Color Cards

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
8–11

GOAL
To encourage participants to observe the range of colors in the natural environment

SETTING
Outside in a forested, grassy, natural area

MATERIALS
- Color cards (you can use colored index cards, plain white cards that have been painted different colors, or sample paint cards from a hardware store)
- Colored toothpicks, string, or pipe cleaners (for variation 4)

TIME
5–15 minutes

INSTRUCTIONS
- Distribute one color card to each participant or team.
- Ask them to find something that matches the color as closely as possible.
- Share the findings.

VARIATIONS
Variation 1: Hide the cards, but leave half of each card showing. Have the participants hunt for the cards.

Variation 2: Use only green or only brown cards from the paint store with variations in hues and shades. This requires a finer ability to distinguish the differences and makes participants aware of the many different greens or browns to be found in nature.

Variation 3: Use to the cards to make a large color wheel. Have the participants go out and find objects that match the colors, then return and place them on the color wheel.

Variation 4: Use colored toothpicks, colored string, or pipe cleaners instead of the cards. Hide them around the area and have participants find as many as possible in an allotted time.

WRAP-UP
These activities can lead to a discussion of pigmentation, camouflage, and adaptation.

Source: Miller, Lenore Hendler. 1986. The Nature Specialist. *Martinsville, IN: American Camping Association.*

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Web of Life

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
8–14

GOAL
To encourage participants to understand the interconnected relationships between living and nonliving things, as well as between humans and nature

SETTING
Indoors or out

MATERIALS
A roll of string or yarn

TIME
20 minutes

INSTRUCTIONS
Gather the participants in a circle. Read to them the description of the "Interrelationships" concept from the Key Concepts. Ask them to name a plant or animal they have found signs of in the area. Give the end of the string to the first person who answers, and ask him or her to hold on to it.

Building on the first answer, ask the participants, "Who eats that [plant]?" or "What does that [animal] eat?" Unroll the string and hand a section to the next person who answers, so the string reaches from the first person to the next. Continue asking questions about how each plant, animal, or nonliving thing affects others and unrolling the string to connect each thing answered. For example, "What does the plant need to grow?" "What animal depends on that animal for food?" "Can anyone name a plant that a [animal] might eat?"

Be sure to include nonliving resources such as water, soil, sunlight, and rocks. Eventually the group will have woven a web of life made up of their community's animals, plants, and resources.

Next, use the web to show how all living and nonliving things are connected to each other. First, ask the participants to gently pull on their sections of string. This illustrates how each thing represented by the group is linked to the others.

Next, discuss how human interaction with the natural world affects the web of life. For example, surface runoff pollution might affect a community's water source. Instruct the participant who answered "water" to drop the string. Explore the importance of water's connections in the web by asking the participants which animal or plant relies heavily on water. If the answer is a fish, then the participant with the fish section of string drops that section. Whatever eats the fish is dropped next, and so on. This cycle would continue until all sections of string have been dropped. As the strings drop, explain how each member of the community relies on other members for food, shelter, water, and other life-sustaining resources.

These interconnected relationships can be understood in different ways at various age levels. You can use this activity to teach young participants about the food chain and habitats. For older kids, you can include more complex aspects of human interaction with the environment such as pesticide use, oil spills, and forest fires to get participants thinking about human impact on the web of life.

VARIATION
This activity can be used to conclude a pond or stream study, using the actual plants and animals the group discovered. Once you've created the web, ask questions like, "What would happen if more fertilizer from farmer's fields flowed into the water?" (The plants would grow uncontrollably, so those who named plants at the beginning of the activity give a tug on their string to see who else is affected.) "What if

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Web of Life

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

the farmer used a lot of pesticide to kill insects?" (Those who are insects or larvae drop their strings, anyone who feeds off of them drops his or her string, and so on.) Ask participants what they think makes the strongest web. Once participants conclude it's the one with the most connections, explain that the activity illustrates the value of diversity.

Source: Cornell, Joseph. 1998. Sharing Nature with Children, 2nd ed. *Nevada City, CA: DAWN Publications.*

YMCA of the USA

Squirrel Scramble

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
8–14

GOAL
To help participants understand how a behavioral adaptation (storing food in caches) helps squirrels survive long winters and simultaneously encourages the growth of new trees

SETTING
Outdoors in any wooded area

MATERIALS
One bag of plastic poker chips

TIME
20–30 minutes

ABOUT THIS ACTIVITY
This activity illustrates a behavioral adaptation that squirrels have developed to survive long winters: caching food. Because this activity is lively and competitive, most participants will join in enthusiastically.

BACKGROUND
Squirrels spend a good deal of their time every fall hiding nuts and seeds in caches, which they dig up during the winter and early spring when food is scarcer. It is estimated that squirrels will forget where they hide 60 percent of this food, so caching behavior also helps trees disperse their seeds.

INSTRUCTIONS
Explain to participants that they will be playing the role of squirrels in this game…but not just any squirrels, oh no! They will be playing the part of *Vegas* squirrels, which feed exclusively on a diet of poker chips. The participants' goal is to cache as much food as possible for the coming winter, but there are a few rules they must follow:

- The squirrels may put all of their chips in one cache or several caches, but they may carry only one chip at a time.
- Opposable thumbs are a structural adaptation that squirrels *do not* possess, so participants cannot use their thumbs when picking up food.
- Participants can steal chips from one another's caches, but they can only steal one chip at a time. If the cache's owner sees them take the chip, the thief must put the chip back.

Monitor the participants as they play and make sure they are all following the rules. If participants are caught breaking any rules, they have to serve some hard time in "squirrel jail." When squirrels are in jail, they stand to the side and cannot collect any chips until you let them back into the game.

Once everyone understands all the rules, gather the participants around you. Yell "Jackpot!" and throw all of the chips into the air.

When all of the available chips are gone, call an end to the game and have the participants bring all of their chips back to the middle.

After the first round, take a moment to recognize the most successful squirrels and ask them to share the secrets of their success. If you choose (and if participants are having fun), play additional rounds.

VARIATION
With successive rounds, vary the amount of food you put into play. For instance, before the second round, tell participants there was a drought and throw only half of the poker chips into play. This can lead you to a discussion of population dynamics and how the available food supply affects the squirrel population.

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Squirrel Scramble

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

WRAP-UP

Ask the participants to count their chips and then place them in the bag.

- Who got the most chips?
- How did he or she do it?
- What strategies did the participant employ?
- Did anyone modify his or her approach in later rounds?
- Where did everyone position their caches?

Encourage participants to compare their strategies with ones that actual squirrels might use. End with a discussion of caching behavior and how it can be advantageous to other species (such as nut-bearing trees).

Source: Submitted by Frost Valley YMCA. Adapted with permission.

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Micro Hikes

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
9–11

GOAL
To encourage participants to discover the small world of insects and focus on the variety of plants in a specific area

SETTING
Outside in a forested area

MATERIALS
- String for each group
- Toothpicks
- Hand lenses

TIME
20 minutes

INSTRUCTIONS
Talk with participants about the smallness of insects, spiders, and worms. Encourage participants to imagine how different the world must seem to such tiny creatures.

Stretch each group's string along the ground and distribute hand lenses and toothpicks among the participants.

Have participants gain an ant's-eye-view of the world by crawling slowly along the strings with their lenses close to the ground. Tell participants to keep their heads no higher than one foot from the ground.

Encourage participants to be thorough, slow, and methodical.

Participants can mark any interesting discoveries with their toothpicks . When each group has completed their micro-nature trail, have everyone gather around members of one group while they act as tour guides for their nature trail. Repeat with each group. Keep track of the items marked with toothpicks. Which items were most common? Which was the rarest?

VARIATIONS
Variation 1: Have participants make their strings into a circle. Then lead participants to discover, with and without the lens, the wide variety of plants and animals to be found within the circle. Have participants count the number of each type of plant or animal. Classify finds into living vs. nonliving, plant vs. animal, living vs. dead, natural vs. man-made.

Variation 2: Have participants find an area where an ant could have an amusement park. What natural features would be the rides or interesting spots for the ant?

WRAP-UP
To get a discussion going, ask participants the following questions:
- What kind of world are you traveling in when you're an ant?
- Who are your nearest neighbors? Are they friendly? Do they work hard?
- What is this spider going to do—eat you or take you for a ride?
- What would it be like to be that metallic green beetle? How does she spend her day?

Sources: Cornell, Joseph. 1998. Sharing Nature with Children, 2nd ed. *Nevada City, CA: DAWN Publications. Miller, Lenore Hendler. 1986*. The Nature Specialist. *Martinsville, IN: American Camp Association.*

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Biodiversity Survey

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
Any. Adjust complexity to age.

GOAL
To demonstrate how human intervention in nature affects the diversity of plant species

SETTING
Three or four different areas where plants grow, such as a lawn, a wooded area, and an open field

MATERIALS
- 30' of rope or clothesline
- Plant identification reference book (optional)

TIME
45 minutes

BACKGROUND
Biodiversity, the variety and number of organisms in a place, is critical for the survival of all living things. Unfortunately, when we humans bend natural areas to our liking, we tend to limit the number of other organisms who can share space with us. We use pesticides to eliminate insects from fields and gardens, we kill snakes, coyotes, and other animals simply because we fear or dislike them, and we cut down trees in order to build parking lots and roads. To build a healthy, diversified ecosystem and let nature balance itself through its own processes, we need to leave areas wild. The plant life is the first step, because a variety of plants nourishes a variety of animals, and thus contributes to biodiversity.

INSTRUCTIONS
On the ground, lay out a 30' rope in a circle approximately 10' in diameter. Ask participants to count how many different plants are in the circle. They do not need to know the names of the plants for this activity, but they will learn more if a reference book is available to help them identify the plant species they find.

Ask participants to also look for signs of how people have affected the plant life inside the circle. Has the grass been cut with a lawnmower? Do they see trash or areas where heavy foot traffic has worn away the vegetation?

Move the rope circle to three or four different outdoor places, such as a park, a front lawn, and a wooded area, and repeat the counting activity. Make a chart to record the group's findings and observations.

WRAP-UP
After counting the plant species in the final location, gather the participants for discussion. Here are some questions to ask:

- Is there a relationship between how much impact humans have on an area and how many plant species exist in that area? Help participants draw conclusions from the data they gathered.

- Why is biodiversity important?

  Explain to participants that living things depend on one another and their environment, and that is why biodiversity is crucial to the survival of all life. The food chain, the Earth's water quality, and the amount of oxygen in the air are just a few examples of things that depend on a healthy balance of plants, animals, bacteria, and other forms of life.

- How would the absence of one species affect other life forms?

  To illustrate the importance of biodiversity, ask participants to imagine that wolves became extinct. Lead them to consider that the absence of wolves would cause the population of deer and

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Biodiversity Survey

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

other prey animals to increase. A larger number of deer would require more food, causing vegetation to become scarcer. This, in turn, would affect other animals that eat the same types of plants that deer eat.

Source: *Submitted by the YMCA of Metropolitan Dallas Collin County Adventure Camp. Adapted with permission.*

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Build a Pond

Interrelationships
Plants and animals live in communities that meet their special needs, and are connected through a "web of life"

AGES
8–14

GOAL
To encourage participants to think about all of the living and nonliving inhabitants of ponds

SETTING
Classroom, streamside, or pond

MATERIALS
- A large piece of paper, possibly chart paper or newsprint
- Different colored markers or crayons

TIME
20–30 minutes

ABOUT THIS ACTIVITY
This activity works best in combination with a pond study class. The Build a Pond drawing can also be used to process the end of the pond study class by asking participants to compare what they caught or observed in the pond to what they drew.

INSTRUCTIONS
Gather participants in a circle with all of the materials in the middle. You will be asking them questions that lead into drawing a pond and the objects and organisms that inhabit it.

Have one of the participants draw a big pond (usually a rounded shape shaded in blue or green). Ask all the participants what color pond water is. (There are no right or wrong answers.)

Get the participants thinking about what else is inside this pond. Ask questions such as, "What can you find at the bottom of a pond? Floating or swimming in the water? At the surface? Along the shore?" You may need to ask some questions that lead the participants in the direction of birds, insects, plants, and even rocks. One way to phrase these questions would be, "What other animals can you think of that live near or are seen using ponds?"

Have the participants draw each organism or object they mention. The goal is for participants to create a well-rounded picture drawn in several different colors by several different people. You also want to point out the often-overlooked elements of a pond like mud, leaves, rocks, and macroinvertebrates, which are small animals like crayfish and leeches that can be used as water quality indicators during a pond study class.

Source: Submitted by Ryan Daugherty of Frost Valley YMCA. Adapted with permission.

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Water Cycle Tag

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
8–13

GOAL
To show younger participants how the water cycle works and introduce the concept of water as a limited resource.

SETTING
Indoors or outdoors, in a relatively large, open area free of rocks, roots, and other tripping hazards

MATERIALS
Cones or other objects to mark out a playing field (optional)

TIME
30–40 minutes

ABOUT THIS ACTIVITY
Kids really like playing this game, and because it's very active, it's a great way for them to work off excess energy.

INSTRUCTIONS
Set up a playing field approximately 25'x 40'. Use surrounding objects (trees, posts, signs, rocks) or items you have with you (water bottles, backpacks) to mark the four corners. Ask participants to line up along the short edge of the playing field.

Explain that in this game, most of the participants will play the role of molecules of water that are flowing across the pond (the playing field). Before they can begin, though, you need a volunteer… and not just any volunteer. This has to be a participant who really got out on the right side of bed this morning, someone who exudes happiness and cheer. Hands will go shooting skyward.

