

Newport Bailey School Forest Learning Station Guide

Entrance Sign

The 80-acre School Forest Park was originally a tree plantation for the Bailey Nursery. In 1967 the Bailey Family donated the land to Washington County to be the future Minnesota Zoo. When the Zoo was instead constructed in Apple Valley in the 1980s, the county donated the land to the City of Newport, which established it as a park in 1989. In 1993, Newport and District 833 entered a partnership with the Minnesota Dept. of Natural Resources to establish the park as a School Forest.

There are 14 numbered posts along the trail. Can you find them all?



A boy demonstrates how to find a numbered post!

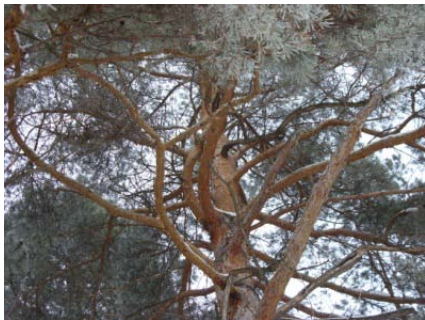
Post 1

This open area was probably part of the nursery. Coniferous trees include Scotch pine (leaves in bundles of 2, orange-y bark), white spruces (leaves not bundled), and northern white cedar (flat, scaly leaves). Deciduous trees include white-barked aspen and thick-twiggged green ash. Staghorn sumac is a shorter deciduous tree-like plant. In the winter, sumac has waxy bark. In fall, sumac branches are covered with soft, velvety fuzz, similar to antler fuzz of white-tailed deer.

Learning activities:

1. Get to know trees.

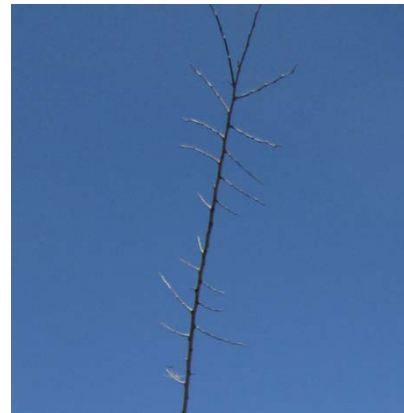
- Discuss tree characteristics. Trees are woody plants, usually single-stemmed, self-supporting (not a vine), that grow 15 feet in height or more at maturity.
- Discuss categories of trees: [Coniferous](#) and [Deciduous](#)
- Discuss conifer leaves. White, red and Scotch pine have needles in bundles of 5, 2, and 2. *Scotch and Scots pine are the same species: *Pinus sylvestrus**. Cedars have flat scaly leaves. Spruces have single, short leaves.
- Discuss categories of deciduous trees: Opposite vs. alternate branching. In Minnesota, only 3 trees have opposite branching: Maples, Ashes, and Dogwoods. Acronym: MAD. Green ashes have very thick twigs compared with nearby, thinner-twiggged boxelder maples. Dogwoods don't usually exceed 15 feet in height. Ask students to find examples of each kind of branching.



Scotch pine



Opposite branch pattern on a red osier dogwood



Alternate branch pattern on a hackberry

Post 2

From the pavilion, enjoy views of prairie and woodlands. There is a grove of aspen to the east, white cedars to the south, and deciduous forest to the west. Terracing likely took place when this area was part of Bailey Nursery. The tall-grass prairie was burned in the mid-1990s. The pavilion is dedicated to Dr. Mike Phillips, a long-time Newport resident and DNR forester who was integral to establishing this park as a School Forest for education and recreation for all students in District 833.

Learning activity

1. Have students identify and describe overall tree shapes and colors from a distance.
2. Ask each student to venture into the prairie and find a place to sit individually. Ask students to count the number of different bird songs they hear.
3. Look for insect galls on goldenrod plants. Use a field guide to identify tallgrass prairie grasses and forbs.
4. Measure soil and air temperature, soil moisture, wind speed and direction, and amount of daylight. Compare with readings in the deciduous and coniferous woodlands.
5. The picnic tables are a good place to collect leaves and make rubbings, or create watercolor art, draw pictures, or sort collected seeds.



A student marks out a study plot to measure soil temperature

Post 3

This is where the sumac encroaches on the prairie. Behind the sumac a clone of aspen borders the forest. Moving uphill along the paved trail you will find remnants of an old fruit tree orchard, mostly apple, plum, and crab apple.

