UNIT II:

YOUTH ACTIVITIES

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SUMMARY — The activities in this unit are designed to educate, encourage, and engage future conservation leaders — youth visiting your chapter or engaged in community events. Activities were developed using age-appropriate educational techniques and are generally organized by the League's core conservation areas: soil, air, woods, waters, and wildlife.

We hope these activities will inspire and help your chapter leaders and the young people they work with to enjoy America's outdoors.

Suggested Youth Activity Lesson Plans

The primary goal of these activities is to give children positive and fun experiences with nature. With children ages 5 to 11, building a love of the natural world will encourage curiosity in science and other related exploration. For children in middle school and high school, more emphasis is placed on learning the environmental content.

All the activities in this guide are designed to be led by leaders in a League chapter that the children are visiting voluntarily. They are not meant to make the chapter seem like a school! An effort has been made to include activities that require minimal equipment and cost.

The primary goal of these activities is to give children positive and fun experiences with nature. All the activities in this guide are designed to be led by leaders in a League chapter.

Division of Activities

The League is committed to defending America's soil, air, woods, waters, and wildlife. So the activities in this manual are organized by those five categories, although many activities touch multiple resources.

- Soil: Healthy soil is critical to healthy fish and wildlife populations as well as healthy crops. It all starts with what's in the soil. Youth will learn about soil quality, types of soil, soil erosion, and creatures that live in the soil.
- Air: The air we breathe is also important to the plant world. Youth will learn about how some trees use wind currents to seed new trees, how some flowers use the wind for pollination, the basics of air pollution, and how scent travels.

- **Woods:** Trees provide invaluable services to people as well as wildlife. Youth will learn the parts of a tree and what each part does to keep trees healthy and how to identify trees based on their leaves and branches — even by touch and smell!
- **Waters:** Fresh, healthy water is critical to life on the planet. Youth will learn the importance of small creatures that live in aquatic environments (and how they can indicate water quality), how creatures adapt to live in the water, what other animals live near the water, and how to detect water pollution.
- **Wildlife:** Learning about their "wild neighbors" gives children a better understanding of how their every day actions can affect animals that live nearby. Youth will learn about local wildlife, how to identify animals by their tracks, and about predator/prey relationships (in a non-scary way!).

Soil, air, woods, waters, and wildlife are all important parts of our own habitats. Youth should be able to bring together lessons learned in these activities to explain how the various elements of local ecosystems work together.

The League is committed to defending America's soil, air, woods, waters, and wildlife, so the activities in this manual are organized by these five categories.

Structure of Lesson Plans

Each activity lesson plan is structured with the following common components:

- **Learning Objectives:** Core learning objectives in each lesson are easily identified. These objectives guided the selection of suggested activities.
- **Materials:** Exactly what materials you need to successfully complete each activity, as well as optional materials.
- **Activity Description:** Step-by-step instructions on how to run the activity, from location to the size of groups and interaction among the youth.
- **Discussion Questions:** Suggested conversation topics to discuss with the youth during or after the activity.
- **Estimated Time:** Time frames for each activity as well as any pre-activity prep are included.
- **Ages:** Most lesson plans were developed specifically for youth ages 5 to 8. Additional suggestions may be included to adapt activities for youth ages 9 to 11.

- **Credits (when applicable):** Many of these nature games and activities have been used for decades, and it is often impossible to know who originally developed these time-tested ideas. Whenever possible, and where a source could be identified, we provided credit to the authors.
- **Related Sources (if available):** Web sites and books/manuals that offer additional information on topics related to each activity.

Additional Learning Objectives

A list of additional learning objectives is provided near the end of each of the five categories. These may be helpful to chapter youth leaders who want to add activities and incorporate lessons of their own to a youth program.

Additional Projects and Activities

There may be other activities that could be modified for the ages targeted in this guide. Additional potential projects are listed at the end of each category that can be adapted to expand chapter youth activities.

A list of both additional learning objectives and potential projects and activities are provided at the end of the five categories.

YOUTH ACTIVITIES

CATEGORY: SOIL

CATEGORY: SOIL

SEARCH FOR SOIL DWELLERS

Learning Objectives

To learn that healthy soils contain a great variety of creatures and that many of these creatures help make soil fertile and healthy.

Materials

White butcher paper, tweezers, hand lenses or magnifying glasses, trowels (small garden shovels), gardening gloves, small glass jars, and buckets.

Activity Description

Option #1: Healthy soil provides habitat (food, water, and shelter) for an astonishing array of creatures. Scientists estimate that more than half the mass of soil is made up of living things.

To demonstrate this, have the youth use trowels to dig up soil samples and put them in buckets. On a flat, comfortable surface (inside or outside), dump the soil onto white butcher paper and ask the youth to root through the soil to search for creatures. They can move the creatures to the side of the paper with tweezers or put them in small glass jars to view them from all angles. For a closer look, the kids can use magnifying glasses or hand lenses.

Hint: To ensure you find living creatures in some of your soil samples, dig in "natural" areas such as woods or fields rather than areas with car and foot traffic. If you are not having any luck, a garden plot should yield plenty of critters.

Critters the children might find include earthworms, millipedes, centipedes, ants, termites, mites, ground beetles, springtails, and spiders. Be sure each child has an opportunity to see every type of creature found and ask what they think the animals are doing in the soil (see "Discussion Questions"). When the activity is over, have the children return all their critters to the soil.

Option #2: If you have more time to spend on this project (and more space), take soil samples from a variety of sites — wet, dry, with plants and without, under mulch, along stream banks, or in the woods. Which soil sample has the most animals in it? Do the sites with the "healthiest" soils have the greatest number and variety of creatures? What makes the soil "healthy"? Discuss the answers (see "Discussion Questions").

Discussion Questions

What do you think these animals are doing in the soil?

Answer(s): *Will vary, depending on what animals you find. Possible answers (and associated creatures) include*

- *Eating decaying leaves and plant roots (earthworms, millipedes, springtails)*
- *Eating other creatures (spiders, centipedes, earthworms)*
- *Eating dead wood (termites, ground beetles)*

Note: *Earthworms will eat small living creatures such as parasitic worms and the decomposing remains of other animals*

Looking at the soil samples from different sites, which site has the most animals?

Answer(s): *Will vary. However, soils that are least eroded and disturbed and have the most decaying organic matter (such as leaves and roots) should have the most abundant and varied animal life.*

Do the sites with the "healthiest" soils have the greatest number and variety of creatures?

Answer(s): The *"healthiest" soils should have the greatest number and variety of creatures.*

Why do you think this might be?

Answer(s): *Healthy soil is full of life, including organic matter (such as decaying leaves and plant roots), insects, earthworms, air, water, and nutrients. Healthy soil is not eroding or disturbed (such as by excessive cars or construction).*

Decaying leaves, logs, branches, and other plant and animal materials on the ground provide food and shelter for animals that live in the soil. Soil derived from decaying organic matter is able to support healthy plant life, which in turn helps support healthy animal life.

The animals themselves are vital to making the soil healthy. How do you think they do that?

Answer(s): *When tiny soil creatures eat dead and decomposing organic matter, such as leaves and wood, they break the material down so that the nutrients (such as nitrogen, phosphorus, and potassium) can be drawn up by plant roots and made available to the ecosystem again.*

Animals burrowing and moving through soil make small pores, holes, and tunnels. Oxygen can get into these little spaces so tiny animals can breathe. These little spaces also enable the soil to absorb and hold rainwater for plants and other living things to use, like a sponge.

Estimated Time

30 minutes.

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, no specific changes are needed for this activity. Older youth may be able to spend more time identifying animals found in the soil samples and can have a more scientific discussion of soil quality. Consider taking samples from eroded or damaged areas to compare with samples of healthier soils. Youth should enjoy this activity up through early teenage years.

Related Sources

Young Ikes Activity Book — Ages: 5 to 8, by the Izaak Walton League of America, 2011. Page 2 – Soil.

CATEGORY: SOIL

REDUCING SOIL EROSION

Learning Objectives

To understand how crop cover, mulch, and contour plowing help limit soil erosion.

Materials

Wood to make two shallow, open boxes; plastic to line the boxes to make them waterproof; thin sheets of tin for making spouts for the boxes; dirt and sod or mulch; two garden sprinkler cans (watering cans); and two large, wide-mouth glass or clear plastic jars.

Activity Description

First, construct two open boxes at least 16 inches long, 12 inches wide, and 4 inches deep. Line each box with plastic to make them waterproof. Cut a notch in one end of each box 1 to 1 ½ inches from the top edge and fit each with a tin spout to direct water into the wide-mouth jars.

Experiment #1: Fill one box with bare soil. In the other box, put either grassy sod or soil covered with mulch. Place the two boxes on a table, with the spouts hanging over the edge of the table, and tilt them with sticks, books, or other objects so the non-spout ends are one to two inches off the table. Beneath the two spouts, place or have someone hold the wide-mouth jars.

Fill the sprinkler cans with water and pour the water onto the two boxes at the same time, simulating the effect of a rain storm. Observe the water that runs out of the tin spouts and into the jars. Which jar of water seems to be clearer? Which water seems to have more soil in it? (See "Discussion Questions" below.)

Experiment #2: To demonstrate how contour plowing controls erosion, fill both boxes with soil from the same source. Using a pencil, a stick, or your finger, make several grooves in the soil in one box going lengthwise, and grooves going across the width of the other box. Fill the sprinkler cans with water and pour water on the boxes at the same time. Observe the water that has collected in each jar. Which jar of water seems to be clearer? Which water seems to have more soil in it? Discuss the answers (see "Discussion Questions" below).

Discussion Questions

(Experiment #1) Which jar of water seems to be clearer? Which water seems to have more soil in it?

Answer(s): *The grass or mulch you used in the second box should have held the soil in place, so the water should have washed away more of the bare soil than the soil under the mulch or grass.*

(Experiment #2) Which jar of water seems to be clearer? Which water seems to have more soil in it?

Answer(s): *The water coming from the box with the grooves going perpendicular to the direction of the water should be clearer.*

Note: *When using sand in place of soil, you will have a similar outcome. When doing this activity with sand, it will not matter if the sand is dry or wet. Once water is run through it, the sand gets quite wet but you will see the same effects.*

Definitions:

- Contour Plowing — Farmers use plows to break up the soil before planting new seeds. The plow digs rows of little ditches. "Contour plowing" means that the farmer plows these rows following the ups and downs and curves of the land rather than in straight lines. These curves help slow the flow of rain water, which prevents soil from washing away and allows more time for the water to be absorbed into the ground.
- Cover Crops — These are plants put in the ground specifically to benefit the soil or other crops — not to be harvested for food. Cover crops reduce soil erosion from wind and rain because the plant roots hold the soil in place and help the soil absorb water. For example, a corn farmer may plant rye in the early fall to hold the soil in place until corn is planted again in the spring.
- Mulch — Straw, bark, grass clippings, and other materials are placed around plants or in plant beds to prevent soil erosion, hold moisture in the ground, and prevent weeds from growing. As some mulches break down, they add nutrients to the soil to help plants grow.

Estimated Time

Once the boxes have been constructed and soil collected, 30 to 45 minutes.

Ages

Recommended for ages 5 to 8.

This activity will work equally well for ages 9 to 11, and older youth may be more focused. Both groups would enjoy experimenting with different soils, cover crops and mulch, and types of contouring. If you have more time, encourage the youth to create their own soil experiments.

Credits

Adapted from *Soil and Water Conservation Activities for Youth*, Program Aid Number 1391, U.S. Department of Agriculture, Soil Conservation Service (now the Natural Resources Conservation Service), 1986.

Related Sources

Cover Crop Fundamentals, AGF-142-99, by Diane Relf, Ohio State University, Department of Horticulture and Crop Science, 1999. Available online at *http://ohioline.osu.edu/agf-fact/0142.html*.

CATEGORY: SOIL

HOW SOIL QUALITY AFFECTS PLANT GROWTH

Learning Objectives

To understand that plant growth depends on soil quality and learn what makes soil more or less fertile.

Materials

Equal size plant pots (with drainage holes) or paper/plastic cups; small gardening trowels (shovels); small bags of sand, potting soil, and clay kitty litter; blender (not one you'll want to use again for food or drinks!); bucket or covered plastic container; water; measuring cups; masking tape; permanent marker; and corn, beans, or other fast-growing vegetable seeds (plant only one type of seed).

Activity Description

Before the youth event, grind the clay kitty litter in a blender to make a fine clay powder. Store the clay in a covered bucket or plastic container. (If you have clay soil nearby, you can use that instead. Break up large clumps until the clay is fairly smooth.)

Use pots with drainage holes or punch holes in the bottoms of your paper/plastic cups to show how much water may run out of different soil types.

With the youth, use the garden trowels and measuring cups to fill plant pots or cups with the three soil types in different combinations, such as

- All sand
- All clay
- All potting mix
- Half sand, half clay
- Half sand, half potting mix
- Half clay, half potting mix
- One pot of local soil (have the youth look at the local soil and evaluate what they think is in it)

To control the factors that could affect plant growth, use the same amount of soil in each pot (use measuring cups), plant an equal number of seeds in each pot, and water each pot with the same amount of water using the measuring cup(s). Water may run out of some pots/cups quickly, so do the watering in a tray or on the ground.

Use masking tape and the permanent marker to label the soil combination in each pot. Ask the youth to predict which seeds will grow the best and write down their predictions.

Place the pots in a sunny location (indoors if the temperatures outside are extremely cold or hot) and continue to water them. After a few weeks (or at your next youth event), compare the plant growth in each pot and discuss why plants (hopefully) grew better in certain types of soil. You can transplant the plants that grew well or allow the children to take them home in paper cups with some extra soil.

Option #1: Have each child choose a soil combination and plant their own seeds. Ask why they chose a particular soil and what they think will happen to their seeds. Keep a few extra pots to use for soil combinations the children did not choose on their own.

Option #2: If you want to use this activity for a one-day-only event, do the soil combinations and planting at least several weeks before the event. Label the bottoms of the pots so the children can't read the labels. Allow the youth to see and touch samples of the three soil types and ask them to predict which soils grew the biggest plants — then reveal the answers.

Results: The results should demonstrate two different features about the soils (depending on which ones you used). All but the sand should grow small seedlings — even the clay can hold enough water to make a seed grow. However, the clay will not hold enough water to *keep* a plant growing as the seedlings get bigger. The same may be true for the potting mix/sand combination.

Discussion Questions

Which soils were the most fertile (meaning the plants grew the best)?

Answer(s): *Will depend on soil combinations used. "Fertile" soil is full of nutrients plants need to grow and has good drainage (meaning it can hold water for plants to drink but doesn't hold it for so long that plants drown). Sand or clay alone or combined with each other do not offer these benefits — sand would let the water flow too quickly and clay won't let water flow at all, and neither one has nutrients that plants need. The potting soil does have nutrients and good drainage, and can still do this combined with some quantities of sand and/or clay.*

Why do you suppose this is?

Answer(s): *The potting soil contains mostly "organic materials" — the decomposed remains of plants and other living things, which have nutrients that plants can use.*

In the ground, soil with organic materials also provides habitat for small animals (earthworms, beetles) and microorganisms (smaller animals you can't see without a microscope, such as bacteria) that stir up the soil and contribute their own wastes to the nutrient pool. The sand and clay lack vital nutrients that plants need to grow, such as nitrogen.

What does this suggest about the importance of maintaining healthy, fertile soils?

Answer(s): *We need fertile soils to grow enough food to feed people and animals and to grow trees and plants to meet our other needs (such as lumber for building homes, plants that reduce soil erosion around streams). We also need fertile soils to provide food and habitat for wildlife.*

Estimated Time

Initial soil preparation and seed planting: 20 to 30 minutes. Growth time: several weeks (until plants appear).

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, no specific changes are needed for this activity. With older children, you should be able to have a more complex discussion about the soils and how soil contributes to healthy plant growth. You could also discuss how to conduct a "controlled" experiment, explaining that using the same amount of soil, water, and seeds helps pinpoint soil quality as the factor affecting plant growth.

CATEGORY: SOIL

HOW MUCH WATER WILL THIS HOLD?

Learning Objectives

To observe how water drains from different types of soils and the impact soil health has on surrounding waters.

Materials

Large metal can(s), emptied and rinsed; can opener; pliers; ruler; permanent marker; large measuring cup; plastic drink containers with lids (such as soda bottles); a stopwatch (or a wristwatch with a second hand); clipboards with paper and pens.

Activity Description

Soil that has been compacted (packed down) by livestock, tractors, construction vehicles, or other human activity does not hold rainwater. When it rains, the water runs off this land instead of percolating (dripping) down into the soil, which can cause serious erosion on land and along stream banks and lead to extreme fluctuations of stream levels. In addition, pollutants flow directly into streams, damaging not only water quality but fish and wildlife habitat.

In contrast, healthy soils retain water because they are riddled with small pores and cavities, many of which are created by plant roots and soil-dwelling creatures such as earthworms.

Step 1: Find soil samples. To demonstrate how different types of soil absorb water, find at least a few of these samples in the area where you plan to hold your youth event:

- Bare, compacted soil (such as a walking path or on a playground)
- Grassy area that doesn't get a lot of foot traffic
- An area with leaves and other plant material on top of the soil (preferably a wooded area or one with shrubs, but you could also use a mulched garden plot)
- Muddy, wet soil
- Flat paved area (such as a concrete sidewalk or paved parking lot)
- Sandy soil (you can buy a bag of sand and dump it on the ground, if needed)

Step 2: Prepare field materials. To test how quickly soil drains from each of these areas, start with a metal can:

- Check the rim at the top of the can for sharp edges and crimp down any rough pieces with the pliers.

