Environmental Science Programs

With

Beaver Brook Nature Center

Animals Adaptations & Antifreeze *- Winter*

Students will experience several hands-on 'lab' stations on winter animal adaptations and be able to observe feathers under a microscope, test out different types of insulation in snow or ice, and examine furs, animal foods and animal sign up close. By end of their lab the students will learn that the environment dictates how an animal adapts and will also understand that not all animals adapt; some choose to migrate and others simply lay eggs and die. Two hour classes will migrate outside for an **Animal Antifreeze** experiment in which they will work in pairs to quickly forage for supplies and create an insulated shelter for their "warm blooded creature" (a little container of hot gelatin). This experiment follows the basic outline of the Scientific Method and touches on hypothesis, control and independent variables, and conclusions. As the experiment runs, a hike to look for animal signs keep everyone warm and then it's back to see if the little "buddies" survived!

1 - 2 hours. 3rd grade and up ***NHSS: 3-LS2-1, 3-LS4-2, 3-LS3-2, 3-LS4-3, 4-LS1-1***

Animals in Winter *- Fall, Winter, early Spring*

How do our New England animal friends survive the winter? From the smallest chickadee to the largest black bear, everyone is dealing with winter differently! Even we as people adapt ourselves to the winter weather ...we are mammals after all! This program animates the concepts of hibernation, adaptation, and migration with a funny and **informational puppet show** which showcases some of our common New England animals and the strategies they use to they survive the winter. A hike outside to explore nearby habitats using a clue sheet is a good way to hunt for signs and clues of what NE wildlife have been up to.

1.5 - 2 hours*. PreK -3rd grade*

NGSS: K-ESS2-1, K-ESS2-2, K-ESS3-1, K-LS1-1, 1-ESS1-2, 1-LS1-1, 2-LS4-1, 3-LS2-1, 3-LS4-3, 3LS3-2

Aquatic Wonders *- Spring, Summer*

Explore a diverse pond ecosystem! Students will have the opportunity to investigate aquatic food chains and life cycles as they use pond nets and magnifiers to search for and collect not only frogs and fish, but the smallest and most interesting of aquatic life. Meet a water scorpion who breathes from his tail and a caddis fly who attaches whatever he finds to himself to create a cocoon-like home. Every unique animal in the pond has adapted their internal and external structures to survive, grow, and reproduce. Students will make observations and identify the species they find with the help of identification charts. Older students will also focus on the life cycle of the pond itself and will assess water quality by identifying indicator species found in "healthy" and "unhealthy" water systems. An optional watershed model is available for assessing human impacts on our water resources. ***1 - 2 hours. K and up***

NGSS:* K-LS1-1, K-ESS3-1, *1-LS1-1, 2-LS4-1, 3-LS1-1, 3-LS4-3, 3-LS4-4, 4-LS1-1, 5-LS2-1

Bats & Owls *- Year Round*

Bat myths are busted! We will turn unsure students into aficionados of these often misunderstood flying mammals. While discovering new facts about our furry, flying friends students will understand how these

mammals are perfectly adapted for their nocturnal lifestyle. With some fun outdoor games students can experience how bats' internal and external structures help them survive. We will also explain how bats use echolocation and their keen sense of smell as well as their other senses. The benefits of bats in pollination and insect control are also discussed. How can we help many of these endangered species? Longer classes will head out for a hike to see where bats live and observe our bat houses.

Everyone loves owls, but most people don't know all their amazing abilities and adaptations! After covering the owls' true superpowers, we can move onto a dissection of owl pellets or an outdoor hike to search the local owl habitats for roosting sites and to practice owl calls. (There is an additional cost for owl pellet dissection.)

1 - 2 hours*. 2nd grade and up* ***NGSS: 2-LS4-1, 3-LS1-1, 3-LS2-1, 3-LS3-1 4-LS1-1, 4-LS1-2, 5-LS2-1***

Beavers & their Wetlands Friends

- Spring, Summer, Fall

Beavers are incredibly well adapted for their wetland habitat. While observing a beaver mount, skull, and various other items, students will have the opportunity to learn about the beaver's amazing adaptations. Students will take a 1 hour adventure to a nearby beaver pond, dam and lodge to see how these mammals have altered their environment to suit their own needs. We will also discuss how these changes benefit other species of wildlife. Older students will also learn about the important functions and diversity of freshwater wetlands and be able to compare the wetland habitat to the fields and forest they walk through along the way.