Learning activities

1. Fruit trees attract wildlife and people. Ask students to look for nests and evidence of deer. In the fall, taste some of the fruit.
2. Discuss plants that thrive in sun. Sun-loving plants include: oak, red pine, aspen, fruit trees, sumac cottonwood, goldenrod, bergamot, and grasses such as big and little bluestem. Can students find examples of each?
3. Discuss the history of the area. Why did the Bailey family plant trees in the specific places chosen throughout the School Forest?



The paved trail leads to the overlook

Post 4

This shaded, sloped area is bordered to the south with old apple trees, sumac, and [buckthorn](#). Mud and water accumulate here. If there is mud, look for animal tracks.

Learning activity

1. Look for animal tracks in the mud or soil. Ask, “What kind of animal was here? What were they doing here?”



Can you see the two deer hoof prints?

Post 5

This scenic overlook is the highest point in the school forest and marks a watershed divide between the Mississippi River to the west and the St. Croix River to the east. The energy company periodically removes tall-growing plants from under the humming power lines. Power lines extend from the St. Croix River in Bayport west into the Twin Cities. The paved trail is for the energy company vehicles.

Learning activities

1. Observe the thin soils and abundance of larger rocks up here. When it rains, water carries unprotected soil downhill. Ask students how people could help protect the soil.
2. Practice using binoculars. Count the number of water towers seen in the distance. Each water tower is built to pump groundwater to serve the population around it. What is the population of the Twin Cities? Is it growing?
3. Find the Mississippi River. Newport was founded in 1858 partly because of its riverside location downstream from St. Paul. Discuss why people choose to live near rivers.
4. Locate downtown St. Paul and Minneapolis. Why were they founded along rivers?
5. Estimate the height of the power lines. Discuss why people need power and power lines, how energy is created and transferred.



The view at the Overlook

Post 6

Remnant species of original prairie such as big bluestem grow here. The forest is rapidly encroaching. Tree species include sun-loving sumac, aspen, oak, and [buckthorn](#).

Learning activity

1. Before entering the forest, teach students how to identify European [buckthorn](#). Show students how to uproot small buckthorn plants out of the ground by grasping the plant close to the base. Make sure each student removes the buckthorn's roots and shakes off the soil. Buckthorn is an exotic, highly invasive small tree that outcompetes native species for water, sunlight, and nutrients. Originally imported from England and sold as hedge plants in Minnesota nurseries, they escaped cultivation around 1900 and have been reproducing voraciously ever since. The thorn-like projections repel deer and rabbits. Each black berry contains a bundle of seeds, each of which generates a small, fast-growing tree that blooms earlier than native trees. The non-nutritious seeds contain a cathartic property, which means that birds excrete them as quickly as they're eaten. In late October, buckthorn is easily identified because it holds its leaves later than all the other trees.
2. As you enter the forest, pay attention to the number of buckthorn plants and trees in the understory. Compare that with the number of plants of native trees and plants.



Buckthorn has dark green leaves and thorn-like projections on its twigs. The berries are dark black and have no nutritional value for wildlife.

Post 7

You are entering the deciduous forest. Large, old oaks form a shady canopy over an infestation of buckthorn. You can occasionally find a young oak seedling rooting from last year's acorn, but you won't find oak saplings. Deer browse and kill oak seedlings before they reach a couple years old.

Learning activity

1. Let students find a downed tree or stump. Ask them to inspect different parts of tree wood, identifying sapwood, inner bark, and outer bark. Discuss each part's function. Sapwood consists of xylem cells which carry water/sap up and down the tree. Nutritious inner bark consists of phloem cells which carry nutrients. Rough outer bark is made of dead phloem cells which protect the tree. Between the xylem and phloem there is a microscopic but important layer of cambium cells. Cambium cells are the tree's growth cells, and produce a new layer of phloem and xylem each year. Each year's sapwood growth can be counted in the tree's annual rings.
2. Roll over a rotting log and look for bugs, worms, fungi, and other decomposers. Have students record observations in words and drawings in a science journal.



Downed trees and stumps are great habitat for decomposers such as pillbugs, worms, and fungi



An old buckthorn tree growing next to an old oak. Notice that there are no oak seedlings anywhere, but a lot of buckthorn seedlings!



Reading tree rings on a stump.

Post 8

This steep path shows some signs of erosion. Abundant ferns grow here in this cool, damp location. More maples, basswoods, and ironwoods begin to appear.

