

# White Mountain National Forest



## The Forest Discovery Trail

“Between the Signs”



## **The Discovery Trail ...**

... leads through 85 acres of the 800,000-acre White Mountain National Forest and is managed by the Forest Service. The trail will help you discover how this forest is part of an ever-changing landscape managed to protect the health of the ecosystem and to produce wood, water, wildlife, clean air, and scenic and recreational opportunities. We call this a “working forest.”

Foresters are the professionals who manage and care for forests. Forest managers on the White Mountain National Forest balance the needs of the land and resources as well as the people who use, visit, and depend on the forest. We plan and prepare for the long term use and needs of the forest.

This self-guided booklet encourages you take a closer look at the forest “between the signs.” We encourage you to look down at the ground, at eye-level, and way up into the tree canopy to find out what affects a forest ecosystem and how it all is connected. In some areas we have included the number of “paces,” an average step taken, to help you identify where the item of interest is located. These are in italics either before the paragraph or as part of it.

Please enjoy this guide and return it to the sign-in box when you are finished.

*This booklet was produced in cooperation with the North Country Resource Conservation and Development Area Council.*

*Researched and written by Clare Long.*

*Edited and designed by Richard Dow.*

**See trail map on pages 10 and 11.**

# Welcome to the White Mountain National Forest Forest Discovery Trail

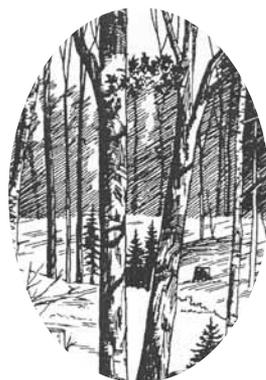
As you explore the Forest Discovery Trail —

Watch for examples of how:	Pay attention to:
<ul style="list-style-type: none"> <li>• Trees and forests change over time.</li> </ul>	<ul style="list-style-type: none"> <li>• Your senses, especially the sounds, sights, and smells of the forest.</li> </ul>
<ul style="list-style-type: none"> <li>• Forest ecosystems are home to many plants and animals.</li> </ul>	<ul style="list-style-type: none"> <li>• What the forest looks like at each site— the variety that exists.</li> </ul>
<ul style="list-style-type: none"> <li>• Everything in the forest is connected to everything else.</li> </ul>	<ul style="list-style-type: none"> <li>• Signs of animal presence (tracks, scat, nests, holes, etc.).</li> </ul>
<ul style="list-style-type: none"> <li>• Humans help to care for our forests.</li> </ul>	<ul style="list-style-type: none"> <li>• Signs of human use (roads, cut trees, trails, equipment, etc.).</li> </ul>

## Start here

*From the box at the entrance where you picked up this brochure, go 15 paces up the trail.*

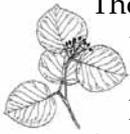
Stop and look at the forest in front of you on the left. This is the northern hardwood forest hard at work! Forests change every day, whether it's the simple change of day to night, season to season, or the larger changes created by windstorms, fires, and timber harvest. As you walk through the forest, notice different stages of change along the trail.



*Up Around the Bend After the Box*

Water is the major transporter of nutrients through the soils. Tree roots absorb them and use them to grow and produce their

food factories – leaves. The trees you see here, sugar maple, are nutrient-loving species. Whenever you see them you'll know that the soil is highly nutritious – for a tree!



The strange looking plants growing near the edge of the trail are called hobblebush. The leaves are large, round and grow in pairs opposite one another. They are known as hobblebush, because this plant will re-root from the top of the plant creating a hoop that will trip or “hobble” anyone walking through thick patches of it.

*A little farther up on the left* there is a community growing on a rock. Like communities you live in, the plants here find food, water, shelter, and space enough to live together. You see moss, grass, ferns, and other plants growing together in one habitat. Look for these micro-habitats throughout the trail.

*Follow the arrow around to the left.*

Stop and see if you can find these different layers. Animals and plants find food, water, shelter, and space in these “life zones.” Look for them as you walk along the Discovery Trail.

