

Brief Descriptions of Black Rock Forest Curricula

Intermediate Grades: Fourth to Eighth Grade

These brief descriptions of curricula frequently pursued by intermediate grades at Black Rock Forest are organized by subject area. Consortium members may obtain information and curriculum materials from Forest staff. Descriptions of curricula for other grade levels are also available on this web site.

Life Science

Aquatic Invertebrates. A stream's condition and health can be evaluated by studying the amount and types of aquatic invertebrates living in it. In this class, students sample the stream to collect a selection of the invertebrates. They then identify the organisms and assess the condition of the stream.

Deer Biology and Management. This class begins with a classroom discussion using pictures, deer skins, skulls, and antlers to help explain the adaptations of deer and their critical behavior for survival. Students can go on a hike to explore the habitats and needs of white-tailed deer. Scheduled stops include visits to deciduous and conifer stands along neighboring swamps and wetlands. Techniques of tracking and study of deer sign are discussed and practiced, with an emphasis on the deer's annual breeding cycle. The class is best pursued during September, October, and November. Winter classes are possible if the weather permits.

Dendrology. Black Rock Forest is home to 65 species of trees and many species of shrubs. A dendrology identification key has been established to enable students to identify 25 of the most common woody species. The key uses leaf anatomy and structure as identification clues. Leaf-out at Black Rock Forest occurs in late April and leaf-fall begins in mid-October.

Forest Ecosystems. *This is an interdisciplinary unit with separate write-ups for plant life, wildlife, geology and soils, human impacts, and environmental measurements, which can be pursued together or separately.* A hike leading from the Center for Science and Education to the White Oak Tree includes ten stops, each representing a different habitat found in the Forest. At each stop, Forest staff have collected information about wildlife, plant life, geology and soils, environmental measurements, and human impacts. The theme or themes of the hike should be chosen by instructors based on the class level and interest. That theme can then continued through the hike. Generally, the wildlife and plant life classes are suggested for younger grades and the others are for more advanced classes. The time needed to complete each class is about 3-4 hours.

Mammals. Introduction to the mammals of Black Rock begins with a discussion of mammal adaptations using skulls, skins, and pictures. The diverse habitats of mammals are also discussed. Following the lab discussion, it is off to the woods to investigate animal signs and survival strategies in a variety of habitats.

Amphibians. Amphibian life and health are directly related to water availability and quality. Vernal pools, which serve as breeding and developmental locations for a variety of amphibians, are scattered throughout the Forest. During early spring visits (March-May), students can easily

discover first amphibian eggs and then larva and adults. Students can use dip nets to collect and observe amphibians and can measure pH, temperature, pool size and depth, and surrounding terrain to correlate species diversity with habitat quality.

Trout in the Classroom. *This is a multivisit course, although the program can be observed on a single-day visit.* This intensive hands-on course runs from December through May in concert with the life cycle of New York's only native trout species, the brook trout. Classes can sign up to integrate this into their curriculum or just observe on a day visit. Students observe brook trout in tanks from fertilization through fingerling stages, applying hatchery and lab techniques as a foundation for understanding life cycles, aquatic systems, and the behavior and requirements of aquatic organisms. Participating classes make three winter visits to the Center for Science and Education and three spring visits to the freshwater streams of Black Rock Forest. The program concludes with the introduction (or stocking) of the raised brook trout into a stream environment that has been studied and concluded to be adequate trout habitat.

Turtles. Black Rock Forest is home to turtles that live on land and in the water. Years of study of aquatic painted turtles have produced much information pertaining to behavior, population size, sex ratio, and age structure. Turtles, most already electronically tagged, can be captured alive in turtle-safe hoop traps. Students can scan for tags, learn life histories, and perform measurements to assist in the ongoing turtle research.

Wetlands. Students discover how wetlands provide many benefits to humans and animals. They will also learn the qualities that characterize a wetland.

