

HAW CREEK NATURE TRAIL REFERENCE GUIDE

Welcome to Haw Creek Elementary School's nature trail. Use this reference guide as you walk to learn about the plants, animals and geologic features present here. Please protect, respect and enjoy the trail.

Habitat Certification: *Wood kiosks.* Haw Creek Elementary is certified by the National Wildlife Federation as a wildlife habitat. This recognizes our efforts to protect and sustain our green spaces. The following certification requirements can be adapted for use in your own backyard:

- **Food and water sources:** Native plants, seeds, nectars, fruits, birdbaths, a stream or pond.
- **Places for cover and raising young:** Bramble patches, rock piles, birdhouses, dense shrubbery, nesting boxes and ponds.
- **Sustainable gardening:** Mulch, compost, rain collection and native plantings.

Temperature: *Wood kiosks, Markers 14 and 24.* Forest plants, or vegetation, react directly and positively to the environment. The influence of forests on humans and the local climate is vitally important. Plants provide shade and help reduce the average temperature. Vegetation is affected by temperature. Plants need different temperatures to thrive; too hot or too cold climates can be devastating. The United States map can be divided into temperature zones to reflect plant needs. Western North Carolina (WNC) is in Zone 7; our summers are not too hot and our winters are not too severe. When you stop at the wood kiosks and markers 14 and 24, record the temperature. Is there a difference? Why?

Trail Blazing: This is the practice of marking outdoor paths with blazes that follow each other at certain distances, showing the direction of the trail. Blazes tell hikers if they are on the trail, alert them to turns and switchbacks, and mark where trails begin and end. It is extremely important to stay on marked trails to ensure that hikers do not get lost and to keep the surrounding habitat protected. You should be able to see the next blaze (paint, flag, string, or sign) from the last one. We use directional signs, yellow and white paint and numbered marker posts. Look for them on all sections of the trail.

Animal Observation: Animals leave evidence of their presence. Be an "animal detective". Use your eyes to find tracks, holes, feathers, scat, burrows, insect galls (growths produced by plants in response to insects), birds and squirrel nests. Use your ears to hear squirrels chatter, hawks call, and woodpeckers knock. Walk quietly and stay on the trail; being quiet improves your chances of seeing animals. If you see an animal, watch it from a distance and do not approach it. Wild animals can be dangerous. If a wild animal comes toward you, back away and tell an adult.

Bird Houses: *End kiosk, Markers 2, 4, 18, 21 and 22.* How many bird houses can you find? Different houses are appropriate for different kinds of birds. People make bird houses from wood and straw; birds use the same materials. Houses, or nesting boxes, provide shelter and places to raise young. The nests in the houses should be removed each year and the area inside the houses cleaned. Old nests contain droppings, natural trash and possibly disease. We want to encourage birds to live in the houses by providing healthy homes. Watch for Carolina wrens, sparrows and blue birds using these houses.

Ecosystems: Ecological systems, or ecosystems, are the plants and animals that live together and interact with their environment (weather, atmosphere, soil, etc). These plants and animals depend on each other for survival, so ecosystem disruptions (natural and manmade) can destroy the organisms living there.