## **Life Zones of the Forest**

1. Emergent — trees that are above the general level of the forest canopy.
2. Canopy — layer just below the emergent where the trees form a roof. Here you'll find birds, small mammals, and insects.
3. Understory — shrubs, snags, and small trees. Here you'll find small mammals, insect, coyote, fox, spiders, bear, and deer.
4. Forest Floor — Here you'll find seedlings, grasses, flowers, fungi, ferns, dead and downed wood, insects, small mammals, reptiles, amphibians, insects, spiders, invertebrates, micro-organisms, and ground nesting birds.

Find the two evergreen trees on this short section of trail. Balsam fir and red spruce — two trees that helped shape the past of this forest. The four-sided needle of the red spruce increases needle area without increasing size. Fir has a flat needle with gray and green stripes; the gray is nature's equivalent of tree antifreeze to prevent water inside from freezing. (The red spruce is the small evergreen on the left, the balsam fir are the tall ones with the flat needles on the right.)



### **Sign #1 (Web of Life: Forest Ecosystem)**

*Twenty-five paces up from Sign #1, look to your left at the pit in the slope below you. Most of the forest was completely logged over at the end of the 1800s. This site was where logs were “twitched” or dragged and then rolled onto the bed of a truck. The truck transported the logs to the sawmill in Lincoln, eight miles away. This loading site was dug into the slope so logs could be rolled rather than lifted onto the truck beds.*



## Sign #2 (The Forest: Where Change is the Only Constant)

*Walk a few paces past the sign and look to your right.* The rock looks



like it is starting to crumble, and it is! This is called rotten rock. When this rock was forming millions of years ago it was heated up twice, weakening the bond between minerals in the rock. This weakening allows water, ice, and air to get in-between the minerals and break it apart into little pieces.

*Take a close look at the rock 25 paces further up the trail on your right.* This rock carries a disguise! At first glance it looks like the gray/white granite you just passed — but look again. It really is an orange color but lichens (pronounced “like-n”) are covering the rock face. These lichens are actually breaking down the rock, releasing the nutrients from the rock and back into soil.

## Sign 3 (One, Two ... Tree by Tree)

*Walk 25 paces past the sign and look to your left.* Ground water is on the move! A seep is a wet place where groundwater oozes from the ground to the surface year-round. This is a vital source of water for animals, especially during the winter and in drought conditions. It also plays a major role in transporting nutrients through the soil as it slowly drains down the slope.

*Continue walking up toward the bench and look for the large tree stump on your right.* A forester placed the orange spot on this stump to help keep track of the harvested logs. A special tracer chemical in the paint identifies legally harvested logs. Tree paint comes in many colors. Can you find the green colored paint on the stump nearby? Keep your eye out for other painted stumps as you walk the trail.



*Walk past the bench (about 50 steps) and look to your left.* This mound in the woods was created by immigrant workers building the logging railroad used here at the end of the 1800s. You have

been walking on the old railroad bed since you turned at the first interpretive sign. This mound goes all the way down to the town of Lincoln and all the way up to the last logging camp used in this area in the 1920s.

### **Sign #4 (Fields Into Forest, Wildlife Openings)**

*Stop at the bench below the opening and listen for a moment. Do you hear buzzing insects, calling birds, wind rustling through the grasses? You are coming out of a closed canopy area into an open field. There are no branches and leaves to block the sunlight or trap wind as it blows through. This habitat provides the greatest amount of diversity in plant and animal life.*



*Walk through the opening and consider this:* Open areas like this are an important source of food and provide the earliest seasonal food source. Food chains abound: mice eat the seeds and plants while hawks eat the mice. Birds eat the insects while fox eat the birds. Butterflies feed on plant nectar, dragonflies feed on mosquitoes and moths. It's a wildlife supermarket!

*Walk to the bench at the top of the wildlife opening and look closely at the tree near the bench.* This yellow birch has a shelf fungus called false turkey tail because of the colored striping on the top. Shelf fungi are actually the fruiting body of the organism that is eating away at the wood inside the tree. Chemicals found in the fungus are currently under study as a possible source for anti-cancer treatments.

