



UPPER VALLEY LAND TRUST

Teacher's Activity Guide to the Lyme Hill Conservation Area



2012 Edition

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for the Upper Valley Land Trust**



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Program Overview

Recent research has shown that time spent outdoors in nature provides many benefits to children, including reduced stress, better physical health, improved concentration and more creativity. Studies have also indicated that children perform better in school when they spend time learning outdoors. Beyond these health and cognitive benefits, nature also provides them with a sense of wonder and a desire to take care of the natural world. UVLT's mission is to protect and preserve natural places in the Upper Valley, and we believe that the more we teach kids about the natural world around them, the more they will appreciate it and see the value in conserving it, and the more likely they will be to become active environmental stewards as adults.

UVLT can provide opportunities for place-based nature education by offering conserved natural areas as outdoor classrooms. This activity manual is intended to facilitate this by providing ideas for learning experiences and descriptions of activities and games that can be conducted on UVLT land. The activities contained in this manual are intended to be conducted outdoors on UVLT land and to be used alone, or to supplement existing classroom curriculum. Teachers and educators may choose which activities to use depending on the grades they teach and the learning goals they seek to meet. They may choose to do just one or two activities that directly align with a specific goal, or they may choose to visit the UVLT site several times and conduct some or all of the suggested activities.

This manual has been compiled and adapted specifically for the Lyme Hill Conservation Area for use by teachers and others who work with groups of children in grades K-6. Most activities are best for grades 2-5, but can easily be expanded or simplified as needed for younger and older grades. UVLT has a box of supplies and materials intended to be used for these activities. Please note that easy to find, single use, and perishable supplies are not included in the materials boxes. Please call 603-643-6626 if you would like to borrow the supplies box.

Disclaimer:

It should be noted that none of these activities were invented by UVLT, they have simply been collected, edited and compiled to facilitate effective outdoor learning at Lyme Hill Conservation Area. All activities, diagrams, illustrations, photos and materials are intended strictly for educational use, not to be sold or publicly distributed.

History of the Lyme Hill Conservation Area

Lyme Hill Conservation Area is a 237.4 acre property composed of eight parcels acquired by the Upper Valley Land Trust over 20 years. Conservation easements and trails on private property surrounding the LHCA extend over 183 acres of adjoining land.

The process of building the Conservation Area began in 1991 when Michael McGeen and Robert Alden gave UVLT a 37.3-acre property at the top of Lyme Hill. This was the first property UVLT acquired for ownership. In 1993, Bayne and Jean Stevenson donated 3.3 acres that includes the meadow where the parking lot and trailhead are now, and 550 feet of road frontage.

In 1996, UVLT began an initiative to conserve land along Grant Brook, which is the creek running through the LHCA. By 2000, after the purchase of two major properties and negotiations with neighbors who donated conservation easements, 420 acres were conserved, including four parcels which connect the meadow and road frontage property to the top of Lyme Hill. These conservation projects were supported by the Lyme Conservation Commission, the Connecticut River Joint Commissions, the Lyme Foundation, the North American Wetlands Conservation Act, The Nature Conservancy, and the Audubon Society of New Hampshire. The Grant Brook Trail runs east from the Connecticut River to the village of Lyme Center, crossing several parcels of conserved land. Finally, in 2011, UVLT acquired the 15.8-acre wetland property adjacent to the rest of the LHCA through a gift from David and Barbara Roby.

The trailhead and parking lot were installed in June of 2012 with funding from a gift of Bayne and Jean Stevenson. LHCA continues to be a work in process as trails are developed and made more accessible to community members, including school groups and those with disabilities.

Brief Natural History Overview

The Lyme Hill Conservation Area is composed of Northern hardwood forest. It contains a beaver-created pond and surrounding wetland area, and portions of Grant Brook run through it.

Northern Hardwood Forest

Northern hardwood forest is a forest type that ranges from the upper-Midwest to eastern Canada. Sugar maple, American beech, yellow birch and hemlock are the primary indicator species of this type of forest. Other common species are eastern white pine and ash. Broad-leaved deciduous trees are the dominant form in this type of forest. These trees lose their leaves in the fall and are dormant throughout winter months when photosynthesis does not provide much benefit. Northern hardwood forest is known for brilliant fall colors. Most northern hardwood forest is not virgin forest as most of the forest in New England was harvested for timber or cleared for agriculture in the past.

Beaver Pond Wetland

While beavers destroy some habitat by damming and flooding streams, the resulting ponds and wetlands rival rainforests and coral reefs in the biodiversity they support. A third of North America's threatened and endangered species rely on these habitats. Wetlands also absorb floodwaters, alleviate droughts, reduce erosion, raise the water table and even purify water. Due to the high concentration of plant and animal life in and around wetlands, they have mucky soils with a high concentration of decaying material. Wetland muck soils support large populations of microorganisms, and some of these microbes can use pesticides and other organic molecules as food. In addition, wetland plants also act as filters, removing contaminants such as agricultural runoff and pathogenic bacteria from the water. Silt deposited upstream of the dam can also have a filtering effect, resulting in cleaner water downstream.