- With a ruler, measure two inches from the bottom of the can and draw a line inside the can with a permanent marker.
- Fill the can with water to the 2-inch level. This will show the effect of two inches of rain on your sample site.
- Pour the water from the can into a measuring cup and make a note of how much water that is.
- Fill plastic soft drink bottles with that amount of water. You will need one bottle of water per can for every soil site you test.
- If you are using different size cans, you'll need to measure the amount of water needed for each can size. Write the water amount (such as 8 ounces) on the outside of each can and soft drink bottle to be sure you pour the correct amount into each can.
- Cut the bottom off the cans with the can opener. Again, check for sharp edges and crimp them down with the pliers.

Step 3: Experiment. Now you're ready for the field. At each sample site:

- Ask the youth to predict how quickly the water will drain into the soil.
- Assign four youth for each test: One to place the can, one to pour water, one to use the stopwatch, and one to record the location and time.
- Place the can on the ground and twist the can back and forth into the soil — ideally about two inches down, but less is okay. (On the paved area, someone will need to hold the can in place.)
- Slowly pour the water into the can. Start the timer as soon as you start to pour.
- Keep timing until all the water has disappeared into the soil. If you reach the 5-minute mark and the water has not drained, call a halt and move on to the next site. (You can use the time that you're waiting to discuss why the water is not draining well into a specific soil location. See "Discussion Questions" below.) On the cement or asphalt, the water will immediately run out.

Options: If you have a large group of children, divide them into smaller teams. Provide each team with the necessary equipment (metal can, water, stopwatch or watch, paper and pen) and let each team conduct their own experiments.

With older children, bring in the science. Conduct two to three experiments at each site and have the children calculate the average time per minute and then translate that into the average per hour. Add more water to the same site and see if the rate changes.

Discussion Questions

Which soil(s) absorbed water more quickly?

Answer(s): *Will vary. On bare, compacted soil, the water should remain in the can for a long time. Severely compacted soil can seem as hard as an asphalt road or concrete sidewalk. With healthy soil, such as the grassy and wooded areas, the water should drain away more quickly but not immediately — that means the ground is absorbing the water but it will also hold it for plants to drink. On the sand, the water should drain even faster, but that also means the sand will not effectively hold water for plants to use.*

Why is it important for soil to be able to absorb water?

Answer(s): *When it rains, the rain water picks up pollutants such as pet waste on lawns, excess fertilizer from farms, dirt from construction sites, even oil that leaked from a car onto the roadway. Tree and plant roots can filter pollutants out of the water — that is, if the ground absorbs the water before it runs into local streams or storm sewers.*

In addition to not absorbing water, compact soil such as clay prevents air from moving through and can restrict the growth of plant roots, which will restrict plant growth. So for trees and plants to do their jobs, it's important to protect soil quality.

***Note:** Did you know the water that runs into our storm sewers does not go to a wastewater management plant to be cleaned? That water — and any pollution in it — runs right into local waterways, such as rivers, lakes, and bays.*

What activities damage soil quality and how can we improve soil quality?

Answer(s): *To keep our soils in the best shape, we can just leave them alone — but that would mean no food or homes, since farming and construction activities can damage soil quality. That won't work! Instead, we can work to limit the effects of soil-damaging activities. We can do this by keeping an area of plants in between farms fields and streams (called a "buffer zone"), so those plants can stop and absorb polluted water before it runs into streams. Or we can use soil-catching fences at construction sites to prevent dirt from washing into local waterways. At home, we can improve our soil by adding organic materials (such as decaying leaves and other plant parts) to it — perhaps compost we've made ourselves or soil purchased at the local nursery.*

Estimated Time

Allow 5 to 10 minutes per soil site for the experiments (although asphalt/concrete will take less than 1 minute) plus additional discussion time at the end.

Ages

Recommended for ages 5 to 8, although your discussion of how soil works will need to be somewhat simple.

For ages 9 to 11, no specific changes are needed for this activity. However, you can talk in more detail about soil structure and encourage the youth to think about ways to improve soil structure and how that would improve fish and wildlife habitat.

Credits

Adapted from *Soil and Water Conservation Activities for Youth*, Program Aid Number 1391, U.S. Department of Agriculture, Soil Conservation Service (now the Natural Resources Conservation Service), 1986.

Related Sources

WOW! The Wonders of Wetlands, The Watercourse and Environmental Concern Inc., 1995.

CATEGORY: SOIL

MAKING A NATURE CORNER

Learning Objectives

To learn how soil affects the health of many living things and to learn more about the ecology of the chapter grounds (or the area where you are conducting the activity).

Materials

Natural materials gathered from the chapter property; small shovel; buckets; soil and geology reference materials; bulletin board; exhibit table; poster board; glue; terrariums; and other craft or project materials (depending on the type of exhibit to be created).

Activity Description

Youth can create a nature corner that teaches visitors about the types and quality of soils on your chapter property or an area in the community. The content of the exhibit will depend on available resources and the interests, expertise, and artistic and mechanical skills of the kids and youth leader. This activity is a natural outgrowth of the other soil-related activities in this manual and could be a good project to finish out the year for your youth program.

Depending on the activity you select, you may need to have the youth work on this throughout the year; others can be done in one day. This can also be used as a community outreach activity. You could provide a nature corner for the local library or elementary school.

Some possibilities include:

- Soil dwellers (insects and other animals) found on the property
- Soil erosion — different soil management practices that help prevent erosion
- Soil quality — how different types of soil absorb water (or don't!)

Soil Dwellers: Healthy soil provides habitat (food, water, and shelter) for an array of creatures, and many of these creatures actually improve the soil quality. For a one-day display, have the youth collect dirt from different locations and fill clear glass containers with the dirt samples. The containers should have wide openings (think fish bowl) so you can dig in with a small shovel to unearth critters for onlookers. Prepare the youth to talk about the insects and other animals in the soil samples and how they help make soil healthy. They should also be prepared to discuss why some samples do not have any creatures. Additional talking points could include what was growing in the different soils. At the end of the day, return the samples to their original locations.

For a long-term exhibit, have the youth explore different types of soil and create a display that includes:

- Color photos of the different soil types
- Photos or drawings of small creatures found in each soil (worms, beetles, ants) and explanations of how they help improve soil quality
- Photos or drawings of other animals that live underground (such as moles) and explanations of how they help improve soil quality

The children could also include information about predators (birds, skunks) that eat the different critters found in soil, and how more of those animals are found in areas with good soil quality.

Soil Erosion: Soil erosion is bad for soil and water quality. To demonstrate practices that can help keep soil where it should be — on the ground — have the youth illustrate different types of soil management:

- Bare dirt versus an area with grass and plants
- Farm practices such as contour plowing and cover crops
- Stream buffer areas — plants placed (or kept) along stream banks that help keep water flow from eroding soil

Soil Quality: The size and makeup of the particles in your soil affect how much water it can absorb and hold, which then affects plant life. If soil can't absorb water quickly, rain can run right off the soil — taking some soil with it. If the soil holds water for too long, only certain types of plants can live in it. Have the youth illustrate cross sections of different types of soil and plants that can and can't survive in it. Examples could include:

- All clay — very small particles that clump tightly together. It cannot soak up water quickly or hold a lot of water, so small plants may start well in it, but as plants grow larger, the clay can't hold enough water for them to survive.
- All sand — larger particles with a lot of space between them. It can soak up water quickly but can't hold onto it. Most plants can't grow in sand, other than plants that do not require a lot of water (like a cactus).
- Potting mix — large and small particles and lots of organic matter. This soil can both absorb and hold water and is ideal for planting.

Include a small glass jar of each soil type with the display. The children could also take photos or draw pictures of the different plants (trees, shrubs, flowers, grasses) on the property and prepare a quiz on which type of soil each plant thrives in.

Estimated Time

Approximately one to two hours, depending on the project selected.

Ages

Recommended for 5 to 8.

For ages 9 to 11, youth should be able produce more specific and detailed exhibits. Other advanced presentation features could include:

- Inventory of soil types found on the property
- Rocks found on the property, identifying their type (sandstone, granite, etc.), origin (sedimentary, igneous, metamorphic), and age

Designing and keeping up a high-quality nature corner that rotates throughout the year could also be the outcome of a potential conservation service project by this age group.

Additional related projects to consider include: invasive plant removal, reforestation, and nature trail work (and tour). Refer to samples found in Unit IV, "Conservation Programs and Projects" and Unit V, "Outdoor Recreation and Activities," in the *IWLA Chapter Manual*.

Related Sources

A Field Guide to Rocks and Minerals (Peterson Field Guide), by Frederick H. Pough and Roger Tory Peterson, Houghton Mifflin Harcourt, Fifth Edition, 1998.

Cover Crop Fundamentals, AGF-142-99, by Diane Relf, Ohio State University, Department of Horticulture and Crop Science, 1999. Available online at *http://ohioline.osu.edu/agf-fact/0142.html*.

Field Book for Describing and Sampling Soils: *http://soils.usda.gov/technical/fieldbook*

IWLA Chapter Manual, by the Izaak Walton League of America, 2008.

Soil and Water Conservation Activities for Youth, Program Aid Number 1391, U.S. Department of Agriculture, Soil Conservation Service (now the Natural Resources Conservation Service), 1986.

WOW! The Wonders of Wetlands, The Watercourse and Environmental Concern Inc., 1995.

Young Ikes Activity Book — Ages: 5 to 8, by the Izaak Walton League of America, 2011. Page 2 – Soil.

CATEGORY: SOIL

ADDITIONAL LEARNING OBJECTIVES

These additional "soil" learning objectives may be helpful to chapter youth leaders who want to add activities and prepare lessons of their own. Consider teaching the following:

- Soil is made of up rocks and decomposing plants and animals.
- Soil contains a multitude of living things, including bacteria, fungi, insects, arthropods, earthworms, salamanders, and moles. Larger animals — such as gopher tortoises, woodchucks, ground squirrels, chipmunks, foxes, and badgers — den in burrows in the soil.
- Bacteria, insects, earthworms, and other small soil creatures help dead leaves and other organic materials decompose, thus returning vital nutrients to the soil and maintaining soil fertility.
- Soil fertility is essential for healthy plant growth, including agricultural crops.
- Healthy soil is often porous (has space for water to trickle through) and retains rainwater like a sponge. This reduces flooding during rainstorms. It also allows plant roots to filter pollutants out of the water before the water enters rivers and streams.
- Plant roots loosen soil to allow oxygen to get into the soil. But these roots also hold the soil in place, preventing erosion from water and wind.
- Due to their constant movement through the soil, creatures such as worms and beetles maintain the soil's structure and ability to hold water.
- Soil erosion can occur when plant cover is removed through activities such as agriculture, timber cutting, and urban construction. Wind and running water both carry unprotected soil away. However, when conducted with conservation in mind, farming, construction, and other activities can be done with limited impact on soil conditions and fish and wildlife habitat.
- Soil erosion leads to serious water pollution. Too much soil in the water can smother fish eggs, clog fish gills (preventing them from breathing), and block the sunlight underwater plants need to grow (which then limits food sources available for wildlife).
- It is essential that we preserve soil fertility and soil water-holding capacity and protect soil from water and wind erosion.

CATEGORY: SOIL

ADDITIONAL PROJECTS AND ACTIVITIES

These additional projects and activities are related to "soil" and may be helpful to chapter youth leaders who want the youth to further participate in chapter-hosted projects or activities.

Consider using these resources found on the Izaak Walton League Young Ikes Web page: *www.iwla.org/youngikes*

- **Soil Matching Game:** The soil under your feet is filled with all sorts of living things. Match each animal to the place it belongs. (Found in the *Young Ikes Activity Book* for ages 5 to 8)
- **Soil Crossword Puzzle:** Soil is vital for plants and other living things. We need to prevent soil from washing into waterways, where it can hurt fish and other animals. (Found in the *Young Ikes Activity Book* for ages 9 to 11)

Consider these activities found in the *IWLA Chapter Manual* under Unit IV, Sample Conservation Projects:

- **Native Grassland Restoration:** Restore native prairies or grasslands by improving growing conditions and managing the diversity of fauna on the property. Plant native grasses and wild grains on reclaimed or abandoned space, allowing the grasslands to revive.
- **Roadside Litter Cleanup:** Organize and conduct a community highway or roadside litter cleanup by mobilizing volunteers, both members and non-members.
- **Vermicomposting:** Worm farming with compost is the process of recycling food waste by feeding it to worms in a self-contained bin. Native worms play an important ecological role and are particularly beneficial to agriculture.

Consider these resources found on the Izaak Walton League Youth Programs Web page (subject to change): *www.iwla.org/youthprograms*

Ages 9 to 11 (4th to 6th Grades)

- **How To: Vermicompost (Worm Compost):** Because a worm will eat its weight in table scraps, vermicomposting is a triple win: You recycle waste, produce organic fertilizer for house and garden plants, and raise worms you can use for fishing. (Izaak Walton League)
- **Soil Is Alive:** From mineral content to capturing carbon, this workbook describes all the amazing features of soil. (U.S. Department of Agriculture)

- **How To: Build a Model Watershed:** This model watershed demonstrates how water picks up sediment and pollutants as it flows — and that simple measures can reduce the amount of polluted runoff that ends up in your watershed. (Izaak Walton League)
- **Root Words:** Quizzes and a word search that educate kids about soil. (Smithsonian Institution)

Ages 12 to 17 (7th to 12th Grades)

- **How To: Build a 3-Bin Composter:** You can easily turn waste into useful compost — and help the environment in the process. (Izaak Walton League)

YOUTH ACTIVITIES

CATEGORY: AIR

CATEGORY: AIR

SEED RACE

Learning Objectives

To learn how plants disperse their seeds through the air using wind power.

Materials

Magic markers in multiple colors and a variety of wind-dispersed seeds from trees such as maples, ashes, and elders.

Activity Description

This activity is a team-based race. Before the race begins, collect wind-dispersed seeds — technically called "samaras" but most kids call them "helicopters." Collecting seeds is a great activity to do with younger children to get them excited about the race. Or you can collect a variety of seeds yourself prior to the event and bring them with you. If you can only find one type of seed, that's okay.

Note: This is normally a spring- and summer-time activity, based on the availability of seeds in your area.

Divide the youth into pairs and ask each pair to pick out a variety of seeds from the pile (or several of one type of seed). Also have each team choose a different color magic marker and mark their seeds. (If you have more teams than colors, ask teams to draw different symbols on their seeds, such as stars or triangles.) From a high place such as a tree stump, hill, or embankment, ask each team, in turn, to release their seeds into the air. They can throw them, fling them, or find any other way to release them from a standing position. (A windy day would make this activity lively!) Enlist the other kids to help track and find the seeds where they land. The team whose seed(s) traveled the farthest is the winner.

Note: This activity works best in an open area because the seeds need to be exposed to the wind and you need to be able to track the seeds.

After the race, ask the youth why plants produce seeds with a helicopter design and why plants produce them in such large numbers. (See "Discussion Questions.")

Additional Activity: These helicopters might not look like much now, but they can grow into great, big trees. As a follow-up activity, you could have youth place a few helicopters in a planter filled with dirt. The next time you have a youth event, include time to see how roots sprang forth from the seeds and are growing down into the soil. You can follow the progress of these seedlings as long as you like — even plant the trees later.

Variation: If you are unable to locate "helicopter" seeds, you could hold a milkweed or thistle seed race, which could be done inside or out. Establish a starting line and finish line. Have each child hold

a milkweed seed in his or her hand. When the race starts, each child should blow the seed into the air and continue blowing it down to the finish line. (This race can be done individually or in teams of two.) To make the event more challenging, make it a relay race! If milkweed or thistles are not available, you could try dandelion seeds, but they are much smaller and may be hard to track.

Discussion Questions

Why do plants produce seeds with a helicopter design, and why do plants produce them in such large numbers?

Answer(s): *"Helicopter" seeds are designed so that they can spiral gently downward without damaging the seed and carry on wind currents far away from the parent trees. Trees produce large numbers of wind-dispersed seeds to maximize the chances that at least a few seeds will land in places suitable for a new plant to grow. Because they are so small, each fruit — the pod holding the seed — requires relatively little energy to produce, so the plants can make a lot of them.*

Some trees and bushes produce berries to scatter their seeds. How do you think these are spread? What are some examples that you know of?

Answer(s): *Birds eat the berries and fly away. The seeds come out in the birds' waste and can grow where they land. Trees with berries include hollies, cherries, and many evergreens.*

Some trees produce nuts. How do you think these trees scatter their seeds? What are some examples that you know of?

Answer(s): *Some tree nuts fall onto the ground. Others are removed from branches by animals (such as squirrels) that eat the nuts or bury them to eat later. Some of the buried nuts are forgotten and can eventually sprout a new tree. Examples include oaks, hickories, walnuts, and butternuts.*

Note: *Peanuts are not tree nuts — they are "legumes."*

Estimated Time

30 minutes for the contest, more if the kids want to continue.

