





## HIGHLANDS BIOLOGICAL STATION & NATURE CENTER

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PO Box 580 | 930 Horse Cove Road, Highlands, NC 28741 USA | Outreach - (828) 526-4123 | www.highlandsbiological.org

# HIGHLANDS NATURE CENTER'S

Highlands Nature Center introduces children and adults to the rich biological diversity and ecology of the southern Appalachian Mountains. Through its exhibits, hands-on educational science programs, and immersive biological field experiences the Nature Center seeks to instill a greater awareness, understanding, and appreciation of the natural world.

## SCHOOL PROGRAMS

Highlands Nature Center (HNC) provides more than 50 different science enrichment programs for public, private, or homeschool groups in grades K-12. These outreach programs are correlated with the North Carolina science Essential Standards for each grade level, and supplement existing lessons by bringing additional resources to the classroom and by providing immersive, experiential education opportunities for students.

Programs can take place in the classroom or in natural outdoor settings, and are designed to provide hands-on learning experiences through activities, games, observations, and field studies. Most classes can be modified and presented either at your school or facility, as well as at HNC. Each program lasts approximately 60 minutes, unless specific circumstances require adjustments to the schedule.

#### Nature Center & Botanical Garden Tour (all ages)

Students will have the opportunity to see examples of native plant and animal species. The Nature Center's exhibits include live reptiles and amphibians, a honeybee hive, a 439 year-old hemlock tree, geology and archaeology specimens, and mounts of birds and mammals. Interactive exhibits include the birding station, microscopes, and our Touch & Learn table. A guided walk through the Botanical Garden features labeled plant species, and numerous trails to various habitats including hemlock forests, streams, a mountain bog, and Lindenwood Lake.

#### Discovery Hikes (grades 3-12)

Interpretive hikes take place along any trail of your choosing (such as Siler Bald, Whiteside Mountain-Devil's Courthouse, etc.). Students will explore mountain habitats and learn about regional plants and animals, ecology, and geological features. Hikes may take several hours; please bring a sack lunch, water, rain gear, and wear appropriate shoes. Students should be in good physical condition.



### Birds & Flight (all grades)

This class focuses on shape and color of specific birds, marks used for identification in the field, bird songs, habitat and diets, and bird anatomy. Additionally, it will cover the concepts of flight including lift, force, and aerodynamics. Weather permitting, students will also learn techniques to attract birds for better viewing in the field.

*Botany (grades 1–8)* Activity topics will include groups of plants, types of leaves, parts of trees, tree growth, transpiration, and photosynthesis. We may also discuss pollination including the parts of flowers, seeds, and fruit. Students will also be given an opportunity to locate and identify various tree species.

#### Compass & Orienteering (grades 3-12)

Students are introduced to the use of a compass. They will learn such concepts as direction and bearing, degrees in a circle and angles, and how to use a compass and interpret maps to find their way. This class is a good supplement to lessons in geography and math.

#### Experimental Design & the Scientific Method (grades 9-12)

This workshop is specifically designed for students developing independent field research projects. Participants will review the steps of the scientific method, and will work together to plan the protocols for a hypothetical research project involving stream salamanders. Time will be spent in the field collecting data, followed by a detailed discussion of the pitfalls and potential sources of error when designing similar field experiments.

*Forestry Methods (grades 6–12)* Students will develop math skills measuring such things as diameter and height of trees, canopy, leaf litter, and logs to evaluate the quality of the habitat for wildlife. Alternate versions give students opportunities to survey levels of infestation by the invasive hemlock woolly adelgid, or quantify lichen growth on trees as indicators of air quality.

*Forest Study (grades K-8)* Students will explore forest layers (soil, shrub, canopy) and the living things found in each. Students will participate in a variety of activities as they are led on an interpretive forest walk. Topics include plant and animal species diversity, adaptations and niche, forest microhabitats, soils, decomposition and nutrient cycling, forest succession, and conservation.

#### Group Dynamics (grades 4-12)

This class features a series of fun team challenges that illustrate the importance of using effective social skills in small group interactions. Concepts include communication and active listening, goal setting, teamwork, leadership, cooperation, and group decision making and problem solving. Can be repeated with additional activities and new discussion topics that build upon previous lessons.

# OUTREACH PROGRAMS

#### Insects (grades K-8)

This class focuses on differences between insects and other invertebrate groups, types of insects, anatomy, and life cycles. Students will be given the opportunity to collect examples of live insects from several habitats using various field techniques.

#### Keys & Classification (grades 5-12)

Students will be introduced to the biological classification system, and to the use of dichotomous keys to separate biological groups and identify specimens based upon their characteristics. Activities may include creating a key to classmates or insects, tree identification, or a reptile and amphibian or bird "hide & seek" using keys to navigate the Station's trails.

#### Mammals (grades K-12)

Students will learn what makes something a mammal, examples of different types of mammal groups, and examples of mammal tracks. Students will have the opportunity to examine skins and skulls of various mammal species. Concepts also include predator and prey adaptations and diet. Shorter programs on specific mammal groups are also available.

#### Nature Games (grades pre-K-2)

Students will play a variety of fun games that illustrate various ecological concepts such as food chains, predators and prey, habitat, biodiversity, and animal behavior. Can be repeated with different games and topics.