Creek

The animals able to live in creeks are uniquely adapted to survive in flowing water. Fish must remain in nearly constant motion, and the stream invertebrates must be able to cling to rocks or debris to avoid being swept downstream. There are four zones in the creek habitat, *riffles* (shallow areas where debris like leaves and branches collect; *pools* where the water flows more slowly (such as downstream from a riffle, around a curve or in a wider area); *channels*, where water runs very quickly through areas that are narrow, straight and unblocked; and the *near-shore* area where flow is slower. The soil along the shoreline of the creek is wetter than in the rest of the forest. These riparian areas can support a community of plants that are not found elsewhere. Most forest trees cannot tolerate these soggy soils, but water-tolerant species such as willow thrive there.

A thorough description of these habitats can be found in the book *Wetland, Woodland, Wildland* published by The Nature Conservancy and the Vermont Department of Fish and Game (see Suggested Reading and Additional Resources at the end of this manual for a link to a PDF copy of the book).

Tips for Teaching Outdoors

Many of the same techniques used by teachers in the classroom can be effectively employed in the outdoors, but teaching in nature is unique in important ways. The suggested tips and techniques below may help you in providing a smooth and successful outdoor learning experience for your class.

1. Set clear expectations and rules before you begin. This can be particularly important outside when students are excited and energetic. This is also an opportunity for any chaperones you have along to hear the rules themselves.
2. Alternate active times with focused, listening times. Being outdoors is an excellent opportunity to incorporate physical activity into teaching, but you also have information you want to share. Ensuring that you alternate these will help you get the best of both. If you have just played a game, take a moment to explain something or point out something interesting. If you just spent some time talking and expecting the students to listen, play a game.
3. The sounds, sights and smells in the outdoors can make it especially difficult for students to listen quietly for long. If you are outdoors, do not expect your students to be able to listen to you talk for more than five minutes or so. Ask them questions to help guide them to answers and keep things as interactive as possible.
4. Before you begin any activity or game, set clear boundaries and make sure the students understand them (ex: “don’t go past that bench”). If you forget to do this, students can end up out of sight and far from the group very quickly.
5. Stop for teachable moments. If a flock of birds flies overhead and gets everyone’s attention, stop and watch, and talk about them for a moment. That is why you are outside!
6. Getting the students to come back together to wrap up after an activity can be difficult. Incentives to do so can help. A good one is the “Planet Earth” circle. When you want students to gather around and listen, yell “planet earth!” and begin counting. Tell the students before you start the trip that you want to see how fast they’ll be able to get into a planet earth circle by the end. If you make it a contest to see how fast they can do it, they will run to get in the circle.
7. Use the Quiet Coyote. If you want students to be quiet, put your hand up in the shape of a coyote’s head, with ears up and listening and mouth closed. This is the signal that they should do the same (listen with their mouths closed).
8. Be a cartoon person! It is easy to get upstaged by nature. This is fine sometimes, but for safety and to ensure that the students listen to you, you may need to bump up your energy level. Smile, make large gestures, tell jokes, jump around, etc. Think about it like being onstage—all of your movements should be bigger and your voice should be louder.
9. If you know you are coming to a “trouble spot” such as a steep hill, creek or pond, stop the students BEFORE they have a chance to see the exciting thing ahead and explain what they will see and what you expect of them.

Icebreakers & Introductions

Before plunging head first into the activities, you may want to introduce your students to the habitat and give them a feel for their upcoming nature education experience. It can also be helpful to start the trip with physical movement to warm up for your hike and to release the excess energy that often accompanies students on a field trip. If this is a new group of students, you may also want to review names. Some ideas for simple introductions to each other and to the habitat:

Animal Charades: Stand in a circle. Each student thinks of an animal they believe lives in the habitat you are visiting and invents a motion to match it (i.e., flapping arms for a bird). As you go around, the student performs his or her charade and the other students guess what animal it is. You can have the students say their names as you go around if desired.

Wildlife Yoga: Similar to above, stand in a circle and go around. Each student invents a yoga pose (downward duck, sniffing fox, tree pose) to match a plant or animal they expect might live in the habitat.

Ecosystem/Habitat Freeze Tag: Choose a student or two to be It. Everyone else must say the name of a plant or animal in the ecosystem before being tagged or they are frozen. Once frozen, they can be unfrozen by the tag of another non-It student. You can only use a name once.

Habitat Charades: Split the group into teams of about 5 or 6. Each chooses a habitat (wetland, upland forest, creek, meadow) and assigns parts. They should have some of the key components: a primary producer (plant), an herbivore, a predator, and an abiotic (non-living) component (such as rocks, sun, sand, or wind, or water). After each team has had a practice run of acting out their habitat, bring the whole group together again. Have each team act out their habitat while the rest of the group guesses what they are. *Example:* To act out a forest, the players could be the sun, a tree, a fox, a bird, and a moose.