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, no specific changes are needed for this activity, and you can explore more complex topics. For example, invasive, non-native plants such as "tree of heaven" also produce wind-dispersed seeds — and produce them in vast numbers. You can talk about how invasive plants crowd out native plants that provide food and shelter for wildlife and how most wildlife have not adapted to be able to use invasives for food or shelter.

Related Sources

Introduction to Seed Dispersal: *www.mbgnet.net/bioplants/seed.html*

Photographs of Dispersed Fruits: *www.cas.vanderbilt.edu/bioimages/pages/fruit-seed-dispersal.htm*

Wind-Dispersed Seeds: *http://waynesword.palomar.edu/plfeb99.htm*

CATEGORY: AIR

FLOWERS POLLINATED BY WIND

Learning Objectives

To learn how many plants, especially grasses and trees, produce flowers that are pollinated through the air by wind. Youth will also learn about pollination by insects, birds, and other animals.

Materials

Wind-pollinated flowers in bloom found on trees (such as black walnut or sugar maple), grasses, or grain crops (including corn, rice, and wheat); insect- and animal-pollinated flowers for comparison; paper, pens, tape/glue, and other materials for a conservation exhibit.

Note: In most regions, this is a spring-time activity, based on when flowers are producing pollen in your area.

Activity Description

When people think of flowers, they usually conjure up images of graceful stalks and brightly-colored petals; they rarely think of flowers without petals, scent, or a splashy presence. However, grasses and many trees also have flowers that look very different from a rose or a tulip. Instead, these flowers are usually green and small and have no petals. On trees they come out before the leaves do. That's because these flowers are not pollinated by birds or bees — they are pollinated by the wind.

Take the youth to find examples of wind-pollinated flowers. The best candidates are grasses and trees in the early spring as well as some roadside weeds, including plantain and ragweed (a major source of hay fever). As you walk around, see if the kids can recognize wind-pollinated flowers. Next to a tree that is blooming, for example, you can stop and say something like, "I can see a whole bunch of wind-pollinated flowers from where I'm standing. Can you find them?" Once the kids spot them, try to reach a branch with flowers and bring it in for closer inspection. Ask the kids what they notice about the flowers' color, scent, and shape and how they are designed for effective wind pollination. Dab the flower with a damp tissue to reveal the pollen. Have the youth collect samples of wind-pollinated flowers that they find.

Note: Young children are likely to mistake wind-dispersed *seeds*, such as the seeds from dandelions, for pollen produced by wind-pollinated flowers.

If you have different types of flowering trees nearby, ask the youth to tell you which are wind pollinated and which are not. Tree flowers with colorful petals — such as apple, cherry, redbud, flowering dogwood, and black locust — are not wind pollinated.

Additional Activity: Have the youth make a simple conservation exhibit using the flowers they collected. The exhibit could be in quiz format, asking field questions about each sample, such as "What is this and what plant did it come from?" They could make a matching game, asking the viewer to match

the flower with the leaf of the plant that produced it. Or they could make a quiz using examples of wind-pollinated and animal-pollinated flowers and ask the viewer to categorize each sample. Have the children explain wind pollination in their own words for the display.

Discussion Questions

What is a flower?

Answer(s): *Ask the youth why plants produce flowers. They may not know that flowers are the reproductive parts of plants.*

What is pollination?

Answer(s): *Pollen from one part of a flower (the stamen) lands on a different part of another flower (the stigma or pistil), ultimately creating a seed. For most plants to produce a seed, the flower on one plant needs to mix with pollen from the flower of another plant of the same type — a process called pollination. The trick is how to get the pollen from one flower to another. This can happen with the help of animals or the wind.*

What is animal pollination?

Answer(s): *Most commonly recognized flowers rely on insects and other animals such as hummingbirds (even bats, in the tropics) to move pollen among flowers. So flowers need to attract these animals, which is why most flowers are colorful and scented. Once on the flowers, the animals pick up pollen on their bodies and drop it onto the next flower they visit. These animals visit flowers for food (such as nectar) or some other reward, and in the process enable the plants to reproduce.*

To illustrate this, use a piece of paper or a chalkboard to sketch two flowers and a bee or hummingbird traveling from one to the other, covered with pollen. (On hummingbirds, the pollen can be on different parts of the body, such as the top of their heads.)

If you are near a garden or wildflowers in bloom, you can take the kids out to look at the flower parts. If it is a warm, sunny day, you are likely to see bees and other insects crawling and buzzing around the flowers, caught in the act of pollination. Look closely at the bees, and you may see little orange pollen sacs attached to their legs, bursting with pollen that they are taking back to their nests. You might even see pollen dusting their bodies.

***Caution:** Although the risk of being stung is low, ask about allergies to bee stings before you start the activity. Keep these children away from areas where bees are active and ensure the children have medication with them for an allergic reaction (auto-injectable epinephrine, such as an EpiPen®).*

What is wind pollination?

Answer(s): *Ask the children what other ways pollen could get from one flower to another other than by hitching a ride on an insect or bird. Did anybody answer "wind"? Ask them what they think wind-pollinated flowers would look like. Would these flowers have a scent? Would they be brightly colored? How would they be shaped? Wind-pollinated flowers have no scent and are not brightly colored because*

they are not competing to attract a bird or bee flying by. Instead, these flowers are usually green or brown and have tiny petals or none at all (petals would keep the pollen from being blown by the wind). They often dangle exposed from branches so the wind can catch them easily.

What are the odds are that one wind-blown grain of pollen will land exactly where it is supposed to on another flower of the same species.

Answer(s): *The odds, of course, are astronomically low. So wind-pollinated flowers produce huge amounts of pollen. Ask the kids if they have ever noticed yellow dust, especially in the spring, covering car windshields, porches, sidewalks, and ponds. This is part of wind-blown pollen (and a major cause of allergy symptoms!).*

Estimated Time

At least 45 minutes, depending on how far you plan to walk during the field time. If you make a conservation exhibit, allow another 30 minutes.

Ages

Recommended for ages 5 to 8. Pollination concepts may be too complex for some of the younger children. Instead, you can simply point out wind-pollinated flowers on a tree and ask, "What do you see in this tree that isn't a leaf or branch?" or "What do you think that is?" (It's a flower!) Having shown younger children what a wind-pollinated flower is, you can wander the site and make a game: Who can spot the most tree flowers?

For ages 9 to 11, no specific changes are needed for this activity, and you can cover more of the technical details about pollination.

Related Sources

Introduction to Wind-Pollinated Trees: *http://northernwoodlands.org/articles/article/why_are_some_trees_pollinated_by_wind_and_some_by_insects*

Photographs of Pollinated Flowers: *www.cas.vanderbilt.edu/bioimages/pages/pollination.htm*

CATEGORY: AIR

CATCHING AIR POLLUTION

Learning Objectives

To learn about air pollution by viewing particulate matter (small particles) captured from the air.

Materials

White card stock or cardboard, poster board (any color), petroleum jelly (such as Vaseline®), scissors, ruler, pencil, tape that will adhere to exterior surfaces, permanent marker, and hand lenses (magnifying glasses).

Activity Description

When we talk about air pollution, we mean small particles in the air — made up of solids and liquids — that can affect our ability to breathe and cause other health problems. These particles can also be harmful to plants and wildlife and to fish when they land in the water. This project is an easy way to show kids the particulate matter that floats in the air around them, largely unseen.

Option #1: Take a sheet of white card stock or cardboard and cut it into two-inch squares. Next, smear a thin layer of petroleum jelly (Vaseline) evenly onto each square (there's no need to glop it on). Place a rolled-up piece of tape on the back of each square and stick the squares to different vertical surfaces — ideally in places that have different amounts of air pollution. For example, you might put squares next to a driveway, along a road, or near a fireplace. Use the permanent marker to write the name of the location on the back of each square before you stick it up.

Wait at least 48 hours or longer, depending upon your schedule and the weather forecast (rain will not be helpful), and then retrieve the squares. Bring a sheet of poster board and tape all the square samples to the poster board to examine more closely later. (Bring extra tape.) Make a note on the poster board about where each square was placed and for how long.

Once back in the chapter house, ask the children to decide which squares have the most particles stuck in the Vaseline. Squares that had been located near automobile traffic, fireplaces, dirt roads and driveways, wind-blown patches of bare soil, and other sources of particulate matter should be the dirtiest. In early spring, some squares might be yellow with wind-blown pollen. Patches protected from the wind should have fewer particles.

Option #2: If you want to use this activity for a one-day event, cut and smear the squares and place them in different outdoor locations at least 48 hours before your event (depending on the weather forecast). Keep a list of the specific locations where the squares were placed. During the youth event, you could discuss air pollution and ask the youth which locations they think will have more particles. Or

you could create a quiz with the list of locations and ask the youth to rank them in order of where they expect to find the most particles. Then head outside to find the answers!

Discussion Questions

To answer the following questions, it would be helpful to have hand-lenses handy, which the kids can use to inspect the squares. They should especially consider the locations of the squares. Tiny airborne particles, however, travel long distances, so it is not always clear where they come from.

What do you think made the particles? Do the particles appear to be different from one square to another?

Answer(s): *Will vary. Possible particle sources include factory emissions, car and truck exhaust, coal-fired power plants, wood stoves, exposed soil from construction sites or farms, pollen from plants, particles of crushed rock from gravel roads.*

Did you think before doing this investigation that this material was in the air and that you are breathing it?

Answer(s): *Will vary.*

Do you think these particles in the air might affect your health?

Answer(s): *When you breathe in particles from the air, they can clog your lungs and affect your ability to breathe, leading to shortness of breath and coughing. Very small particles can even get into your blood stream. Airborne particles can contribute to asthma attacks, lead to development of chronic bronchitis, and be particularly dangerous for small children and elderly people. Larger particles can irritate your eyes and nose.*

Particulate matter can also damage the environment. Some particles can make lakes and streams acidic, deplete nutrients in soil that plants need to grow, and damage trees and crops. Acid rain is caused in part by particle pollution.

Mercury particles from coal-fired power plants can cause health problems in humans ranging from brain disorders to heart attacks and can be particularly dangerous for babies and pregnant women. When these particles land in the water, they can cause high mercury levels in fish and any animals that eat those fish — including us!

What do you think you can do to improve air quality?

Answer(s): *Will vary depending on what sources of pollution are around you. Some topics you could include:*

- *Bus Idling — Does your school allow buses to "idle" (park with the engine on) in front of the school? The exhaust coming out of those buses could contain a lot of harmful particles. Students will breathe in these particles when they come outside at the end of the school day. The particles can even get inside the school through open windows and the air intake system. Talk to your*

teacher and principle about an anti-idling policy for your school. Get your friends involved. You can find a sample policy on the EPA Web site at http://epa.gov/cleanschoolbus/idling_policy.htm.

- *Electricity — Conserve electricity at home. Until cleaner sources of electricity are more widely available, cutting back on electricity use will help cut back on power plant emissions of pollution. Ways you can help include turning off lights when you leave the room and turning off electronics when you're not using them. (Encourage the kids to add other ideas)*
- *Cars — Carpool with friends to events and ride your bike, skateboard, or scooter for short trips to decrease car emissions that contribute to particle pollution.*
- *Fireplaces — Talk with your family about cutting back on using candles, wood-burning stoves, and fireplaces at home. These all can contribute to particle pollution.*

Estimated Time

One hour, plus some added time for preparing and putting up the squares (how much time will depend on how far apart you place the squares).

Ages

Recommended for ages 5 to 8, but take a simple approach to explaining particulate matter in the air.

For ages 9 to 11, no specific changes are needed for this activity, and the discussion of the particles trapped in the Vaseline can be more in-depth.

Related Sources

Particulate Matter: *www.epa.gov/pm*

What Is Particulate Matter? *www.airinfonow.org/html/ed_ particulate.html*

Young Ikes Activity Book — Ages 5 to 8, by the Izaak Walton League of America, 2011. Page 3 – Air.

Young Ikes Activity Book — Ages 9 to 11, by the Izaak Walton League of America, 2011. Page 4 – Air.

CATEGORY: AIR

SMELL WALK

Learning Objectives

To increase awareness of scents and odors in the environment by identifying sources of scents and odors and whether these indicate healthy or unhealthy air.

Materials

Pencils and paper (either pads of paper or paper on a clip board), onion, cutting board, and knife.

Activity Description

This activity helps kids to become more aware of the sources of odors in the air around them and to think about whether the smells they are inhaling are good or bad — for them and for the environment.

Before embarking on your smell walk, have the children space themselves out in a line, with you toward one end. Take an onion, cut it in half, and hold it up. Ask the kids in the line to raise their hands when they first smell the onion. Once the kid furthest from you raises her hand, ask the kids what they think they are smelling. Answer: Their noses are detecting tiny, invisible, particles of the onion so small that they are wafting in the air and going up their noses. Explain to them that this is how they detect odors.

Now give each child a pencil and paper. Ask them each to draw three columns on their paper. Column number 1 will be the name of a scent, column number 2 will list how the odor smells (e.g., good, strong, bad, stinky), and column number 3 will say whether the smell is good or bad for human health and the environment. Explain that you are going to hunt for odors.

Begin strolling slowly around, both indoors and outside, until you or (ideally) a child picks up a scent. Encourage the kids to get down low, stand up high, and really search for smells. Some odors won't reveal themselves until they are up close to the source, sticking their noses into something.

Once a child detects a smell, ask the kids to fill out their columns. Then discuss the answers they provided and work together to determine the correct answer for column #3 for each smell. Once you are finished, tally up the smells and how many of them indicate something good and how many suggest pollution.

Discussion Questions

After the children detect a smell, ask the following:

What is the source of the smell?

Answer(s): *Will vary*

Does the scent smell good or bad to you?

Answer(s): *Will vary.*

Does the scent indicate something good for you and the environment, something bad, or something neutral?

Answer(s): *Generally, if a smell comes from a natural process, such as rotting wood (a good home and food source for many animals) or a flower advertising nectar (which sends out smells to attract pollinators), it will indicate something that is appropriate for the environment. It may not smell good, however, such as a decomposing animal or a recent visit by a skunk! All of these smells reach your nose through tiny particles sent into the air, just like the onion.*

If the smell comes from human activity, it might not be healthy for the environment — or people. Examples include:

- *Car exhaust, which contains particles that are not healthy to breathe*
- *Trash thrown on the ground or in the water, which can damage wildlife habitat and water quality*
- *Pet droppings left on the ground, which can wash into waterways when it rains and damage water quality and habitat for fish and other aquatic animals*
- *Fumes from paint, which is caused by chemicals released into the air in a process called "off-gassing" (this process can take months or even years, depending on the chemical and the product made with the chemical). The same process is involved in that "new car smell." Such chemicals can cause allergy symptoms including congestion, watery eyes, and even skin irritation.*

Note: *Not everything that's bad for the environment or human health has an odor. So smell is not the only indicator of potential problems — but it's a start!*

Does the smell suggest that we should encourage people to change their behavior?

Answer(s): *Will vary, but encourage the kids to talk about ways they can help fix some of the pollution problems you identified on your Smell Walk, such as:*

- *Car exhaust — Carpool, use other modes of transportation (skateboards, bikes, buses)*
- *Litter — An anti-litter campaign at school*
- *Pet waste — Encourage owners to pick up after their pets through a neighborhood education effort*
- *Paint fumes — Paint in well-ventilated areas. Air out carpet or other off-gassing items outside before bringing them indoors.*

Estimated Time

About 30 minutes, depending on how long you walk and can keep the kids' attention.

Ages

Recommended for ages 5 to 8.

This activity is better suited for younger ages, but for ages 9 to 11 you could extend the activity and develop plans for addressing possible sources of pollution.

Related Sources

Air Pollution Basic Facts: *http://www.epa.gov/air/basic.html*

Interesting Air Pollution Facts: *www.evsroll.com/Interesting_air_pollution_facts.html*

CATEGORY: AIR

WHAT IS AIR?

Learning Objectives

To learn that while air cannot be seen, it can be felt and observed through its actions. Children will use their senses to learn about the nature of air. They will also learn about the role wind plays in carrying air pollution.

Materials

Large glass bowl; bottle of vinegar; funnel; 24-inch piece of lightweight ribbon; paper (8 ½ inches x 11 inches); colored pencils; a flip chart with markers or a large dry-wipe board with dry-erase markers.

Activity Description

To start, ask the children these questions: What is air? Can they see air? If they can't see it, ask them: How do they know that it's there? Talk about their other senses: Can they feel air? Smell it? Taste it? Hear it? Then ask the group: Why is air important?

Even the youngest children should know that we breathe in air, and many will know that we breathe it into our lungs. What they may not know is why. Our lungs bring air into our bodies and pull oxygen out of that air to help power our bodies. (The air we breathe is made up of about 20 percent oxygen.)

When we exhale, our lungs push out air that carries a gas called carbon dioxide out of our bodies. All animals on land breathe in air for oxygen and breathe out carbon dioxide. Plants, on the other hand, "breathe" in air so they can use carbon dioxide for energy and "breathe" out oxygen that people and animals need. Air is important to all living things on land — plants, animals, and people.

Unfortunately, a lot of communities have problems with air pollution — harmful particles and gasses in the air — that can hurt people as well as animals and plants. Air pollution can:

- Irritate our eyes, noses, and throats; cause lung infections such as bronchitis and pneumonia; make asthma symptoms worse; and even cause more serious health problems (cancer, heart disease, brain damage).
- Hurt plants by destroying their leaves. Pollutants can also be absorbed by plants and then hurt the people and animals that eat the plants.
- Travel many miles through the air, carried by wind from factories, cars, power plants, and other sources.