1.5 - 3 hours. 2nd grade and up ***NGSS: 2-LS4-1, 2-ESS1-1, 2-ESS2-1, 3-LS4-4, 3-LS2-1***

Bugs, Butterflies, Beetles

- Spring, Summer

Take to the fields and create a classroom insect collection! Using nets and bug boxes students will get an up close look at the components of an insect. Students will learn about the anatomy, adaptations, sometimes odd habitats and always interesting life cycles of insects. They will develop an understanding of these largely beneficial creatures that outnumber us a million to one! Longer programs will have the opportunity to hike into to a forested habitat for further insect examination or to take a short walk to our Beaver Brook bee hives to learn about these brilliant honey making machines!

1 - 2 hours. *K & up.* **NGSS: K-ESS3-1, 1-LS1-1, 2-LS2-2, 2-LS4-1, 3-LS1-1, 3-LS2-1, 3-LS3-1, 4-LS1-1**

Discover the Cycle of Seasons

- Year Round

Each season has its own special occurrences and with these discovery programs the students are able to explore and experience the different seasons first hand! The sensory filled hikes through our various habitats place emphasis on nature's cycles and developing a student's connection with nature.

Discover Spring: **Birds, Bugs & Buds** - Visit a field to investigate insect activity, a vernal pool to discover frogs and aquatic life, a forest to explore the budding of trees and flowers, and pass through the fields to enjoy the spring activity in the world of birds.

Discover Fall: Leaves, Seeds & Changes - Explore the changes of our New England forests and animals as they adapt with the changing seasons. A seed walk through the surrounding habitats gives students an opportunity to investigate the changes around them.

Discover Winter: Tracks, Trails, & Trees - Winter brings about a new environment of snow covered ground and ice covered streams. Animals and plants have adapted to survive and the trees are also changing. Snow brings the opportunity for animal tracking and snowshoeing adventures. Take a winter

outing to explore it all.**1 - 2 hours.** ***PreK and up*** ***NGSS: K-ESS2-1, K-ESS2-2, K-ESS3-1, K-LS1-1, 1-ESS1-1, 1-ESS1-2, 1-LS3-1, 2-LS2-2, 2-LS4-1, 3-LS1-1, 3-LS4-3, 4-LS1-1 (Fall); 5-LS1-1 (Fall)***

Exploring Habitats & Seeds *- Spring, Summer, Fall*

While taking a hike through our nearby wetlands, forests and fields, students will make and record observations about these three different habitats. As they begin to experience the main components of each habitat they are easily able to compare and contrast the different environments and learn how these differences/similarities will determine which plants and animals would live where. Students will also be paying close attention to the plants and learning how each plant is able to creatively disperse its seeds! Students will use sampling devices and Venn Diagrams to provide an engaging conclusion to their hike.
2 hours. 2nd grade and up ***NGSS: 2-LS2-1, 2-LS2-2, 2-LS4-1, 3-LS4-3, 3-LS4-4***

Fine Feathered Friends *- Spring, Summer, Fall*

What makes a bird a bird? Students will rotate through a variety of hands on activities and exhibits within the largest collection of bird mounts in New Hampshire, our Maple Hill Bird Museum! They will have an opportunity to learn about the special adaptations that are unique to each family of bird species. While understanding that birds have defining characteristics, students will also observe the wide diversity and see how each birds traits are specially adapted for their individual lifestyles and habitats. By making observations of a bird's feet, beak, and size, students will hypothesize about its habitat and eating habits. As a group we will practice identifying some common bird songs and take a hike through our various nearby habitats to look for nests and evidence of bird activity. ***1 - 2 hours. K and up***
NHGS: K-ESS3-1, 1-LS3-1, 1-LS1-1, 2-LS4-1, 3-LS1-1, 3-LS2-1, 3-LS4-2, **3-LS4-3,** ***4-LS1-1***