Earth Science

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Map and Compass II: Introduction to Orienteering. In this unit, students learn how to properly use a compass and map to orient themselves in the Forest. After the initial introduction, during which students learn how to measure distances by pacing, students set off in small groups to complete a compass course. Two compass courses have been set up: one at the Stone House and one at the Center for Science and Education.

Rocks and Minerals. The bedrock geology of the Forest is comprised of billion-year-old Precambrian granite gneisses. Hand samples of various rocks from the Forest in which various minerals can be identified have been cut and polished by scientists from the American Museum of Natural History. A geology hike through the Forest (as written up in the Forest Ecosystems unit) allows exploration of erosion and sedimentation, glaciation, and soil formation.

Watershed Exploration. Students learn that high-quality surface water is a rare and vital resource that needs to be protected. They discover how plants and animals, human use, and land

use all impact the quality of our water. The water cycle is reviewed, emphasizing the movement of water from the atmosphere to the earth, then over and through the earth, eventually returning to the atmosphere.

Chemistry

Surface Water Testing. Students measure pH, dissolved oxygen, and temperature along an elevational gradient from Tamarack Pond (elevation 1305 feet) down to Aleck Meadow Reservoir (elevation 1016 feet), and potentially all the way to the Hudson River at sea level. They learn how water quality can be studied, how humans can impact water quality, and how natural filtration through the Forest improves water quality.

Math and Technology

Environmental Measurement. The Black Rock Forest Consortium has installed an environmental monitoring network in the Forest, consisting of remote, automated environmental monitoring stations that measure weather conditions, soil and stream conditions, and other environmental parameters. Classes can tour these stations to learn how research-grade environmental data are collected. They can then access archived and real-time data from the network and explore them using a series of digital exercises.

Green Building Tour. The Black Rock Forest Center for Science and Education and the Forest Lodge are called green buildings because they were built to have a more positive impact on the environment than traditional buildings. For example, the buildings are heated and cooled using only heat pumps connected to a well system, and the bathroom toilets are waterless, composting toilets that turn human waste into soil. The concepts behind a green building are intriguing to discuss and impressive to see in reality. For example, how best can a building take advantage of the sun's energy – heat and light? Tours allow students to see and learn about these features and the many other special considerations that went into the design and construction of these two special buildings.

Tree Measurement. Students learn and practice how a variety of tree and forest measurements, such as height, age, growth rate, and wood volume are obtained. A Biltmore stick is used to measure tree diameter and height, from which wood volume can be calculated and compared to measurements of real wood walls inside the Center for Science and Education. The exercise can be limited to single trees or extended to trees on a 0.1-acre plot to calculate volume per acre and timber value. These exercises lead naturally to discussions of natural resources, forestry, and other land uses.

Humanities: Visual Arts

Art from Nature. Art from Nature or Environmental Art is created from the materials found in the Forest. This variety of materials can be arranged and manipulated into wonderful, though often temporary, art. Structures, sculptures, models, masks, and habitats can all be made using leaves, twigs, pine cones, acorns, clay, etc.

Sketching and Painting. Whatever the season, the Forest offers myriad sites for artists of all ages to draw and paint. Crayons, chalk, charcoal, and watercolors can all be used to depict forest scenes, lakes, and ponds. The dramatic landscape of the nearby Hudson River, inspiration for development of the Hudson River School, can readily be incorporated into trips.

Humanities: Social Studies

Ethnobotany. A general knowledge of forest dendrology can be helpful in understanding the great variety of useful goods and products that come from forests. Hikes along any of the many trails can be used to identify plants and both their historical and modern uses.

Historical Hikes. Two self-guided hikes start at the Stone House (built 1832) and go to either Eagle Cliff or Split Rock. Along the way, written descriptions explain historical highlights and Forest usage. Destinations such as the great White Oak Tree (250+ years old) and Continental Road are remnants from Revolutionary War times.

Humanities: Language Arts

Creative Writing. Many of the landmarks of Black Rock Forest have inspired poems, legends, and historical short stories. Beautiful vistas, rock formations, waterfalls, and old homesteads supply the settings. All that is needed is imagination.