This cheery volunteer will be playing the role of a ray of sunshine. This person's goal is to tag water molecules as they try to cross the pond. If the water molecules reach the boundary at either edge of the pond (the short sides of your playing field), they are safe. But what happens when a water molecule gets "tagged" by a ray of sunshine? The participants should answer this for you: "It evaporates!" That's right. It turns into water vapor and floats into the air.

Any tagged water molecule has to go condense in the cloud (an area to the side of the playing field, marked by a tree or cone or towel). The cloud can only hold a maximum of three players. What happens when the cloud gets full of water? "Rain!" the kids will say. Right—or snow or sleet or even hail.

If there are four participants in the cloud, the one that was tagged earliest gets to precipitate back into the game. You may need to guard the cloud to discourage anyone from breaking the rules of the activity.

Start each round by saying "Ready, set, SUNRISE!" The participants cross to the other side of the field, and then they wait for the next round—they don't simply dash madly back and forth.

VARIATION
Before you start a round, talk about places on Earth where water does not readily evaporate. For example, many people get their drinking water from underground reservoirs. How do they get it? Wells! Create groundwater reservoirs (lay hula hoops on the playing field) in your game where participants are safe from being tagged.

YMCA of the USA

Water Cycle Tag

Cycles
The building materials of life (air, water, soil) are used over and over again

WRAP-UP
After you're finished (the participants should be pretty tired at this point and ready for a break), ask the participants if this game accurately reflects the real world. Follow up by asking how many water molecules permanently left the game. The answer is none, and this aspect of the game *does* accurately reflect the natural world.

Take a poll. How many participants think there is more water on Earth and in its atmosphere now than there was one million years ago? Less? The same amount? The third answer is the most accurate. This is because water continually circulates through three processes: evaporation, condensation, and precipitation.

The water cycle has been working for billions of years, constantly cleaning and redistributing water around the planet. But there are ways we can damage the cycle. How? (Help participants come up with answers similar to these):

- Air pollution can poison the rain (acid rain)
- Groundwater can be polluted with chemicals like oil or pesticides
- Erosion can fill streams and lakes with sediment

Source: *Submitted by YMCA Camp Campbell Gard. Adapted with permission.*

YMCA of the USA

Tide Demo

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
9–12

GOAL
To demonstrate the concept of tides on Earth and help participants understand why they occur

SETTING
Anywhere

MATERIALS
One hula hoop

TIME
15 minutes

BACKGROUND
What is a tide? Why do tides occur? The cause of the tides is the gravitational pull of the moon acting on the surface of the earth, which is 70% water. The gravity pulls the water into a bulge toward the moon, creating a high tide. At the same time, the earth's centrifugal force causes another high tide bulge on the opposite side. The areas in between the bulges experience low tides. The earth rotates beneath these bulges of water, causing cyclical patterns of high and low tides.

INSTRUCTIONS
Ask for four volunteers. The first will play the role of Earth, the second will symbolize the moon, and the remaining two will illustrate the moon's gravitational pull on the Earth and Earth's centrifugal force.

Place a hula hoop around the first participant's waist to symbolize the water on Earth.

Tell the group that the first participant's nose represents a nearby body of water. Try to pick a specific ocean or lake that the participants will recognize. Have Earth face the second participant (who represents the moon) and stand about ten feet away. Ask the remaining two participants to stand on either side of Earth—one of them should be between Earth and the moon, and the other should stand behind Earth. To demonstrate how the moon's gravitational pull and the Earth's centrifugal force affect the water on Earth, ask these two participants to stretch the hula hoop so that it forms an oval with bulges at the front and back.

Explain that since the front bulge of the hula hoop aligns with the first participant's nose, the group should imagine the body of water you mentioned earlier is experiencing a high tide.

Ask Earth to turn ninety degrees, explaining that it takes the planet six hours to rotate to this point. Now the body of water is in a low tide. Now ask Earth to turn another ninety degrees. Tell the group that another six hours have passed, and the body of water is experiencing high tide again.

As Earth continues to turn round and round within the oval hula hoop, point out to the group how the body of water passes through high and low tides every six hours.

Source: *Submitted by Camp Seymour. Adapted with permission.*

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Who's Rotting this Log?

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
8–11

GOAL
To show participants how a fallen tree becomes soil and what roles different creatures play in this decomposition

SETTING
In the woods (or you can bring a log indoors)

MATERIALS
- Rotten log(s) or stump(s)
- Paper
- Pencils
- Hand lens magnifiers or magnifying glasses
- Optional: Flag pins to mark discoveries

TIME
30 minutes

BACKGROUND:
Where do plants get their energy? From the sun. Right! What happens to fallen leaves in the autumn? They decompose. Decompose is a fancy name for "rot." But leaves don't do it on their own—many types of organisms do the "break down" work that turns the dead leaf into soil. What happens when the whole tree dies? Same thing. So let's be scientists and see if we can identify the decomposers that are at work on a rotten log.

INSTRUCTIONS:
Read to the group the description of the "Cycles" concept from the Key Concepts. Then, in groups of 2 to 4, have participants examine the log with hand lenses for different organisms. The kids should keep a list of what they find on or under the log (and mark with a flag pin, if available).

Guide them with these questions:
- Have you found anything with legs? What color are they?
- Have you found any holes? Do you know who made those holes?
- Have you found anything that is green?
- With roots?
- Have you found anything that's growing that isn't green? What could it be?
- What's the tiniest thing you've found?

WRAP-UP:
Discuss their findings. Have them guess how the different decomposers (algae, fungi, mosses, insects, rodents, etc.) found the log, and what will happen to them when the log has completely broken down into dirt. What would happen if the decomposers were all destroyed by chemicals? If all logs were burned for firewood and not allowed to decompose?

Ask them to guess how long it takes to decompose an entire tree into soil. A long time! That's why it is so important to take care of our soils. If we let them erode into streams and rivers, it takes years and years to rebuild. Ask participants to think about what they could do at home to prevent soil erosion and to encourage decomposition to create new and better soil (composting, etc.).

A ROTTEN JOKE!
"What was Beethoven doing when they dug up his grave?"

Decomposing!

Sources: This activity submitted by YMCA Camp Cosby, Alpine AL. Variations can be found in Sharing Nature with Children, 2nd ed.*, by Joseph Cornell, DAWN Publications, Nevada City, CA, 1998; and* The Nature Specialist *by Lenore Hendler Miller, American Camp Association, Martinsville, IN, 1986.*

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Apple Evolution

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
8–12

GOAL
To help participants understand the cycle of an apple tree's developmental stages

SETTING
Indoors or outdoors

MATERIALS
None

TIME
20–30 minutes

BACKGROUND
If an apple seed were to fall beneath its parent tree, the seed would have difficulty growing. Much of what the seed would need to grow—space and sunlight—would be taken by the adult tree. Therefore, seeds need to be dispersed from their "parents" in order to grow.

Some plants, such as milkweed, have lightweight seeds with feathery hairs to help carry them in the wind. Plants from the pea family use an explosive method, dispersing their seeds by ejecting them from peapods. Plants growing near moving water may drop their seeds into the current, which carries the seeds to new locales. Other plants, like the burdock, have seeds with small hooks that allow them to "hitchhike" on the fur of passing animals, far away from the parent plant. Animals also help disperse seeds by eating fruit and depositing the seeds in natural fertilizer away from the parent plant.

Apples have evolved in such a way that the species will continue to propagate. The skin of the apple functions like human skin—it keeps everything together while protecting the sensitive inside from bacteria and other harmful elements. The skin's color attracts animals that will help with future seed dispersal, and the fleshy, juicy middle makes for a tasty treat animals can eat. More important, because fresh apples are 84 percent water, the "fruity" part of the apples helps protect the seeds from drying out (desiccation).

INSTRUCTIONS
Have a discussion with participants about the parts of an apple and their functions (skin, flesh, and seeds). Be sure to go over the main methods of seed dispersal (wind, explosive, water, hitchhiker, and animal food). Ask participants why seed dispersal is necessary for the species to thrive.

Make sure participants understand that the main purpose of a seed is to produce more seeds, thus continuing the species.

Explain that the activity will demonstrate how an apple seed develops into a tree. The participants will progress from one stage of an apple tree's life to the next by playing rounds of the tried-and-true game of rock, paper, scissors.

Remind participants how to play: Two partners shake their fists with each word as they say, "Rock, paper, scissors…." Then each chooses a hand motion that symbolizes a rock, a piece of paper, or a pair of scissors. ("Rock" is a fist, "paper" is a flat hand, and "scissors" are formed by holding the index and middle fingers open in the shape of a pair of scissors.) The partners determine who wins a round by knowing that rocks break scissors, scissors cut paper, and paper covers rocks.

YMCA of the USA

Apple Evolution

Cycles
The building materials of life (air, water, soil) are used over and over again

Demonstrate each of the following motions with a student volunteer:

- Seeds: Tell participants they all start as seeds. As seeds, they crouch down low and use their arms to form a seed shape over their heads.
- Trees: Remind participants that over time, and with ample resources, seeds grow up into trees. Trees stand up straight with their arms out, symbolizing branches.
- Flowers: In late spring, apple trees will develop flowers. Flowers help with pollination, which is the process of fertilization that produces seeds. Keep in mind that apple trees cannot pollinate themselves. In fact, orchards plant a few different varieties to act as pollen sources. Participants act as flowers by cupping their cheeks with their hands, as if their faces are the center of the flowers and their hands are the petals.
- Apples: Healthy apple trees will begin bearing fruit after five years. To represent an apple, participants stand with their arms making a circle in front of their bellies with fingers interlocked.
-

Once you have explained the apple motion, ask the participants what they think the next stage is. They will probably scream "SEED!" which is absolutely correct. Ask them how they knew it would be the next stage.

The participants' goal is to develop through all the stages of an apple tree's life cycle. The way to develop from one stage to the next is to meet another participant who is in the same life stage and duel it out with a game of rock, paper, scissors. The winner of each round moves on to the next stage in an apple tree's life cycle. Participants who don't win a round remain at the same stage until they are successful at a round of rock, paper, scissors.

Start a new round by having participants arrange themselves as little seeds again… and let them grow!

WRAP-UP

Ask participants to rehash the different stages and remember the purpose of each one. (For example, ask, "What was the first stage? Why is it important?") Review why seeds need to be dispersed.

Ask who finished as an apple, a flower, a tree, or a seed. Be sure to applaud every stage—there are no winners or losers in this activity.

Source: Submitted by Frost Valley YMCA. Adapted with permission.

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Water Cycle Sprint

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
9–12

GOAL
To learn the concepts and terms of the water cycle

SETTING
Field, gym, or other open space

MATERIALS
Four orange cones or two ropes for marking two lines

TIME
10–30 minutes

ABOUT THIS ACTIVITY
This is an *I CARE* version of the game known as "Ship to Shore" or "Captain's Coming."

INSTRUCTIONS
- Ask participants to line up down the middle of the open space. Designate one direction to be the "sky" and the other to be the "ground." Mark each direction by laying down a rope or placing two cones about 20 feet apart, parallel to the line of participants.
- When you yell, "Evaporation!" everyone runs toward the "sky" line; when you yell, "Precipitation!" everyone moves toward the "ground" line.
- Anyone who moves in the wrong direction sits down.
- You could add some drama by shooting a squirt gun in the air when you say "Precipitation," or fool them with lines like "Perspiration!" or "Invitation!"

VARIATIONS
Once you've established the basics, add various weather/water cycle related twists:
- Snowflakes: Participants move into groups of five and spin in a circle
- Condensation: Two participants stand back to back, one with arms in the air like a blade of grass and the other making the shape of a dew drop
- Cumulus Clouds: Participants pretend to float around in groups of three
- Hurricane: Participants act like trees blowing in the wind

Source: Submitted by Susan Dickerson of YMCA Camp Seymour. Adapted with permission.

YMCA of the USA

Rabbit and Fox Tag

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
9–14

GOAL
To demonstrate to participants the predator and prey cycle through a fun tag game

SETTING
Any space large enough to allow participants to run around

MATERIALS
None

TIME
At least 10 minutes, but you can play as long as you like

ABOUT THIS ACTIVITY
For this activity, you will need an even number of participants. If you have an odd number, consider asking one participant to assist you as the game progresses. You can play with a minimum of four, but this activity works best with a very large group.

INSTRUCTIONS
Begin by explaining the concepts of predator and prey animals. Ask the participants: What are some examples of predators? What are some examples of prey?

Invite everyone to get into pairs and spread out. Tell the partners to link arms and imagine that they are rabbits—their linked arms mean that they are safe in a "rabbit hole."

Choose one pair and ask the two participants to decide which one of them will become a fox and which one will stay a rabbit. (At this point in the game, there will be only one fox and one rabbit.) The fox will chase the rabbit, but the rabbit can escape the fox by linking arms with another rabbit to form another rabbit hole.

Only two rabbits can fit in a rabbit hole. When a running rabbit links arms with one of the rabbits in a rabbit hole, the rabbit on the other side gets bumped out of the hole and takes a turn running from the fox. If the fox catches a rabbit, that rabbit becomes a fox.

Because in the first round there is only one fox and one running rabbit, the round will end when the fox catches the rabbit. When you begin the second round, choose two pairs of participants in order to make two foxes and two running rabbits. Tell the participants who are safe in their rabbit holes to observe how quickly the rabbits are getting "eaten." Wait until all the running rabbits have become foxes, then declare an end to round two. With each round, increase the number of foxes and running rabbits. Tell the foxes they can chase any of the rabbits that aren't in holes.

Shout out a tally of the number of foxes and rabbits as the game progresses.