- **Plant Life Cycles:** All living things have life cycles. For plants, there are basically four stages. It begins with a seed that sprouts to a seedling. Some plants stay in the seedling stage for days while others remain seedlings for years. When plants receive approximately 17 hours of light each day, they rush to grow leaves and stems. This is called the vegetative stage. They stay in the vegetative stage until they receive about 12 hours of uninterrupted darkness. As the summer wanes and nights grow longer, plants begin the flowering stage. After about two weeks of adjustment, plants have another growth spurt or two and begin seed production (by producing flowers, vegetables, fruits and nuts). The seed stage completes the plant's life cycle and begins the next generation.
- **Life in a Rotting Log:** Trees die from disease, fires, flooding, starvation and old age. These fallen trees are still important to the ecosystem because plants and animals use these trees as homes. A log becomes a miniature community. Moth and butterfly cocoons can be found in cracks and crevices, and insects lay eggs in moist wood. Squirrels and chipmunks store acorns and nuts in hollow logs. Ants, snails and earthworms live in the wood as it softens. Moss, mold, mushrooms and seedlings begin to grow and in a few years, the log returns to the soil to make food for trees and animals.
- **Nature's Recycling:** Plants and animals produce nearly 4,000 pounds of material in one acre of forest each year. This natural litter includes fruit, fallen leaves, twigs and limbs. Leaf litter protects the topsoil from beating rain, minimizes flooding by soaking up water like a sponge, and protects young plants from freezing. Animals consume the fruits and seeds in the tree litter and search dead wood for insects. Decomposers like moss, mold, mushrooms, worms, and maggots turn the remains into dirt. All living material that comes from the soil returns to the soil. This "producer, consumer, decomposer" system is nature's way of recycling.
- **Brush Pile Homes:** You will see piles of tree limbs and brush along the trail. Brush piles offer shelter for birds, rabbits and other small mammals where they can hide from predators and find cover from the weather. When they eat, animals drop seeds into brush piles. In a few years, desirable plants and trees grow from those dropped seeds. The seedlings grow strong and healthy in rich, decomposed dirt. Without plants, animals could not exist.
- **The Soil Beneath Us:** Soil is made of gravel, sand, silt and clay. Gravel is the largest particle in soil and clay is the smallest. Too much of either silt or clay makes a poor soil quality. The perfect soil for plants and organisms has about equal parts sand and silt plus a smaller amount of clay. This soil is called loam. The ideal loam has enough large and small spaces for air and water to move, and clumps for plant roots to grow. Soil is comprised of different layers, called horizons, which are defined by physical features like color and texture. The top layer, *O horizon*, is an organic layer rich with humus. The second layer, *A horizon*, is topsoil where you will find worms and plant roots. The third layer, *B horizon*, is subsoil that contains clay and minerals. The fourth layer, *C horizon*, is made of rock particles from the parent material. The fifth layer, *R horizon*, is bedrock. It takes countless years to make soil. To make soil, rain, sun, physical and chemical weathering, and biological actions from living things are all required.

Plants and Non-plants: WNC is home to a variety of plants (many of which are used for medicine, food and decoration) due to nutrient-rich soil and climate conditions. We have ample sun for sun-loving plants and enough shade for tender plants. Our weather is not extreme, and we have a long growing season.

- **Galax:** *Marker 6.* Galax is an evergreen found mainly in the Southern Appalachian Mountains. It is particular about its habitat and grows only in forests at altitudes up to 1,500 meters (4,921 feet). It is a protected evergreen; collection is restricted due to over-harvesting by florists for the plant's leaves. It has a long, thin flower stalk that blooms white flowers from May through July.
- **Mountain Laurel:** *Marker 9.* Also known as Spoonwood because Native Americans used it to make spoons, Mountain Laurel is an evergreen shrub that can grow to the size of a tree in undeveloped forests of this area. It is drought resistant and needs acidic soil, dappled shade and cold winters to thrive. Mountain Laurel blooms May through June and its flowers vary in color.
- **Christmas Fern:** *On the right after Marker 11 and near Marker 28.* This fern is recognizable by its evergreen leaves that look like little stockings. Ferns require moist, humus-rich soil with light shade. They are different from plants because they have spores on the back of the leaves. Spores reproduce the plant instead of seeds. Ferns do not flower but are appreciated for their foliage. The Christmas Fern is a common fern because it grows well in most soils and settings. It can be used on steep slopes to conserve soil. In the winter, the fronds lie on the ground and trap fallen leaves that become soil.
- **Poison Ivy:** *Markers 28, 29 and on all school property.* Poison Ivy is one of the first plants to grow in difficult environments because it requires little to survive. It thrives in hard clay soil with any amount of water and sun and tolerates most temperatures. It is recognized by its "leaves of three" and "hairy" root system. All parts of this plant produce oil year round that can cause an annoying skin rash. Wash well with soap and water within 5 to 10 minutes of exposure to Poison Ivy to remove the oil and avoid the rash. It is wise to recognize this plant.
- **Fungus:** Fungi are mushrooms, yeasts and molds. A fungus differs from a plant because it does not contain chlorophyll. It is essential in the decomposition of organic matter and helps cycle nutrients through ecosystems. A fungus can live almost anywhere; soil, dead matter, living plants, animals and even other fungi. Mushrooms and mold are the fruit of soil-dwelling fungi. We can eat some fungi, but others are toxic and can kill you. Never eat a wild mushroom, plant or berry!
- **Lichen:** Lichen is a combination of an alga and a fungus. (Remember this saying; "A fungus and an alga got together and took a lichen to it!") The fungus stores water which the alga combines with sunlight to make food for plants. Lichen patches can live on rocks, wood, and dying trees and are gray or greenish in color. Lichen can grow in extreme environments and are being used to study pollution and ozone depletion.
- **Moss:** Moss grows in clumps (or mats) and prefers damp, shady locations. Some varieties can live in water; others live in bogs and marshes. Like a fern, moss has spores but no flowers or seeds. Moss is appreciated for its small size, texture and color. In WNC and other northern latitudes, moss grows best on the north side of rocks and trees. It is assumed that the north side retains more water because it gets less sun. In deep forests with little or no sunlight, moss grows equally on all sides.