*Look a little further up the same tree at the black hoof-shaped projections.* These woody fungi, tinder polypore, get their name from their traditional use as tinder for starting fires before matches were invented. The 5,000 year old "Ice Man" found in a European glacier had this in his small pouch. More recently it was used by soldiers in the Civil War, who would soak the shelf fungus in oil and carry it with them to help light their cooking fires at night. The forerunner to the charcoal briquette!



Walk 5 paces up the trail and find the trees that have the smooth gray bark. This is the American beech, a producer of beechnuts — one food source for bears as they fatten up for the winter. The roasted nut is also used as a coffee substitute. Wood from this tree is used for furniture, flooring, tool handles, crates, and more.



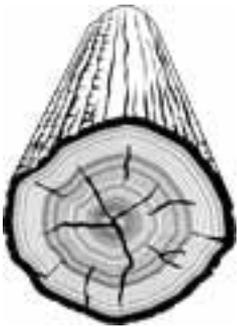
Look at the tree with the double trunks across the trail from you and find the thumbprint sized indentations in the bark. This is the result of beech scale, a forest insect pest that bores holes through the bark and drinks the sap. The insect dies and leaves a hole in the bark where fungus can enter the wood and harm and even kill the tree. Beech scale was accidentally introduced into Canada from Europe in 1889 and continues to spread throughout the Northeast.

Walk 20 paces past the bench and kneel down to look at the young trees on the edge of the trail. This is the yellow birch. Gently scratch a twig with your fingernail and sniff. Smell the wintergreen? The sap, twigs, and leaves can be used as flavoring. The waterproof bark has been used by native peoples to make containers such as buckets, baskets, and dishes.

## Sign #5 (The Sheltering Woods)

Walk 20 paces up the trail and look at the downed tree to your right. Notice the wood looks like it is already in boards? This tree

experienced ring shake — weaknesses in the wood layers causing the wood fibers to separate into layers that resemble planks of wood. When loggers “felled” the tree, it hit the ground hard enough to separate the weak wood layers.



Continue up the trail and look into the woods on your left. Dense stands of trees provide greater shelter from wind, reduce snow depth, and provide nesting habitat and protection from predators. But dense stands make it difficult for trees to grow because of competition for light, space, nutrients, and water.

Look at the large dead tree standing behind the bench on your left near the "Shelterwood" sign. Standing dead trees, known as "snags," indicate strong competition for shelter, space, light, and nutrients. These snags provide wildlife homes, food, nesting, resting, and perching sites. A complete forest food chain can be found in a dead tree.

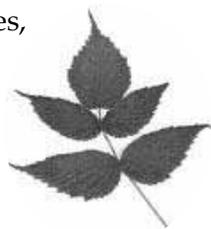


Each spring and late summer a tree adds new layers of wood. Wood formed in spring is light in color, while late summer growth is darker. Count the dark rings and you can determine a tree's age.

Walk up to the next sign and consider this as you go. Many things affect the way a tree grows. Drought, fire, competition for space and sunlight, insect infestation, available nutrients, and where it is on the earth's surface (slope, river's edge, open field, etc.) are factors that determine how healthy and long-lived the tree is.