WRAP-UP
Discuss what the participants observed during the activity:
Was it harder to be a rabbit when there were multiple foxes?
Which rabbits survived longer, the ones that only had one fox chasing them or the ones that had many? Relate this to actual predator/prey relationships.

Source: Submitted by Frost Valley YMCA. Adapted with permission.

YMCA of the USA

Spitting Plants?

Cycles
The building materials of life (air, water, soil) are used over and over again

AGES
5–8

GOAL
To teach participants about the role of plants in the water cycle

SETTING
Outside in a yard or woods

MATERIALS
- Twist-ties or twine
- Clear recycled plastic bags (bread bags, grocery bags, etc.)

TIME
20 minutes with an interlude of at least 2 hours

ABOUT THIS ACTIVITY
This is a great experiment to do with young kids to spark their interest in plants and the environment.

INSTRUCTIONS
Start out by asking the kids if they believe that plants are constantly "spitting" water into the air. Most of them will say no, of course. Investigate along with participants, taking a walk and looking closely at the plants you see along the way. Ask if anyone sees water coming out of the plants. Once all of the kids see that there appears to be nothing coming out of any of the plants, discuss how the rain filters into the soil, the plants drink the water to grow, and then the plants release the water. Most of them will not believe you because they can't see the water coming out of the plants.

Give each participant a plastic bag and a twist tie. Ask everyone in the group to choose a plant and place the plastic bag over it, gently securing the closure with the twist tie. Remind participants to be careful not to harm the plants.

When all the participants have finished bagging their plants, lead them on to other activities. After a couple of hours have passed, let them return to the plants that they chose for the experiment. They will be astonished to see just how much water has appeared on the inside of their bags.

WRAP-UP
Ask participants what they think would have happened to the water if it had not been trapped in the bags. The answer is that it would have evaporated and floated up into the sky to become part of a cloud. When enough water gathers in a cloud, droplets of rain, snow, or hail form and fall to the earth again.

Explain that plants help to make the rain cleaner. If a plant "drinks" water with harmful chemicals in it, it can absorb some of these chemicals and release cleaner water through its leaves.

Source: *Submitted by Norwich Family YMCA. Adapted with permission.*

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Sound Inventory

Awareness
leads to Appreciation,
which leads to Action

AGES
9–14

GOAL
To help participants gain an understanding of how animals use their senses for protection

SETTING
Outdoors, at night

MATERIALS
None

TIME
10–20 minutes

ABOUT THIS ACTIVITY
This activity works well in conjunction with some sort of night or sensory awareness class.

BACKGROUND
Most people use their sense of vision more than any other sense. Think of the visual cues one picks up during the day—a sunny sky can evoke smiles, while a gray sky can make people feel dreary. As surroundings get darker, the body adjusts. Specific adaptations have developed to help animals survive in the dark, whether by detecting nearby food or nearby predators (to avoid becoming food themselves).

One way the human body adjusts to the dark is through the dilation of the pupils; when the pupil dilates, it allows more light to enter the eye. Another way the body adjusts is to become more aware of information coming from its other senses. Many people may not realize that senses other than vision may become slightly heightened with the onset of nighttime. For example, smells become more pronounced and noises—such as a distant stream—may sound louder. As the body loses some of its dependency on visual cues, it looks for additional information to help process its surroundings.

White-tailed deer have good eyesight. Because they are crepuscular (most active at dawn and dusk), their vision is not the only sense they depend on. In fact, most white-tailed deer have very keen hearing, as well as a great sense of smell. One of their defense mechanisms is to listen for any sounds that might be out of the ordinary—and a possible predator.

INSTRUCTIONS
Scope out a trail that will take you past a variety of locations—near water sources, through fields, along roads, or to any other place that will give participants different sounds to hear.

Before you begin, ask participants what changes happen to the human body as nighttime falls. The big one will be the change in vision. Talk about the five senses and ask which ones are being used more as the night gets darker. After a brief discussion, set the expectation that participants will need to focus a bit and keep their voices down for the activity to be successful. Participants will initially whisper and chat, so quietly discourage them from doing so.

Tell participants that during the upcoming walk they should inventory every sound they hear. Follow a path for approximately four minutes, taking them through a few different areas.
Find a flat area in which to stop. Ask the participants what sounds they heard. Once they have listed a couple of sounds, ask them if they heard any of these same sounds during the day. Were most of the sounds still there? Of course they were. Most humans tend to rely on their sense of sight rather than their other senses if they can see.

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Sound Inventory

Next, find out which participants have a pet cat or dog. Ask them what their pets do if there is a sudden loud noise. Someone will say their ears perk up. Bring up white-tailed deer—if the deer hear a noise, they stand perfectly still and perk up their ears. Demonstrate this. Then, ask the participants to cup their hands behind their ears so they make a funnel for sound waves. Lower your voice a bit and ask the group if anything sounds different. Many participants will say that your voice sounded louder. Tell them you actually *lowered* your voice.

WRAP-UP

Ask the participants why they think your voice sounded louder when they cupped their hands behind their ears. Explain to them that, by perking up their ears, mammals are pinpointing sound and funneling it into their ears more directly—horses and deer have ears on top of their heads for the same reason. Ask the participants why certain animals have this adaptation and humans do not.

Source: Submitted by Frost Valley YMCA. Adapted with permission.

Awareness
leads to Appreciation,
which leads to Action

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Sound Maps

Awareness
leads to Appreciation,
which leads to Action

AGES
5 +

GOAL
To show participants how to listen carefully to sounds around them and become more comfortable outdoors

SETTING
A forest or another natural area, like a meadow or the bank of a stream

MATERIALS
- Index cards
- Pencils

TIME
25 minutes

INSTRUCTIONS
Begin by showing participants a 4" x 6" index card with an X in the center. Tell participants the card is a map and that the X shows where they're sitting. When they hear a sound, they should make a mark that aptly describes the sound on the card. The mark's location should indicate as accurately as possible the direction and distance of the sound. The marks should be interpretive, not literal; participants don't have to draw pictures of plants and animals, just a few lines indicating wind, or a musical note indicating a songbird. In other words, they should spend little time drawing and most of the time listening.

Tell participants to keep their eyes closed while they listen. Explain that cupping their hands behind their ears provides a reflective surface for catching sounds, creating a shape like the sensitive ears of a fox or kangaroo. To hear sounds behind them, they don't need to turn their heads, but just cup their hands in front of their ears.

Select a site where participants are likely to hear a variety of sounds: meadows, streams, and forests are fine. It's important to have everyone find a special "listening place" quickly, so that some participants aren't walking around while others are already listening. Give participants one minute to find a spot and tell them to stay in the same spot until the end of the activity. Giving participants enough time to disperse fairly widely will ensure a diversity of sound maps and greater interest in sharing.

The length of the activity will depend on the participants' age and attention span, and on how well-supplied the environment is with sounds. A good basic guideline is 10 minutes for adults, 5–10 minutes for children. A good way to call the group back together is by imitating a natural sound or blowing a crow or duck call. As the participants reassemble, ask them to share their maps with a partner.

It's sometimes hard to find a site that's protected from the sounds of cars and machinery, but these noisy areas are ideal for teaching lessons about noise pollution. Have participants make two sound maps, the first one near a busy street and the second one in a quiet, natural spot. After the activity, ask them where they felt more comfortable. This is a fine way to build participants' conscious appreciation of natural areas.

WRAP-UP
After participants have drawn their maps and shared them, ask questions such as:
- How many different sounds did you hear?
- Which sounds did you like best? Why?
- Which sounds did you like least? Why?
- Which sounds had you never heard before? Do you know what made the sounds?

Source: Cornell, Joseph. 1989. Sharing Nature with Children II. *Nevada City, CA: DAWN Publications.*

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Nature Meditations

Awareness
leads to Appreciation,
which leads to Action

AGES
10–13

GOAL
To encourage participants to reflect quietly in nature

SETTING
Outdoors

MATERIALS
Nature Meditation cards

TIME
30 minutes

HOW TO MAKE NATURE MEDITATION CARDS
Select a number of nature quotations and write them on index cards. If you don't have enough different quotations for an entire group, give your most effective ones to more than one participant. Along with each quotation, write brief instructions on what you want the participants to do while they sit in a beautiful quiet spot in nature. Laminate, if desired, for future reuse.

Here are some examples:

"My heart is tuned to the quietness
that the stillness of nature inspires."
–H.I. Khan

Instructions to participant: Listen to the sounds around you. Listen also for the silences between sounds. When your mind wanders, repeat the above saying. It will help bring you back to the present moment.

"Creator, the trees and all nature
are witnesses of your thoughts and deeds."
–Winnebago Indians

Instructions to participant: Go for a walk, silently repeating this Winnebago prayer of reverence for the earth and its Creator. When an animal, plant, rock, or beautiful scene draws your attention, stop and silently offer thanks for the joy and beauty you feel.

These and other quotes can be found in the book *Listening to Nature* by Joseph Cornell and John Hendrickson.

INSTRUCTIONS
Turn the cards face down and have the participants choose their own cards. Tell them to feel as if the quote they chose was made especially for them.

Emphasize that this is a quiet activity.

Allow 10–15 minutes for reflection, and then call the group back to have everyone share their experiences.

VARIATION
Instead of writing one quotation on each index card, you can write several and allow participants to choose the one that speaks to them the most.

Sources: Cornell, Joseph. 1989. Sharing Nature with Children, II. *Nevada City, CA: DAWN Publications. Cornell, Joseph and John Hendrickson. 1995.* Listening to Nature: How to Deepen Your Awareness of Nature. *Nevada City, CA: DAWN Publications.*

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Bumbas and Alcans

Awareness
leads to Appreciation,
which leads to Action

AGES
10 +

GOAL
To illustrate the value of learning about the customs of other groups of people

SETTING
Anywhere

MATERIALS
Customs and attributes lists for each group
(See page 3)

TIME
1 hour

BACKGROUND
Differences between cultures are often hard to recognize, anticipate, or understand. Conflicts commonly arise when members of one culture misinterpret the actions of those who belong to another culture. An action that one culture sees as a way to pay respect may be an insult to another culture. Some cultures honor individuals with certain attributes or behaviors that another culture would discourage. It is important to increase our awareness of the customs and attributes of cultures that are not our own so that humans can cooperate and live together in peace.

INSTRUCTIONS
Divide participants into two groups, the "Alcans" and the "Bumbas." Ask the groups to separate and spread apart far enough to avoid overhearing each other.

Distribute the appropriate customs and attributes lists among the members of each group. Give each group ten minutes to acquaint itself with the items on its list. Tell participants it is forbidden to explain the rules of their own culture to visitors.

Choose one third of each group to "visit" the other culture for five minutes. The remaining members of each group must strictly follow their own customs as they receive the visitors.

When the visitors return home, ask them to report their observations of the others to their group.

If time permits, repeat until everyone has paid a visit.

Make sure to set aside time for discussion afterwards; it's the most important part of this activity.

WRAP-UP
Bring the two groups back together. Ask one group at a time to answer the following questions while the other group listens carefully and waits for its turn to respond. After both groups have discussed their experience, each group can explain its customs and attributes to the other group.

- Describe the people from the other culture. How were they different from you?
- What problems did people from your culture encounter when interacting with the other group?
- How did you solve these problems?
- How did you feel in the other culture?
- How did you respond to that culture?

Encourage participants to think about the following questions and share their responses with the group if they would like:

- Did you at any time abandon your culture's beliefs? Was it worth it?

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Bumbas and Alcans

Awareness
leads to Appreciation,
which leads to Action

- Have you ever visited another country? What differences have you found in the way people act? What did that culture have in common with your own?

Source: *Submitted by YMCA Camp Cosby. Adapted with permission.*

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Awareness
leads to Appreciation,
which leads to Action

Bumbas and Alcans

BUMBA CUSTOMS AND ATTRIBUTES

- People stand very close together.
- To greet another person, you touch each other's hands.
- While speaking with another person, you maintain continuous physical contact.
- To signal the end of a conversation, you lightly touch elbows and say "whoop, whoop."
- Your culture has very few rules.
- Your culture is very modest. You do not brag about your achievements or try to show off. You only respond to questions that others ask about your personal life, and then only in terms that downplay your accomplishments. You prefer to talk about the beauty of nature, music, and other pleasurable, noncompetitive topics.
- Your culture believes that short people are superior to tall people. You can only initiate a conversation with someone who is taller than you. At all times, you must show respect to those who are shorter. The shortest woman is in charge of your culture.
- When you walk by someone who is shorter than you, you must stop and touch your nose as a sign of respect.

ALCAN CUSTOMS AND ATTRIBUTES

- In your culture, people keep at least one foot of distance between themselves and another person at all times.
- To greet another person, you touch your noses.
- While speaking with another person, you look at his or her shoes.
- To signal the end of a conversation, you stamp on the floor next to the other person's foot.
- Your culture has very strict rules. If a rule is broken the person is asked to leave the culture.
- Men and women are equal in this culture.
- In your culture, it is very important to show off wealth, status, possessions, and achievements. You flaunt your athletic ability, your income level, your grades in classes, and other achievements. You do so loudly and insistently all the time.
- Your culture believes that tall people are superior to short people. You can only initiate a conversation with someone who is shorter than you. At all times, you must show respect to those who are taller.
- When you walk by someone who is taller than you, you must stop and say "whoop, whoop," as a sign of respect.

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What Do You Think?