Trees: Trees improve the environment by moderating temperature, encouraging soil retention and producing oxygen. Wood is one of the most widely used raw materials. Paper, houses, linoleum, many plastics and pencils are a few items that contain wood. A variety of trees call WNC home.

- **Dawn Redwood:** *Marker 3.* Although in the same family as the Sequoia, Dawn Redwoods are deciduous conifers because they shed their needles in the winter. They came from China, where they can grow more than 160 feet tall. It is unknown how tall they could grow in the United States. Some Dawn Redwoods in the U.S. approximately 50 years old have reached 100 feet in height. Dawn Redwoods can grow up to seven feet a year with the right conditions. They need full sun with lots of space, ample groundwater and well-drained, acidic soil. This tree was donated by the Biltmore Estate in 2010, at 3 years old. Watch it after the first frost; the leaves change color from spring green to apricot before turning brown and dropping to the ground.
- **Oak:** *Marker 7.* There are evergreen and deciduous oak varieties, all known for their strength and hardness. Their flowers, or “catkins”, bloom in the spring and their fruit are acorns, enjoyed by people and animals alike (especially squirrels). The cap of an acorn is called a “cupule”. Each acorn contains just one seed that takes 6 to 18 months to mature. Oak bark is used to tan leather; acorns can be used for flour or coffee; and the wood is perfect for furniture and flooring.
- **Carolina Hemlock:** *Marker 10.* The hemlock is an evergreen that belongs to the pine family and can grow up to 70 feet tall. There are quite a few of these trees on the school property. Unfortunately, they are threatened by the *woolly adelgid*, a tiny Asian insect with the scientific name *adelges tsugae*. This insect feeds on the new growth at the base of hemlock needles, killing a tree in as little as four years. The insects form fluffy, cotton-like puffs on infested hemlock trees. There are treatment options, but they are cost-prohibitive and not guaranteed.
- **Sourwood:** *Marker 10.* Most frequently found in the lower chain of the Appalachian Mountains, Sourwood is prized for its beauty and usefulness. These trees can grow 25 to 35 feet tall if they have acidic soil, ample root space in the topsoil, and non-polluted environments. Eight to 10- inch long fragrant flowers bloom June to July. In fall, the glossy green leaves turn a rusty orange and scarlet. Cherokee and Catawba Indians used the shoots of this tree for arrow shafts. The honey and jelly produced from its flowers are renowned.
- **Holly:** *Marker 15.* Hollies are evergreens and can grow as trees or bushes. They are drought resistant and prefer well-drained, acidic soil. They will grow in shade but require sun to fruit. Although the berries are poisonous to humans, they are eaten by bluebirds and other wildlife. Because of their spiny leaves, birds often perch in Holly trees for shelter and protection from predators. Holly leaves are rich in caffeine and can be used to make herbal teas.
- **White Pine:** *Marker 19.* Native Americans called this pine the “Tree of Great Peace”. They used the inner bark to make flour in the winter; stewed and ate the green cones; and used the sap to make turpentine and treat wounds. Because of their height (which can reach 160 to 189 feet tall), White Pines were extensively logged in the 1700s and 1800s. Outside the Great Smoky Mountains National Park, there are only five other U.S. states that have confirmed White Pine stands. To calculate the age of a living White Pine, count the whorls of branches as they grow up the trunk. The distance between one whorl (the line of branches that grow in a circle around the tree) and another represents one year of growth. If lower branches have fallen off, count the scars left behind. These trees can live more than 400 years and are recognizable by their groups of five long, thin needles. Pine cones are the fruit of this tree, and each seed lodged in them has a “wing” for wind dispersal.

Erosion: Erosion happens when water runs over soil and washes it away. The weather causes erosion naturally with rain. There are two types of rainwater runoff; surface and seepage. Surface runoff can be destructive, but seepage runoff gives streams a steady water flow. Humans have caused erosion, too. We developed machines and tools (bulldozers, drills and dynamite) to change the land quickly over large areas. We also created impervious surfaces like buildings, parking lots, roads and sidewalks that increase water runoff. These changes are not always beneficial to nature.