Note: How much of this you tell your group will depend on their ages.

Step 1: Test indoor air. Assemble the children in one room. Write each child's name on the flip chart or dry-erase board. Have the children stand in different places around the room. Ask them to close their eyes and hold their noses closed until you tell them you are ready. Find a suitable hiding place for the glass bowl and fill it with a bottle of vinegar (white vinegar works well and is inexpensive). Tell the children to unplug their noses and raise their hands when they smell an odor. Put numbers next to their names based on the order in which they raise their hands.

Once all (or most of) the children smell the odor, tell them to open their eyes but stay standing where they are. Show them the location of the hidden smell and, starting with the person who raised his or her hand first, walk from person to person in the order in which they smelled the vinegar. The order should be according to their distance from the vinegar. Then ask if they can explain why the people closest to the vinegar smelled it first and the people farthest away smelled it last (see "Discussion Questions" below). Before you move on to the next activity, use the funnel to pour the vinegar back into the bottle and rinse out the bowl.

Step 2: Test outdoor air. Take the children outdoors on a slightly breezy day. Hold the piece of ribbon high above your head. Hopefully the children will be able to observe the ribbon blowing in the wind. Have them describe what is happening to the ribbon. Ask them: **What is causing the ribbon to move?** *(Wind)* **What is wind?** *(Moving air)* **Is air always moving even if you cannot feel it?** *(Yes)*

Next, have the children wave their bare hands very quickly up and down (like birds flapping their wings). What do they feel on their hands? (Resistance as their hands move through air) Ask them to look around to see if they can detect the movement of air by examining objects around them — tree leaves and branches, blades of grass, flower stalks, a squirrel's bushy tail, or a friend's hair.

Repeat the vinegar activity outside. Bring your flip chart or dry-wipe board outside. Have the children stand in random order, close their eyes, and hold their noses. Bring the bowl and bottle of vinegar outside, place the bowl in the middle of the area in which the children are standing, and pour in the vinegar. Have another adult stand near the bowl and hold up the ribbon to gauge the direction of the wind and keep track of whether it changes during the experiment. Ask the children to unplug their noses and raise their hands an soon as they smell the vinegar (keeping their eyes closed). Put numbers next to their names based on the order in which they raised their hands. Once all or most of the children have smelled the odor, tell them to open their eyes and show them the location of the bowl. Walk from person to person in the order in which they smelled the vinegar. The order will depend on the direction(s) of the wind during the experiment. Then ask if they can explain why some people smelled it first and why others smelled it last or not at all (see "Discussion Questions" below). Ask the adult volunteer with the string to tell the youth which direction(s) the wind was blowing during the experiment and see if that helps the youth determine how the smell moved among them.

Discussion Questions

Did the children standing closest to the vinegar smell it first? Did the children standing farthest away smell it last?

Answer(s): *Will vary, depending on the shape of and airflow in the room for the indoor experiment and the wind direction(s) outside for the outdoor experiment. Indoors, the children standing closest the vinegar*

should have smelled it first and those farthest away smelled it last. However, when outside, some of the children standing close might smell it first but others nearby might not because of the direction of the wind. The direction and speed of the wind affects the movement of odors and other pollutants.

Why was the vinegar odor able to travel around indoors and outside?

Answer(s): *The air and wind carried it. Even indoors, air is moving – it's just not usually fast enough that we can feel it without a fan moving it. That's because the walls limit how the air can move. Outside, air has much more freedom to move and is affected by weather conditions. Wind is created when warm air rises and cold air jumps in to take its place.*

How can wind affect air pollution?

Answer(s): *Wind can move pollution from one location to another. A strong wind can carry air pollution for hundreds of miles, across rivers and state borders. So it's important to identify the source(s) of air pollution to help prevent people, animals, and plants from getting sick.*

Estimated Time

About 60 minutes depending on your indoor and outdoor locations and how much discussion time you have with the children.

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, you can spend more time on the concept of air pollution and sources of pollution as well as what we can do to clean up our air.

Credits

Adapted from "Pardon Me, But What's Air" activity from *A Teacher's Guide to Air Quality Awareness Week*, by the Clean Air Campaign and the Georgia Department of Education, 2012.

Related Sources

Particulate Matter: *www.epa.gov/pm*

What Is Particulate Matter? *www.airinfonow.org/html/ed_ particulate.html*

Young Ikes Activity Book — Ages 5 to 8, by the Izaak Walton League of America, 2011. Page 3 – Air.

Young Ikes Activity Book — Ages 9 to 11, by the Izaak Walton League of America, 2011. Page 4 – Air.

CATEGORY: AIR

ADDITIONAL LEARNING OBJECTIVES

These additional "air" learning objectives may be helpful to chapter youth leaders who want to add activities and prepare lessons of their own. Consider teaching the following:

- Human activities send many toxic pollutants into the air — such as ground-level ozone, lead, and mercury — that endanger human health. The impact on our health of long-term exposure to most of these pollutants remains unknown.
- Through photosynthesis, plants absorb carbon dioxide from the air and combine it with water to form glucose molecules that capture sunlight and turn it into food energy. The vast majority of animals on Earth, including humans, depend on this process for our food.
- Carbon dioxide and methane gas produced by burning fossil fuels and other human activities is contributing to a changing climate that is affecting the natural world as well as our water and other natural resources.

CATEGORY: AIR

ADDITIONAL PROJECTS AND ACTIVITIES

These additional projects and activities are related to "air" and may be helpful to chapter youth leaders who want the youth to further participate in chapter-hosted projects or activities.

Consider using these resources found on the Izaak Walton League Young Ikes Web page: *www.iwla.org/youngikes*

- **Clean Air Maze:** Clean air is healthy for people, trees, and wildlife. Find your way past the pollutants. (Found in the *Young Ikes Activity Book* for ages 5 to 8)
- **Energy Quiz and Word Scramble:** Different energy sources can affect the air you breathe. Learn what they are and find our more about each energy source's good and bad points. (Found in the *Young Ikes Activity Book* for ages 9 to 11)

Consider these resources found on the Izaak Walton League Youth Programs Web page (subject to change): *www.iwla.org/youthprograms*

Ages 5 to 8 (Kindergarten to 3rd Grade)

- **Bicycle Rodeo:** Going "green" includes encouraging families to drive less often. A bicycle safety event is a great way to get the community involved at your chapter and spread the word about your chapter's other "green" initiatives. (Cascade Bicycle Club Education Foundation)

Ages 9 to 11 (4th to 6th Grades)

- **Make a Solar Oven:** Instructions on making a solar oven from scratch. (U.S. Department of Energy)
- **Build a Basic PVC Wind Turbine:** This wind turbine model is designed to be used as an educational tool. (Kidwind Project)

YOUTH ACTIVITIES

CATEGORY: WOODS

CATEGORY: WOODS

BUILD A TREE

Learning Objectives

To learn the parts of a tree and what each part does to help keep trees alive.

Materials

None.

Activity Description

In this lively activity, children will act out the parts of a tree to learn tree biology. Ideally, you should have a group of 12 or more children for this activity. You can make adjustments based on the size of your group and also encourage adult mentors to join in.

After assigning each role and describing what that part of the tree does, have the group practice its role. Include parts such as heartwood, taproot, lateral roots, sapwood, cambium and phloem, and bark.

Step 1: Select one to three people (depending on group size) to be the tree's **heartwood**, and ask them to stand with their backs together.

- Heartwood provides the strength to hold the tree's trunk and branches up so that the leaves can gather sunlight. (Think of it as a column holding up the front porch.) The heartwood is now dead, but it once was alive and carried water up and food down through many needle-sized tubes within the wood. Now, these little tubes are filled with resin and pitch (sap).
- Heartwood Role: Tell the players to "stand strong and tall" and have them keep straight backs. If they would like to add a sound, you can have them make a low, strong hum.

Step 2: Ask for one (or more with a large group) child to volunteer to be the **taproot**. Ask the child to sit against the heartwood, facing outward with his or her palms against the ground. Invite the child to imagine sending a long root deep into the ground, about 15 to 30 feet.

- The taproot allows the tree to drink water from deep in the ground and also helps the tree stay stable during wind storms. Not all trees have a taproot, but many do.
- Taproot Role: When you say, "Drink up," the taproot should make a low slurping sound.

Step 3: Ask for two to three (or more) volunteers to be the **lateral roots**. (People with long hair are helpful here!) Ask the lateral roots to lie on the ground with their feet toward the heartwood, arms reaching above their heads, and to spread their hair out around their heads.

- Thousands of lateral roots grow outward from a tree in all directions. Lateral roots help hold the tree up, but they have another important job: At the tip of each lateral root are tiny root hairs that

detect water and grow toward it to suck it up. The tough cells at the tips of the root hairs allow them to grow through the ground.

- Lateral Root Role: When you say, "Drink up," the lateral roots should make a big, loud slurping noise.

Step 4: Ask for a small group (three to five) to play the **sapwood**. Ask these people to form a circle around the heartwood, facing inward, and holding hands.

- Sapwood (also known as the xylem) draws water up from the roots and carries it to the highest parts of the tree. The sapwood can pump hundreds of gallons of water a day (depending on the size of the tree).
- Sapwood Role: When you say, "Bring the water up!", the sapwood should kneel down (still holding hands — a fun balance challenge!) and then rise up, making a "Wheeee!" sound that starts low and gets higher as they stand up.

Step 5: Choose a group of volunteers to be the **cambium** and **phloem** (pronounced "FLOW-em") layers. This group should stand around the sapwood, also facing inward and holding hands.

- The cambium layer is where the tree grows, and it adds a new layer to the sapwood and phloem each year. This is how tree rings are created!
- The phloem layer is where the food (sap) produced by the leaves is moved throughout the tree. The phloem is also called the "inner bark" because it is the layer just underneath the tree's bark and may eventually turn into bark.
- Cambium/Phloem Role: Ask the youth to raise their arms up and out, intersecting them with their neighbors (like branches of a tree). When you say, "Leaves, make food," the cambium/phloem participants flutter their hands like leaves gathering sunlight. Then direct them to "Move food!" Now, they make a descending "whooshing" sound as they kneel down and lower their arms to the ground, moving the sap down from the leaves to the rest of the tree.

With two groups moving up and down for their roles, it will be helpful to space out the "layers" so the children have room to move.

Step 6: Have the remaining people circle the tree, facing outward. They will play the **bark** of the tree.

- Ask the bark from what dangers they protect the tree. (Examples include fire, insects, extreme temperatures, people who carve into bark)
- Bark Role: Explain that they should take the stance of a football player ready to block intruders (knees bent, hands on thighs — this is not a traditional football stance but one that will keep them from falling over!). Tell them to "be tough!" Then turn your back and lift two pencils or twigs to your head like the antennae of an insect borer. Make a menacing sound and grimace your face. Try to break through the bark participants to get to the inside of the tree, allowing them to keep you out.

Step 7: Finally, go through all of the commands, one at a time:

"Heartwood, stand strong and tall!"

"Roots, drink up!"

"Sapwood, bring the water up!"

"Leaves, make food!"

"Phloem, move food!"

"Bark, be tough!"

Repeat this several times, eventually not providing the names of the tree parts. Once done, celebrate with a round of applause! If the group wants to continue to play "tree," have them switch roles and try different parts of the tree or, if you have a large enough group, some of the children can play the roles of insects and other animals trying to attack the tree (a sort of Red Rover game).

Discussion Questions

What is the function of these parts of a tree?

Heartwood?

Answer(s): *The heartwood provides strength so the tree can support its trunk and branches.*

Taproot?

Answer(s): *The taproot allows trees to get water from deep in the ground and also helps trees stay stable during wind storms. Note: Not all trees have a taproot, but many do.*

Lateral roots?

Answer(s): *Lateral roots also help support the tree. Importantly, they grow laterally to the sides to get water. They have tiny root hairs that detect water, grow toward it, and then suck it up.*

Sapwood?

Answer(s): *Sapwood (also known as the xylem) draws water up from the roots and carries it to the highest parts of the tree. The sapwood can pump hundreds of gallons of water a day.*

Cambium and Phloem?

Answer(s): *The food produced by the leaves is moved throughout the tree in the phloem. The cambium layer is where the tree grows, and it adds a new layer to the sapwood and phloem each year. This is how tree rings are created!*

Bark?

Answer(s): *The bark helps defend the tree from injury, disease, and some pests. It also slows the loss of water from trees and helps protect trees from temperature extremes.*

Estimated Time

20 to 30 minutes.

Ages

Recommended for 5 to 8.

For ages 9 to 11, no specific changes are needed for this activity. Youth in this age group might like to study the cross section of a cut tree (if you have access to a stump or log) and try to identify the various layers and count the rings to see approximately how old the tree was when it died. Wider growth rings often indicate favorable growing conditions, and a short distance between rings can indicate stress from drought, flood, or other unfavorable conditions.

You can use *Trees (A Golden Guide)* as an introductory text. *The Sibley Guide to Trees* is a comprehensive reference book to trees better suited for this age group.

Credits

Adapted from *Sharing the Joy of Nature* by Joseph Bharat Cornell, Dawn Publications, 1989.

Related Sources

The Anatomy of a Tree: *www.arborday.org/treeGuide/anatomy.cfm*

Parts Of A Tree: *www.ncforestry.org/webpages/classroom%20activities/trees/partsoftree/index.htm*

The Sibley Guide to Trees, by David Allen Sibley, Alfred A. Knopf, Inc., 2009.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WOODS

LEAF MATCHING

Learning Objectives

To help kids learn to observe nature closely and introduce them to the idea that you can distinguish different kinds of trees by their leaves.

Materials

Leaves from four different kinds of trees (total number of leaves should be at least the number of children participating in the activity), note cards or scrap paper, pens or markers, poster board, glue.

Activity Description

Before the activity, collect leaves — alive or dead — from a range of tree species. Depending on the amount of time you have and which activities you plan to tackle, you could have the youth help you collect leaves or put together a collection in the days prior to the event. Different types of leaves you might collect include:

- Single leaf on a stem
- Multiple leaves on a stem
- Fan-shaped leaf on a stem
- Different number of projections on the leaves (like the fingers on a hand)

With single and multiple leaves on a stem, trees are further identified by whether the leaves appear exactly opposite from each other or alternate across the stem (for multiples) or the tree branch (for singles). If you find a branch with leaves still attached, the position of the leaves will offer additional clues to the tree species.

Although pine needles will not work for the activities described here, they still offer a great discussion point about what trees have these leaves and why. This is also a great opportunity to identify poison ivy and poison oak (if you have them in your area) and explain how to identify and avoid them!

Once the leaf collection is assembled, you can use the leaves for several different activities:

- Leaf groups. Take equal numbers of leaves of four different kinds of trees and distribute them evenly among the kids, one leaf for each person. Have the kids then find the others with the same kinds of leaves. This will form small groups.
- Describe your leaf. Each group can then write a brief description of the team leaf on a note card, listing as many details as possible. The leaves can then be put in a pile. Each team gets the card written by another team and tries to identify the leaf described on the card. (If you have only

a few youth at your event, you can do this project without breaking into teams. Have each person describe his or her own leaf on a note card. Then mix up the note cards, hand them out, and let the guessing begin.)

- Where's my leaf? Ask each child to make an identifying mark on the bottom of his or her own leaf. Then ask the kids to return their leaves to a pile, making sure the marks are not showing. You can also combine these leaves with others to make this game a little more challenging. After stirring the leaves up a bit, ask each child to find his or her particular leaf (without looking for the mark). While the leaves are picked or after every child has found his or her own leaf, ask them to describe to the rest of the group how they knew which leaf was theirs.
- Leaf chain. If you do this activity during autumn, have the youth make a chain of leaves based on color gradation (e.g., starting from dark red and working their way to orange, yellow, light green, and dark green). These can be glued to white poster board. Discuss why leaves change color in autumn and fall off trees.

Discussion Questions

How does each leaf differ when compared with the others?

Answer(s): *Will vary depending on availability and variety of trees and leaves on a given forested site. Encourage the youth to look at shapes, colors, the number of leaves on a stem, and whether the two sides of each leaf are symmetrical.*

Did all of the leaves from the same tree look identical, or are there ways that they varied?

Answer(s): *Will vary depending on availability and variety of trees and leaves on a given forested site.*

If you folded the leaves in half, did the halves of any look identical? Which ones? Were there any that were not identical when folded in half? (These are known as asymmetrical leaves.)

Answer(s): *Will vary depending on availability and variety of trees and leaves on a given forested site.*

Note: *Asymmetry in leaves can be exaggerated in diseased trees, such as elm trees with Dutch elm disease.*

Why do leaves change color in the autumn and fall off trees?

Answer(s): *In the winter, there is not enough light or water for photosynthesis — the process trees use to make food from sunlight. A chemical called chlorophyll is an important part of photosynthesis. This chemical also makes the leaves green. When nights grow longer and cooler, the trees slow down the food-making process (in the winter they live off stored food). When photosynthesis stops, so does production of chlorophyll – and leaf colors are revealed. Other chemicals in the leaves are what produce the brilliant yellows, oranges, and reds we love to see in the fall.*

According to the U.S. Forest Service, certain colors are characteristic of particular tree species. For example, oaks turn red or brown and hickories turn golden bronze. The fall color of a maple tree depends on the species — red maples turn red (as the name suggests). But black maples turn yellow. Leaves on other species like elms simply turn brown and fall off the tree.