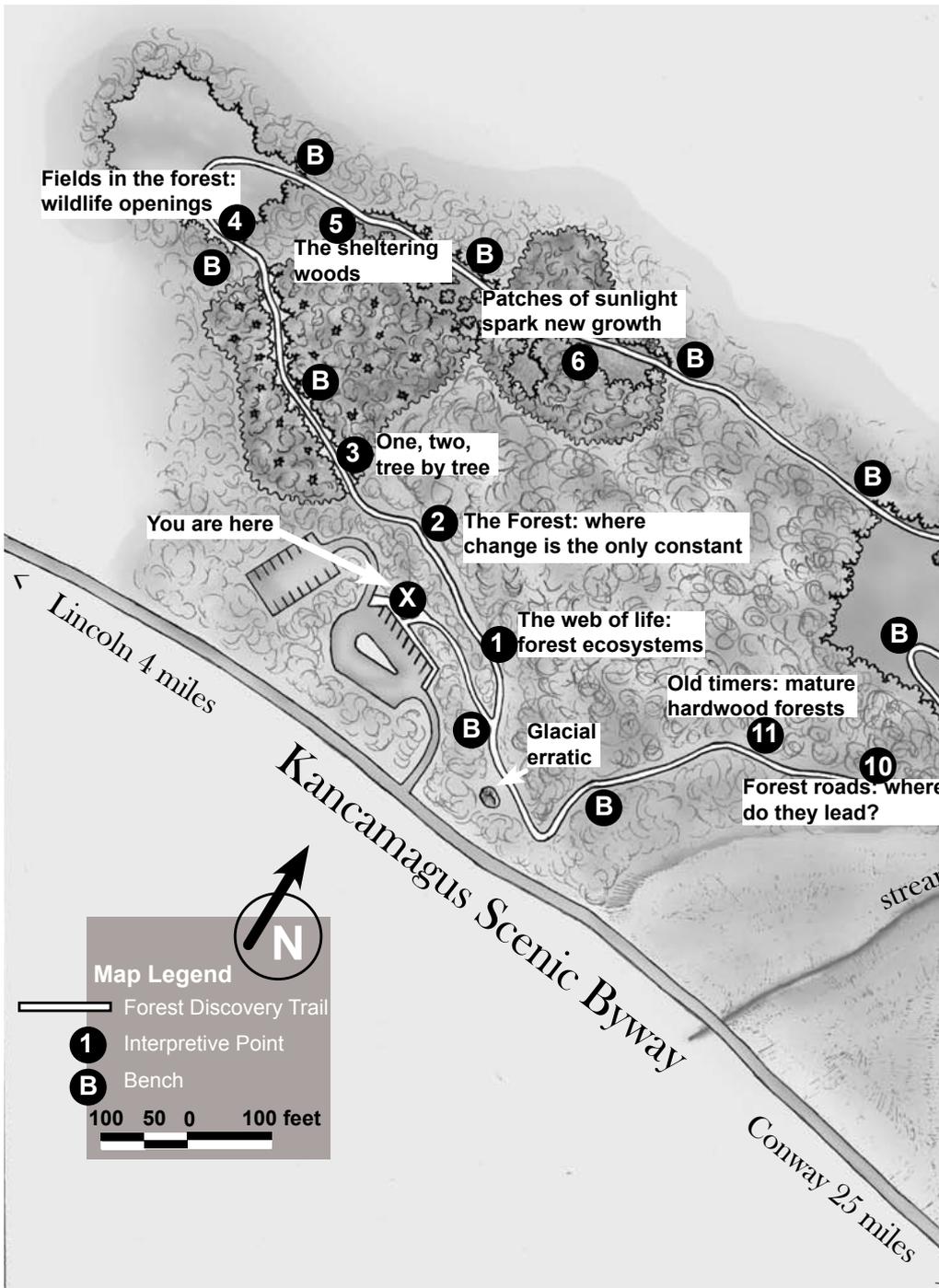
## **Sign #6 (Patches of Sunlight Spark New Growth)**

The prickly-looking stems and leaves are raspberries, an early forest species. These plants build mineral soil, organic matter, and create available nutrient pools. Raspberries are a good source of food for wildlife.



Walk 15 paces past the last sign and look at the old logging road. Do you see the difference between what is growing on the upper portion of the road and what is growing on the lower half. More space, open soils, and light promote growth of pioneer plant species and hardwoods like beech and birch.

Walk another 10 paces and look down the old road. There are more evergreens and taller trees, less open space, and lots of competition for light here. The small trail to the left is a wildlife trail. Deer, moose, fox, coyote, and other animals find it easier and safer to travel near the shelter and cover of the trees.