#### Nature Observation (grades K-8)

This class encourages creativity, discovery, and appreciation for nature as students learn how to observe plants and animals. While exploring nature, they may sketch things they find, describe behaviors of animals, make leaf and bark rubbings, and make a "sound map." Older students learn ways of collecting data, or be encouraged to write short stories or poems.

#### Pond Life (all grades)

Students will discover the diverse aquatic fauna of Lindenwood Lake or another local pond. We will examine samples of mud for live insects, discuss adaptations for aquatic life, and see how the composition of the pond community can indicate water quality. Older students may perform chemical analyses of the water such as pH and dissolved oxygen.

#### Population Genetics (grades 7-12)

Activities simulate the effects of natural selection and mutation as agents of genetic change in populations over time. Additional concepts include alleles, genotypes, phenotypes, adaptation, speciation, and evolution.

#### Predators & Prey (grades K-8)

This class features activities that teach such concepts as diet, food chains, predator, prey, and camouflage. Students examine skulls of carnivores and herbivores, discuss morphological and behavioral adaptations, and learn how predators and prey use these adaptations in different ways.

#### Reptiles & Amphibians (all ages)

This class focuses on differences between reptiles and amphibians, life histories, habitat, and anatomy. Students will have the opportunity to see and touch examples of live animals to gain a greater understanding of these creatures and their needs, and to dispel common misconceptions. Shorter programs on specific reptile & amphibian groups are available.



### Storybook Science Programs (grades pre-K – 4)

Students will be given a brief nature lesson, based around a children's storybook, using items from the Nature Center to illustrate concepts. Can be offered repeatedly with different topics and stories. Examples include beavers, bears, frogs, trees, turtles, insects, opossums, snakes, squirrels, owls, bats, camouflage, snails, salamanders, etc. **Mini-lessons without story also available for older grades. See reverse for more details.** 

#### Streamside Salamander Communities (grades 4-12)

Southern Appalachian streams contain a great diversity of salamanders. Students will learn to identify species, capture and measure salamanders, and collect and graph data to examine how species use the stream habitat in different ways. Topics include adaptations, habitat, communities, niche, competition, and predation. **Bring shoes appropriate for wading.** 

### Watersheds (grades 3-12)

Students will learn what a watershed is and how its condition affects the water downstream. Activities demonstrate topics such as watershed delineation and function, the components of the water cycle, and both point and non-point sources of water pollution.

### Wildlife Habitat (grades 4-8)

Students will learn how animal populations are influenced by the availability of habitat resources. Activities teach concepts such as habitat components and wildlife needs, population growth, the role of predators, interdependency and connectedness, carrying capacity, limiting factors, conservation, and endangered species.

#### NC Wildlife Programs (grades 9-12)

Presentations, labs, & field-based workshops. Visit website for details.

"Highlands Nature Center regularly provides valuable enrichment programs to our rural school that support our state and national science goals. These experiences go far beyond textbook learning and will have a lasting impact on the lives of our students."

## "In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught."

- Baba Dioum, Senegalese ecologist and poet



## FOR THE VERY YOUNG

Children of ages pre-K to 2nd grade are recommended to participate in our wide range of Nature Games and "Storybook Science" programs. These are shorter, simpler lessons focusing on a single topic, accompanied by a reading of a related children's storybook. Programs are also available for older grade levels without the story.

Animal Signs Animals in Winter Rats Bears Beavers **Birds** Camouflage Canines (fox, coyote, etc.) Cats (bobcat, cougar, etc.) Deer Earthworms Fall Leaf Colors/Evergreens Frogs & Toads Fungi Habitats/Ecosystems **Insects** 

Leaves/Tree Identification Mice Moles & Shrews **Opossums** Owls Predators & Prey/Food Chains **Rabbits** Salamanders Scary Animals Seeds & Flowers Snails & Slugs Snakes Squirrels/Groundhogs Tree Life Cycles/Forests **Turtles** William Bartram

## STEM EDUCATION

STEM (Science, Technology Engineering & Math) education is an interdisciplinary approach to learning that couples rigorous academic concepts with real-world experiences. Informal science education offered by museums and nature centers extends student learning beyond the classroom through hands-on activities that let students discover and practice STEM concepts. Such programs inspire and educate youth and adults and raise student interest, confidence, achievement, and desire for science careers. Highlands Nature Center's STEM programs integrate multiple subject areas and correlate with NC science Essential Standards.

#### NC Essential Standards



## OTHER GROUPS

School programs are available for groups such as scouts, churches, 4–H, libraries, other community organizations, and the general public. Special request programs can be accommodated. Lectures and workshops for adults are available on a variety of topics, as are teacher and informal educator workshops for science CEU and NC EE Criteria II or III credit.

## COSTS

The requested donation for school programs is only 50¢ per student, but may be waived. Fees for lectures, workshops, and public programs with general admission are typically a flat rate based on the expected number of participants and program length. Tours of the Nature Center and Botanical Garden are free, but contributions are greatly appreciated.

## FOR MORE INFORMATION

Descriptions and details of each program offering, including correlations to the North Carolina Essential Standards Science Curriculum, are available on our website. For additional information or to schedule a program, please contact the HNC Outreach Office at the address below:



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Highlands Nature Center is supported in part by the NC Science Museums Grant Program, and by the Highlands Biological Foundation, Inc. HNC is located on the campus of the Highlands Biological Station, an inter-institutional center of Western Carolina University.