Activity 1: Take a Dip

Overview: Students collect and observe creek invertebrates using dip nets, magnifiers and field guides.

Goal: Students will observe that creeks are home to a variety of invertebrates.

Objectives:

1. Learn about the life cycles of animals that begin their lives in the creek
2. Understand how the presence and number of species can indicate ecosystem health
3. Identify and classify creek life
4. Use magnifiers, nets, collection trays and field guides to assist them

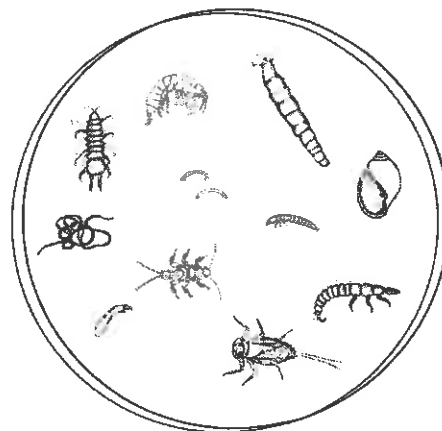
Time:

30 min-1hour

Materials:

- Dip nets-1 large and several small
- Water resistant, child-friendly magnifying viewers
- 2-4 collection trays
- Creek invertebrate field guides

Note: All of these items are in UVLT's check-out supplies box



Procedure:

1. Discuss insect life cycles and creek life. Define invertebrate.
2. Fill collection trays with water
3. Use the large dipnet to scoop around in the creek. Gentle sweeping strokes will not yield much as animals can easily swim away. It is best to move the net around somewhat roughly in order to churn up the bottom a bit and “surprise” animals into swimming into the net. Scoop underneath rocks or foliage. Adults or older students can use the large net, but smaller students may find it too difficult.
4. Place any animals you find into the collection trays
5. Allow students to use smaller nets and viewers to examine specimens. Encourage students to use the field guides to identify what they find.

Discussion: Discuss their findings. What will the nymphs they found become? What are they eating? Why might these animals benefit from beginning their lives in water? Where did they tend to find higher concentrations of animals, and why? What can we say about the water quality of this creek?

NH Stems/Expectations:

K-2: ESS4.2; LS1.1(1,3); LS1.3; LS5.2

3-4: LS1.1(1,2); LS1.2(3); LS1.3(2,4); LS2.1(2); LS2.2(1,2)

5-6: ESS1.2(2); ESS1.7(2); LS1.1; LS1.3(3); LS2.1(1); LS2.3(3); LS5.2

Activity 2: Wetland Metaphor

Overview: Use a selection of common objects as metaphors to explore wetland functions

Goal: Students will have a better understanding about the function of wetlands

Objectives:

1. Students will name at least four functions of wetlands
2. Understand the importance of wetlands in ecosystems
3. Understand how animals and humans depend on wetlands

Time: 10-20 minutes

Materials:

-Bag/box for containing objects

<u>OBJECT</u>	<u>METAPHORIC FUNCTION</u>
Sponge	Absorbs excess water caused by runoff, prevents flooding; retains moisture for a time even if standing water dries up
Pillow	A resting place for migratory birds
Mixer	Mixes nutrients and oxygen into the water
Baby Doll	Provides a nursery that shelters, protects, and feeds young wildlife
Strainer	Strains silt and debris from water (keeps water supply clean)
Coffee Filter	Filters smaller impurities from water (excess nutrients, toxins)
Antacid	Neutralizes toxic substances
Cereal	Provides nutrient-rich foods for wildlife and humans
Soap	Helps cleanse the environment

Procedure:

1. Explain that a metaphor represents a thing or idea through another thing or idea, such as: “your room is a pigsty.” Ask students to provide examples of other metaphors. Help them to conclude that the household objects in this activity are tangible symbols of wetland benefits.
2. Divide the class into groups. Ask a representative from each group to choose an item from the Mystery Metaphor Container. Each group must decide how the object could represent something a wetland is or does.
3. Allow time for students to discuss their answers in groups before each group presents its objects and ideas to the class.
4. Discuss each idea as students present to the class.

Discussion: Summarize the major roles that wetlands perform. How do animals depend on wetlands? How could the loss of wetlands impact ecosystems? How do wetlands benefit people?