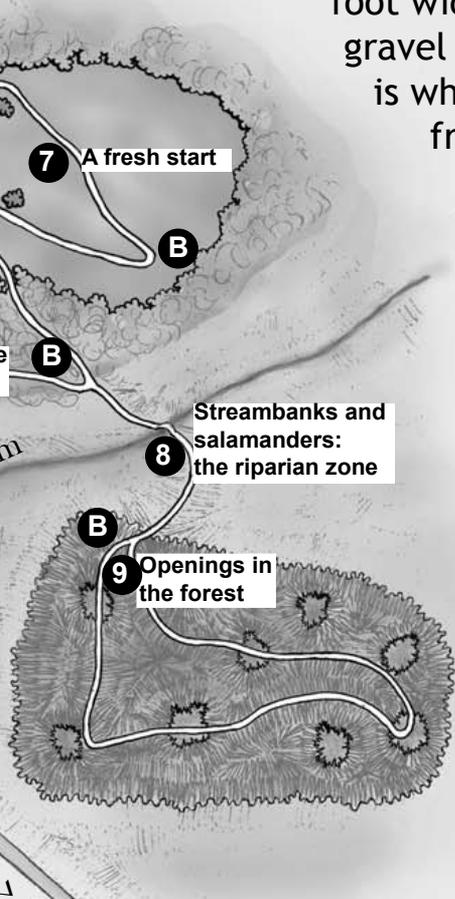


# Welcome to the Discovery Trail ...

The full tour follows a 1.5 mile loop trail ... the 6 foot wide crushed gravel trail bed is wheelchair friendly.

... a living classroom in forest management practices. The trail leads through 85 acres of young hardwoods and stands of old pines, past rocky streams and forest wetlands. Along the way you will see forest practices that are patterned after natural disturbances. The full tour follows a 1.5 mile loop trail with 10 interpretive stops that explain these forest practices. Along the way, benches provide rest and opportunities for observation, and the 6 foot wide crushed gravel trail bed is wheelchair friendly.

*Note that there are some steep areas of the trail (up to 14% grade).*



Walk 30 paces up and look to your right at this large split “erratic” rock. In geology, a glacial erratic is a piece of rock transported by a glacier to a different area. About 12,000 years ago, a one-mile high glacier scoured the surface, carrying rocks and soil as it moved. Glacial erratics vary in size from small pebbles to giant boulders larger than a house! They made soils rocky and difficult for farmers to till.



Continue further up and look to your left in the small dip in the landscape. The trees here are the same as those you saw at the start of the trail. Sugar maples need lots of nutrients and have found them collected in this dip. Notice the difference in the wrinkled bark of the maple compared to the smooth beech around it.

Continue up the trail and look to your left at the ring of trees similar in age. These are stump sprouts from an old beech. Nutrients and energy in the stump nourish the young tree sprouts. Many sprouts from one stump create a ring of trees.

Move to the bench at the large clearing and look to your right at the ridge across the valley. Soils in the White Mountains are relatively young (12,000 to 14,000 years old) and are a mix of sand, silt, and small amounts of clay. At the higher elevations you will see “avalanche-like” patterns, where the soil has “let loose” in something known as a debris slide. These are natural phenomena on very steep slopes where the soil is very shallow on hard bedrock. Can you find the slides on the ridge?

The ridge across the way is called “Scar Ridge” (or on older maps “Scaur Ridge”) for the slide scar visible on the slope. It is 3,774 feet high at the tallest point. The two peaks on the ridge near the scar have no name but the peak to the farthest left is the West Peak of Mount Osceola at 4,114 feet. The peak to the farthest right is the North Peak of Loon Mountain at 3,065 feet.



©NHFG

Walk 35 steps from the bench and look to your right for three blue stripes on a tree. This is a boundary marker. Striping on trees mark where the forest management practice (single-tree, group selection, clearcut, etc) will take place.