Awareness
leads to Appreciation,
which leads to Action

AGES
All

GOAL
To teach participants basic concepts and general knowledge about reptiles and dispel many misconceptions and irrational fears surrounding them

SETTING
Anywhere

MATERIALS
- A whiteboard or chalkboard
- Something to write with

TIME
20–40 minutes

INSTRUCTIONS
Open by explaining to the participants that you will be discussing reptiles and hope to challenge the stereotype that they are scary, ugly, or mean animals.

Define *reptile*: A cold-blooded vertebrate that has an external covering of scales or plates and breaths by means of lungs.

On your whiteboard or chalkboard, write a list of statements a person might make about reptiles, including facts as well as misconceptions. (For ideas, see the examples following these instructions.)

Read each statement aloud. Have participants give a "thumbs-up" sign if they think it is true or a "thumbs-down" sign if they think it is false. Those who aren't sure can hold their thumbs sideways.

Tally the responses after each question and allow the participants to share why they answered true, false, or not sure.

After the students have shared their opinions, give them the most accurate answer or acknowledge the participant(s) who answered the questions correctly.

EXAMPLES
- *Reptiles are scary and creepy.*
  There is no right or wrong answer. You are just gauging the participants' points of view on the topic. *Note: You can ask this question at the end again to see if anyone's views changed.*

- *All turtles are slow.*
  False: Many turtles are slow. Some of the big tortoises, for example, walk at a pace of 1/8 of a mile per hour—compare that to the average speed of people, who walk about three miles per hour! A few turtles, however, can really move fast. For example, in one hour, green sea turtles can swim *twenty* miles.

- *Lizards and snakes are slimy.*
  False: Like all reptiles, snakes and lizards have dry skin. But many amphibians—salamanders and some frogs—are slimy. Their skin contains glands that produce mucus, which helps to keep the animals from drying out.

- *Most snakes are poisonous to people.*
  False: Less than 10 percent of all snakes have venom that is capable of harming people. More people die each year from bee stings than snake bites.

- *Some turtles can live for more than 100 years.*
  True: The oldest known turtle was thought to be at least 152 years old when it died—and the tortoise did not even die of old age! This captive tortoise might have lived a lot longer if it had not accidentally taken a fatal fall.

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Awareness
leads to Appreciation,
which leads to Action

What Do You Think?

- *Farmers should rid their barns of all snakes.*
  There is no right or wrong answer, but snakes and people can work together. Many farmers are glad when certain kinds of nonpoisonous snakes take up residence on their farms. The snakes eat rats and mice, which can gobble up a lot of the grain that the farmers have stored. Certain snakes may eat some chicken eggs and young, but the benefits of having nonvenomous snakes around the barnyard often outweigh the disadvantages.

- *Only a few reptiles and amphibians are endangered or threatened.*
  False: The U.S. Fish and Wildlife Service lists over 100 threatened or endangered species.

- *Reptiles are easy to care for. They make great pets for young children.*
  False: Most reptiles available for sale in the United States are wild-caught and imported from other countries. Experts estimate that 50 percent of the animals shipped to the United States die before or shortly after arriving here, and that 90 percent of those who survive and are sold die within their first year in captivity. This high death rate is primarily due to the fact that most people who buy and sell them do not know what their needs are or how to care for them properly, and most fail to seek out information on proper care. Reptiles are easy to care for only if you know what you are doing and what the animal needs.

- *It is easy to tell a venomous snake from a nonvenomous snake.*
  False: There are quite a few nonvenomous snakes that look exactly like a venomous snake. There are very small differences that can be hard to notice at first glance.

- *Snakes do NOT have bones.*
  False: All reptiles are vertebrates. Large boas, for example, may have 300–400 pairs of floating ribs.

WRAP-UP

Lead participants to consider what happens when people take action on information that may not be true. For example, ask what happens when governments make laws based on faulty information.

Source: *Submitted by Camp Seymour YMCA. Adapted with permission.*

YMCA i·C·A·R·E for the world we live in!

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Rockity Rock Rock

Awareness
leads to Appreciation,
which leads to Action

AGES
10–14

GOAL
To help participants remember the three methods of rock formation

SETTING
Any area that is large enough for participants to stand in a circle

MATERIALS
- Whiteboard or chalkboard (optional)
- Examples of each type of rock (optional)

TIME
20–30 minutes

BACKGROUND
There are three major classifications of rocks: metamorphic, igneous, and sedimentary. Metamorphic rocks form by having heat and pressure on them over a long period of time. Igneous rocks form from the lava of volcanoes or from magma, which is molten rock found deep underground. Sedimentary rocks form when layers of sediment stack onto each other.

INSTRUCTIONS
If you like, write the three rock types—metamorphic, igneous, and sedimentary—on a whiteboard or chalkboard and then explain how each type is formed. If you have examples of the rocks, pass them around for participants to look at as you talk.

Have participants get into a circle, and ask one person to stand in the center. That person is the "rocker." The rocker points to someone in the circle and calls out one of the types of rock or shouts, "Rockity Rock Rock!"

The participant the rocker pointed to and the participants on either side of that person are the three "responders," and they compete with each other to see who can do the following responses the fastest.

If the rocker calls:
- Metamorphic - The responder in the middle stands straight and tall while the two other responders press against his or her shoulders. Then all three responders say "heat and pressure" three times.
- Igneous - The responder in the middle puts his or her hands in the air and the two responders on either side make a volcano shape over the middle responder's head with their arms. Then they call out, "Magma makes it!"
- Sedimentary - The three responders stack their hands in layers and say, "sand and silt, layer by layer!"
- Rockity Rock Rock – All three responders compete to say the word "rock" first.

After each response, announce who finished first. That person moves into the center of the circle as the new rocker and another round begins. Repeat the game until everyone knows the three types of rock formation.

Source: Submitted by Frost Valley YMCA. Adapted with permission.

YMCA of the USA

Adjective Game

Awareness
leads to Appreciation,
which leads to Action

AGES
9–11

GOAL
To help participants focus on objects found in nature

SETTING
Anywhere

MATERIALS
- A handful of natural objects (examples include a pine cone, a deer antler, a piece of quartz, a mushroom, etc.)
- Paper and pens or pencils for each participant

TIME
15–20 minutes

INSTRUCTIONS
Gather participants into a circle and give everyone paper and something to write with. Pick up an object and use an adjective to describe it. Pass it to the next participant, who must repeat the last adjective and then think of another. The adjectives should all be different and should not be restricted to the visual—find inspiration in the object's smell or texture. When everyone in the circle has taken a turn, repeat the activity with another object.

Encourage the participants, as individuals or as a group, to incorporate the adjectives into a poem. They can jot down ideas as others call them out or work out lines for themselves on the paper you've given them. For those who are eager to share what they have written, try to set aside time for them to read their poems aloud. If the group collaborates on a poem, think about making copies for everyone to take home as a souvenir.

Source: Miller, Lenore Hendler. 1986. The Nature Specialist. *Martinsville, IN: American Camping Association.*

YMCA of the USA

Box Concentration

Awareness
leads to Appreciation,
which leads to Action

AGES
9–11

GOAL
To reinforce participants' knowledge of natural objects

SETTING
Anywhere

MATERIALS
- Empty box
- 10 natural objects (examples include a mushroom, piece of bark, seed, bird's nest, leaf, rock, etc.)

TIME
5–10 minutes

INSTRUCTIONS:
Show participants the items you have collected and go over anything that is unfamiliar to them. Explain where each object came from and share any facts or stories you know about it as you arrange the objects in the box.

Let participants concentrate on the items in the box for a moment.

Close the box and have participants draw pictures of or write the names of all the objects they can. After a few minutes, ask participants how many they were able to remember.

VARIATIONS:
Variation 1: Increase or decrease the number of objects, move them to different spots, or have participants go out and find similar objects to duplicate the arrangement in the box.

Variation 2: For an additional challenge, limit the amount of observation time participants get. For example, you might allow the participants only 15 seconds to observe the objects before you cover them.

Sources: Cornell, Joseph, 1998. Sharing Nature with Children, 2nd ed. *Nevada City, CA: DAWN Publications. Originally titled "Duplication." Miller, Lenore Hendler, 1986.* The Nature Specialist. *Martinsville, IN: American Camping Association.*

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Olfactory Inventory

Awareness
leads to Appreciation,
which leads to Action

AGES
9 +

GOAL
To experience how losing one sense heightens other senses

SETTING
Anywhere in the dusk or dark. The air should be dry.

MATERIALS
- Small airtight containers that conceal their contents
- At least three different scented substances, such as garlic, powdered chocolate, coffee, cherry drink mix, peppermint, lemon, mint, or cloves.

TIME
15 minutes

ABOUT THIS ACTIVITY
This activity is based on the idea that when people don't use one sense, their other senses become more perceptive. In dim light or darkness, the participants will encounter less distraction from their sense of sight and experience firsthand how their sense of smell becomes stronger.

INSTRUCTIONS
Fill at least three of your scent containers, each one with a different scent.

Know which container holds which scent, but do not write the name of the scent on the container. If all of your containers look the same, you might mark them with letters or numbers to distinguish them.

Gather the kids into a circle, and start by explaining that you will pass a scent container around the circle so everyone gets to smell it.

Tell the participants to guess about the identity of the scent, but make sure to emphasize that they should keep their answers to themselves until later.

After all the participants have taken a turn smelling each container, have them call out their guesses. Give the correct answer and then send the scent container around a second time if participants want to smell again.

Repeat the activity with each scent container.

WRAP-UP
After you have told them what all the scents truly were, lead the participants to talk about how aware they became of their sense of smell when they stopped using their sense of sight.

Sources: *Submitted by Frost Valley YMCA. Adapted with permission.*

YMCA of the USA

Camera Game

Awareness
leads to Appreciation,
which leads to Action

AGES
9 +

GOAL
To help participants notice the beauty of nature up close

SETTING
Outdoors

MATERIALS
- Index cards
- Pencils

TIME
10–15 minutes

INSTRUCTIONS
Give participants partners. One person will be the "camera," and one person the "guide." The guide leads the camera (eyes closed) to something beautiful or interesting to "take a picture" of. Remind the guides to look out for the safety of the cameras as they walk along. They should walk slowly and lead the cameras away from dangerous areas where they could trip or hit their heads. The guide can carefully position the camera's head so that when the camera opens their eyes they will be looking directly at the object.

When ready, the guide taps the camera on the right shoulder—this is the sign for the camera to open their eyes to look at what the guide has chosen. A tap on the left shoulder signals the camera to close their eyes again. Each camera can take about 6-10 photos for about 10 minutes. Then have participants switch roles.

Encourage guides to take their time in choosing interesting photos, but encourage cameras to look for only 3-5 seconds. Photos can be close up, looking upward from a supine position, or panning a horizon. Ask participants to be as quiet as possible, explaining that silence creates a more dramatic picture.

WRAP-UP
Give each participant an index card. Ask them to remember one of the photos they took, draw their best interpretation, and give it back to their guides.

VARIATIONS
Variation 1: Have all participants write about their photographs.

Variation 2: Have cameras take pictures of a certain theme: conifers, forest succession or animal homes. Then have participants tell or write a story about their photos.

Variation 3: Have all participants be cameras and lead them on a rope along a safe path where they would be unlikely to stumble. Take pictures by asking them, "please turn your head left," etc.

Source: Cornell, Joseph. 1989. Sharing Nature with Children, 2nd ed. *Nevada City, CA: Dawn Publications.*

YMCA of the USA

Rock Pass

Awareness
leads to Appreciation,
which leads to Action

AGES
Any

GOAL
To study a piece of nature so carefully that participants recognize it, even with their eyes closed, and relate that connection to other aspects of nature

SETTING
A natural area with a variety of small rocks or stones

MATERIALS
A bucket full of rocks if they aren't readily available to find

TIME
20 minutes or more

INSTRUCTIONS
Ask each person to look for and choose a rock, then sit on the ground with the other participants in a circle. Encourage everyone to examine his or her rock carefully, especially noticing its texture, shape, or unique characteristics. Tell participants to pay close attention to the way their rocks feel, because later on in the activity they will need to recognize them using only their sense of touch. After the participants have taken some time to get to know their rocks, collect them from everyone and mix them up. Ask all of the participants to close their eyes.

Pass the rocks, one at a time, to the right around the circle. Ask the participants to feel each rock, trying to determine if it is theirs. Instruct participants to keep a rock if they believe it is the one they chose earlier but continue passing the other rocks to the right. When all rocks have been claimed, the participants open their eyes.

WRAP-UP
Discuss how each person knew his or her rock. Invite participants to think about what stories their rocks could tell if they could talk. What can participants find out about their rocks simply by touching them or looking closely at them? For example, do the rocks have layers or mineral crystals? Show participants how to test the hardness of a rock by scraping it against another rock. Does it leave a scratch?

Lead participants to explore the connection between noticing the unique details that make each rock special and their level of interest in the rocks. The rocks were hardly noticeable until participants took the time to search them out and study them, but it is likely that they seemed very important when participants were trying to identify their own rocks. Participants might conclude that people care about things that have meaning to them and that taking the time to know something makes it important to us.

Ask participants to think about how taking time to appreciate other aspects of nature can encourage us to protect it. When we know a piece of land, we notice small details that make it special. Perhaps we find a field of wildflowers, a bubbling brook full of clean water, or an unusual type of insect. Discoveries such as these can make us care more about preserving the beauty of nature.

Source: *Submitted by the YMCA of Metropolitan Dallas Collin County Adventure Camp. Adapted with permission.*

YMCA i·C·A·R·E for the world we live in!

