detective assignment. First, have the children gather samples of chewed leaves. Examine the leaves for similarities in the type of holes. Send the children back to "the scene of the crime" to look for suspects in the act of chewing. Organize a shakedown of the site with sweepnets or shake-it containers, gathering suspects (see "How to Make Tools" section). Put some of the types of leaves chewed into bags with the bugs. Observe and discuss the types of insects (predators and herbivores). Identify the culprits. If no culprit can be identified, why not?

Too hot?
Too cool?
Too light?
Too early?
They've moved on?



Plants

Plants that Hitchhike [6]

Number of Children: 3 or more

Environment: An area where plants or grasses are going to seed

Equipment Needed: Burlap bag or other loosely woven cloth, hand lens

Purpose of Activity: To discover how seeds transport themselves

Activity: Drag a burlap bag or other piece of loosely woven cloth over an area that has not been mowed, and where plants and grasses are going to seed. How many different kinds of seeds do you find on the cloth? Are there more of some kinds? How did the seeds hitchhike on the cloth? Use a hand lens to discover the fasteners if they are too small to be seen unaided. What do you think these seeds hitchhike on besides the bag? Match the seeds to their plants.

This is a variation of checking your socks for seeds after a hike.

Plant Hunt [12]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To increase observation skills

Activity: Describe a plant so completely that someone else can find it. Give a careful description of a plant—size, color, type of leaves, smell, feel, etc. Can the children find it from your description? Let them try to describe a plant to each other, then find it.

Green People [12]

Number of Children: 1 or more

Environment: Any

Equipment Needed: None

Purpose of Activity: To examine the relationship between plants and humanity

Activity: Find plants that help people and animals survive.

Find a plant that burns well (fuel), is good to eat (food), or has lots of leaves (air supplier).

Find a plant that creates products people use. For example, a plant that can be made into paper, clothing (belts, shoes), houses (shelter), or that has water in it (water supply).

Meet a Tree [11]

Number of Children: 2 or more

Environment: Forest

Equipment Needed: Blindfolds

Purpose of Activity: To gain a sensory awareness of forest trees

Activity: Blindfold half of the children. The other half of the group finds a partner and leads him or her to a tree (each guide should choose a different tree). Tell the blindfolded kids to feel the tree all over, learning about its bark, size, smell, texture, etc. Then return to the starting point, using an indirect route. Take off the blindfolds and try to find your tree.

Heartbeat of a Tree [11]