Look for the Bear Tree, the one with the blue band painted all around it. Look closely at the parallel markings up the tree. These are bear claw marks. In the fall, black bears gorge themselves on the beechnuts that are found at the end of the branches. They “hug” their way up the tree, digging their claws into the bark on the opposite side and pulling themselves up. Which side of the tree did this bear climb?



To prepare for winter, a black bear needs to eat approximately 60,000 calories a day. That's the equivalent of us eating 250 peanut butter and jelly sandwiches a day! The bears need to find many trees with nuts for them to eat. Can you find another Bear Tree in the area? (Hint: Stand in the trail with your right shoulder in line with the bear tree. Now look to your left.)

### Sign #7 (A Fresh Start)

Walk 3 paces from the sign and look at the young “pioneers” on your right. Pin cherry, the brown-reddish barked tree, plays a major role in natural forest regeneration by recycling nitrogen, an important component in plant growth. It also provides shelter for other pioneer and early age forest species, protecting them from the effects of predation and erosion.



Walk down the trail 25 paces from the granite bench. Notice the tops of the younger saplings growing along the side of the trail and throughout the clearcut. The tips of the pin cherry branches have been nipped off by moose, deer, and snowshoe hare. The buds are a great winter food source, too.

*Walk down to the bottom of the large clear cut area and look up at the crown of the trees. Follow the path of the light and you'll discover one of the main reasons why the forest in that area looks as it does. It's all about photosynthesis! Plants need the light in varying forms to help manufacture their food. They get nutrients and moisture from the soil and air, but without light, plants have a hard time growing.*



*Coming out of the base of the clearcut, walk down the trail past the corner bench. Notice the cooler temperatures, and that the birds and insect noise has been reduced. The tightly growing needle-leaved evergreen branches provide cooler shelter from the heat in the summer and warm insulation in the winter.*

*One-Mile Bench near Riparian/Parking Lot Sign. You are now at the "Y" in the trail. To continue on, follow to the left toward the sound of the moving water and the Softwood Loop. To head back to the parking lot, take your right and follow the trail, and skip ahead to page 16, the section after the Softwood Loop.*

## **Softwood Loop**

*Continue to the left, walk 40 paces down from the bench towards the stream, and look at the cracks in the bark of the large leaved trees. These are frost cracks. All trees have liquid sap that will freeze. Warming trends and exposure to extreme light release sap into the wood. Then when the temperatures drop, the sap refreezes, causing the cracks.*

*Walk another 25 paces and look to your left. There's a competition happening here, and the lower branches of the trees aren't doing very well. They aren't getting sunlight or space to grow, but they still provide space, shelter, and perching spots for birds and small mammals.*

## **Sign #8 (Streambanks and Salamanders: The Riparian Zone)**

*Walk down to the bridge.* Stand on the bridge and feel the temperature and moisture. Animals and plants have special adaptations for this environment. Insects cling to the bottom of rocks, while smaller streamlined fish move freely through the rocky streambed.



*Look up the stream and think about what you see.* Trees provide shade that keeps water temperatures cool, provide food and habitat for water and land animals, and help stabilize the stream banks.

Look down the stream and notice the shape of the rocks in the streambed. Rocks that have been heavily influenced by water action will be more rounded.

*Cross the bridge and look at the large white pine across from the bench.* This tall tree would be a good candidate for a mast tree, a tree used for a ship's mast in the 1600s. Trees had to be straight, without a lot of limbs, and at least 100 feet tall.

## **Sign #9 (Openings in the Forest)**

Tree size is not a good indicator of age. Some trees can be hundreds of years old and only as large as your arm. The big white pine near the bench is about 90 years old! Look across the way back towards the bridge at the three evergreens. The hemlock in the middle is the same age as the big white pine, but it is crowded in with others and doesn't have the same growing space.

*Walk 25 paces down the trail to your left and look at the young evergreen trees.* Needles are less efficient than leaves but you don't have to replace your entire food-making factory every year. By keeping their needles, evergreens photosynthesize early in the spring.