NH Stems/Expectations:

K-2: LS2.1(1, 2); LS2.2

3-4: LS1.2(4); LS2.1(2); LS2.3(2); LS3.1(1); LS4.2

5-6: ESS1.2(2); ESS1.7(1,2); LS2.1(1,2); LS2.3(2,3); LS3.1(2)

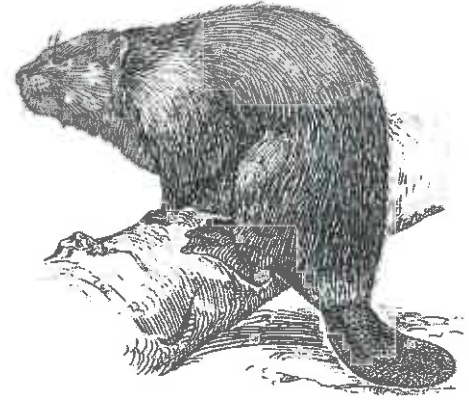
Activity 3: Leave it to Beaver

Overview: Students will create a miniature beaver pond by constructing a miniature beaver dam using twigs and small debris

Goal: Understand how and why beavers build dams and how they can change the ecosystem

Objectives:

1. Discover the materials and methods used by beavers
2. Understand the beaver's life cycle and activities
3. Understand how beavers alter their environments
4. Understand how beaver activities can increase diversity



Time: 15-20 minutes

Materials:

- Dam construction materials: sticks, leaves, mud, twigs
- Water
- Bucket
- Plastic trays (one per group)

Procedure:

1. Discuss beaver activities, the beaver life cycle and the reasons they build dams to students in the classroom ahead of time or in the field before the activity (see materials box for some help with this)
2. Divide students into groups of 2-4
3. Pile and intertwine half of the collected twigs in the center width of a large plastic container, such as a dish tub or a storage container. The twig mound is thicker at the bottom and narrow at the top. This is because the flow of water increases as the depth of the water increases. The shape of the dam is similar to an elongated dome and in a real-world situation may be up to six feet high.
4. Mix dirt and water in a bucket to form a dense mud. Mix the grass clippings in with the mud and stir them together with your hands.
5. Apply the mud and grass mixture to the spaces between the twigs as a glue, which holds them together and fills the cracks, preventing water from getting through.
6. Insert the remaining twigs into any cracks and to keep the mud from seeping out of the dam.
7. Pour water into one end of the container to test the dam's density and construction. Add more mud and twigs as necessary to prevent water from permeating through.

Discussion: Discuss whether this would be an effective dam. What benefits would the beaver gain from the pond? How will the pond change the habitat/ecosystem that was there before? How will it affect number of individuals/species?

NH Stems/Expectations:

K-2: LS1.2; LS1.3(2); LS2.1 (1,2,3); LS2.2; LS3.3(1,2)

3-4: LS1.2(1,3,4); LS1.3(2); LS2.1(1,2); LS2.2(2); LS2.3(2); LS3.1(1,2)

5-6: ESS1.7 (1,2); LS1.3(3); LS2.1(1,2); LS2.3 (1,2); LS3.1(1,2); LS3.2(1)

Activity 4: Bird Beak Buffet

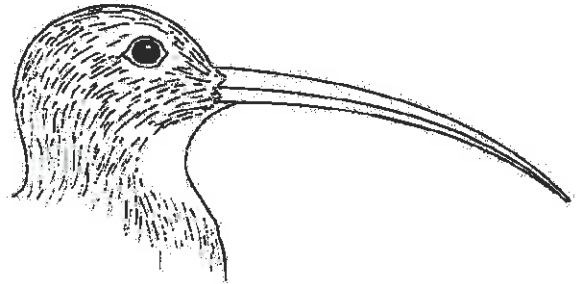
Overview:

Students learn how bird beaks are adapted to various food sources using different implements to represent different beaks and snacks to represent food sources

Goal: Discover the ways in which birds' beaks are adapted for feeding on various types of food.

Objectives:

1. Students will understand that birds have different beak types
2. Understand that the type of beak a bird has is related to its food source
3. Understand that birds developed their beaks over time in response to their environment
4. Develop and test a hypothesis



Time: 20 minutes

Materials:

- “Beaks”: Toothpicks, coffee stirrer straws, tweezers, clothespins, slotted spoon
- “Food”: juice, peanuts in the shell, Gummy worms, cereal, raisins, mini-marshmallows
- Small cups, plates, Ziploc bags
- Pictures of different bird beaks

Procedure:

1. Set up the “buffet” (see page 2 for how to do this)
2. Ask if anyone is allergic to nuts. If so, remove the peanut food source and omit the nutcracker.
3. Ask the kids, “What kinds of birds have you seen?” Allow them to name or describe the birds they have seen. Ask, “What do birds eat?” and “Does every bird have the same size and shape beak?” Allow them to describe the types of foods they believe birds eat and the different types of beaks they have seen.
4. Explain that bird beaks have adapted to suit the environment. Look at pictures of different birds and hypothesize how their beaks may be useful when feeding. For example, raptors have hooked beaks to tear fish and prey; woodpeckers have strong, sturdy beaks with chisel-like tips; a hummingbird’s needle-like beak reaches into flowers and protects its tongue, which it uses to sip nectar.
5. Explain to the kids that they will be using different utensils to represent the different sizes and shapes of bird beaks. Their task is to pick up various different food items using their “beaks” and deposit them into the small cups. Show the utensils and ask what kind of beak they may represent. Show the food items and ask what kind of bird food they may represent.
6. Give students a set of every utensil, a small cup and small piles of each food item on a plate. Allow them to experiment with which utensil is best to pick up each food item. Regroup and discuss their findings. What size utensil picked up the small items best? How about the large food items? Ask them to make a hypothesis about which utensil is best for gathering each food item.