YMCA of the USA

Blind Trail

Awareness
leads to Appreciation,
which leads to Action

AGES
5 +

GOAL
To cultivate participants' sensory awareness

SETTING
Outdoors, in the daytime, in an area conducive to setting up a rope that goes between different trees, rocks, or stumps

MATERIALS
- One long rope (100' of clothesline)
- Blindfolds (old towels ripped into 3" strips work well)

TIME
20–30 minutes

BACKGROUND:
A blind trail is a rope-guided walk. Participants walk along the rope wearing blindfolds, and the rope takes them to interesting, mysterious, and exciting things to explore with their hands, ears, and noses. The trail might go through a shady forest path, over a moss-covered log, into a sunlit clearing, or near a pond where participants can hear sounds of wildlife and water.

INSTRUCTIONS:
Create the trail by running the rope through areas the participants will explore. *Because participants will be walking along the trail blindfolded, avoid areas with low-hanging branches, uneven ground, or other hazards.* Choose a variety of natural objects for participants to discover as they follow the rope: over a smooth rock, under a dense canopy of saplings, around a tree with rough bark, or across crackling leaves. Giving the blind trail a theme such as tree identification or animal habitat can make the experience even more exciting and educational for participants.

Tie a knot in the rope to indicate an interesting smell nearby. You can also make the rope lead up or down by attaching it to objects on the ground or overhead.

Decide which side of the rope you want participants to travel along, and make sure they stay on that side. Be sure to caution everyone to walk slowly and carefully so that they will not trip and get hurt. It is also helpful to introduce this activity by having them practice exploring. They could hug a tree to see how it feels, how big it is, or what it's like to smell a leaf. This puts them in the mind-set for exploring.

WRAP-UP:
Sit down in a circle nearby and talk about what participants remember "seeing" with their ears, noses, and fingers and what they felt like along the way. What sounds do they remember? Do they want to do it again to see how well they remember things? Remind them it's not a race!

Source: Cornell, Joseph. 1998. Sharing Nature with Children, 2nd ed. *Nevada City, CA: DAWN Publications.*

YMCA i·C·A·R·E for the world we live in!

YMCA of the USA

Burma-Shave Trail

Awareness
leads to Appreciation,
which leads to Action

AGES
10–14

GOAL
To encourage participants to appreciate, enjoy, and explore the environment

SETTING
Along a trail in a forested area

MATERIALS
- Burma Shave cards
- Masking tape, duct tape, or clothespins

TIME
30 minutes (depending on how large a group you have)

BACKGROUND
In the 1950s, the Burma-Shave Company advertised its shaving cream with a series of signs placed along roadsides. We've all seen billboards, but these small signs were famous for their clever rhymes and the ingenious way they captured people's attention. A funny rhyming verse was divided among a series of red and white signs along a road, so drivers had to pay attention to read the whole message. For example, a famous series of Burma-Shave signs once read: "School's in session … Take it slow … Let the little … Shavers grow … —Burma-Shave"

HOW TO MAKE BURMA SHAVE CARDS
Start with brightly colored index cards or 8 ½" x 11" paper cut into card-size pieces.

Write one saying on each card. Use the following examples—or invent your own!

- Look for a spot that would be a good home for a squirrel.
- Walk as quietly as a deer to the next card.
- Hop like a frog to the next card.
- Can you find something shaped like a heart?
- Look for something that has a pattern.
- Look for something that would feel soft.
- Look for three different kinds of leaves.
- Give a really loud HOWL!
- Smile and wave at the person behind you.
- Do you see anything cool under this rock?
- Look up—what do you see?
- Breathe in through your nose, what does it smell like?
- How many different colors can you see?

Laminate, if desired, for future use.

INSTRUCTIONS
Explain what Burma-Shave signs were and tell the participants that this activity will use the same idea. Everyone will walk along a trail, taking time to read each card and follow its instructions.

Appoint a gatekeeper; it's best to choose a responsible young person or an adult. This person will release participants one by one to walk along the trail, waiting for the first two card posts to clear before letting the next person begin. Since the gatekeeper will be the last person in line, he or she is also responsible for collecting the cards and tape while following the trail.

You, the instructor, should be first in line because you will mark the trail with cards. When you come to an interesting spot, use tape or a clothespin to post a card in a visible place.

Before you start, remind participants to walk one at a time and not go to the next card until the person ahead of them has moved on. Tell them not to bunch up (it can spoil the fun!).

YMCA of the USA

Burma-Shave Trail

Ask participants to stay quiet during the activity—except when a card instructs them otherwise—so as not to disrupt the experience for others.

WRAP-UP

A fun way to end the trail is to write, "Find me, I'm hiding" on the final card. After you post this card, find a place to hide. Then, as participants find you, tell them to hide nearby. Because the participants will probably stay quiet as they're hiding, it will help them avoid disturbing others who haven't finished the activity.

When everyone has finished, you can quickly wrap up with questions such as, "What did you see when you were walking along?" or "What was your favorite part?

Burma-Shave is a registered trademark of the American Safety Razor Co.
Source: Adapted with permission from the Frost Valley YMCA

Each One Teach One

Awareness
leads to Appreciation,
which leads to Action

AGES
10–15

GOAL
To teach participants how to identify various species of forest vegetation and share interesting facts about them

SETTING
Outside, any time of year, along a trail

MATERIALS
None

TIME
15–20 minutes

INSTRUCTIONS
Before leading this activity, stake out a number of "stations" along a trail that has plant, tree, or fungus specimens you want to teach participants to identify. The number of stations you set up will vary according to the number of participants—a good rule of thumb is to divide the number of participants by three to determine how many stations you need. For a group of fifteen, five stations work well.

For each station, select a specimen and prepare a list of three or four facts about it that you will share with participants during the activity. You may find it helpful to consult the Internet or a guidebook. If you select a sugar maple as your first station, you might collect facts like these:

- Sugar maple sap contains a lot of sugar, and it can be tapped to make maple syrup.
- Lichen is commonly found on the bark of sugar maples.
- Sugar maples can live as long as 300 years!

Begin the activity by dividing participants into small groups. Now label the groups as A, B, C, etc. Group A will be the first "teaching" group. Get the remaining participants started on a simple game or other activity that will occupy them while they wait for their turn, then take Group A to the first station on the trail and teach them the facts you gathered about that species of vegetation.

Review the facts about the plant or tree at the first station with the members of Group A many times and explain that they will teach the facts to the other groups. Remind participants how to be good teachers: speak loudly; pass around leaves, lichen, or bark to touch; and ask questions to reinforce the lesson. It is a good idea to assign which participant will teach which facts.

When ready, call the next group (Group B) to learn from Group A. Observe Group A as they teach Group B. When students in Group B have received their lesson, lead them on to the next station and train them to teach the facts about the specimen featured there. Meanwhile, Group A stays at the same spot and calls for Group C to come learn. The other groups progress through the stations until they reach an empty station where you will train them to be teachers. When Group A has no more people left to teach, they move to Group B's station. Continue until all groups have rotated through all stations.

WRAP-UP
Gather participants together and quiz them about what they learned at each station. To let them see how well they taught their lessons, ask them not to answer questions about their own specimens. This will encourage them to remember what they learned from each other.

Source: *Submitted by Frost Valley YMCA. Adapted with permission.*

YMCA of the USA

Shelter Building

Awareness
leads to Appreciation,
which leads to Action

AGES
11–17

GOALS
- To introduce different types of shelters and the natural materials that are useful in building them
- To encourage cooperation as participants construct shelters

SETTING
Any forested area where there is ample deadfall (trees or branches that are already dead and lying on the ground) for participants to use in building their shelters

MATERIALS
Deadfall

TIME
40–60 minutes

INSTRUCTIONS
Begin the activity by describing how to build the three basic shelters: lean-tos, A-frames, and tepees.

Lean-to. To build a lean-to, find a living tree that looks like the letter Y. Place a sturdy log upright and leaning from the ground to the tree so that it rests in and is supported by the notch in the Y. This log is called the spine of the shelter, because it supports the rest of the shelter logs. Now lean other logs upright from the ground to the spine. These logs are called the ribs. Continue adding ribs to the shelter until all of the gaps between the ribs are filled.

A-frame. An A-frame shelter is built by finding two living Y-shaped trees that are fairly close together. Find a log long enough to bridge the distance between the two trees. Place the log horizontally between the two trees so that it spans the trees and is resting firmly in the splits of the Ys. This is the spine. Once the spine is in place, rest logs against it so that they are standing upright and leaning from the ground to the spine. These are the ribs. The shelter will begin to look like a long tent spanning between the two trees. Continue stacking the ribs until all of the gaps on the sides on the shelter have been filled.

Tepee. For a tepee shelter, find a living tree that will support the weight of several logs. Lean upright logs all the way around and against the tree. The logs will surround the tree in the shape of an upside-down cone or a tepee. Continue until all of the gaps between the upright logs are filled.

Explain that these three types of shelters may be combined in various ways to form a unique shelter. Shelters may also be built against other natural formations (such as hillsides or boulders). Participants can use their creativity to design shelters that make the best use of the materials available.

Set clear boundaries and make sure participants understand they must not wander outside them as they search for building materials. Next, divide the participants into groups of about five and remind them that they will need to cooperate with each other as each group builds a shelter.

Be sure to go over the following guidelines with participants before they begin:

- Only deadfall (trees or branches that are already dead and lying on the ground) may be used to build the shelter.
- Participants must not go beyond the boundaries.
- Branches, limbs, and other shelter-building materials must never be thrown—only carried or dragged.
- Participants are not allowed to climb or stand on the shelters, as shelters may collapse.

YMCA of the USA

Shelter Building

- At all times participants must be alert for falling logs and for other people around them who could get hit by a log.
- Nobody's shelter will be any better than anyone else's, because they are all unique.
- There may not be enough time for every group to completely finish its shelter. This is okay; each group should do what it can in the time allotted.
- All participants in each of the small groups must work together in building their shelter.
- Shelters must be sturdy.
- Every shelter must be large enough that everyone who helped build it can fit inside.
- Participants should not go inside their shelters until the activity leader has tested them to make sure they will not collapse.

Allow the participants about thirty minutes to build their shelters; they will make a lot of progress in that amount of time.

WRAP-UP

Gather the participants and visit each shelter together. Here are some questions you can ask that will help participants think and talk about their shelters:

- What type of shelter did you build? Was this the design that you originally had in mind?
- What do you like about your shelter?
- What would you do differently if you had a chance to rebuild your shelter?
- What would you add if you had more time (for example: mud or snow to fill in the cracks, grass to insulate the inside floor, etc.).

Test the sturdiness of each shelter by leaning or pushing on it. If you are sure that it will not collapse, have the participants who built it get inside. (This is a great photo opportunity, so you might want to have a camera ready.) Make sure you allow enough time to visit every group's shelter so that no one will feel left out.

CLEAN-UP

Ask participants to get back into their small groups to dissemble their shelters so that the next group will have building materials. Participants should haul away the ribs first, followed by the spine. Remind them again not to throw logs and sticks. They should carry or drag them away from the shelter sites so the area looks like it did before they began.

Source: *Submitted by Green Bay YMCA. Adapted with permission.*

The Lorax

Resources
The decisions we make every day have lasting consequences

AGES
5–12

GOAL
To show participants that everyone pays a price when we overuse natural resources

SETTING
Anywhere

MATERIALS
One copy of *The Lorax,* by Dr. Seuss

TIME
20 minutes

ABOUT THIS ACTIVITY
The Lorax, like so many Dr. Seuss stories, never gets old—no matter how many times people hear it. You can get participants even more involved in the story if you let them play parts. It's best if participants who can really ham it up play the Once-ler and the Lorax, so choose wisely. Consider asking adults to play these roles—the kids will love it if the actors wear silly costumes.

INSTRUCTIONS
After choosing the people who will play the roles of the Once-ler and the Lorax, divide the rest of the participants, right where they sit, into the following three groups:

- Swomee-Swans (who will shout "Honk honk honk!")
- Bar-ba-loots (who say "Bar-ba-LOOT, Bar-ba-LOOT, Bar-ba-LOOT!")
- Humming-Fish (who go "HUMMMMMMMM!")

Each time the narrator says one of these names, that group says its part. Practice with each group before you start the story.

As you read the story, show the pictures and let the Lorax and Once-ler act it out as best they can!

WRAP-UP
At the end, ask the participants to discuss the lessons of the story.

Source: Miller, Lenore Hendler. 1986. The Nature Specialist. *Martinsville, IN: American Camping Association.*

YMCA of the USA

Plant Origins

Resources
The decisions we make every day have lasting consequences

AGES
9–11

GOAL
To identify everyday household objects made from plant materials

SETTING
Indoors or outdoors, any time of year

MATERIALS
Pictures of common objects clipped from newspaper ads, catalogs, or magazines. Make sure half of the objects are made from plant materials (cotton sweaters, wooden toys, paper products, etc.) You'll need about ten pictures for each group of participants.

TIME
10 minutes

INSTRUCTIONS

- Divide the participants into small groups to facilitate discussion.
- Distribute the pictures, encouraging everyone to talk about the materials that make up each item.
- Each group should organize the pictures into three piles: one for those that are made from plant resources, the second for items that are made from other materials, and the third for products that are made from a combination of plant and non-plant materials.
- After participants have sorted their pictures, collect the piles from the groups, making sure to maintain the organization. Show the pictures one-at-a-time to the group and let participants guess the resource(s) used to manufacture that item.

VARIATION
This activity can lead into a great discussion about nonrenewable resources. Challenge participants to name the source for the items that did not come from plant materials. For example, chalkboards come from slate, which is a type of rock, and soda cans come from aluminum, which is mined from the earth.

DISCUSSION QUESTIONS

- What item's origins surprised everyone the most?
- What other items that come from plants can we name?
- What do we need to do to make sure we can continue growing plants to support our needs?
- What are some threats to plant-based resources?