"Evergreens" are trees that never lose their leaves — usually needles rather than traditional flat leaves.

Estimated Time

20 to 30 minutes.

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, no specific changes are needed for this activity. You could also show the youth how to use a tree field guide to identify trees to group or possibly to species. Start with distinctive trees or groups of trees such as maples, oaks, and ash. For example, it's not so important that it's a green ash or black ash, but that they can at least identify to the group.

Many tree guides are difficult for kids to use, so it will be very helpful to find a guide to trees local to your area. Otherwise, *Trees (A Golden Guide)* is good for young children. The Arbor Day Foundation's online identification guide, "What Tree Is That?", is very useful if you have access to computers and the Internet.

Credits

Adapted from *Nature with Children of All Ages* by Edith Sisson, Massachusetts Audubon Society, 1982.

Related Sources

What Tree Is That? *www.arborday.org/trees/whatTree*

Why Leaves Change Colors: *www.na.fs.fed.us/fhp/pubs/leaves/leaves.shtm*

The Sibley Guide to Trees, by David Allen Sibley, Alfred A. Knopf, Inc., 2009.

Trees — Fandex Family Field Guide, by Steven Aronson, Workman Publishing, 2010.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WOODS

TREE ID RELAY

Learning Objectives

To identify the differences in leaves from various tree species.

Materials

Small branches from various species of trees (the number of branches and species needed will depend on the number of participants).

Note: Seek trees in remote forested sites and avoid cutting landscape trees.

Activity Description

This simple running game allows kids to practice observation and identification of trees in an energetic and playful relay and is best done with at least 6 people.

Tree Study: Divide your participants into small groups of 2 to 4 players, each group sitting together in a circle. Give the first group several branches from one tree species, give the second group several branches from a second species of tree, and so on. Ask the groups to carefully observe the traits of "their" tree. Do the leaves have teeth along the edges? Lobes (sections of the leaf that jut out like fingers on a hand)? Are the lobes rounded or pointed? What is the general size of the leaves and their shape? Are the leaves opposite from each other or do they alternate across the branch? Are there buds on the branches? (See "Discussion Questions.")

Relay Race: While the teams are studying their branches, mark a starting line using sticks, rope, or any other object you have at hand. Line the kids up in their groups behind the line. Then, walk a distance away (say 20 yards) and spread all the sample branches around in a random order. You will need to have at least as many samples of each species as there are kids on a team; a few more is better.

Explain that this will be a relay race. When you give the signal, the first team member in the line should run to the line of branches, pick up a branch from their team's tree, race back, and tag the next player. Mentors will need to be standing with each team to ensure the correct branch is selected by each team member. The first team done with the correct branches wins!

You can play the game more than once, giving each team a different species each time.

Bonus: To make the game more challenging, put out branches of trees that were not assigned to any of the groups and that have similarities to species studied by the groups. For example, a group assigned a red oak will have to look carefully to distinguish it from white oak! Ideally you would have to double the number of species.

Race Option #2: Divide the children into teams of four and have the teams face each other about 30 feet apart. (You will need to mark lines for each team.) Kids on both teams count off and receive a number (1 – 2 – 3 – 4). The samples of branches are placed between the two groups. The game begins when you call out the name of a tree branch and a number. (For example, "The next plant is a sugar maple and the number is four!") The person who is number 4 on each team races to the center and selects a sugar maple branch. The first one back to their line with the correct answer gains two points for their team; wrong answers result in a deduction of two points.

Note: Unless the kids have learned tree identification through other activities, this version of the game requires all players to become familiar with all of the trees before the game begins.

Discussion Questions

Do the leaves have teeth along the edges?

Do the leaves have lobes along the edges? Are the lobes rounded or pointed?

What is the general size of the leaves and their shape?

Do the leaves connect to the twig evenly or unevenly?

Are there buds on the branches?

Answer(s): *Will vary depending on availability and variety trees and leaves on a given forested site.*

Estimated Time

15 to 20 minutes.

Ages

Not recommended for ages 5 to 8 because of the depth of the questions asked.

Recommended for ages 9 to 11.

Note: If you are working with a mixed-aged group, the younger players can be divided among teams of older players. Allow the team members to collaborate on branch selection.

Credits

Part of this activity adapted from *Sharing Nature with Children*, by Joseph Bharat Cornell, Ananda Publications, 1979.

Related Sources

What Tree Is That? *www.arborday.org/trees/whatTree*

The Sibley Guide to Trees, by David Allen Sibley, Alfred A. Knopf, Inc., 2009.

Trees — Fandex Family Field Guide, by Steven Aronson, Workman Publishing, 2010.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WOODS

FIND YOUR TREE

Learning Objectives

To practice careful observation skills while getting to know an individual tree and further use senses other than sight to identify different types of trees. This activity also helps build a deeper relationship with nature.

Materials

Blindfolds (any squares of dark cloth should do); possibly journals and pencils.

Activity Description

This is a relatively quiet activity that requires concentration and focus. The activity is designed to be done with groups of two people, but you can make adjustments based on the number of youth in your group (such as using groups of three instead).

Step 1: Location. Scout out an outdoor location that has samples of at least several different species of trees. Try to find an area that is relatively flat and free of rocks and logs. Check especially for animal holes or other things on the ground that could cause injury to blindfolded participants.

Step 2: Demonstration. Select a volunteer to help you demonstrate the activity. Explain that you will be dividing the group into pairs, and each pair will have one blindfold. As you place the blindfold on your volunteer, remind the group to adjust blindfolds comfortably so that they are not too tight or too loose.

Explain that you will slowly walk your partner to a nearby tree that he or she will get to know carefully while blindfolded. Their challenge is to get to know the tree so well that you can find the tree without the blindfold on!

Caution: People wearing blindfolds should keep their eyes closed so they cannot see anything out the bottom or edges of the blindfold and their eyes do not get irritated.

Gently and slowly spin your partner so that he or she is not completely oriented. Select a tree and walk your volunteer to it (20 to 30 yards is doable, but you should adjust the distance based on the age of the group). To truly test their observation skills, it is best not to take a direct route to the tree. Once at the tree, show your group how to gently put your partner's hands on the tree so they can feel it and direct their hands to any branches that they might bump into. The blindfolded partner carefully touches and smells the tree. Once confident in their ability to identify it, the blindfolded partner informs the seeing partner, who slowly and gently winds them around the game area to a point where the blindfold is removed. Now, the newly seeing partner tries to find the tree.

Step 3: Game On. Define the boundaries of the game area, divide the children into pairs (or other groupings), and pass out blindfolds. After the first round, partners switch roles. Decide ahead of time how many turns you want each player to take. The activity can continue for as long as there are different types of trees to examine. After the teams are finished, bring them together to discuss what they found.

Note: Some children may be uncomfortable being blindfolded, especially young children. Explain that if they do not want to wear a blindfold, they can simply do the activity with their eyes squeezed shut (no peeking!). The younger the group, the shorter the walking distance should be between the starting point and the tree.

Discussion Questions

How did you identify your tree?

Answer(s): *Will vary depending on availability and variety of trees on a given forested site. Ask the children to talk about the size of the tree or its branches and leaves, the texture of the bark, the texture of the leaves, and even what they smelled and heard around the tree that helped them identify "their" tree. The differences they found in leaves, bark, and branches are also what make different trees useful to different species of wildlife — both when trees are alive and when they are dead.*

Trees provide food and shelter for a variety of wildlife, including insects, birds, lizards, and mammals. When planting new trees, it's important to use native trees (a tree naturally found in North America rather than one imported from overseas) because wildlife here cannot use most non-native trees for food or shelter. Some non-native plants are invasive, meaning they will kill native plants and take over the landscape, which is a problem if wildlife cannot use these plants for food or shelter.

Estimated Time

20 to 30 minutes.

Ages

Recommended for ages 5 to 8, although the activity is likely to be more successful for youth at the upper end of this age group.

Youth ages 9 to 11 will also enjoy this activity. As a spin-off activity, you can introduce these children to the idea of nature journals. Claire Walker Leslie has several helpful books that will further guide you on this related activity (see "Related Sources"). Students could record their observations about each tree they explored with their senses, draw pictures of their trees, and make note of its special features or things they found particularly interesting about each tree.

Credits

Adapted from *Sharing Nature with Children*, by Joseph Bharat Cornell, Ananda Publications, 1979.

Related Sources

What Tree Is That? *www.arborday.org/trees/whatTree*

Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You, Claire Walker Leslie, Storey Publishing, 2003.

Nature Drawing: A Tool for Learning, by Claire Walker Leslie and Kendall Hunt, 1995.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WOODS

TREE ID FIELD GUIDE

Learning Objectives

To learn how to identify trees common to your area.

Materials

Pencils, white paper (tabloid size 11 inches by 17 inches or legal size 8½ inches by 14 inches), crayons or fine-tipped markers, clipboards, stapler, staples, and possibly a personal computer.

Note: Tabloid-size paper works best because the papers will be folded. Otherwise, legal size will suffice.

Activity Description

Tree identification guides can often be difficult for kids to use. The differences between trees are often subtle, and a lot of choices exist from which to choose. If the chapter leader knows how to identify at least some of the trees on the property, he or she can help kids not only learn how to identify trees but help others do so as well.

Take the kids out on the property to look at a variety of trees that you have already identified. At each tree, ask the kids to note and sketch the following:

- What the leaves look and feel like (color, shape, texture).
- What the bark looks and feels like. Ask them to hug the tree, pressing their cheeks against the bark — unless it is poison sumac or the tree trunk is covered with poison ivy vines!
- What the silhouette looks like (tall and straight, broad, scraggly). Ask the kids to mimic the tree's shape with their bodies.
- Whether there are any flowers or fruit hanging from the tree or fallen on the ground.
- Any odd features, such as thorns or burls (knotty growths on the trunk)

Once back in the chapter house, the youth can begin to make the tree field guide. Ask the kids to work together to choose three aspects of each tree to use in identifying the tree. (This may go more smoothly if you organize the kids into pairs and assign specific trees to each pair.) Give the teams sheets of scrap paper to sketch leaves and write down identification ideas. Each entry in the field guide should feature a drawing of the leaf along with up to three identification clues presented by bullet point.

When the teams have worked out what they want to present in the guide, distribute sheets of paper. The kids should fold the sheets of paper in half; these will be the field guides. On each page, a pair can sketch the leaves they are responsible for and neatly write down the identification points. Have the youth sign their illustrations as well. Once the pages for the guide are completed, staple the "spine" of the guide (the folded edge).

You may choose to produce a more polished product using a computer desktop publishing program. Make as many copies as the kids have stamina for (or make color copies before you staple the pages), and give the guides to chapter visitors to use.

Discussion Questions

Which tree did you find to be:

- **The most common? The rarest?**
- **The easiest to identify? The most difficult?**
- **The most attractive? The most interesting?**
- **The one with the most interesting fruit?**
- **The one with the fruit most valuable for wildlife?**
- **The one with the most interesting flowers?**

How did the trees vary with the habitat? For example, did you find different trees in wet or swampy areas from trees in upland forests?

Were the young saplings growing in the shade the same as or different from the large trees providing the shade? With this evidence, what trees do you think will be dominating (growing the largest and tallest) this site in 100 years?

Answer(s): *Will vary according to the site and available tree species.*

Estimated Time

60 minutes or more.

Ages

Recommended for ages 5 to 8. However, you might just want to focus on common and easily-identified trees. You might also want to make supersized tree guides using white construction paper or pieces of poster board held together with paper fasteners to accommodate hand-motor skills that are still developing. Note: *Trees (A Golden Guide)* is an excellent introductory text on trees for young children.

For ages 9 to 11, increase the quantity and variety of trees studied. Note: *The Sibley Guide to Trees* is a comprehensive guide to trees and is better suited for older youth.

Related Sources

The Sibley Guide to Trees, by David Allen Sibley, Alfred A. Knopf, Inc., 2009.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WOODS

ADDITIONAL LEARNING OBJECTIVES

These additional "woods" learning objectives may be helpful to chapter youth leaders who want to add activities and prepare lessons of their own. Consider teaching the following:

- Forests are more than just trees — they include a huge spectrum of plants, animals, fungi, and other living things.
- Different types of forests — with different types of trees, plants, and wildlife — are found throughout the United States. Participants can learn how to identify common species in their area.
- We obtain many useful products from forests besides timber, including fruits, nuts, ferns, and mushrooms.
- Millions of people enjoy recreation in forests, participating in such activities as hiking, hunting, fishing, bird and wildlife watching, outdoor photography, and camping.
- Forests provide essential habitat for a wide range of North American wildlife.
- Forests protect soil from erosion and maintain its fertility and structure.

CATEGORY: WOODS

ADDITIONAL PROJECTS AND ACTIVITIES

These additional projects and activities are related to "woods" and may be helpful to chapter youth leaders who want the youth to further participate in chapter-hosted projects or activities.

Consider using these resources found on the Izaak Walton League Young Ikes Web page: *www.iwla.org/youngikes*

- **Matching Game and Coloring Page (ages 5 to 8):** Trees provide many important benefits to wildlife. Color the picture, then match the animal names to the creatures found in it. (Found in the *Young Ikes Activity Book* for ages 5 to 8)
- **Word Scramble (ages 9 to 11):** Unscramble the names of animals that rely on dead and dying trees for food and shelter.

Consider these activities found in the *IWLA Chapter Manual* under Unit IV, Sample Conservation Projects:

- **Invasive Plant Species Removal:** Organize volunteers to remove invasive plants from an infested area on chapter grounds, in your community, or on public lands.
- **Reforestation:** Establish new woodlands and urban forests using native tree species. Trees can be purchased and planted or raised in seedling beds and holding areas on chapter grounds. (After they mature to a designated size, these seedlings can be replanted.)
- **Reforestation With Native Nut-Bearing Trees:** Reforest a local site with collected native nuts and other seeds. Your chapter can gather the nuts and seeds and plant them in areas where more trees are needed, or you can use them to raise seedlings for other conservation projects.

Consider these resources found on the Izaak Walton League Youth Programs Web page (subject to change): *www.iwla.org/youthprograms*

Ages 5 to 8 (Kindergarten to 3rd Grade)

- **How To: Collect and Plant Nuts:** With autumn comes an abundance of acorns, walnuts, and other nuts strewn across the ground. These native seeds can be collected and put to good use. (Izaak Walton League)
- **How To: Recycle a Christmas Tree:** The fresh smell of pine today will be replaced by dry, dead branches and lots of pine needles in January. But there are plenty of other uses for that tree. (Izaak Walton League)

Ages 12 to 17 (7th to 12th Grades)

- **Backyard Conservation:** Whether you have acres in the country or a small suburban yard, you can help protect the environment and add beauty to your surroundings. (Natural Resources Conservation Service)

YOUTH ACTIVITIES

CATEGORY: WATERS

CATEGORY: WATERS

FISHING FOR POND CREATURES

Learning Objectives

To observe some of the small creatures that live in aquatic environments and learn about their importance in the food chain and other aspects of local ecosystems.

Materials

Aquatic dip nets, kitchen strainer (with handle), eye droppers, tweezers, white porcelain pans (with a small amount of pond water), white plastic tablecloths or drop cloths, plastic containers, aquatic creatures field guide, hand lenses or small magnifying glasses, a small aquarium filled with water from the pond.

Activity Description

A wonderful variety of small creatures live in and around ponds, and kids enjoy finding them. If you have access to a pond — either on your chapter property or in a community space — arm the kids with collecting tools and see what they can come up with. After catching the creatures, they can put their catches in white porcelain pans filled with water, enabling everyone to watch the creatures swim around.

To catch pond creatures, youth can try various strategies:

- Look for large creatures such as aquatic beetles, frogs, or fish and sweep them up with a dip net or kitchen strainer. Transfer them promptly to a pan with water or (depending on size) the aquarium filled with pond water.
- Collect clumps of floating plants like duckweed or algae and gently pick them apart in one of the white porcelain pans or on a white drop cloth. Transfer critters to a clean pan with water.
- Scoop up mud and gravel from the pond bottom with plastic containers, watch what emerges after the sediment settles, and move creatures from the containers to a pan with an eye dropper or tweezers.
- Gently scrape the underside of the banks with a kitchen strainer to loosen any creatures that may be under there. Empty the strainer contents into a white pan or onto the drop cloth to sort through the mud and other materials. Transfer critters to a clean pan with water.

To identify your catch, use a youth-friendly field guide such as *A Volunteer Monitor's Field Guide to Aquatic Macroinvertebrates Field Charts* or *Pond Life (A Golden Guide)*. Youth can use hand lenses or magnifying glasses to study very small animals such as mosquito larvae, water fleas, and other tiny crustaceans.

The kids might want to keep some of the creatures they caught. You can take those creatures back to your chapter and keep them for a few days in the aquarium for educational purposes. Be sure to use water from the pond, not chlorinated tap water, in the aquarium. This is a good opportunity to discuss why these creatures must be released back into their original habitat rather than discarded elsewhere. After a few days, you can release the creatures back into the pond, perhaps accompanied by a little ceremony.