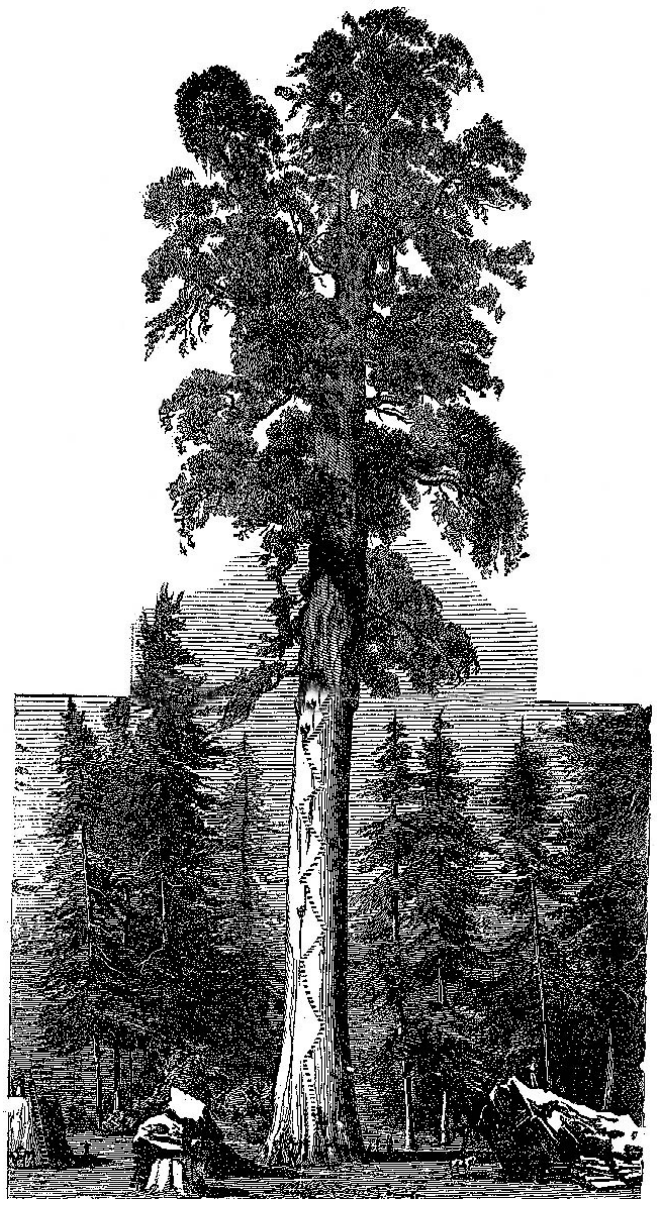
Number of Children: 1 or more

Environment: Forest

Equipment Needed: Stethoscope

Purpose of Activity: To become more aware of the life within a tree

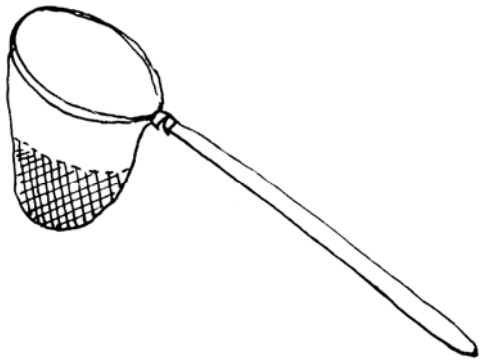
Activity: Using a stethoscope, listen to the sap in a tree. Deciduous trees are the best, and trees with thin bark which are at least six inches in diameter work well. Spring is the best time of year to hear the sap flow. From this activity, lead the discussion to the "circulatory system" of trees and other plants.



How to Make Tools and Equipment

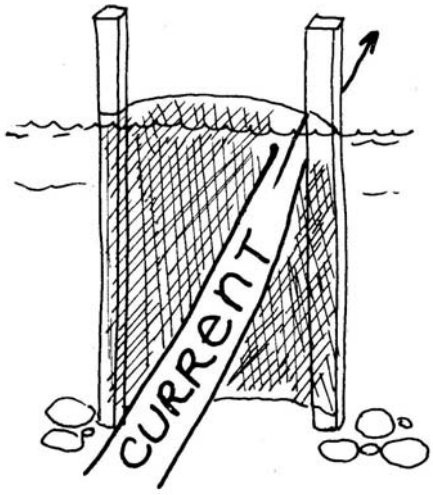
Collecting Net [4]

Wire hoop on the end of a broom handle. Make net from an old nylon stocking top sewn to a piece of muslin.



Stream Sampling Screen [4]

Tack window screen to two long wooden handles. Hold in a stream to catch floating organisms.



Water Scopes [4]

Cut both ends out of a can. Cover the sharp ends with waterproof tape. Place clear plastic over one end, and secure with rubber bands. During the night, place a flashlight in a weighted and sealed jar.

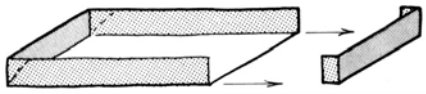
Shake-it Container

Materials for one container:

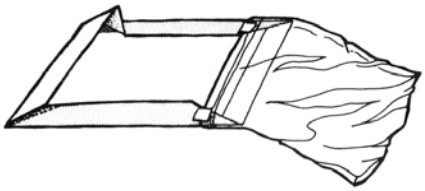
- 1 small, flat box
- 1 piece white paper (optional)
- 1 plastic bag
- Tape

Construction:

Get some small, flat boxes and cut one end out. One-ream standard 8 ½" x 11" paper boxes are perfect.



If the bottom is smooth and light colored, fine. If not, tape some white paper in the bottom. Now put the open end of the box a short distance into a plastic bag. Supermarket produce bags work well. Tape the bag in place on the bottom and sides of the box.



That's it!