Source: *Submitted by Frost Valley YMCA. Adapted with permission.*

YMCA of the USA

Chip Mining Game

Resources
The decisions we make every day have lasting consequences

AGES
Any

GOAL
To introduce one problem related to human consumption of natural resources: how mining damages the earth and makes it difficult to restore the land to a healthy condition

SETTING
Indoors or outdoors

MATERIALS
- Napkins or paper plates
- Granola bars with chocolate chips or raisins (one bar for each participant)

TIME
10–15 minutes

BACKGROUND
Everyone uses natural resources—gasoline to fuel cars, oil to heat homes, water to drink. Natural resources are divided into two major groupings: renewable and nonrenewable. Renewable resources, such as oxygen, wood, and solar energy, are resources that can regenerate themselves if they are not overused. Nonrenewable resources, such as coal, petroleum, and natural gas, do not naturally re-form at a rate faster than they are used. Many of our resources, both renewable and nonrenewable, can be used up over time if people are not conscientious about how much they use. Even if we try to undo the harm caused by human over-consumption, we often find it difficult to restore nature to a healthy condition.

INSTRUCTIONS
Ask participants to define "resource" and distinguish between the two types, renewable and nonrenewable. Also ask participants for some examples of natural resources.

Distribute the granola bars, reminding participants not to eat until *after* the activity is over. Explain that their job is to remove each and every chip or raisin from the bar and put it in a sanitary place, like a plate or napkin. Encourage them to really look for the chips—some may be well hidden, but they still need to come out. Allow five minutes for this part of the activity. Once most participants are finished, ask them how easy or hard it was to remove the chips.

Give participants their next task: replace the chips and make the granola bars whole again. Challenge them to make their bars look as they did before the activity started.

WRAP-UP
Call for volunteers who want to present their reconstructed bars to the group. Chances are, most bars are crumbling or in multiple pieces. Ask the participants if they think they would be able to reconstruct their granola bars better if they had more time or special tools.

Discuss with the participants what they think the bar represented, and then ask what the chips represented. Lead participants to the conclusion that the bar represented the earth, and the chips illustrated natural resources. Invite participants to explain how the activity relates to mining natural resources, like coal. One answer is that once the resources are mined, it is difficult to restore the land to the way it was before.

Finally, let everyone eat the granola bars!

Source: *Submitted by Frost Valley YMCA. Adapted with permission.*

YMCA of the USA

Sustainability

Resources
The decisions we make every day have lasting consequences

AGES
5 +

GOAL
To understand the concept of sustainability

SETTING
Any natural, outdoor setting. Alternatively, bring materials inside.

MATERIALS
15 sticks

TIME
15–20 minutes

INSTRUCTIONS
Scatter sticks on the ground and ask participants, "Does anyone know what sustainability means?"

Guide discussion to conclude that sustainability means not using more resources than nature can replenish. If participants are unfamiliar with the word *resource*, give examples of natural resources, such as clean drinking water, petroleum, and farmable land.

Ask for a volunteer and have him or her come to the front of the group. Begin to tell a story in which that person is the owner of a camp.

Lead the group to explore how the owner will use resources. For example, the camp might need to use four trees each year for heat and building materials. Have the owner pick up four sticks to represent the trees that will be used for the camp's needs.

The owner wants the camp's use of resources to be sustainable, so he or she also *plants* four trees every year. In this way, future generations can enjoy the camp's healthy wooded areas. (Have the volunteer replace the four sticks.)

Ask another volunteer to come to the front of the group. Explain that this person recently moved onto the camp and began to use resources.

Propose to the group that he or she uses *five* trees a year. By contrast to the owner, however, the new camp resident does not plant new trees to replace the ones that were cut.

Have the second volunteer pick up five sticks and carry them away from the group. When he or she returns, instruct him or her to take away another five sticks, repeating this action until all the sticks are gone.

Ask the group to consider whether this person shows concern for the future of the camp or only the present.

WRAP-UP
Encourage participants to discuss the activity. Here are some questions you might ask:

- What would eventually happen to the forest if everyone behaved like the camp resident?

  There would be fewer and fewer trees, and finally the forest would disappear.

- Is that sustainability? Why or why not?

  The camp resident is not practicing sustainability because he or she is using more resources than nature can replenish.

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Resources

The decisions we make every day have lasting consequences

Sustainability

- How could this situation become sustainable?

  Help participants come up with their own answers. For instance, volunteers could plant trees to replace the ones the camp resident used, or perhaps the camp owner could help the camp resident to understand the importance of sustainability.

Source: *Submitted by Camp Seymour. Adapted with permission.*

Natural R^3

Resources
The decisions we make every day have lasting consequences

AGES
10–13

GOAL
To help participants understand the concepts of reduce, reuse, and recycle and appreciate how nature demonstrates each one

SETTING
Outdoors, preferably while hiking

MATERIALS
None

TIME
20–30 minutes

BACKGROUND
One of the best ways we can impact the future of our world is by becoming aware of the amount of waste we create. The average American throws out 1000 pounds of trash annually. This amount is constantly increasing as we use more goods and packaging for those goods.

A good way to remember three important things we can do to combat our growing waste problem is "R^3":

- **R**educe the amount of and toxicity of the trash being thrown away.
- **R**euse the resources you have or give them to someone who can use them.
- **R**ecycle what you can, and use products made from recycled goods.

Many people are already familiar with recycling, such as when old tires are chopped up and used in asphalt to increase the lifespan of a road. Some towns will even levy major fines for failure to recycle.

Fewer people may be aware of the importance of the "reduce" and "reuse" parts of R^3. The best way to improve the garbage situation is to be aware of what you're throwing away, and to reduce the amount you use. For example, carry a travel mug to use in place of disposable foam or paper cups. Pay attention to the toxicity of materials you consume, choosing a more bio-friendly alternative whenever you can. Reusing products, or having them fixed rather than just throwing them away, reduces the amount of garbage thrown out. It also encourages us to use things that already exist rather than supporting the manufacture of a new product. How often is a television with a slightly off color simply thrown away, rather than brought in for repair?

The natural world shows us wonderful examples of how R^3 works. In a forest, leaves decompose and return nutrients into the ground to aid in the growth of new plants. Fungi help to break down dead trees and other organic matter, again returning nutrients into the ground, but also making room for new plants. Old snags (stubs of tree branches that have broken off) and rotting logs can be used as homes for organisms both large and small.

INSTRUCTIONS
Be sure to scope out the trail ahead of time to know locations of shelf fungi, lichen, and other good examples of natural recyclers.

Begin the activity by going over the idea of R^3 with participants and discussing why it's important. Also, talk about some ways that cities and towns take care of their trash (creating landfills, recycling bottles and cans, turning plastic bottles into polar fleece). Ask participants if they can think of any natural examples of reducing, reusing, and recycling.

Natural R^3

Once participants feel comfortable with the concept or R^3, take the group for a walk in a wooded area. Stop when you find a shelf fungus and ask the participants how it is an example of natural reducing, reusing, and recycling. If they need help, explain how shelf fungi recycle dead organic matter by digesting it and converting it into nutrients that other organisms can use.

Standing in the same place, ask the participants to look around for another example of natural recycling. If they have trouble finding something, direct them to look toward the ground at dead leaves and dirt. Explain that the leaves decompose over time and add nutrients to the soil.

Next, look for a decomposing tree or log that could serve as a home or a food source. Ask the participants why that tree or log represents another example of natural R^3. (If another organism eats it or lives in it, it has been reused.)

Before you start walking again, explain to the participants that they will be surrounded by examples of how Mother Nature is an original practitioner of R^3. Their job is to keep their eyes open because, at any time during the hike you might stop and yell "R-cubed!" and begin counting to 10 with your eyes closed.

The participants must find an example of natural reducing, renewing, or recycling by the time you finish counting.

When you open your eyes, call on any participant to explain his or her choice. For example, if one participant says, "This is an example of reducing," ask why that's true.

Each time you call "R-cubed," choose two or three participants to present their examples to the group. Be sure to call "R-cubed!" twice soon after you begin the hike again and at least once between five and ten minutes later. This will help to reinforce the concepts.

VARIATION

If the participants become extremely absorbed in the activity, reduce the time that you count so that participants only have seven seconds, then five, to find their examples.

WRAP-UP

- Ask the participants if they can think of ways to reduce, reuse, or recycle everyday household items. Bring up how soda bottles can be made into fleeces, how tires are used to pave roads, and any other relevant examples you can think of.
- Ask participants for their opinions about our country's waste situation. Will it be better or more severe in 50 years? (You might talk about landfill closures, increased waste amounts, and large vehicles, and also discuss efforts to encourage recycling, start

donation programs, and draft legislation that protects our natural resources from human over-consumption.)

Source: *Submitted by Frost Valley YMCA. Adapted with permission.*

Acid Rain Tag

Resources

The decisions we make every day have lasting consequences

AGES
10–15

GOAL
To help participants learn about water pollution, its impact on nature, and one strategy for combating it

SETTING
Outdoors or indoors in a large open area

MATERIALS
Colored bandanas or nametags to identify participants as "fish," "water," or "pollutants"

TIME
20 minutes

BACKGROUND
Acid rain is a major environmental problem in the United States and in other parts of the world, especially China, Eastern Europe, and Russia. Acid rain occurs when air pollutants such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x) are released into the atmosphere, often by coal-burning power plants or industrial plants. These pollutants combine with water in the atmosphere to form sulfuric and nitric acid, and then fall back to Earth as precipitation. Even though this phenomenon is commonly referred to as "acid rain," it also produces acidic snow, hail, sleet, and dew.

This activity illustrates how acid rain forms and one way to combat the effects that acid rain can have on ponds and lakes.

INSTRUCTIONS
Set up boundaries for a playing field, approximately 50' x 50'. This area will be the "pond" where you play the game.

Hand out your "fish," "pollutant," and "water" nametags or bandanas so that there are roughly equal numbers of each.

Explain the roles:

- Fish. The fish swim around within the pond, trying to avoid being tagged by pollutants. If tagged, they have to move outside the pond area and lay belly-up until the end of the game.
- Pollutants. In nature, sulfur dioxide (SO_2) and nitrogen oxides (NO_x) form acids that harm fish. However, they must first bond with a water molecule. Pollutants need to tag a person marked as a water molecule and then run after fish while holding hands with the water molecule.
- Water molecules. Water molecules circulate around the pond until they are tagged by a pollutant. Make it very clear that water molecules *must* help their pollutant partners; they cannot take it upon themselves to try to save fish by slowing down their companion pollutants.
- The buffer. In the second round, appoint one of the water molecules to be the buffer. The buffer has the ability to tag pollutant-water pairs, causing them to split apart. The pollutant in this split pair then needs to find a different water molecule before chasing after the fish. Explain to participants that play will continue until you call an end to the game.

FIRST ROUND
To begin the game, first release the water molecules into the pond and allow them to distribute themselves evenly. Next, release the fish and then the pollutants, giving each group time to spread out into the pond. Let the game unfold. After a few minutes, most of the fish will probably be "dead," aside from one or two especially quick fishes. Call an end to the game and gather the participants for a discussion.

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Acid Rain Tag

To get a discussion going, ask participants the following questions:

- How many fish died?
- How many survived?

Talk with participants about whether this game accurately represents the effect acid rain can have on fish. It *is* somewhat accurate, but often acid rain only indirectly kills fish. For instance, acid rain can cause aluminum to leach out of stream beds, which, in turn, kills off fish.

SECOND ROUND

We all know there are steps we can take to limit the emissions that cause acid rain, but what can we do when a lake or other body of water has already become severely acidic? We can add a buffer solution!

A buffer solution is a chemical mixture that helps stabilize the acidity of a solution. Sodium hydroxide (NaOH), also known as lye, and calcium hydroxide [$Ca(OH)_2$], also known as lime, are both examples of buffers that can be used to stabilize the pH of ponds and lakes. Some areas of the country have natural buffers, such as limestone.

This round will play out almost like the first one, but this time appoint one of the water molecules to be the buffer. After the pollutants have been released into the pond, the buffer can then join the fray. The buffer has the ability to tag pollutant-water pairs, causing them to split apart. The pollutant in this split pair then needs to find a different water molecule before chasing after the fish.

The second round usually results in better fish survival rates than the first round. After the participants are tired out, call them back and wrap up the activity.

WRAP-UP

To get a discussion going, ask participants the following questions:

- How many fish died in the second round?
- Did adding the buffer to the system help?

Despite the best efforts of the buffer, some fish will still die during the second round. This demonstrates that adding a buffer to a pond or lake may not completely alleviate the effects of acid rain.

Talk to participants about buffers as a solution to acid rain. What are some disadvantages to adding buffers to aquatic systems? (Here are some possible answers: Adding a buffer is expensive; It isn't practical for extremely large lakes; It involves dumping large amounts of chemicals that may cause even more harm to the affected lake.) Sodium hydroxide, for instance, is an extremely caustic base that can cause damage to living tissue.

Acid Rain Tag

Resources
The decisions we make every day have lasting consequences

OTHER WRAP-UP QUESTIONS

- In what other ways is acid rain harmful to our environment?
  In addition to polluting water sources, acid rain weakens forests and upsets the balance of ecosystems.
- What are some common contributors to acid rain?
  Since the main source of the emissions that cause acid rain is the burning of fossil fuels, some common contributors include automobiles and factories that are powered by gasoline and coal. Also, because the United States uses coal-burning power plants to produce much of its electricity, household appliances, televisions, computers, and air-conditioners may all contribute to acid rain.
- What steps can individuals take to reduce acid rain?
  The less a person uses electricity and fossil fuels, the more he or she helps reduce acid rain. Remembering to turn off lights and appliances that aren't being used and using them only when necessary are great ways to pitch in. Another major way individuals can reduce acid rain is to walk, bike, carpool, or use public transportation whenever possible.