Learning activity

1. Discuss plants that thrive in shade: ferns, maples, basswoods, ironwood.
2. Measure soil and air temperature, soil moisture, wind speed and direction, and amount of daylight. Compare with readings in the prairie and coniferous woodlands.
3. Listen for bird songs. Are the songs different from the songs heard in the prairie?
4. Discuss erosion and how humans can cause or help control it.



Fiddleheads of young ferns sprout from forest floor in spring.

Post 9

You are at the top of a ravine that carries water to a culvert near Highway 61 and moves it into the Mississippi River. Around you are large, mature basswood, sugar maple, oak, and ironwood. If you descend into the ravine, look for where the groundwater seeps out of the northern slope and runs downhill to create a small stream. Notice outcrops of limestone and sandstone and the variety of plants growing in this moisture-rich area.

Learning activity

1. Discuss groundwater and where it comes from. Take some water samples and test for pH, microbes, and silt. Measure temperature of the water at the seep's source and at the stream.
2. Look for animal tracks in the mud. Why are there so many animals here?
3. Discuss bedrock. The layer of St. Peter sandstone was created about 450 million years ago when this part of the continent was covered by a large shallow sea. Marine fossils are often found in sandstone. The harder limestone above was created after the seas receded. Throughout the Twin Cities you can find older homes and buildings that use limestone as a foundation.



At the seep. Note the lack of seedlings on the forest floor, most likely due to overbrowse by deer.

Post 10

At the top of the hill, look for trees with large woodpecker holes. Woodpeckers are attracted to insects and grubs living in the tree bark and peck at them. The residual holes that woodpeckers create are used by squirrels, owls, birds, raccoons and other critters.

Post 11

Different trees create different layers in the forest. Large dominant overstory trees include maples, basswoods and oaks. Understory trees contain ironwood and younger maples. Uphill you will see rapidly encroaching buckthorn.

Learning activity

1. Observe the landscape below the trail and contrast it with the landscape above the trail. Which area is easier to walk through? Which area contains more wildlife habitat?
2. Observe the overall shape and growth pattern of basswood trees. Basswoods typically have multiple trunks, which are distinctively curved. Ojibwe Indians used the strong, flexible inner bark of basswood to create baskets and snowshoes. Discuss how native people may have used basswoods, sap-rich maples, and hard-wooded ironwoods to survive.



Uphill from the trail, you'll see rapidly encroaching buckthorn.

Note, posts 12 and 13 are missing, but you will soon reach intersection of the forest and Williams Brothers pipeline trails. Following the pipeline trail west (downhill) leads to the Mississippi. Uphill leads to the parking lot. Notice the density of trees, shrubs and growth at the sun-rich forest edge. Among the raspberries, several non-native weeds grow, such as burdock, motherwort, and plantain.

As you walk along the pipeline trail, notice the erosion, mostly from ATV's and bikes. Tree roots attempt to hold soil in place.

Learning activity

1. Discuss different ways to recreate in a forest. How can people recreate in a forest without harming it?
2. Using baggies, collect seeds from burdock and other weeds. Dissect the pods and burrs to find the seeds. Discuss how seeds move from one place to another. The pipeline trail is very weedy because seeds are transported in mud from bike, truck, and ATV wheels. Also, dog walkers discard burrs onto the ground. Discuss how best to dispose of the seeds the students collect.
3. Discuss what is carried in the buried pipeline (petroleum products) and what people use it for. The area must be cleared of brush every few years so planes and helicopters can fly over and inspect for leaks.



A boy lays down next to some large burdock leaves. Burdock is an invasive plant that creates the Velcro-like burrs that are tough to remove from hair and fur.

Post 14

Toward the end of the pipeline trail there is an old northern white cedar plantation. Significant deer browse is seen on lower branches. Explore the area and look for moss, cedars, and giant puffballs which are large round fungi growing on the forest floor.

Learning activity

1. Discuss why deer browse on trees such as cedar. How tall are deer? Are there too many deer? Can you find deer droppings? Are there many young cedar saplings?
2. Discuss how fungi reproduce by spores. Kicking open a giant puff ball release of puff of brown “smoke” which consists of millions of tiny spores. Take care not to breathe in the spores.
3. Find the rows of smaller cedars. Discuss why these cedars never grew large (overcrowded).



Evidence of deer rubbing its antlers (“buck rub”) on the trunk of a young white cedar tree.