To use the Shake-it Container*:*

Simply hold open part of the box under some foliage and shake the foliage vigorously.

Things that fall into the box can be tipped immediately into the bag. Critters that hold on can be tapped or gently scraped into the bag with a 3 x 5 card.

Returning the box to the level position puts a bend in the bag, preventing any captured critters from escaping. In this way, you can make many "shakes" and transfer the catches to the bag.

To empty the bag, take it off and dump the contents. To reuse, re-tape the bag to the box.

Sweepnet

Materials:

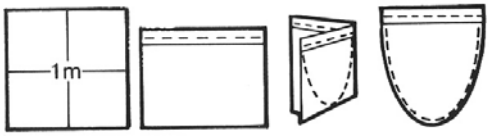
- 1 or 2 wire coat hangers (strong wire)
- 1 stick (approximately one meter long) for your net handle
- 1 piece of cheese cloth or netting for the net bag (about 60cm by 90cm)
- 1 needle and thread for sewing (or a sewing machine) or 1 stapler
- Strong tape to attach net to handle

1. Preparing the hoop

Take a strong wire coat hanger, straighten the hook, and pull the hanger into a square. (Use two hangers for added strength.)

2. Preparing the bag

Your net should be almost one meter in circumference at the top, tapering down to a point. A sewing machine speeds up construction, but older kids can sew the nets if sufficient time is provided. Sew like this:



Fold one edge down 10 cm and sew.

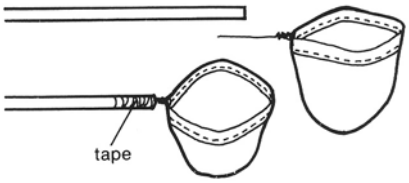
Fold in half and sew or staple.

Cut off excess.

3. Assembling the net

Open the wire square and thread on the net.

Attach wire hoop to stick.



4. Using a sweepnet

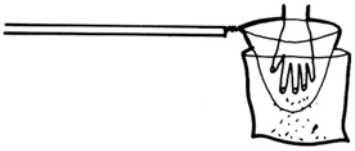
While a sweepnet can be used to pursue and capture an animal that has caught your eye, this is not the most efficient method of use. A sweepnet is best used as a random sampling tool. You walk at moderate speed across the grassy area, sweeping the net back and forth, keeping it close enough to the ground to brush the weeds or grass. The net should just brush across the top of the grass. The idea is to sweep any animals that are buzzing around or resting on plants into the nets, so you must turn the net in your hand to capture animals on both right and left swings of the net. After you have made fifteen to thirty swings of the net, flip the end of the bag over the wire frame to keep the catch from escaping.

How to transfer animals from net to observation bag:

1. Pinch the net closed, keeping the animals on the bottom of the net.

2. Turn the net inside out while holding animals

3. Place the net in a plastic bag. Release and shake animals into the bag



4. Grab the top of the bag.

5. Twist the top a couple of times and tuck the top under your belt or into an open pocket while you continue to sweep.

Suggested Resources: Directed Activities

Armstrong, Pam, Judith Connor, Chris Parsons, Judy Rand, and Jenny Vuturo-Brady. *Sea Searcher's Handbook: Activities from the Monterey Bay Aquarium*. Monterey, CA: Monterey Bay Aquarium, in cooperation with Roberts Rinehart Publishers, 1996.

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Other Sources of Information

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California Environmental Protection Agency. www.calepa.ca.gov.

California Institute for Biodiversity. *CalAlive!* Produces educational materials for grades 4 through 8. www.calalive.org.

California Regional Environmental Education Community Network. An educational project whose mission is to develop a communication network that provides educators with access to high quality environmental education resources to enhance the environmental literacy of California students. www.creec.org.

Department of Conservation. "Kids & Educators." This website is full of fun facts and interesting information that students and teachers can use for school projects and learning. www.consrv.ca.gov/index/qh_kidsEducators.htm.

North American Association for Environmental Education. www.naaee.org.

The EnviroLink Network. Clearinghouse for all environmental education information, materials and ideas. www.envirolink.org.

U.S. Environmental Protection Agency. "Educational Resources." www.epa.gov/epahome/educational.htm.

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