7. Now it is time to test their hypotheses. Testing one food item at a time, give 10-20 seconds (depending on age) to gather as many pieces as possible with the test utensil and place them in their small cups
8. After testing each food item, review the results. Ask, "Which utensil seems to be better for gathering each food item?" Compare and contrast the size and shape of the utensils to the size of the food item.
9. Put the food items they collected into a Ziploc for them to take with them as trail mix.

Discussion: How are birds adapted to their environments? Why don't all birds eat the same things? Why do birds have different strategies for getting food?

Representative Food	Actual Food	Beak Tool	Bird example
Juice in cup	Nectar in flower	Drinking Straw	Hummingbird
Peanuts in the shell	Seeds	Nutcracker or pliers	Finch
Gummy worms in cereal	Worms in soil	Clothespin	Robin
Raisins in water	Floating vegetation	Slotted spoon	Duck
Marshmallows under egg carton	Insects in wood	Kebob skewer	Woodpecker

NH Stems/Expectations:

K-2: LS1.1(2); LS1.2 (1); LS2.2; LS3.3(1,2)

3-4: LS1.1(1,2); LS1.2(1,3); LS1.3(1); LS2.1(1); LS2.2(2); LS3.1(2)

5-6: LS1.1(1,2); LS2.1(1); LS3.2(1)

Activity 5: Predator/Prey Game

Overview: Students (prey) will hide and the teacher (predator) will attempt to find them.

Goal: Demonstrate adaptations and strategies prey animals use for survival

Objectives:

1. Students will define at least three types of animal adaptations
2. Define and understand predator and prey relationships
3. Understand that animals change their behavior in response to the environment
4. Understand that animals use their senses to survive

Time: 15-20 minutes

Materials: None

Procedure:

1. Explain that you are going to play a game called Predator/Prey, and ask the students to define those terms. You will be the predator (choose a local predator) and they are going to be the prey (choose a prey the predator would eat, ask the kids to figure it out).
2. Give the students boundaries, tell them they may not climb trees, and explain that the goal is to get as close to the predator as possible by the end without getting caught. Explain the rules and how the game works (see below).
3. Close your eyes and count to 20 while students find their first hiding place within the boundaries. Assign another adult to ensure students stay within boundaries.
4. After counting, open your eyes and look for prey. You can turn around, squat and stand on tip-toe, but **may not** walk or change locations. Identify students out loud (by name if possible) and describe where they are/what you see. When identified, the prey come to the predator's location and are "eaten." Eaten prey cannot tell the predator where anyone else is hiding.
5. When the predator cannot see any more students, a new round starts. Close your eyes, count to 10 and anyone not yet "eaten" must find a second hiding spot 5 steps closer to you. Then open your eyes and "eat" anyone you see, the same as before.
6. When you cannot see any more students, the final round starts. Close your eyes and count to 5 and anyone still remaining must find their final hiding spot as close to you as possible while still being hidden. Then open your eyes and "eat" anyone you see. After that, anyone still remaining is The Great Frog (or mouse, etc.) and lives to see another day.

Discussion: Ask students what kinds of things they did to keep the predator from finding them. What sense did they use to avoid detection? What senses do they think the predator might have used? Were they quiet, low to the ground, camouflaged, very still? What resulted in being eaten? (Moving, talking, peeking, wearing hot pink, etc.) Ask students to identify animals that are adapted with similar characteristics or behaviors to survive.

NH Stems/Expectations:

K-2: LS1.2; LS2.1(1); LS3.3

3-4: LS1.2 (1,3); LS2.1(1); LS2.2(2); LS3.3(1,2); LS4.1(1,2)

5-6: LS1.2(3); LS2.1(1,2); LS2.3(2)

Activity 6: Bug Box Investigation

Overview: Students will use magnifying boxes to explore and collect small items to examine more closely, such as insects, moss, lichens, leaves, etc.

Goal: Students will make observations about the habitat they are exploring and identify some organisms.