Caution: Mixing children and water makes for a fun event, but this also requires additional safety measures on your part. Ask one of your volunteers to serve as an observer, standing away from the action with a good view of the water area in which the kids are splashing. Ideally this person would be certified in CPR and have lifeguard training (this would be a great role for teens or college students volunteering with your chapter youth program). Depending on the depth of the pond, you may want to consider child-sized life jackets for each youth participant to ensure safety while near the water.

Discussion Questions

How do the creatures share the pond? In which specific mini-habitats do they live?

Answer(s): *Will vary depending on the creatures you find. For example, it might include water striders and whirligig beetles on the pond's surface; water beetles, small fish, and tadpoles swimming; and dragonfly and mayfly larvae in the mud.*

What do the creatures eat? Which ones eat plants and which ones eat other little creatures?

Answer(s): *Will vary depending on the creatures you find. For example, water fleas eat tiny microscopic organisms, water boatman beetles eat plant material, water striders and whirligig beetles eat insects that fall on the water and can't escape, mayfly larvae eat water plants and algae, and dragonfly larvae and water bugs are insect predators. Large water bugs can even subdue small fish and tadpoles.*

Which creatures live their entire lives in water? Which ones only live in water as larvae?

Answer(s): *Permanent aquatic residents may include water striders, whirligig beetles, water boatmen, backswimmers, water fleas, and giant water bugs. Animals that live in water only in their larval stages include dragonflies and mayflies, mosquitoes, and tadpoles or young frogs.*

Why do you think these creatures are important to larger animals like frogs, fish, and birds? Do you see any of these larger animals around the pond?

Answer(s): *Frogs, birds, and bats eat flying insects, the larvae of which can live in water. Aquatic insects are a vital food source for many kinds of fish.*

If you see birds, what are they doing?

Answer(s): *Will vary. Perhaps they will see a heron stalking fish or a Great Crested Flycatcher in search of insects.*

Estimated Time

45 minutes.

Ages

Recommended for ages 5 to 8.

For ages 9 to 11, no changes are needed to the activity.

Related Resources

A Volunteer Monitor's Field Guide to Aquatic Macroinvertebrates Field Charts, by the Izaak Walton League of America, 2002.

Aquatic Invertebrate Illustrations: *www.aces.edu/pubs/docs/A/ANR-0911/*

Aquatic Invertebrate Illustrations: *www.riverwatch.ab.ca/how_to_monitor/invert_identifying-ident.cfm*

Pond Life (A Golden Guide), by George Reid, St. Martins Press, 2001.

The Guide to Aquatic Insects and Crustaceans, by the Izaak Walton League of America, Stackpole Books, 2006.

CATEGORY: WATERS

STREAM CREATURE CONSTRUCTION

Learning Objectives

To learn how stream-bottom macroinvertebrates are adapted to their swift-water habitat.

Materials

Craft materials and tools for making stream creatures. For example: Construction paper, tape, yarn, scissors, pipe cleaners, balloons, straws, crayons, egg cartons, cardboard tubes.

Activity Description

A "macroinvertebrate" is an animal with no backbone that you can see without using a microscope. Stream-bottom macroinvertebrates — including aquatic insects (such as dragonfly and damselfly larvae) and crustaceans (such as crayfish, snails, and clams) — are good indicators of water quality because they live in the same area of a stream most of their lives and differ in their sensitivity to pollution. Which macroinvertebrates you find in a stream indicates the pollution level of the water.

How do these creatures survive and stay in one place when swift-flowing water is moving all around them? That's what the children will find out.

Organize the youth into teams of three or more and ask a member of each team to volunteer to be a stream creature. (Alternatively, each team can decide together who should be the "creature.") Ask the rest of the team members to make the volunteer into a critter that can do the following in moving water:

- Catch food.
- Move around on the stream bottom.
- Camouflage or protect itself.
- Lay eggs.
- Keep from getting washed away.

Now the fun begins! Teams should use the materials at hand to create and attach body parts and construct their critter. Provide a time limit for the construction phase, depending on the age group (approximately 10 to 15 minutes). Once all the teams are done, ask each team to name their creature and explain its adaptations — changes that allow it to survive and thrive in fast-flowing streams. Depending on your groups, you could consider having a critter "fashion show," with the children walking down a pretend runway to show off their designs.

You can then show the youth a few examples of interesting stream adaptations from sources such as IWLA's *The Guide to Aquatic Insects and Crustaceans* or *Pond Life (A Golden Guide)*. Examples might include

- Caddisfly larvae, which live in little houses made of sand, pebbles, and tiny twigs to hide from fish and other predators.
- Net-spinning caddisfly larvae, which construct underwater webs to catch their food.
- Black fly larvae, which attach to rocks and sticks using little suckers on their abdomens and move by drifting downstream on silken threads that come out from tips of their abdomens.
- Water penny beetles, which have flat bodies that allow them to move around on rocks without washing away.

Options: You may find that every child wants to dress up as a stream critter. To keep everyone engaged, change the activity to have each child construct *one* body part in the category of his or her choice. Or divide the children into five groups and assign each group a body part that all the youth in that group will build (such as "parts that help the creatures catch food under water").

Discussion Questions

Did the creature that you invented look like any aquatic creature that you saw in a guide? If so, which one(s)?

Answer(s): *Will vary depending on what aquatic creatures are invented. Discuss not just the appearance of creatures in the guide but what survival techniques they use that are similar to ideas the youth had (such as different ways to cling to rocks in the water).*

If you have a guide, point to the pictures of some aquatic creatures and ask: How is this creature adapted to its aquatic lifestyle?

Answer(s): *Will vary and might include:*

- *Long legs covered with hairs that trap air bubbles and enable water striders to float on top of the water.*
- *Bifocal eyes for whirligig beetles, so they can look above and below the water's surface.*
- *Long legs for swimming used by water boatmen and backswimmer insects.*
- *Camouflaged houses made by caddis fly larvae.*
- *Extendable mouthparts that dragonfly larvae use to snag their insect prey.*

Estimated Time

30 minutes.

Ages

Recommended for ages 5 to 8.

Equally applicable for ages 9 to 11. In addition, with this age group you can spend more time looking at illustrations of stream-bottom macroinvertebrates and start talking about which ones can only live in clean water and which thrive in polluted waters.

Credits

Adapted from *Hands-On Nature: Information and Activities for Exploring the Environment with Children*, edited by Jenepher Lingelbach, Vermont Institute of Natural Science, 1986.

Related Sources

A Volunteer Monitor's Field Guide to Aquatic Macroinvertebrates Field Charts, by the Izaak Walton League of America, 2002.

Pond Life (A Golden Guide), by George Reid, St. Martins Press, 2001.

The Guide to Aquatic Insects and Crustaceans, by the Izaak Walton League of America, Stackpole Books, 2006.

CATEGORY: WATERS

CAN YOU SEE WATER POLLUTION?

Learning Objectives

To learn about water pollution and how to detect it.

Materials

Five clear glasses, sample of stream water (taken within 24 hours of the activity), isopropyl (rubbing) alcohol, food coloring, tap water (preferably from a municipal system), bottled spring water, tape/labels and a permanent marker (to label glasses with water samples), paper (either pads of paper, a sheet of paper on a clipboard, or note cards), and pens/pencils.

Activity Description

Before this activity begins, prepare five glasses with water samples. Label each glass with a capital letter and fill the glasses with the following samples:

- Glass A: Tap water
- Glass B: Bottled spring water
- Glass C: Tap water with a few drops of food coloring (enough to distinctly color the water)
- Glass D: Tap water with a capful of rubbing alcohol
- Glass E: Stream water

Ask the children to look at the glasses and decide which ones contain polluted water. Depending on the number of participants, you can have the children work in teams of 5 to 6 (which means you will need one set of samples for each group) or this can be done as a demonstration for the entire group. Tell the children that they should use their senses of smell and sight to judge the water quality.

Caution: Tell them **not** to taste any of the samples (they could get sick).

Have the children record their observations about each glass of water. Ask them to write down why they believe certain glasses of water are polluted and others are not. Then discuss the answers.

Discussion Questions

Which water samples do you think are polluted and why?

Answer(s): *Responses will vary.*

Is using sight and smell the best way to determine if water is polluted?

Answer(s): *No. Although smell and sight give you clues about potential pollution problems, they don't provide all the answers — and can even be misleading.*

That's why the Izaak Walton League developed the Save Our Streams program and Creek Freaks project for kids — to test water quality using science.

For example, finding out which insects and other underwater creatures can survive in the water will tell you a lot about the water quality. The water is not "polluted" because it has bugs in it. Some insects can only live in clean water! An unusual color may or may not mean there's a problem — perhaps an odd-colored soil washed into the water that day. You can use simple tools to measure chemicals and oxygen in the water to find out if the water is healthy for fish and wildlife — and you!

Before you jump into a creek, you can use your sense of sight and smell to look for clues to water pollution. If you do find a stream with an unusual color or a bad smell, tell an adult about it and ask them to call the county or city authorities to check it out — it could be a sign of pollution and may not be safe to play in. But to be sure about the quality of your water, you need to use scientific experiments, like the ones in League programs.

Following are specific talking points for each of the five samples.

Glass A: **Tap water** can be considered "polluted" because it contains chlorine, which is added to tap water in most parts of the country to make it safe to drink. Although chlorine is needed to kill bacteria in the water that could make you sick, chlorine is extremely toxic to fish and other aquatic life — if a pipe leaked chlorinated tap water into a stream, the chlorine would kill many of the fish and other aquatic animals living there.

Glass B: Some companies get their **bottled water** directly from mountain springs that are generally free from pollution — at least as far as fish and wildlife are concerned. However, these companies do not have to test spring water to make sure it is safe for drinking, so it may be safe for fish but not for you!

Many bottled water companies are now selling treated tap water — and even untreated tap water — in plastic bottles. If this tap water contains chlorine, it would be considered "polluted" for wildlife.

Glass C: **Tap water with food coloring** may "look" polluted because it has an odd color, but unusual colors are not always a sign of pollution problems. The color could be caused by dirt that washed into the stream — or by chemicals dumped there. The only way to know is to test the water.

Glass D: **Tap water with rubbing alcohol** looks clean but smells terrible. It obviously is polluted, even though it looks perfectly clear. Smells like this could be caused by sewage, chemicals, or natural gases. However, this is just a first clue in finding out whether the water is polluted.

Glass E: **Stream water** should look a little dirty and have plenty of life in it — plants, insects, other aquatic animals. If the water is very muddy or dark, it probably has too much dirt (also

called sediment) for fish and other aquatic animals to survive. This sediment can clog fish gills, smother fish eggs, and block the sunlight that water plants need to grow.

What did you learn about detecting water pollution? Name some types of pollution that could harm your stream.

Answer(s): *Just because water looks clean does not mean that it is clean and healthy — and just because water has dirt or bugs does not mean it is polluted.*

There are two basic types of pollution. The first kind of pollution comes from factories or industrial plants. This is usually easy to find and fix. The second kind comes from many sources and can be hard to identify, such as oil leaking from cars, dirt that washes away from construction sites, trash, and pet waste. Some of these we can see (like an oil slick on the water or a plastic bottle floating downstream) and some we can't see (such as chemicals that wash into the stream from someone's lawn).

How do these pollutants get in the water?

Answer(s): *Pollutants get into water by accidental spills, illegal dumping, or rainfall runoff that collects pollutants from the air and ground surfaces such as streets or farm fields and carries them into local waters.*

Are any of these pollutants in your (this) stream? Can you guess which of these might be a threat to the stream?

Answer(s): *Responses will vary.*

Estimated Time

15 to 30 minutes. Preparation time may vary, but allow for another 30 minutes to gather materials and organize samples.

Ages

Recommended for ages 5 to 8.

No adjustments needed for ages 9 to 11, although you can discuss potential pollutants and their impact in more detail.

For youth 9 to 11 and older, you can introduce the terms "point source pollution" for pollution from factories and "non-point source pollution" for pollution from farms, yards, and streets.

Credits

Adapted from "Measuring Stream Health Activities" from the *Hands On Save Our Streams — The Save Our Streams Teacher's Manual,* by the Izaak Walton League of America, 1994.

Related Sources

Young Ikes Activity Book — Ages 9 to 11, by the Izaak Walton League of America, 2011. Page 5 – Waters.

CATEGORY: WATERS

AQUATIC ANIMAL RELAY RACE

Learning Objectives

To identify some of the creatures that live in or near aquatic environments.

Materials

Challenge Cards with clues to different aquatic animals, made on index cards (3 inches by 5 inches or larger). Answer Signs made from paper (8½ inches by 11 inches), including photographs and magazine clippings. (See "Activity Description" for details.)

Activity Description

Youth will work together to learn about animals that live in or near the water. Find an open space where the kids can run a relay race. Mark the starting line with sticks or other materials you have on-hand. Divide the youth into small groups of two to four players. You will need at least two teams. Three or four teams with three to four players each make this game especially lively. It's acceptable for some teams to have an extra player (meaning, for example, that some teams have three players and some have four). To add a little flair to the competition, ask the youth to decide on team names — preferably the names of aquatic animals. (You could even have them draw their team mascots on stickers to wear on their shirts.)

Line up the teams behind the starting line. In front of the first person for each team, lay a set of Challenge Cards upside down so the players cannot read them. Place a set of Answer Signs in a scattered pile about 20 yards away. (Each team needs one set of Challenge Cards and one set of Answer Signs.) The supervising adult should be stationed equidistant behind the piles of Answer Signs. (The important point is that all teams have to go the same distance to the adult after choosing an answer.) If you have enough volunteers, station one adult at each set of Answer Signs.

Explain that when you say "Go!" the first runner for each team should pick up the top Challenge Card then sprint to the answer pile to find the correct answer to the clue. For example, if the Challenge Card reads, "A green animal that eats flies with a big sticky tongue," the player would sprint to the answer pile to look for "Frog."

After finding the correct answer sheet (or best guess), the runner should run to the adult to have their answer checked. The adult needs to be alert to who arrives first and also needs to quickly nod whether the answer is correct or not. If the answer is not correct, the player has to return to the answer pile and try again. If the answer is correct, the player can sprint back home (with both signs) and tag the next runner.

If you have players who are too young to read a challenge card, have an older teammate run with them and read the cards out loud or imitate the sound that animal might make. For example, if the Challenge Card reads, "Loves to swim and also flies," one would make the sound, "Quakkkkk!" and then the player would sprint to the answer pile to look for "Duck."

The winning team is the first to finish the race with all correct answers. Allow the remaining teams to continue to race until every team has finished. After every team is done, gather the runners in a circle to talk about the different aquatic animals and clues. Have a separate list of all the animals on-hand so you can be sure to ask questions about each one.

Challenge Cards: Can be made on index cards, pieces of cardboard, or even scrap paper. Suggestions for Challenge Cards are listed below. (Answers are provided in parentheses for your reference and should not be listed on the Challenge Cards.)

- **A green animal that eats flies with a big sticky tongue. "Grummppfffff!"** *(Frog)*
- **Loves to swim and also flies. "Quakkkkk!"** *(Duck)*
- **Chubby animal who works really hard! "Slap!"** *(Beaver)*
- **Cute and playful. Loves to slide. "Snort!!"** *(Otter)*
- **Fast! Zooms and buzzes, catching mosquitoes. "Whirrrrrrrrr!"** *(Dragonfly)*
- **Slithers on mud and even across water."SSSSSssssss!"** *(Water Snake)*
- **Buries itself in ooey, gooey mud. Watch your fingers! "Snap!!"** *(Snapping Turtle)*
- **Big fish with a big mouth! "Gulp!!!!"** *(Bass)*
- **Swimmers bright and colorful like the sun. "Gurgle!"** *(Sunfish)*
- **Glides across the water like an Olympic skater! "Swishhhh!"** *(Water Strider)*

Answer Signs: Creating answer signs on large sheets of paper (8½ inches by 11 inches) provides plenty of room for images along with each animal's name. (Answers are provided in parentheses above with the sample clues.) You may wish to include pictures or drawings of each creature along with the name. If possible, laminate the Answer Signs so they can be used repeatedly.

Discussion Questions

Which clues were the trickiest?

Answer(s): *Responses will vary based on what clues are used and the ages of children.*

Which animals have you seen in the wild?

Answer(s): *Responses will vary.*

Which do you hope to see? Which would you like to avoid or see from a distance?

Answer(s): *Will vary depending on what animals and clues are used.*

Estimated Time

15 to 20 minutes.

Ages

Recommended for ages 5 to 8; however, their ability to read clues on Challenge Cards and Answer Sheets may vary.

Consider using the "Waters" activity in *IWLA Young Ikes Activity Book — Ages 5 to 8* as a simple introduction to the topic of plants and creatures that live in aquatic environments.

Youth ages 9 to 11 will also enjoy this game. You can make the game more challenging by using more challenging clues. Feel free to make new Challenge Cards and Answer Sheets based on local wildlife and the interests and ages of participants.

Possible advanced Challenge Cards clues are listed below. (Again, answers are provided in parentheses for your convenience but should not be printed on the Challenge Cards.)