Look at the moss on the ground as you continue along the trail. This is star (or haircap) moss. Look straight down on a plant and you'll notice it has a star-shaped appearance, with the pointed leaves arranged at right angles around the stem. Moss helps to colonize areas of loose, nutrient poor, and acidic soil.

*Walk 40 paces and look at the flat needled trees-the balsam fir.* Pitch from this tree is used as a flavoring in sweets, baked goods, ice cream, and drinks. Balsam fir pitch has also been used throughout the world as an effective antiseptic and healing agent. Balsam fir is used for timber, plywood, and paper making.



*Walk 25 paces and give the evergreens with narrow needles a handshake.* If the needles feel like little spikes, then you're holding a branch of the red spruce. A refreshing tea, rich in vitamin C, can be made from the young shoot tips. Native Americans used the pitch as a chewing gum. Its wood is used to make paper and stringed musical instruments.

*Start here if you did not choose to follow the Softwood Loop.*

## **Sign #10 (Forest Roads: Where Do They Lead?)**

*Look to your left while you walk down the trail and see if you can find the small green creeping plants that look like leafy clubs.* About 300 million years ago, this plant, shining club moss, grew nearly



100 feet tall. Its dried spores ignite explosively and have been used to produce fireworks, flash powder, and pyrotechnics.

*Look on both sides of the trail.* The evergreen tree with the fuzzy looking needles is the eastern hemlock. Native Americans used the tree's cambium (the tree tissue that produces new wood cells) in breads, soups, and other food. The needles contain a significant amount of vitamin C. Hemlock is used for flooring, framing, paper, and roofing shingles.

*Notice as you walk down the trail that all of the trees, plants, and soil work together to support the ecosystem. A forest is a system where trees and other plants are connected in ways that ensure the survival of all members. Forest trees have group protection and group defense. For example, trees attacked by gypsy moths send out chemical warning messages to neighboring trees.*

### **Sign #11 (Old Timers: Mature Hardwood Forests)**

*Look at the tree across from the sign on the left-hand side of the trail. A tree grows by putting on new wood every year on its outside. The wood in the center is dead and helps to support the tree. That's why a tree can be alive while the center is rotted out. You can easily kill a tree by "girdling" the outer layer because that's where all the nutrients and food for the tree move up from the roots and down from the leaves.*

*Walk 25 paces past the sign and look deep into the forest on you right.*

*Notice the mounds on the forest floor that have small pits next to them.*

*These "pits and mounds" result from trees falling or blowing over. The root ball is ripped up, leaving the big hole or pit, then slowly rots, leaving the mound.*



*Walk another 25 paces down and look for the trees on "tip-toe" on your right. Downed and decaying trees, known as nurse logs, act as nutrient reservoirs for seedlings. The young seedlings grow on the nurse logs and send out roots through and around the log. The nurse log rots out from underneath the young trees, leaving them looking like they are standing on tip-toe.*

*Look through the forest as you walk down the trail. Scattered throughout is paper birch. It grows quickly in deforested areas, provides shade for other woodland trees, and controls erosion. The sap can also be fermented to make birch beer or vinegar. The outer bark is used to make drinking vessels and canoes, and has been used to make casts for broken legs.*

Look for the trees with wrinkled bark. These are sugar maples. Their sap contains quite a large proportion of sugar, and can be used as a refreshing drink or can be concentrated into syrup by boiling off the water. Considered by many to be the most valuable hardwood tree in North America, the sugar maple is used for furniture, flooring, musical instruments, and boat building. It tolerates atmospheric pollution, so is often used as a street tree.

*As you walk back to the beginning of the trail, see if you can locate aspects of the forest ecosystem you saw earlier along the trail. Can you find the rotten rock on the left at the curve and see the glacial erratic in the trees? Where are the branches on the right competing for sunlight and space? Any more trees on “tip-toe”? This is a continually evolving site, and we encourage you to come back often to witness the changes.*

Thank you for visiting the Discovery Trail. We hope you enjoyed your time discovering what’s “between the signs” in this living classroom of forest management practices.

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*Please return this guide to the box near the entrance when you are finished so others can use it.*

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