Source: Haskin, Kathleen M. 1995. The Ways of the Watersheds: An Educator's Guide to the Environmental and Cultural Dynamics of New York City's Water Supplies. *Claryville, NY: Frost Valley YMCA Press.*

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Landfill Hoops

Resources
The decisions we make every day have lasting consequences

AGES
8–14

GOAL
To help participants recognize the problem of diminishing landfill space and understand how recycling, reusing, and reducing our consumption of resources can help increase space in landfills

SETTING
Outdoors or indoors

MATERIALS
Several hula hoops

TIME
20–30 minutes

ABOUT THIS ACTIVITY
This activity provides a good visual example of how quickly landfills can fill up. It also demonstrates how recycling, reusing, and reducing our trash can make a dramatic difference in the amount of space available in our landfills.

BACKGROUND
Here are a few facts about landfills you might want to share with participants:

- There are two man-made structures on Earth that can be seen from outer space: the Great Wall of China and the Fresh Kills Landfill in Staten Island, New York.
- Americans recycle 40 percent of the paper they use.
- The highest man-made structure in the state of Ohio is a landfill affectionately named "Mount Rumpke."

INSTRUCTIONS

- Gather the group into a circle.
- Ask participants to think of one item of trash, then go around the circle and have each participant say his or her item out loud. No two people can pick the same kind of trash, so make sure everyone picks something unique. If anyone gets stuck, suggest ideas—disposable diapers, used motor oil, and newspapers are good examples.
- Explain that for the purposes of this activity, each participant will represent the item he or she chose.
- Lay the hula hoops on the ground several feet apart and tell the participants that the hoops represent landfills. Ask participants to stand inside the hula hoops. There should be enough hoops so that only two or three people are standing in each one.
- Once everyone is comfortable, "close down" one of the landfills at random, citing one of the following reasons:
    - The landfill has completely filled to capacity.
    - The landfill's seal has cracked and is allowing chemicals to leach into the ground.
    - The landfill is extremely old and presents an environmental hazard.
- Every participant who was standing in the closed landfill must now find space in a landfill that is still functioning. Continue closing landfills this way until participants are crammed tightly into just a few hoops.
- At this point, revisit the types of trash that are in the landfills. Ask participants to think of ways that the trash each one chose can be reused or recycled to remove it from the landfill. Glass, paper, plastic, and metal can be recycled, for instance. Food and biodegradable material can be composted. If a participant's designated piece of trash can be reused or recycled, have that participant step out of the hula hoop. After each participant has taken a turn, the group will see how much space was freed up in the remaining landfills.

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Landfill Hoops

WRAP-UP

Gather the group and discuss what everyone learned. Here are some questions to get you started:

- What can plastic bottles be recycled into?
  Just a few of the products made from recycled bottles include building materials, park benches, school lunch trays, and ski jackets!
- What can be done about the trash remaining in the landfill?
  One way landfill operators free up space is to burn combustible trash. The burning waste can be used to fuel generators that produce electricity.
- What are some ideas for how to reduce consumption of resources that can't be reused or recycled, like motor oil or certain types of plastic containers?
  Ask the group to brainstorm. Some possible answers include walking or riding a bike instead of driving, choosing environmentally friendly products, and using their own mugs rather than disposable foam cups.
- When people regularly recycle paper waste, does it create any other environmental benefits besides reducing landfill waste?
  Recycling paper waste helps preserve forests, reduce pollution, and conserve energy!

Source: Submitted by Frost Valley YMCA. Adapted with permission.

Trash Sociology

Resources
The decisions we make every day have lasting consequences

AGES
Any

GOAL
To help participants learn to make better decisions about what they purchase and consume and how they dispose of it

SETTING
Indoors or out

MATERIALS
- A garbage bag of roadside trash (collected by an adult to avoid any dangerous items) that represents the average stuff along a real street in your community.
- Various things to use to grab the trash as "scientists": tongs, big forks, etc.

TIME
20 minutes

ABOUT THIS ACTIVITY
Sociologists are scientists who study how people live together and the choices they make as a community. In this activity, participants will study a bag of trash to see what kinds of choices people in their community are making about the purchase, consumption, and disposal of various items.

INSTRUCTIONS
Empty the contents of the bag into a pile. Instruct the participants, "First, let's sort the trash into groups. Looking at it before we start, what kinds of groups should we put it in?" Any organizational system they pick is okay. For example, they might sort it by use (packaging, etc.) or by material (paper, etc.).

Once they've sorted the trash, go pile to pile and talk about the choices people made that resulted in the items ending up on the side of the road. Here are some thoughts about those choices:

- Aluminum cans could be recycled (for money in many states!).
- Plastic grocery bags: Did they really need a bag? Could they reuse it? Did they know many stores collect bags and recycle them?
- Plastic bottles: Could they have gotten a paper cup instead … or water out of a drinking fountain for free?

Imagine if every can and bottle were purchased for just a dollar. How much money would all those people have saved if they drank water instead? WOW!

WRAP-UP
Discuss with the participants the choices people make every day. If people made better choices, look how much trash we would keep off our streets!

Values Auction

Resources
The decisions we make every day have lasting consequences

AGES
13 +

GOAL
To encourage participants to prioritize basic needs and ideals

SETTING
Any location where participants will be comfortable sitting for an extended period of time

MATERIALS
- One copy of the Values Auction activity sheet for yourself and each participant (see next page)
- Gavel or device to call group to order
- Pencils

TIME
1–2 hours

INSTRUCTIONS:
- Make sure the location is conducive to discussion (a circular or similar seating arrangement).
- Explain to the participants that they will be bidding on 20 different items (ranging from "a long life free of illness" to "a large fruit and vegetable garden"). Items will be sold to the highest bidder in accordance with the following rules:
    - Assume that no one already has any of the items listed.
    - Each participant has a total of $5,000 to spend.
    - Each participant can spend no more than $2,500 on any one item.
    - Opening bids must be a minimum of $50 and a maximum of $500.
    - Bids can be raised, but only by increments $50 (minimum) to $100 (maximum).
- Allow each participant two minutes to look over the list and strike up a plan of action.
- Hand out a bid list to each participant so they can keep track of their successful bids and how much money they have left.
- Run the activity like an auction. For each item, for example, call out, "We're opening the bidding at $50. Do I hear $50? I have a bid for $50. Now I have one for $100."
- As the bidding speeds up, keep track of who ups each bid first.
- When the bidding slows down, say, "Going once… going twice… sold!" Be sure to say to whom it was sold and for how much money.
- Keep a master list of who acquired what.

WRAP-UP:
- Ask participants whether they were able to acquire everything they wanted. Did anyone feel like they had to compromise? What things were they not willing to compromise on?
- Were participants able to stick to their bidding plans? Why or why not?
- Finally, ask whether anything was surprising about this activity, personally or generally.

Source: Submitted by Moira Poe of Frost Valley YMCA. Adapted with permission.

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Resources
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Values Auction

ITEMS TO BE SOLD	AMOUNT SPENT	AMOUNT LEFT
1. A long life free of illness		
2. Travel and tickets to any cultural and/or athletic events, as often as you wish		
3. The love and admiration of friends		
4. Maintenance-free satellite television		
5. An unspoiled natural setting for your home		
6. Complete self-confidence and a positive outlook on life		
7. Complete library for your personal use		
8. A happy family relationship		
9. The automobile of your choice		
10. A large fruit and vegetable garden		
11. A very satisfying love relationship		
12. The ability to speak many languages		
13. A chance to eliminate sickness and poverty		
14. Free, unlimited electricity		
15. A chance to preserve an endangered species		
16. An understanding of the meaning of life		
17. Unlimited funds for the enjoyment of music		
18. A world without prejudice		
19. Commercially canned and frozen foods		
20. A world without air and water pollution		

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Water Canaries

Resources
The decisions we make every day have lasting consequences

AGES
9–11

GOAL
To give participants a basic introduction to how benthic macroinvertabrate populations indicate water quality

SETTING
At a creek

MATERIALS
- "Creek detective kits" (one for every three participants).
- A notebook for recording the group's findings
- Pens or pencils for each participant
-

TIME
40 minutes

BACKGROUND
Like the canaries miners used in the past to test air quality in mineshafts, modern observers can study benthic macroinvertebrates (BMIs) to survey the quality of water in a stream. Because these creatures dwell on the bottom of streams and are relatively sedentary, they are exposed to higher levels of pollution for longer durations than other aquatic animals. Some BMI species cannot tolerate pollution while others are highly resistant. The presence or absence of tolerant or intolerant species in a stream can indicate the water's overall quality. Because of their ability to signify the health of a stream, these species are often called indicator species.

PREPARATION
If you are not already familiar with how conservationists use BMIs to measure water quality, it is worthwhile to take some time to familiarize yourself with the various species that are common in your area so that you can help your participants identify their specimens and interpret their results. The Environmental Protection Agency is a good place to get started; check out its resource on BMIs at www.epa.gov/bioindicators/html/invertebrate.html.

Gather a few macroinvertebrates ahead of time to use as examples. It's a good idea to choose two species to represent each of the following:
- BMIs that cannot tolerate polluted water
- BMIs that have moderate tolerance
- BMIs that can be found in both polluted and unpolluted water

Assemble and inventory all creek detective kits beforehand. Each creek detective kit should include the following items stored in a 2-quart rectangular plastic container:
- 1 aquarium net
- 3 bug boxes
- 2 pipettes
- 2 stainless steel tweezers

INSTRUCTIONS
Discuss the term *indicator species* with the group and show participants the BMI specimens you collected as examples. As you let the participants look closely at each specimen, make sure to point out that species' level of tolerance for pollution.

Discuss creek safety and ethics:
- Remind students to be gentle with all creatures and to release them back into the creek when they are finished with the activity.
- Warn them not to step into the creek or the water— if they do, it will turn murky, and they will not be able to find enough BMIs.

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Water Canaries

Divide group into teams of three and assign each team a creek detective kit. Demonstrate how to use the aquarium net, pipettes, and tweezers to capture specimens and store them in the bug boxes for later identification.

Instruct groups to gather as many different varieties of BMIs as possible. Allot each group 20–25 minutes to complete this task.

WRAP-UP

Assemble the group and record your findings. For those who found BMIs unlike the examples, ask them to make simple sketches of their specimens for later identification. (You can tear sheets out of the group notebook to give to anyone who needs them.)

Did the group find any specimens that look like the examples you gathered beforehand? Do a count of specimens for each one of the examples. Discuss the results and ask participants to express their opinions of the overall health of the creek based on what they know about how those species tolerate pollution.

Encourage participants to save their sketches for later identification—you can share resources you found helpful or direct them to the library.

Sources: Streamkeeper's Field Guide: Watershed Inventory and Stream Monitoring Methods*, published by the Adopt-A-Stream Foundation, 1999. Adapted by Graham Little.*

Sips & Gulps

Energy Flow
The sun is the source of energy for all living things

AGES
Any

GOAL
To increase participants' understanding of the many ways we use (and waste) energy and why it's important to conserve nonrenewable energy sources

SETTING
Indoors or out

MATERIALS
- Drinking cups, one for each participant
- Enough juice (or any other healthy drink) to fill everyone's cup twice

TIME
20 minutes

INSTRUCTIONS
Begin by reading aloud the description of the concept "Energy Flow." Then, give a brief talk to introduce the difference between a renewable energy source, such as wind power, and a nonrenewable energy source, like gasoline.

Give each participant a cup of juice, explaining that the liquid in the cup represents all the nonrenewable energy sources on Earth.

Ask everyone not to drink anything until the activity begins.

Once everyone has a cup, tell participants to listen as you read out a list of ways we use and abuse energy and to think about whether each statement describes something they did that day. If it does, they take a drink of their juice. A sip means they used a little bit of energy, but if they used a lot of energy or if they wasted it, they take a big gulp!

ENERGY USE AND ABUSE LIST
- Somebody's closet light is on.
- Somebody's closet light is on, and so is the bedroom lamp.
- Somebody rode in a car.
- Somebody rode in an SUV.
- Somebody used a computer.
- Somebody forgot to turn the computer off after they were done using it.
- Somebody ate food that was in the refrigerator.
- Somebody stood in front of the refrigerator for a very long time with the door open while they thought about what to eat.
- Somebody was in an air-conditioned room.
- Somebody was in an air-conditioned room, and a window was open!

Or, if it's cold outside …
- Somebody was in a heated room today.
- Somebody asked their mom to turn up the thermostat instead of putting on a sweater.

If some people still have juice after you finish reading the list, ask participants to call out other ways we use or waste energy. When everyone's drink is gone, explain that many of the energy sources we rely on are limited. That's why it's important not to waste them.

WRAP-UP
Discuss the list of ways people use and abuse energy. Ask participants to imagine what their lives would be like if they suddenly didn't have any electricity in their homes. What would happen if we ran out of gasoline? As a group, brainstorm about ways to use less energy.

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Energy Flow

The sun is the source of energy for all living things

Sips & Gulps

VARIATION

Add a second round after the wrap-up. Refill everyone's cup and read the energy use and abuse list again. This time, even if the statement fits something a participant did that day, he or she can save a sip by calling out an idea for how to make that action use less energy.