- **An amphibian that lays jelly-like eggs in the water.** *(Frog)*
- **A green-headed animal that dips in the water to eat plants and small insects.** *(Mallard)*
- **A busy rodent that loves to chew wood and creates new habitats for other creatures.** *(Beaver)*
- **A whiskered fish-eater that loves to play.** *(River Otter)*
- **A great predator of mosquitoes, this animal whirls and buzzes as it catches them.** *(Dragonfly)*
- **Heavy reptile that eats frogs and fish.** *(Snapping Turtle)*
- **A popular game fish that can have a large mouth or small mouth.** *(Bass)*
- **A long-legged wading bird that spears fish with its beak.** *(Heron)*
- **This marsh-dwelling rodent builds lodges out of reeds and has a round, narrow tail.** *(Muskrat)*
- **Our national bird, which has excellent eyesight.** *(Bald Eagle)*

Related Sources

A Field Guide to Freshwater Fisheries (Peterson Field Guide), by Lawrence M. Page, Brook M. Burr and Roger Tory Peterson, Houghton Mifflin Harcourt, 1991.

IWLA Young Ikes Activity Book — Ages 5 to 8, by the Izaak Walton League of America, 2011. Page 5 – Waters.

Peterson Field Guide to Birds of North America, by Roger Tory Peterson, Houghton Mifflin Harcourt, 2008.

Peterson Field Guide to Mammals of North America, by Fiona Reid, Houghton Mifflin Harcourt, Fourth Edition, 2006.

Pond Life (A Golden Guide), by George Reid, St. Martins Press, 2001.

CATEGORY: WATERS

AQUATIC CREATURE FIELD GUIDE

Learning Objectives

To learn the various small creatures that live in and around ponds or man-made lakes, how to identify them, and how they live.

Materials

Materials for collecting aquatic creatures (refer to the "Fishing for Pond Creatures" activity lesson plan found in the "Waters" section in this manual), pencils, white paper (tabloid size 11 inches by 17 inches or legal size 8½ inches x 14 inches), crayons or fine-tipped markers, clipboards, stapler, staples, and possibly a personal computer.

Note: Tabloid-size paper works best because the papers will be folded. Otherwise, legal-size will suffice.

Activity Description

Before conducting this activity, you'll need to take the kids out to a local pond or stream with collection tools and pans in hand. (Note: Refer to the "Fishing for Pond Creatures" activity lesson plan found in the "Waters" section in this manual.) Encourage the kids to look for aquatic creatures under rocks and attached to the sides of rocks. Alternately, you can collect the aquatic creatures prior to your event and have them ready for observation by the youth. If you take this approach, describe exactly where you found each one to give the youth a better idea of each creature's habitat.

Once the youth have collected pond creatures, have them write and illustrate a local pond creature field guide. This will encourage them to observe the creatures closely and give them the opportunity to educate other people in the community. Kids can work individually or in pairs, each with a sheet of white paper. The kids should draw the creatures as best they can, label the drawings, and include some basic information about each creature such as where it was found and what it eats. (Have books on hand from the "Related Sources" section of this activity for reference.) If you have hand lenses, they can use them to observe the creatures up close. When you are done, be sure to release the aquatic creatures safely where you found them.

Once the kids have illustrated all of the creatures, ask them to sign their work and then combine the sheets into a guide. Fold the papers in half and staple them together at the spine (the folded edge) to make a simple booklet.

You may choose to produce a more polished product using a computer desktop publishing program. Make as many copies as the kids have stamina for (or make color copies before you staple the pages), and give the guides to chapter visitors to use.

Discussion Questions

What aquatic creatures fascinated you the most and why?

What interesting features or adaptations did you notice about "your" creature?

What questions do you have about your creature? What would you like to know?

Answer(s): *Will vary depending on body of water and available aquatic species.*

Estimated Time

45 minutes to create the guide; additional time to capture stream creatures.

Ages

Recommended for 5 to 8. Note: The "Explore Life of the Pond" Web site (see "Related Sources") is a great introduction for young children.

For ages 9 to 11, no specific changes to this activity are needed. Encourage these children to make more detailed drawings of their creatures. They can also provide more in-depth information about their creatures and include questions they have about the life forms they illustrated.

Related Sources

A Field Guide to Freshwater Fisheries (Peterson Field Guide), by Lawrence M. Page, Brook M. Burr, and Roger Tory Peterson, Houghton Mifflin Harcourt, 1991.

A Field Guide to Reptiles and Amphibians of Eastern and Central North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Third Edition, 1998.

A Field Guide to Reptiles and Amphibians of Western North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Fourth Edition, 1998.

A Guide to Common Freshwater Invertebrates of North America, by J. Reese Voshell, Jr., McDonald Woodward, 2002.

Explore Life of the Pond: *http://library.thinkquest.org/04oct/00228/animals.html*

Flash Card of Common Freshwater Invertebrates of North America, by J. Reese Voshell, Jr., McDonald Woodward, 2010.

Insects: A Guide to Familiar American Insects (A Golden Guide), by Clarence Cottom and Herbert S. Zim, St. Martins Press, 2001.

CATEGORY: WATERS

ADDITIONAL LEARNING OBJECTIVES

These additional "water" learning objectives may be helpful to chapter youth leaders who want to add activities and prepare lessons of their own. Consider teaching the following:

- Clean water is essential for most animals (including people) to live.
- Some aquatic animals — from stoneflies to salmon — require very clean and cold water to survive.
- The amount of water on the planet remains constant. Only its location changes.
- Agriculture in the United States depends on clean water. Sources of this water include rainfall, surface waterways, and ground water.
- Some parts of the United States, notably in the southwest, are facing the threat of increasing water shortages. Conflicts over water allocation often arise during times of scarcity.
- We depend on clean water for many types of recreation, including fishing, swimming, and boating.
- Sources of water pollution are categorized as either point or non-point sources. "Point" sources are easily identified because they come from a specific point, like a factory pipe. "Non-point" sources, such as dirt or chemicals washing into streams, are more difficult to pinpoint.
- Human activities dump many thousands of chemicals into waterways. The long-term impact of most of these substances on the environment and human health remains unknown.
- Toxins in water are often absorbed by aquatic plants and animals and tend to increase in concentration moving up the food chain.
- We need to conserve water to make sure we have enough to meet the needs of humans and other living things across the planet in the future.
- We also need to keep our waters clean for use by humans and other living things.

CATEGORY: WATERS

ADDITIONAL PROJECTS AND ACTIVITIES

These additional projects and activities are related to "water" and may be helpful to chapter youth leaders who want the youth to further participate in chapter-hosted projects or activities.

Consider using these resources found on the Izaak Walton League Young Ikes Web page: *www.iwla.org/youngikes*

- **Stream Maze (ages 5 and younger):** Help the fish find its next insect meal. A fun challenge for kids *and* parents.
- **Stream Coloring Page (ages 5 and younger):** It's a splash to learn about clean water!
- **Pond Life Crossword Puzzle (ages 5 to 8):** Ponds are home to a variety of fish, mammals, birds, reptiles, and more. Use drawings and word clues to solve the puzzle.
- **Find the Difference (ages 9 to 11):** Everything you do on land affects the quality of water you drink and play in. Find the differences between two water scenes, then figure out which is better for water quality . . . and why! (Found in the *Young Ikes Activity Book* for ages 9 to 11)

Consider these activities found in the *IWLA Chapter Manual* under Unit IV, Sample Conservation Projects:

- **Fish Habitat Improvement:** Restore native fish populations by improving habitat conditions and promoting species diversity. Construct man-made fish cribs to increase fish habitat in area ponds and lakes.
- **Fish Hatchery and Stocking:** Restore or re-introduce native fish species by raising fish and releasing them into population-depleted areas. This project may be combined with stream restoration to increase the chances of survival for fish released into the wild.
- **Lake and Pond Preservation and Management:** Restore or protect a lake or pond for fish and wildlife habitat and community enjoyment. The project may include stabilizing banks, restoring water sources (stream, spring seeps, wetlands) flowing into the pond or lake, removing invasive species, eliminating excessive algae blooms, monitoring sources of offsite nutrient and chemical pollution, or installing structures to create fish habitat to help bring a lake or pond back to a fully functioning state.
- **Stream Monitoring:** Test the water quality of local streams using the League's Save Our Streams (SOS) monitoring program. Under the biological method, volunteers collect and identify aquatic macroinvertebrates (stream insects and crustaceans) and determine a water quality rating of excellent, good, fair, or poor based on the diversity of insects found and their varying tolerances to pollution.

- **Stream Restoration:** Stream restoration can help to return a polluted or failing stream to health. This project often includes stabilizing banks or altering the shape of the stream channel, fencing cattle out to reduce erosion, and creating fish habitat. Another approach to restoration is to remove disturbances from the stream and allow the stream to fix itself.
- **Waterway Litter Cleanup:** Organize and conduct a community waterway cleanup by recruiting volunteers (both members and non-members) to remove discarded items along stream and river banks and in river corridors.
- **Wetlands Conservation:** Wetlands conservation includes activities that conserve, protect, and restore wetlands and educate people about the important role these areas play in our communities (flood control, water filtration, fish and wildlife habitat).

Consider these activities found in the *IWLA Chapter Manual* under Unit V, Sample Outdoor Recreation and Activities:

- **Fishing Clinic:** Fishing is the most popular outdoor recreational activity in America today. You can host an informative, hands-on event to introduce members of your community to fishing and improve the skills of experienced anglers.
- **Paddle Sports Day:** If you have easy access to water, organize and host an event that teaches individuals about canoe and kayak safety, paddling techniques, and the simple fun of this form of recreation. After your initial event, you may decide to bring participants together again for a float trip to test their new skills.

Consider these resources found on the Izaak Walton League Youth Programs Web page (subject to change): *www.iwla.org/youthprograms*

Ages 5 to 8 (Kindergarten to 3rd Grade)

- **Chessie: A Chesapeake Bay Story:** In this coloring book, Chessie the Bay Monster encourages kids to protect the Chesapeake Bay from pollution to protect the fish and wildlife that live there. (U.S. Fish and Wildlife Service)
- **Thirstin's Wacky Water Adventure:** A short activity and coloring book about sources of drinking water and steps kids can take to save water. (Environmental Protection Agency)
- **Water Word Scramble:** A one-page word scramble about water resources and how to save water. (Environmental Protection Agency)

Ages 9 to 11 (4th to 6th Grades)

- **How To: Build a Model Watershed:** This model watershed demonstrates how water picks up sediment and pollutants as it flows — and that simple measures can reduce the amount of polluted runoff that ends up in your watershed. (Izaak Walton League)

- **How To: Build a Rain Garden:** Stormwater runoff is a leading cause of pollution in our streams and lakes. Driveways, roads, and parking lots block water from draining into the ground. Lawns are not much better, unless they have a place where the water can go. Enter the rain garden. (Izaak Walton League)

Ages 12 to 17 (7th to 12th Grades)

- **How To: Build a Fish Crib:** Discarded PVC pipes can be used to build "fish cribs" — places where bass, bluegills, and other lake species can hide, feed, and reproduce, making for better fishing and aquatic health. Any discarded plastic materials that can create a solid structure could be used, so be creative. (Izaak Walton League)
- **How To: Build a Rain Barrel:** The average American family uses 120 gallons of water each day for outdoor use, much of it for watering lawns and gardens. One way you can help ease the strain on reservoirs and wells is to build a rain barrel to collect and recycle rainwater. (Izaak Walton League)
- **How To: Build a Vernal Pond:** These ponds provide wildlife habitat, attract mosquito-eating critters, reduce runoff, and serve as teaching tools. (Izaak Walton League)

YOUTH ACTIVITIES

CATEGORY: WILDLIFE

CATEGORY: WILDLIFE

WHAT WILD ANIMAL AM I?

Learning Objectives

To learn characteristics and classification of wild animals that live in your area.

Materials

Paper for signs; string or masking tape; markers; and an assortment of photocopies, photographs, and magazine clippings of wild animals found locally.

Activity Description

Place a sign with the name and photograph of a local animal on the back of each person in your group (youth and adults alike can play this game). Don't let them see what animals they are. Signs can be hung around the neck and over the back using string or held in place with masking tape.

Have the youth mingle and ask questions that will help them identify their animals. They can only ask "yes" or "no" questions, although "maybe" or "sometimes" are also acceptable answers.

Examples of questions they can use to help narrow down the animals will vary: Am I a mammal? Could you find me in a pond? Do I eat plants? Do I have fur? Do I have a tail? Am I larger than a cat? Do I have four legs? Do I lay eggs? Discuss the answers (see "Discussion Questions" below).

This is an active and engaging game that can be played with two or more players. Adult volunteers should be ready to help young children who might not know answers to some of the questions (such as whether an animal is a mammal). Include many types of animals — fish, birds, amphibians, reptiles, insects, as well as mammals. Then let the fun begin!

Discussion Questions

Assorted possible questions could include:

- **Am I a mammal?**
- **Could you find me in a pond?**
- **Do I eat plants?**
- **Do I have fur?**
- **Do I have a tail?**
- **Am I larger than a cat?**

- **Do I have four legs?**
- **Do I lay eggs?**

Answer(s): *The answers for these assorted possible questions will vary depending on the specific animals you use. You could discuss where each animal lives, what it eats, and any special characteristics that differentiate animals in your area from similar animals in other parts of the country.*

Estimated Time

10 to 15 minutes for each round of the game played. More if you do more than one round.

Ages

Recommended for 5 to 8.

Also appropriate for ages 9 to 11. With older children, you can make the game more challenging, such as limiting the number of questions they can ask during each round.

Credits

Adapted from *Sharing Nature with Children,* by Joseph Bharat Cornell, Ananda Publications, 1979.

Related Sources

A Field Guide to Freshwater Fisheries (Peterson Field Guide), by Lawrence M. Page, Brook M. Burr, and Roger Tory Peterson, Houghton Mifflin Harcourt, 1991.

A Field Guide to Reptiles and Amphibians of Eastern and Central North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Third Edition, 1998.

A Field Guide to Reptiles and Amphibians of Western North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Fourth Edition, 1998.

Peterson Field Guide to Birds of North America, by Roger Tory Peterson, Houghton Mifflin Harcourt, 2008.

Peterson Field Guide to Mammals of North America, by Fiona Reid, Houghton Mifflin Harcourt, Fourth Edition, 2006.

CATEGORY: WILDLIFE

TRACKING WILDLIFE

Learning Objectives

To learn which animals live (often unseen) in your area and how to recognize them by the tracks they leave behind.

Materials

Empty half-gallon paper milk cartons; scissors; plaster of Paris mix; water; container for mixing plaster; stick or mixing spoon; dust masks; animal bait (e.g., pet food or treats, table scraps, peanut butter on bread or crackers, nuts, seeds, fruit, vegetables); sand, loose dirt, soft mud, or wet snow.

Activity Description

Finding animal tracks is exciting for kids, especially trying to figure out what animal the tracks belong to and what the animal was doing. In this activity, you will set up a special area to attract animals and the kids will see if any creatures left behind tracks.

Step 1: Lay the bait. Towards early evening the day before your youth event, place some enticing animal food out in a flat, open space and surround the food with a soft material such as sand or (ideally) mud. Select a location that is far enough away from the chapter facility or other buildings that animals will not be scared away by noise *and* that the bait will not lure animals close to trash cans or people. (This activity might not be suited to housing developments, for example.) Leave the food out overnight. Any animals that come to snatch the food will hopefully leave their tracks in the soft ground around the food.

If you are hosting a multi-day youth event, the youth can help you with this phase in addition to tracking.

Caution: Before choosing your bait, check to see if any of your youth participants have food allergies (such as peanut or tree nut allergy) and plan your bait strategy accordingly. Many pet foods and treats contain peanuts and may leave allergens behind that could be dangerous for the youth. Bird seed can also contain peanuts and tree nuts. For more information on food allergies, visit *www.foodallergy.org*.

Note: Consult with your state fish and wildlife agency on potential baiting restrictions. You also have an ethical obligation to remove and properly dispose of remaining bait upon completion of this activity. We want to avoid making wildlife too comfortable or dependent on humans with these easy handouts.

Step 2: Look for tracks. The next day, take the youth to the bait location to examine the area for tracks. Be sure to remove and properly discard any uneaten bait. If you do find animal tracks, ask the youth what animal they think made each set of tracks. Then try to identify the tracks using a field

guide, such as the *Peterson Field Guide to Animal Tracks*. After you identify which animal(s) visited the site, ask the youth why each animal lives in your area — how they find food, water, and shelter; what temperatures they may like; etc. This is a good discussion to have while the plaster dries (see next step). This is also a good opportunity to talk about why we don't leave food out in the open during camping trips!

Option #2: If no tracks are found near the bait, you can look for animal tracks in nearby woods or fields. Although the chances of success are slim, this can help children hone their outdoor skills, and they may also enjoy the opportunity for a hike.

Step 3: Cast it. If the tracks are firm, try to preserve them by making a cast using plaster of Paris. Cut up the milk carton width-wise into squares about 3 to 4 inches tall. Place one of these squares over each track you want to preserve so the sides of the square surround the track and act as a barrier to hold the dirt and wet plaster of Paris in place.

(For tracks found in snow, dust the track with dry plaster of Plaster and allow it to harden or use spray water in the track to freeze it before trying to make a cast of the track. When plaster of Paris hardens, it produces heat that may melt the snow track before the cast can take shape.)

Next, mix the plaster of Paris with water, gently pour it into the track, and let the mixture harden. Use a ratio of one part plaster of Paris with two parts water. Check the package for further instructions — the mixing method will affect how well the plaster sets. Allow at least a half hour for the plaster to set in the track before removing it (although it may take longer, particularly if you are using old plaster).