Objectives:

1. Students will be able to identify particular flora and fauna of a habitat
2. Understand that different plants and animals are found in different habitats/ecosystems
3. Use tools (magnifying lenses) to enhance their senses

Time: 15 minutes

Materials:

-Bug boxes (included in materials box)

Procedure:

1. Divide students into teams of two and give each team a bug box
2. Gather the group around to explain the activity. Give students an area in which to explore and provide clear boundaries (i.e., “don’t go past that rock”).
3. Tell the students they will have 10 minutes to explore the area with their partner. They should look for the most interesting thing they can find to bring back in their bug box to share with the group. It need not be alive, but if it is, it must fit safely in the box and be able to be returned safely to its home. They should not pick plants, but they could bring back a piece of a plant no bigger than their little fingernail. Remind them that small insects, etc. are VERY tiny and fragile.
4. Send the teams off on their search. At the end of 10 minutes (or when interest wanes) call the students back to the sharing circle with one interesting thing they have found. Go around the circle and have students share their findings and pass them around the circle. With older students, encourage them to use field guides to identify their findings.
5. Send students back out to put everything back as close to exactly where they found it as possible.
6. Repeat activity in different habitats to see the differences between creeks, wetlands, fields and different parts of the forest.

Discussion: What plants/animals did you find? What characteristics do they share? Did you find the same animals in different habitats? How did having the box help you explore the habitat/ecosystem? What did you see that you may not have seen otherwise?

NH Stems/Expectations:

K-2: LS1.1 (1,2); LS1.2; LS2.1(1); LS3.3(1,2); LS5.2

3-4: LS1.1(1,2); LS1.2(1,2,3,4); LS5.2(1)

5-6: LS1.1(1,2); LS2.1(1,3); LS5.2

Activity 7: Web of Life

Overview: Students use string to illustrate the web-like interconnections between elements of an ecosystem.

Goal: Students understand how plants, animals and environment interact and depend upon one another.

Objectives:

1. Identify plant and animal adaptations
2. Understand relationships among plants and animals
3. Understand the importance of a healthy ecosystem
4. Understand how living and non-living factors interact



Time:

15 minutes

Materials:

- Ball of string
- Web of Life cards

Procedure:

1. Give each student a card and keep the SUN card for yourself.
2. Give students a minute to look at their cards, read the backs and think about their character's needs and lifestyle.
3. Begin by asking, "Who here needs the sun to survive?" Choose a student and throw them the ball of string, keeping hold of the end.
4. Ask the student a series of questions. If for instance the instructor threw it to the beaver, "Who here would you eat?" "Who here would eat you?" "Who do you need to survive?" "Who here needs you to survive?"
5. Have the student choose another character in the circle on whom he or she is dependent on to throw the ball of string to. Have the student hold the string and throw the ball.
6. Game continues until all students are connected at least once and a Web of Life has been created.
7. Ask a student near the base of the web (plankton is a good one), "What would happen if your character disappeared from Earth?" Have this student drop the string.
8. Ask all students connected to this character to drop the string, since something on which they depend no longer exists. Continue until the Web of Life is not visible.

Discussion: Did any connections we made surprise you? Who are the producers in the web? The consumers? What happened when we removed a character from the web? What are the key components of the web on which we all depend?

NH Stems/Expectations:

K-2: ESS2.2; LS1.1(1); LS2.1(1); LS2.2

3-4: ESS2.2; LS1.2(3,4); LS2.1(1,2); LS2.2(1,2); LS2.3(2); LS3.1(1); LS3.3(2)

5-6: ESS1.6(2); ESS1.5(1); ESS1.7(1,2); LS1.2(3,4); LS2.1(1,2,3,4); LS2.3(2); LS3.1(1,2)

Activity 8: Meet a Tree

Overview: Students will use senses to explore and discover an individual tree

Goal: Use observational skills to recognize a tree based on physical characteristics

Objectives:

1. Students will practice using observational skills
2. Understand physical characteristics of trees
3. Understand that trees provide habitat for other species
4. Identify common local tree species

Time: 15-20 minutes

Materials:

- Bandanas or strips of fabric to use as blindfolds
- Tree ID cards or field guides



Procedure:

1. Discuss types of trees in the area and identify a few nearby as a group. Discuss physical characteristics of trees, i.e. bark, leaves, branches, roots. How are trees important to the habitat?
2. Have each student find a partner
3. Ask each group to choose a person to be blindfolded and a person to be a guide
Instruct the guides to disorient their blindfolded partners by spinning them in a circle a few times. The guides should then carefully lead their partner to a nearby tree.
4. Instruct the blindfolded students to feel the tree's bark, hug it to feel the circumference, feel along it for any patches of lichen or fungus, holes, etc. Feel and smell the leaves, listen for birds, wind in the leaves, etc.
5. Once the blindfolded partner feels satisfied that he or she "knows" his/her tree, the guide should spin to disorient again and lead him/her back to the starting place and remove the blindfold.
6. Now the blindfolded students should look around and try to locate "their" trees.
7. Once they find their trees, they can use a field guide to identify them (older grades). Discuss other types of wildlife using their trees (birds, insects, lichen, moss, vines)
8. Switch roles and repeat

Discussion: What observations did you make about your tree? What characteristics does it have that help it survive in this environment? How does the tree get energy to grow? How is the tree supporting other life in the habitat? Is this the type of tree that loses leaves in winter? What benefits does the tree get from losing/not losing leaves?