Forest Ecology *- Year Round*

While following a trail from an old farm, through its nearby fields and into the forest, students will find themselves surrounded by the various stages of natural reforestation. As the habitats change, students can observe the differences and brainstorm as to why the plants and animals living there also change. Students will learn about the ever-evolving land use and forest succession as it intertwines with other plants, animals, and decomposers. Students will use tree rings to age trees and a dichotomous key to identify species of trees. Students will also learn how the sun's energy is transferred to animals and plants alike. Optional Middle School activity: **Tree Geometry** lesson during which the students will use algebraic calculations to determine the height of trees.
2 - 4 hours. 3rd grade and up
NGSS: 3LS4-3, 3LS4-4, 4LS1-1, 4ESS2-1, 4ESS3-1, 5PS3-1, 5LS1-1, 5LS2-1

Habitat Quest *- Year Round*

This questing activity employs maps and compasses as small groups of students and their chaperones head out to the trails on their own. Each group works together to follow maps and specific written directions to seek out a set of clue boxes which are based on a particular animal from a specific habitat. These animals represent the four main types of eaters: omnivores, carnivores, insectivores and herbivores as well as three main habitats: fields, forests, and wetlands. As the group finds the clue boxes, the students will begin to learn more and more about their specific animal. When the groups reconvene at the end, they will each "present" the habitat requirements of their animal. As discussions take place the class can compare and contrast the diversity of life from each habitat while beginning to understand how these New England animals survive out in the wild. ***Combines well with Skulls & Teeth.*** **1 hour. 2nd grade and up**
NGSS: 2-LS4-1, 3-LS2-1, 3-LS4-2, 3-LS4-3, 3-LS4-4

Map & Compass: Orienteering *- Spring, Summer, Fall*

Learning map reading is very empowering and a valuable life-long skill. In this class, participants will learn how to read maps, use compasses and navigate on trails in search of orienteering markers on our property. The challenges increase the longer you stay! This can be combined with team building activities or natural science challenges to accomplish along the trail. After the introductory lesson, students will travel on the trails in small groups with chaperones. You always see and learn about new things along the trail. Map reading and comprehending directions are important skills to backup GPS use. Excellent for middle & High School students.

2 - 4 hours. 4th *grade and up* ***NGSS: 4-ESS2-2***

Maple Sugaring *- Late February to Early April*

Biology, Chemistry, History, Physical Science—Talk about S.T.E.M.! This fascinating class encompasses it all. From photosynthesis to tree identification and measurement to the historic process by Native Americans who discovered how to cook sap into sugar. Students will use measuring tapes, hand drills, spiles, and buckets to set their own tap and then be put to work collecting sap and adding it to our on-site, working wood-fired evaporator pan located in the sugar bush so they can see evaporation, condensation, combustion in action. Student can take a taste test to see if they can tell the difference between syrup from a tree and syrup from a factory. Longer classes can try out an antique shoulder yokes in a sap relay. Younger classes can enjoy a fun puppet show which explains sap and the magic behind maple syrup!

1 - 3 hours. ***PreK and up*** ***NGSS: K-2ETS1-2, K-2-ETS1-3, K-ESS2-1, K-PS3-1, 1-ESS1-2, 2-PS1-4, 3-LS1-1, 3-ESS2-2, 4-LS1-1, 5-LS1-1, 5-LS2-1, 5-PS1-1***

Native Americans of the Woodlands *- Year Round*

This is a field trip like no other... complete with a visit to a real Ash Bark Wigwam! Students will enjoy an interactive Native American experience as they grind corn, scrape deer hides, and practice their hunting skills. While observing our large collection of Native American tools, students will see that these early people fully depended on the land, plants, and animals for their survival. All of their early inventions came from their environment and students will have the opportunity to handle and think of their own inventions as they hike. Older students and/or longer classes will also touch on wild edibles and herbal medicines Native Americans used as well as participate in Native American games. **1 - 4 hours. PreK and up.**