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Build a Tree

Energy Flow
The sun is the source of energy for all living things

AGES
9–13

GOAL
To guide participants to a basic understanding of tree physiology and how the different parts of a tree interact to keep the tree alive

SETTING
Indoors or outdoors, in any relatively clear area

MATERIALS
Build a Tree cards

TIME
20–30 minutes

ABOUT THIS ACTIVITY
This activity illustrates for participants basic tree biology. Though you can just draw a diagram of a tree and point out the different parts to the participants, Build a Tree gets them more involved and makes them more likely to absorb the information. This is an activity that you have to "sell" to participants with your enthusiasm—it takes some encouraging to get participants involved, but once they are, they really enjoy it. Build a Tree works best for a large group. You need a minimum of seven participants—one to represent each part of the tree.

HOW TO MAKE BUILD A TREE CARDS
Start with index cards or 8 ½" x 11" paper cut into card-size pieces. Write one of the following parts of a tree on the front of each card (one per card):

Heartwood	Bark
Xylem	Taproot
Phloem	Leaf
Cambium	

Adjust the number of cards you make according to how many participants you expect to be involved in the activity. You will need only one card each for heartwood and taproot, but you can make more than one card for the other terms as necessary. For example, if you expect 17 kids to participate, make one heartwood card, one taproot card, and three duplicate cards for each of the other terms.

On the back of each card, write interesting information about that part of the tree, how it works, and how it contributes to the tree as a whole. You can find this information in an encyclopedia or on the Web as you prepare to lead this activity.

Laminate if desired for future use.

INSTRUCTIONS
Hand out Build a Tree cards to participants. Make sure that you distribute at least one card for every part of the tree.

Explain that through this activity you are going to build a human model of a tree, creating it from the inside out. Everyone will have a role, and it's important that everyone plays their role or else the tree will die.

Heartwood
Invite the participant holding the heartwood card to come forward. Position him or her so that you have plenty of room to build the rest of the tree. Have the heartwood participant read the back of the card, then feel free to expound upon it as necessary. Make sure that the other participants get the idea that:

- The heartwood makes up the majority of a tree's mass.
- The heartwood provides the structural support that keeps the tree standing.
- The heartwood is made of dead wood.

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Build a Tree

Now, because the heartwood is the *heart* of the tree, the person who is acting as the heartwood will make the noise of a beating heart while thumping his or her chest. Th-thump. Th-thump. Th-thump. Have him or her try this. Other participants may laugh, so you can remind them that they will *all* be doing ridiculous things in a bit.

Xylem
Invite the xylem participants to stand on either side of the heartwood. Have them read their cards. Make sure that all your participants understand that:

- Xylem cells transport water and nutrients up from the roots to the leaves.
- This process is driven by transpiration—as water evaporates through the tree's leaves, it triggers cellular processes that pull water up through the xylem. (You may choose to skip this one if you don't have time to research or explain it.)

The xylem participants, therefore, pretend they are zipping water up to the top of the tree by crouching down and then standing up, raising up their hands, and exclaiming: "Zooooooooooooop!" (or something to that effect).

Phloem
Haul your phloem participants out of the crowd and have them stand to the outside of the xylem. Usual drill.

- Phloem cells work in the opposite direction of xylem cells.
- Phloem cells transport sugars made in the leaves down to the rest of the tree.

The phloem motion is pretty much the opposite of the xylem motion. The participants start by standing with their hands raised. Then they squat while bringing their hands down and making the sound effect "Wheeeeeooooooo!" (or some other sound indicative of downward motion).

But wait! Neither phloem nor xylem cells have the ability to reproduce on their own, so where do they come from? Why, it's time for the…

Cambium
Bring up your cambium participants and squeeze them in between the xylem and phloem. Have them read out the backs of their cards and be sure that the other participants understand them.

- Cambium cells are constantly creating new xylem and phloem cells to replace the ones that die.
- Dying xylem becomes heartwood, and dying phloem becomes bark.

The cambium participants pretend to be blacksmithing away on some project, swinging an imaginary hammer and yelling "CLANG!" with each strike.

Bark
Bark people come up to the mike! The bark participants read their cards, which should say something like:

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Build a Tree

- Bark protects the tree from injury and disease.
- Bark is made up of dead phloem cells.

The bark participants are going to assume a linebacker stance (since they're protecting the tree) and simply bark like dogs.

Taproot

Have your taproot participant kneel or sit in front of the heartwood. Have the participant explain the taproot's role:

- The taproot provides stability for the tree by digging into the soil and providing the tree with a foundation.
- The taproot sucks up water and nutrients for the xylem to transport.

The taproot participant gets to pretend to have a jackhammer and to be digging into the soil with it while making appropriate jackhammer noises.

Leaves

Your leaf participants can stand somewhere on the periphery of your model tree. Have them explain their job: to produce sugars for the rest of the tree via photosynthesis. The leaves do their best impression of a French chef: smacking their lips, stirring an imaginary bowl, and even singing "Les Poissons" from *The Little Mermaid* if they want.

PUTTING IT ALL TOGETHER

Once everyone knows their roles, you can unveil your plan for the Build a Tree symphony—everyone doing their respective sounds and motions all at the same time. At this point, many of the participants will have forgotten what they are supposed to do, so you have an opportunity to do a quick review.

VARIATIONS

Variation 1: Layout. Rather than organizing your participants in a line, you can orient them in a circle to better capture the essence of being a tree. The only problem with this is that you need a lot of people (i.e., one heartwood, two xylems, three or four cambiums…it adds up fast). You can reduce the size of your tree by having only two participants play the cambium and having two play the bark.

Variation 2: Seasons. Once you have all of the participants in their roles, you can take the tree through a typical year. In the spring, the tree slowly comes to life, so the participants do their sounds and motions quietly, with the xylem being especially loud, since stored nutrients from the roots are heading to the leaves. In summer, everyone plays their role loudly, since photosynthesis is in full swing. The tree begins to quiet back down during autumn, but the phloem does extra work to store sugars in the roots). And in winter, the tree is dormant and the leaves have fallen to the ground; you can have the leaves act out tragic death scenes.

Build a Tree

Energy Flow
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Variation 3: Techno Tree. Building a techno tree is another possibility, where each part of the tree sounds out a beat or makes a noise, and all of the combined sounds resemble a techno song.

Variation 4: Analogies. In order to get participants more involved in this activity, you can make analogies between parts of the tree and elements of pop culture the kids are familiar with. The Professional Wrestling Tree was meaningful when wrestling was at its peak, where participants played the roles of different wrestlers who exemplified different aspects of the tree. A large, strong wrestler, for instance, would represent the heartwood.

This analogy could be made with pop singers, sports stars (Shaq definitely gets to be the heartwood), movie characters, comic book heroes, etc. If you decide to try this, make sure of three things:

- Have a plan for who each person in the tree will be imitating.
- Make sure your analogies are at least *somewhat* coherent.
- Don't let the kids lose sight of the goal of the activity.

This last one is especially important. If you don't stress the functions and names of each part of the tree, participants will only retain the motions and sounds and not the meaning behind them.

Source: Joseph Cornell,1998. Sharing Nature with Children II. *Nevada City, CA: DAWN Publications.*

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Energy Audit

Energy Flow
The sun is the source of energy for all living things

AGES
All. Adjust complexity to age.

GOAL
To teach participants about energy efficiency and simple ways to reduce the amount of energy we consume

SETTING
Your facility. Talk with the facility manager to get "behind the scenes."

MATERIALS
- Pens or pencils
- Worksheet (See page 2 and modify to suit your facility if necessary.)

TIME
30–60 minutes

BACKGROUND
Though the sun is the ultimate source of energy for all living things, people rely heavily on fossil fuels to warm their homes, power their cars, and light their workplaces. Since the earth will not renew its supply of fossil fuels in the near future, we must use this precious resource responsibly.

A great way to judge how wisely we use our energy resources is to take a close look at the buildings where we live, work, and learn. For example, solar energy helps warm a cool building on a summer morning but overheats it in the afternoon. Instead of increasing our use of air conditioning, we can plant shade trees and shrubbery to keep buildings cool. Old, poorly maintained furnaces run inefficiently and use more energy than newer units. Inspecting furnaces periodically or replacing them with more energy-efficient models reduces waste. The biggest causes of heat loss from a building in the winter are cracks in walls and air leaks around doors and windows. Installing caulk and weather stripping is one of the most effective things any homeowner can do. These are examples of simple ways to reduce our use of energy.

We should all work toward greener, renewable energy sources, but in the meantime we must conserve the supply of fossil fuels. What are some simple energy savers in your facility?

INSTRUCTIONS
As you prepare to lead the activity, take a close look at your facility to find five or ten examples of how it saves energy. You might want to talk with your facility manager or review energy efficiency tips on the Internet for ideas and supplementary information. If necessary, modify the sample worksheet on page 2 so that it suits your facility, and then print copies for your participants.

Distribute the worksheet among participants and take them on a tour of your facility. Remind everyone to be on the lookout for examples of how the facility saves energy. They may use their worksheets as guides. See if your facility manager can help lead the tour and guide the group "behind the scenes" in closets, utility rooms, offices, or basements. You or the facility manager should keep participants from wandering too far from the group, making sure that they understand the items on their worksheets and why each one contributes to energy savings.

WRAP-UP
At the end of the tour, go over the items on the worksheet and allow participants to share their discoveries. Ask participants to share ways they noticed the facility helped to conserve energy and brainstorm about how they could share those ideas and habits with others.

Source: *Submitted by the YMCA of Metropolitan Dallas Collin County Adventure Camp. Adapted with permission.*

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Energy Flow
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Energy Audit

Read each statement below. Does it describe one way your facility saves energy? If it does, mark the box to the left of the statement.

Windows and doors
- □ Curtains or blinds on the windows block the sun when the weather is hot and help keep the cold air outside in the winter.
- □ The windows and doors do not let in drafts. (Check by holding your hands near the crack of the window or door. Do you feel the air moving? If the air is still, it is likely that the window or door helps protect your facility from drafts.)
- □ Weather stripping has been installed around windows and doors.

Bathrooms
- □ Faucets do not leak.
- □ Shower heads conserve water.

Thermostats
- □ Someone adjusts the thermostat when the building closes to save energy for heating or cooling the building when no one is there.
- □ The thermostat runs on a timer that helps to conserve energy during hours the facility is closed.

Lighting
- □ The facility uses fluorescent or high-intensity discharge lighting, which are both much more efficient than incandescent lighting. (Ask your tour leader to explain how to identify each type.)
- □ The lights are turned off in rooms that are not being used.
- □ Windows help let in natural light to reduce the need for artificial lighting.

Boilers, heating, and air-conditioning units
- □ The facility features an energy-efficient boiler, heater, or air-conditioner. (An easy way to check is to look for the "ENERGY STAR" label. The U.S. Department of Energy and the U.S. Environmental Protection Agency use this label to mark energy-efficient appliances.)
- □ An insulating jacket covers the hot water heater.
- □ Air filters on heaters and air-conditioners are clean.

Other energy savers in our facility

_____

_____

_____

_____

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Magic Circles

Energy Flow
The sun is the source of energy for all living things

AGES
9–12

GOAL
To help participants see how a small-scale forest ecosystem uses energy from the sun to support all its members

SETTING
Outdoors, preferably off a trail

MATERIALS
- One hula hoop per group of three to five participants
- One Magic Circle activity sheet per group (see last page of this activity)
- One pencil per group

TIME
20–30 minutes

BACKGROUND
An ecosystem is a community of organisms interacting with one another, as well as with the environment in which they live. Whether the ecosystem is large scale (the entirety of the Catskills, for instance) or small scale (within a hula hoop), its members depend on one another. One way they are linked is through the flow of energy that comes from the sun and changes forms as it progresses through the food chain.

Here are some common terms you might find useful when discussing an ecosystem:
- Producers: Mostly photosynthetic organisms that use light energy to make sugar and other organic compounds. The organisms use the sugar and organic material as fuel for cellular respiration, as well as for growth.
- Consumers: Organisms that obtain their food by preying upon other organisms or by eating particles of organic matter.
- Decomposers: Organisms that help return nutrients and organic substances back to the ecosystem by feeding on and breaking down dead matter.

INSTRUCTIONS
- Ahead of time, be sure to scope out an area where participants will likely find good examples of producers, consumers, and decomposers.
- Set up enough hula hoops for each group in one area. Leave five or six feet between each hoop.
- Begin by defining what an ecosystem is and explain how each organism in an ecosystem fulfills a role, whether it is as a producer, consumer, or decomposer.
- Ask participants to break off into small groups and find a hula hoop that the group can use as an "observation area."
- Ask the participants what they notice within their group's hula hoop. After about ten minutes, hand out the Magic Circle activity sheet and give the groups five minutes to fill it out.
-

WRAP-UP
- Ask each group what its answers were for each section of the activity sheet.
- Point out any cases in which participants found multiple producers, consumers, and decomposers.

Source: Submitted by Frost Valley YMCA. Adapted with permission. Campbell, Neil A., Jane B. Reece, and Lawrence G. Mitchell. 1999. Biology, 5th ed. *Redwood City, CA: Addison-Wesley. www.Merriam-Webster.com.*

YMCA of the USA

Energy Flow
The sun is the source of energy for all living things

Magic Circles

MAGIC CIRCLE ACTIVITY SHEET

Find something in your circle that begins with:

S: _____

H: _____

A: _____

R: _____

E: _____

Is there anything in the circle that is NOT important to the ecosystem?

_____

_____

In your circle, find an example of:

- A producer (uses photosynthesis)

  _____

- A consumer (eats plants or animals)

  _____

- A decomposer (breaks down dead matter)

  _____

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