- **Marker 5:** This ravine was caused by impervious surface runoff. Rainwater rushes off the school roof and down the hill. Leaves on the trees slow the falling rain, but erosion will continue. This area provides a perfect habitat for Galax and other plants.
- **Marker 17 at Field Crossing:** The development of the baseball and soccer fields caused erosion here. Rainwater washes down the bank and carries dirt with it. Service vehicles and pedestrians occasionally travel through, further eroding the earth and limiting correction options.
- **Marker 18:** *Looking toward the field.* This area was once the site of a pond. The opening in the woods was made during construction of the soccer field. Water drainage from the field has been a problem here. A drainage pond was built, but later filled with rocks. After a heavy rain, look for the old pond site where water is retained and slowly gets absorbed by the earth.
- **Marker 26:** This ravine was formed by impervious surface runoff. Most of the school's rainwater drains here. Look around; there are a number of large culverts. These culverts divert water into the ravine and off the property. Consider where the water flows after the bridge, and what would happen if the culvert under the driveway became blocked.

Bibliography

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Credits

Original Trail Design: Dr. Larry Ligget, Director of Environmental Education Center, and Alan Lenk, Buncombe County Science Supervisor (1975). *Construction of Original Trail:* Dr. Reginald Teague, principal, and Dr. Ira Trollinger (1977). *Planning Trail Addition:* Ivan Randolph and Danny Ammons, Principals of Haw Creek. *Construction of Addition:* Bill Matthews and members of Asheville Detachment RNMCB 1324. *Marker Placement:* Ben Roberts, Rob Horton, Mike Harmon, Fred Powell and Boy Scouts of America. *Trail Guide:* Patricia Cox (1987); John McMahon and Tamara Calabria (redesign 2003); and Addison Martin and Sharon Leonard (revised 2010). *Trail Map:* Bryson Kopf (1999) and Tadd Cole (revised 2010).

ONLINE RESOURCES

The National Wildlife Federation (NWF) and other organizations offer free online teaching resources for educators' use. These resources provide guidance on how to maintain established habitats and create lesson plans that use habitats and gardens as outdoor classrooms.

Appalachian Sustainable Agriculture Project (<http://www.asapconnections.org>): ASAP is an Asheville group focused on integrating food systems that are locally owned and controlled. They offer free certified lesson plans, seeds, cooking sets, a leveled library and more to make food fun.

Happenin' Habitats (<http://happeninhabitats.pwnet.org>): Explore this Web site to learn about habitats, and for a wealth of information about how to create an accessible wildlife habitat site, or outdoor classroom, right in your own schoolyard!

NWF's Eco-Schools USA (<http://www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA.aspx>): Learn how to reduce waste and conserve resources at your school.

NWF's Climate Classroom (<http://www.climateclassroom.org>): An NWF site dedicated to educating high-school students about the effects of climate change and how to make a difference.

Access Nature (<http://www.nwf.org/Get-Outside/Be-Out-There/Educators/Lesson-Plans.aspx>): NWF's collection of more than 1,000 lesson plans designed to introduce students to life science, ecology, wildlife biology, scientific identification and observation. All lesson plans are aligned with National Science Education Standards.

Nature Find (<http://www.nwf.org/naturefind/>): NWF's national tracking system of plants and animals for people of all ages to use. Record your observations and help NWF track the health and behavior of wildlife and plant species nationwide.

Wildlife Watch (<http://www.nwf.org/wildlifewatch/>): Looking for an outdoor event for your students? This NWF site allows you to search for specific outdoor events in your area.

Wildlife Library (<http://www.nwf.org/Wildlife/Wildlife-Library.aspx>): Learn about the diversity of life that can be found in your backyard, country and around the world.

ARKive: Images of Life on Earth, Wildlife Films and Photos (<http://www.arkive.org>): A beautiful Web site dedicated to the world's endangered animals.

NWF's Ranger Rick Educators' Guide (<http://www.nwf.org/Kids/Ranger-Rick/Parents-and-Educators/Ranger-Rick-Educators-Guide.aspx>): This concise guide provides educational extensions for each month's *Ranger Rick* magazine. Delve deeper into every issue with activity ideas and student pages.

NWF Magazines (<http://www.nwf.org/Kids.aspx>): Subscriptions are available for purchase and there is online access to crafts and activities. Magazines for all ages include *Wild Animal Baby*, *Your Big Backyard*, *Ranger Rick*, and *Ranger Rick Just for Fun*.