NH Stems/Expectations:

K-2: ESS2.2; LS1.2; LS2.1; LS2.2(1,3)

3-4: ESS2.2; LS1.2(1,2,3,4); LS2.1(2); LS2.2(2); LS3.1(1,2);

5-6: LS1.1(1); LS1.2(3); LS2.1(1,2,3,4)

Activity 9: Bark Rubbings

Overview: Students will take rubbings from different trees using paper and crayons, and learn to identify common trees by their bark.

Goal: Learn the basics of tree identification, tree bark types and explore textures.

Objectives:

1. Students will understand structure and function of tree bark
2. Understand local diversity of trees and forest habitats
3. Identify common local trees
4. Make a record of their observations using bark rubbings

Time: 15-20 minutes

Materials:

- Paper
- Crayons

Procedure:

1. Give each student a piece of paper and some crayons with the paper peeled off
2. Have students pick a tree to rub and identify it using a field guide
3. To take a rubbing, hold the paper to the bark and gently rub with the long side of the crayon
4. Take multiple rubbings and label each rubbing with the tree's name. Observe differences among the bark types.

Note: You can also do this with leaves

Discussion: How are trees the same as/different from other plants? Do all trees have the same kind of bark? What do you think the purpose of tree bark is (protection from animals and disease, limiting moisture evaporation)? Why do you think different trees have different kinds of bark (depends on which animals eat them, what part of the forest they live in, what their strategy for survival is, etc.)

NH Stems/Expectations:

K-2: LS1.1(2); LS1.2; LS3.3(1,2)

3-4: LS1.1(1,2); LS1.2(1,2,3); LS3.3(1)

5-6: LS1.1(1,2); LS3.3(1)

Activity 10: Plant Un-Identification

Overview: Students make up their own names for plants based on physical characteristics

Goal: Students will learn about plant structure, characteristics and adaptations

Objectives:

1. Students will understand basic structure and function of plants
2. Understand common plant characteristics/adaptations
3. Be able to identify some common plants

Time: 15 minutes

Materials:

-Pencil and paper for each student

Procedure:

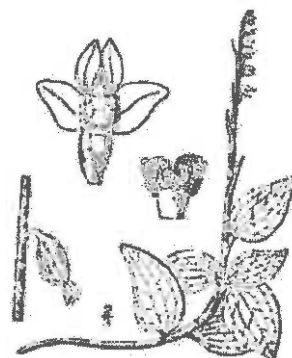
1. Discuss basic plant adaptations and structure as a group. Look at a few nearby plants and discuss the purpose of the stem, leaves, roots and flowers. What is the purpose of each part of the plant (absorbing water and nutrients, carrying water and nutrients to the rest of the plant, photosynthesis, reproduction)? Do all plants have the same kind of leaves or stems? Why not? How might the different characteristics be adapted for this habitat?
2. Divide into teams of 2. Give each team a piece of paper and pencil.
3. Disperse the teams to find their plant within boundaries you give them. Instruct them to find a plant they find interesting that they do not know the name of.
4. Students will sketch the plant, make notes about what it looks, feels, smells like, and one interesting thing about it. Older students may note which adaptations their plant has.
5. Students make up a name for their plant based on its characteristics (i.e., Thicleaved Fuzzystem).
6. When 10 minutes has passed, gather the group together and have each small team share their sketches, notes and name. Try to find each other's plants based on the descriptions. If desired, use field guides to find out the real name of the plant.
7. Repeat in different habitats to

NH Stems/Expectations:

K-2: LS1.1(1,2); LS1.2; LS2.1(1); LS2.2(1,2);LS3.3(1,2)

3-4:LS1.1(1,2); LS1.2(1,2,3,4)

5-6: LS1.1(1,2); LS2.1(1,4)



Activity 11: Binocular Scavenger Hunt

Overview: Students will use binoculars to locate natural objects

Goal: Identify and understand parts of the ecosystem and evidence of human activity using binoculars

Objectives

1. Students know how to use binoculars
2. Use observational skills to identify parts of the ecosystem
3. Understand that humans can impact the environment
4. Use observational skills to look for signs of humans

Materials:

-Binoculars

Procedure:

1. Divide students into groups so that each group has a pair of binoculars
2. Show the students how to use the binoculars correctly by adjusting them for their own eyes, and looking first with their bare eyes at the object they want to look at and then lifting the binoculars to their eyes
3. Provide the students with a list of objects to find and look at through binoculars. These can be added to or changed based on the instructor's specific goals.
 - Three different birds
 - A beaver lodge
 - A beaver dam
 - Something man-made
 - Something natural
 - A tall tree
 - A small insect
 - Evidence of prior or current human use of the land (stone wall, tree farm, skidder/logging trail, snowmobile trails, etc.)
 - Evidence of human attempts to improve the habitat (trail markers, bird houses, removal of invasive species)
 - A large granite boulder
 - A tree with evidence of deer/bear/squirrels/birds

NH Stems/Expectations:

K-2: ESS4.2; ESS4.3(1,2,3); LS1.1(1,2); LS5.2

3-4: LS1.1(1,2); LS5.2

5-6: LS1.1(1,2); LS3.1(1); LS5.2

Activity 12: Fox in the Front

Overview:

Students will move from point A to point B while trying not to be “caught” by the fox.