Caution: Plaster of Paris is a light, fine powder. Depending on conditions (such as wind), you may want to mix it indoors to prevent the powder from blowing around. People mixing the plaster should wear masks to avoid breathing in any of the dust.

Option #2: Alternatively, you can have the youth draw pictures of the animal tracks rather than making casts of them. (This is quicker and less messy.) Provide drawing pads and pencils for this activity.

Drawings and plaster casts can be put on display at the chapter facility, or you can let the youth take them home. For additional fun, have the youth paint their plaster casts. Allow the plaster to dry for at least 24 hours before painting it. Spray on a clear acrylic sealer first; once dry, paint the cast with acrylic or poster paint.

Discussion Questions

Can you identify this track? What kind of animal made it?

Answer(s): *Will vary depending on the animals you encountered.*

Estimated Time

Setting up the bait station(s): 15 to 30 minutes. Making casts: one hour or more, depending on the plaster drying time. Additional time will be needed if you need to search for other tracks and if you decide to paint the casts.

Ages

Recommended for 5 to 8.

For ages 9 to 11, no adjustments needed. These youth can take more responsibility for making and pouring plaster of Paris, preparing cast sites, and pulling out finished casts.

Credits

Adapted from *Nature with Children of All Ages* by Edith Sisson, Massachusetts Audubon Society, 1982.

Related Sources

Peterson Field Guide to Animal Tracks, by Olaus Murie and Mark Elbroch, Houghton Mifflin, Third Edition, 2005.

CATEGORY: WILDLIFE

ANIMAL ACTORS

Learning Objectives

To learn about local wild animals while having fun sharing and learning.

Materials

An assortment of photocopies, photographs, and magazine clippings of wild animals found locally. Use a variety of animals, including birds, insects, reptiles, and mammals. You may opt to include fish as well. If the animal name is not already included, write the name on the page.

Activity Description

These performances can be done individually or in small groups of 2 to 5.

- Give each person or group a piece of paper with the name and picture of a local animal.
- Players should keep the name of their animal a secret from other players or other groups.
- Give groups some time to share what they know about their animal, including what it looks like and how it moves and behaves. Individuals can simply visualize their animal and think about what they know about it.

Each performance should include a fixed pose for the first 8 to 10 seconds — a pose that captures the essence of the animal. Then the performance can continue into a scene with movement. Small groups working together can provide a lot of laughter for the audience!

Kids will be eager to guess the animal right away, but explain that no guessing is allowed until the performance is complete and you give them a signal to guess. If the audience is stumped, ask the performer(s) to provide a few clues. You can increase the level of difficulty by asking that guesses include not only the animal name but what the animal eats or where it lives.

If you have just a few individual performers, each youth can take multiple turns acting out a different animal.

Discussion Questions

The audience will be asking a wide assortment of questions.

Answer(s): *Will vary as answers are the young audience's guesses as to what wild animals are being portrayed.*

Estimated Time

About 20 minutes; less if you have a small group.

Ages

Recommended for 5 to 8.

For ages 9 to 11, use more difficult wild animals to guess or focus on only one species, such as only reptiles or only fish.

Credits

Adapted from *Sharing Nature with Children* by Joseph Bharat Cornell, Ananda Publications, 1979.

Related Sources

A Field Guide to Freshwater Fisheries (Peterson Field Guide), by Lawrence M. Page, Brook M. Burr and Roger Tory Peterson, Houghton Mifflin Harcourt, 1991.

A Field Guide to Reptiles and Amphibians of Eastern and Central North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Third Edition, 1998.

A Field Guide to Reptiles and Amphibians of Western North America (Peterson Field Guide), by Roger Conant and Joseph T. Collins, Houghton Mifflin Harcourt, Fourth Edition, 1998.

Insects: A Guide to Familiar American Insects (A Golden Guide), by Clarence Cottom and Herbert S. Zim, St. Martins Press, 2001.

Peterson Field Guide to Birds of North America, by Roger Tory Peterson, Houghton Mifflin Harcourt, 2008.

Peterson Field Guide to Mammals of North America, by Fiona Reid, Houghton Mifflin Harcourt, Fourth Edition, 2006.

Sharing Nature with Children, by Joseph Bharat Cornell, Ananda Publications, 1979.

CATEGORY: WILDLIFE

BAT AND MOTH

Learning Objectives

To demonstrate a predator-prey relationship in a lively and fun game.

Materials

Strips of cloth for blindfolds, small jingle bells.

Activity Description

For this lively activity, find a relatively flat area and ask your group to form a circle about 10 to 15 feet in diameter. You will need at least six people, and more is better. Look for a grassy spot with no roots or holes that could trip up players. You can also play this game indoors — again, with no obstacles that could injure players.

Choose one person to be a bat and several others to be moths — 2 to 5 moths, depending on the size of your group. The bat and moths then move to the center of the circle to be blindfolded. While blindfolding them, explain that most bats primarily use sound to hunt. They send out sound waves, which bounce back to tell them where their prey is. (This is called "echolocation.")

One popular bat food in North America is moths, which fly at night (the same time that bats are out hunting). To mimic sound waves during the game, the bat will say "bat," to which each moth must respond "moth." The bat hones in on its prey by listening to the responses, reaching out with his or her arms like wings to try to tag the moths. Meanwhile, moths are trying to avoid being "eaten," so they move around with their arms out like antennae. To avoid collisions, bats and moths can duck and move around in other ways. If a bat or moth reaches the edge of the circle, this is the "edge of night" — the person on the edge should whisper "edge of night" and gently redirect them to the center of the circle.

Caution: For safety, remind the youth participants that they must stay at a walking pace (no running) and must have hands out in front of them at all times to further help avoid collisions.

The bat should make a statement like "Gotcha!" when he or she catches a moth so the moth knows it has been eaten by the bat rather than just colliding with another moth. If a moth runs into the bat accidentally but escapes before the bat can grab him or her, the moth can continue to fly around. When caught (tagged), a moth should remove his or her blindfold and join the circle. Continue the game until all moths are caught.

If the group isn't too large, play several rounds until each person has had a chance to be a bat or moth. With a larger group, two bats can hunt at the same time. You can encourage them to hunt together, but

it's recommended to have one tall bat and one shorter bat so they won't bang heads if they bump into each other.

Option #2: Select a different predator and prey (e.g., fox and mouse) from your local area. Still blindfolded and in a similar circle, give each prey animal a small bell that jingles as it moves around. The predators chase the prey by sound. (Make sure your prey do not try to mute the bell.) In this scenario, prey won't hear the predator coming — a credible way to reenact hunting in the wild.

Discussion Questions

What did you learn about how the bat hunts for its food — the moth?

Answer(s): *They depend on being able to use sound waves ("echolocation") to sense how far away the moth is and in what direction the moth is moving. Bats can even tell how big the prey is based on the size of the sound wave that bounces back.*

What did you learn about how the fox hunts for its food — the mouse?

Answer(s): *They depend on being able to hear the mouse as it is moving below and above ground.*

Estimated Time

About 20 to 30 minutes, depending on the size of the group and number of rounds.

Ages

Recommended for 5 to 8. Use the wildlife activity in the *IWLA Young Ikes Activity Book — Ages: 5 to 8* for this age group. It is better suited as a simplistic introduction to predator-prey relationship for young children.

Ages 9 to 11, no adjustments needed. Older youth may be more focused and should enjoy this activity.

Credits

Adapted from *Sharing Nature with Children* by Joseph Bharat Cornell, Ananda Publications, 1979.

Related Sources

IWLA Young Ikes Activity Book — Ages: 5 to 8, by the Izaak Walton League of America, 2011. Page 6 – Wildlife.

CATEGORY: WILDLIFE

SCAVENGER HUNT

Learning Objectives

To help children become careful observers of wildlife and nature.

Materials

Lists of items to be searched for in the scavenger hunt, pencils, note cards or scraps of paper with clip boards.

Activity Description

Scavenger hunts are a good way for kids to focus their attention and become careful observers of wildlife and nature while having fun. Divide the kids into groups of 2 to 4 and give them a list of things to find outdoors. Check to ensure they could reasonably find the things on your list.

Caution: Do not allow children to get too close to wild animals and stinging insects. Encourage them to respect nature by not harming or disturbing the things they find.

Depending on the resources on your property, you can include insects and invertebrates with the wildlife theme hunt.

Animal Signs: Look for examples of

- Tracks of three different animals
- Five potential food sources and what animal might eat them
- Three signs of animals having eaten
- Homes or shelters of three animals
- Three animal sounds
- Feathers, bird and mammal skulls and other bones, dropped deer antlers, and shed snake skins

Insects and Invertebrates: Look for examples of

- A flying insect
- A butterfly or moth
- A grasshopper or cricket
- An insect found under a log
- A wasp or bee's nest

- Two kinds of ants
- A fly
- A spider's web (bonus if there is a spider on it!)
- A worm
- A mosquito
- An invertebrate that is not an insect (such as a spider, millipede, or mite)

Depending on the resources on your property and the interests of the participants, you can choose other themes, such as trees and other plants, and expand the search to gather leaves and flowers.

Leaves: Look for examples of

- A leaf with smooth edges
- A leaf with edges with small teeth
- A leaf with big teeth or lobes
- A red leaf, a yellow leaf, etc.
- A soft leaf
- A fuzzy leaf
- A leaf as wide as your foot
- A leaf as long as your little finger
- A leaf so small you can cover it with your thumb
- A leaf eaten by something

Flowers: Look for examples of

- A flower with petals bigger than your pinky fingernail
- A flower with three petals
- A flower with more than three petals
- A plant with many flowers on one stalk
- A plant with only one flower on one stalk
- A white flower, a yellow flower, etc.
- A flower that smells sweet
- A flower that has no scent
- A flower with easy-to-see stamens and pistils (this may need some explanation for younger children)
- A flower with a bee on it
- A flower with another type of insect on it

You can combine features from all of these lists to fit your particular location or do different scavenger hunts on different days — each with a different focus. Rather than picking and collecting such items as flowers and live insects, ask the kids to draw pictures of what they found (you will need to provide pencils and note cards) and to be prepared to show the adults where they found them. With older children, you can have them take photos of each item with a phone or digital camera.

Before they head out, set the boundaries and give them a timeline (15 to 30 minutes works well, and you can give them more time if they are really engaged). As groups come back, ask them to talk about what they found.

Discussion Questions

Questions you could ask after the scavenger hunt include:

What were your favorite finds?

What surprises did you see?

What was the most beautiful thing you found?

Where did you find this (*specify*) colored item?

Which things were common and which were rare?

> Answer(s): *Will vary depending on the scavenger hunt items and the preferences of the scavenger hunters.*

Estimated Time

30 to 45 minutes.

Ages

Recommended for 5 to 8.

For ages 9 to 11, no changes are necessary to this activity. You can adjust the scavenger hunt list and the organization of the hunts depending on the ages of participants, their reading abilities, and their general knowledge of nature.

Credits

Lists adapted from *Hands-On Nature: Information and Activities for Exploring the Environment with Children*, edited by Jenepher Lingelbach, Vermont Institute of Natural Science, 1986.

Related Sources

Insects: A Guide to Familiar American Insects (A Golden Guide), by Clarence Cottom and Herbert S. Zim, St. Martins Press, 2001.

Peterson Field Guide to Animal Tracks, by Olaus Murie and Mark Elbroch, Houghton Mifflin Harcourt, Third Edition, 2005.

Trees (A Golden Guide), by Alexander Martin and Herbert Zim, St. Martin's Press, 2001.

CATEGORY: WILDLIFE

ADDITIONAL LEARNING OBJECTIVES

These additional "wildlife" learning objectives may be helpful to chapter youth leaders who want to add activities and prepare lessons of their own. Consider teaching the following:

- Each animal is specifically adapted to a particular habitat — a home that provides food, water, and shelter the animal needs to survive and thrive. Discuss native animals and their particular habitats.
- Different habitats and locations in the United States support different kinds of wildlife.
- Animals play essential roles in nature. They provide food for each other, recycle nutrients in the soil, pollinate flowers, and disperse seeds.
- Animals are also connected to each other through a huge range of symbiotic relationships in which they provide food for each other.
- People enjoy wildlife in many ways — hunting, fishing, wildlife watching, bird feeding, and photography are some examples.
- Some wild animals in North America are in danger of becoming extinct. Causes include habitat loss and competition with species introduced from other places (called non-native species).
- Many people are working to protect North America's wildlife through measures including habitat protection and restoration, controlled hunting, and removal of non-native invasive plants and animals.
- Once habitat like a wetland is destroyed, the services it provided to wildlife cannot be replaced. For example, studies show that even 100 years after a new wetland is created, it is of very limited use to wildlife (few live there).
- Hunting helps keep wildlife populations in balance in areas where prey and predator relationships have been disrupted. For example, white-tailed deer were almost extinct 100 years ago and now, thanks to conservation efforts, populations are booming. In many areas of the country, humans are the only predators for these animals.
- With no predators to keep their numbers in check, invasive plants destroy food and shelter needed by native wildlife. Most native animals have not adapted to be able to use invasive plants.

CATEGORY: WILDLIFE

ADDITIONAL PROJECTS AND ACTIVITIES

These additional projects and activities are related to "wildlife" and may be helpful to chapter youth leaders who want the youth to further participate in chapter-hosted projects or activities.

Consider using these resources found on the Izaak Walton League Young Ikes Web page: *www.iwla.org/youngikes*

- **Animal Connect-the-Dots (ages 5 and younger):** Count your way to an animal that was almost extinct 100 years ago.
- **Wildlife Coloring Page (ages 5 and younger):** Find out what three things all wild animals need to survive.
- **Predator Connect-the-Dots (ages 5 to 8):** Every wild animal, either predator or prey, has its place in the food chain.
- **Matching Game (ages 9 to 11):** Match the animal names to signs commonly found in nature — and learn what to look for on your next walk in the woods.

Consider these activities found in the *IWLA Chapter Manual* under Unit IV, Sample Conservation Projects:

- **Wildlife Habitat Improvement:** Restore a native wildlife species population by improving habitat conditions and managing the diversity of wildlife on the property. This project may be carried out by planting fruit- and nut-bearing trees and shrubs, native grasses, wild grains, and forbs; employing beneficial land practices; enhancing riparian buffers; and protecting wetlands. It can include the release of game bird species you have raised or native wildlife trapped and transferred by state fish and wildlife agency personnel.
- **Wildlife Propagation and Management:** The purpose of this project is to restore or introduce wildlife, particularly game bird species. The project involves raising and nurturing the birds, improving habitat conditions, and releasing the birds on property that you maintain. Habitat improvements range from making minor modifications to existing agricultural practices to undertaking extensive clearing and planting of native grasses, wild grains, and fruit- and nut-bearing trees and shrubs.

Consider these activities found in the *IWLA Chapter Manual* under Unit V, Sample Outdoor Recreation and Activities:

- **Hunter Education Course:** Many states require first-time hunters to take a hunter education or safety course before purchasing a hunting license. These courses teach hunting techniques, firearm and hunter safety, survival, first aid, and ethical behavior.

- **Wildlife and Bird Watching Tour:** Tours can be conducted on chapter grounds, other private property, or area parklands. This activity provides an opportunity to observe and study wildlife in a natural setting. Bird watching often involves studying bird songs and calls as well, since many species are more readily identified by ear than by eye.
- **Youth Hunt:** In a highly controlled environment, some chapters host fun, hands-on events to introduce novices or youth to hunting. A popular form of outdoor recreation, hunting is regulated by state and federal fish and wildlife agencies as a component of modern wildlife management.

Consider these resources found on the Izaak Walton League Youth Programs Web page (subject to change): *www.iwla.org/youthprograms*

Ages 5 to 8 (Kindergarten to 3rd Grade)

- **How To: Build a Bee House:** Honey bees may be getting all the press, but they're not the only pollinators in town. The United States is home to almost 4,000 native bee species (honey bees are non-natives brought here from Europe). One way you can help protect pollinators is to build a home for them. (Izaak Walton League)
- **How To: Build a Bird Feeder with Recycled Materials:** Bird feeders — and bird watching — are a great way to involve youth in wildlife conservation. Using an old milk carton or juice bottle for construction offers additional eco-benefits. (Izaak Walton League)

Ages 9 to 11 (4th to 6th Grades)

- **Bee Pollen Popular:** This workbook educates students about different types of pollinators — from bats to bees — and their importance to our environment. (U.S. Department of Agriculture)
- **How To: Plan a Pollinator Garden:** From planting cover and food plots to cleaning up water resources, Ikes are working to restore native habitat for game and non-game species alike. One important group that may not be on your list: Pollinators. (Izaak Walton League)

Ages 12 to 17 (7th to 12th Grades)

- **How To: Build a Bat Box:** More than half the bat species in the United States are declining or already listed as endangered, mostly because of habitat loss. Not only do bats help control insect populations (a single bat can eat up to 2,000 mosquitoes in one night), they also pollinate plants and disperse seeds. To help compensate for habitat loss, you can build a "bat box." (Izaak Walton League)
- **How To: Build a Wood Duck Box:** Most waterfowl nest on the ground, but wood ducks prefer depositing their eggs in the holes of mature trees, which means the ducks lose their nesting sites whenever forests are cleared. America's wood duck population has dropped significantly over the last century. Fortunately, wood ducks readily adapt to nest boxes. (Izaak Walton League)