NGSS: K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3, K-LS1-1, K-ESS2-1, K-ESS3-1, K-ESS3-3, 1-ESS1-1

New England Wildlife: Tracks, Clues & Signs *- Year Round*

A number of interesting clues can been found at Maple Hill Farm! Who left them? What do they tell us? Using their detective skills, students will examine animal clues such as: tracks, skulls and other items and determine what animal it is “from”. Once their observational skills are honed, they will head out onto the trails to hike through the different habitats to search for more clues left by the animals who make Beaver Brook their home. Our outdoor discoveries are guaranteed to lead to teachable moments when the students are able to make memorable connections to the animals and understand how their adaptations allow them to survive in the wild.

1 - 2 hours. K and up ***NGSS: 2-LS4-1, 3-LS1-1, 4-LS1-1, 5-LS1-1***

Skulls & Teeth, What Do You Eat? *-Year Round*

Take advantage of our extensive New England Mammal Skull collection! Students will examine these skulls up close and by making observations to compare and contrast details they will determine which of these native species are carnivores, omnivores, herbivores and insectivores. Students will further explore the skull’s components and their functions to see how these internal structures support the animal’s survival, growth and behavior. With the help of some hands on activities we bring the food chain to life.

Students will develop an understanding of how energy is passed from the sun not only these animals, but the plants, insects and primary consumers they may be eating! To wrap up this unique class, we take a quick peek at some local scat because what goes in has to come out! Longer classes will have an opportunity to hike through different habitats to see where these animals live.

1 - 2 hours. 3rd grade and up ***NGSS: 3-LS3-1, 3-LS3-2, 4-LS1-1, 5-LS2-1, 5-PS3-1***

Snowshoeing & Animal Tracking *- Winter*

Students and grown-ups will put on a pair of Beaver Brook snowshoes and head out into the fields and forests for a guided winter adventure! Test your snowshoe fit on an obstacle course in the gardens before heading onto the trails. As we hike, students have the opportunity to explore for evidence of wildlife activity in winter. Finding animal tracks is inevitable and students will learn to correctly identify these into the main groups of trotters, hoppers, walkers, and waddlers. These tracks naturally lead to conversations about the winter behaviors of animals and how these active animals are responding to winter changes ...and even what has happened to the animals that have opted out of winter! ***1.5 - 2 hours. 1st and up NGSS: K-PS2-1, K-ESS2-2, 2LS4-1, 5PS2-1***

A Worm's Work *- Year Round*

During this program students will get an up close, hands on experience with our hardworking, composting worms who are composting food scraps into nutrient rich soil around the clock! Interacting with our Working Worms is a great opportunity to excite students about the important work that earthworms and other decomposers perform and will prove how important these small creatures are to our gardens and forests. Students learn that earthworms are living invertebrates and discover 'scientific evidence' while conducting mini "worm safe" experiments. A trip outside to our composting court and gardens gives students an opportunity to investigate different types of soils and to use a soil sieve to separate soil down to its basic layers. Older students delve into the processes of vermiculture composting and the internal workings of our worm friends as well as look more carefully at soil layers and composition.

1 - 2 hours. PreK and up ***NGSS: K-ESS2-2, K-ESS3-3, 3-LS1-1, 4LS1-2, 5-LS2-1***

Educational Program Fees			
	Per student	w/ Minimum fee	
1 hr program	$7	$125	**Outreach Programs-We come to you**
1.5 hr program	$8	$150	
2 hr program	$9	$175	
2.5 hr program	$10	$200	**$200/ 1hr program (w/i 25 mi)Each consecutive class on same day receives a $10 discount.**
3 hr program	$11	$225	
3.5 hr. program	$12	$250	
4 hr program	$13	$275	
4.5 hr program	$14	$300	(2 hr. min. for programs over 25 mi)
5 hr. program	$15	$325	
			+Mileage = $ .575/mile
Please note: Class size is limited to 24 students. Includes 6 adult chaperones in cost of trip. Custom programs or program blends may incur surcharge of $25 and up. **Weekend programs subject to 20% surcharge.**			