Goal: Students will learn basic methods for viewing wildlife and behaviors of animals while continuing to move down the trail.

Objectives:

1. Students will recognize that animals use their senses to survive in their environments
2. Understand that animals have physical characteristics that help them survive
3. Understand why it can be hard to see wildlife
4. Know basic techniques for wildlife viewing

Materials:

None

Procedure:

1. Tell the group that you will now be impersonating a fox, and they are expert wildlife trackers trying to observe this fox.
2. Ask the students to list some adaptations foxes have for sensing their environment (large ears for hearing, long nose for smelling, etc.).
3. Ask students why it is rare to see some animals in the woods (they hide)
4. Ask students to suggest ways they can increase their chances of observing the fox: e.g., walk on their toes, don't talk or whisper, move slowly and quietly, etc.
5. Have the students stand behind a starting line and give yourself ahead start to put some space between you and the students. Tell them that when you say “go” they are to try to get as close to you as they can without alerting your fox senses. Tell them that if you hear a sound, you will turn and face them and say: “alert!” or whatever word you choose. They must freeze. Anyone who is still moving or making noise has to move to the back of the group.
6. Start. Move along the trail doing your best fox impression. Sniff things, pretend to dig a hole, trot around. If you hear a sound (giggling, talking, loud footsteps) turn around and face the group. Send anyone not frozen to the back. You may choose to ignore clothing swishing, breathing, sounds the kids can't control.
7. You should be slowly making your way along the trail. Continue until you reach your destination.

NH Stems/Expectations:

K-2: LS1.2; LS2.1(1,2)

3-4: LS1.2(1,3); LS4.1(1,2)

5-6: --

Conclusions & Reflections

Taking the time to reflect and review conclusions is key for ensuring that students make the connections between their experience and the lessons they have learned (sometimes without even knowing they were learning). Below are some suggested activities for encouraging reflection as well as winding the students down to return to an indoor setting.

Magic Spots: Have each student find a place to sit alone. Give them 2-10 minutes (depending on age) to sit and observe. When time is up, circle up and share observations and thoughts about the experience.

Nature Noise: Stand in a circle and have everyone close his/her eyes. Tell them you will spend the next 1-2 minutes counting sounds. Tell them to hold up a finger each time they hear a new sound. Don't count the same sound twice (count *different* bird calls, but not the same one more than once). When time is up, open eyes and see how many sounds were heard. Discuss. This can also be a good way to re-focus the group after a more energetic activity.

Nature Journals: Bring paper and pencils into the field and have students write about and sketch the most memorable moments of the experience.

Group Poem: In a circle, go around and have each student sum up the day with one word. Write each word down and then read aloud as a poem ending with the word "day." Example: "Sunny, fun, muddy, sparkly, educational, beautiful, froggy, leafy, magnified day."

Something Learned/Something Liked: In a circle, go around and have each student share something new they learned and something they liked doing or seeing.

Suggested Reading & Additional Resources

Place-based Education Evaluation Collaborative. 2010. The Benefits of Place-based Education: A Report from the Place-based Education Evaluation Collaborative (Second Edition). Download PDF at: <http://www.peecworks.org/index>

Joseph Cornell website (author of Sharing Nature with Children books)
<http://www.sharingnature.com/about-us/joseph-cornell.php>

New England Association of Environmental Education: <http://www.neeea.org/>

Louv, Richard. Last Child in the Woods: Saving Our Children From Nature Deficit Disorder. 2005. Algonquian Books.

Thompson, Elizabeth and Eric Sorenson. Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. The Nature Conservancy and Vermont Fish & Wildlife (2005). Download PDF at: <http://www.vtfishandwildlife.com/books.cfm?libbase=Wetland,Woodland,Wildland>

Northern Woodlands Goes to School:
http://northernwoodlands.org/programs/nw_goes_to_school

Take a Child Outside: <http://www.takeachildoutside.org/activities/index.html>

New Hampshire Fish and Game classroom resources:
<http://www.wildlife.state.nh.us/Education/resources.html>

One New England: Science and Nature
<http://www.onenewengland.com/chapter.php?cid=6>

Green Teacher
<http://www.greenteacher.com/>