The Numbered Forest

Numbering trees in the schoolyard or in a nearby woodland opens the door to a variety of activities

by Emily Kissner

Grade levels: 4-5
Subject areas: science, language arts, math
Skills: writing, reading, mapping, observing
Location: outdoors
Time: 1 hour or more

Although it may sound like an exotic locale, the Forest of Fractions is an ordinary stretch of forest. Walking into it, you would likely find your attention drawn, as in any other forest, to the deep shadows of the trees and to the twitter of birds overhead or the crunch of a pine cone underfoot. But venture a little further and you begin to notice what makes this ordinary stretch of forest something extraordinary. Here and there, on this tree and that, are wooden plaques with numbers carved into them.

“Hey, what is that number doing there?” a student asks, pulling at the teacher’s sleeve. “Why would someone put numbers on the trees?”

“And strange numbers, too,” another student adds. “I think I saw 16.25 back there.”

The idea of assigning numbers to trees is not new. Trees along nature trails often display numbers that are keyed to information on interpretative signs or trail guides. But the numbered trees on the grounds of the environmental learning center at Biglerville Elementary School in Pennsylvania have a wider purpose. They encourage students to look beyond their feet as they walk through the forest, and they open the door to a variety of mapping, mathematics, language arts, and environmental monitoring activities. They also make the schoolyard a more friendly, accessible place.

Whether you have an entire forest in your outdoor classroom or just a few trees scattered in your schoolyard, you can do some pretty neat things with numbered trees. The following are tips on numbering your trees and suggestions for activities and investigations that can be done using the numbered trees as a focal point.

Numbering the trees

The first step in numbering trees is to make a list of the numbers you want to include. For example, to facilitate math activities, you may wish to select a wide range of prime numbers, factors, fractions, and decimals. If you
teach younger children, limit your list to numbers that the students will recognize.

If you intend to use the numbers for only a few seasonal activities, laminated index cards tied around the trunks of trees with string work well. This method allows your students to help with the work of numbering. (My students take it very seriously!) Cards that are double-laminated should survive a season or two of soaking rains; but for more permanent numbers, use stencils and exterior paint to paint the numbers directly on the trees. Painted numbers will last several years and are resistant to vandalism. Alternatively, permanent placards can be made by using a router to inscribe numbers on 10-centimeter-square (4-inch-square) boards. Drill holes in the corners of the placards and use weather-resistant rope or clothesline wire to attach them to the tree. Affixing the numbers high enough to be out of reach will encourage the children to look up in the trees and will also minimize vandalism.

Which trees do you number?
In a schoolyard that has only a few trees, you may want to number them all. If you are fortunate enough to have a wooded area nearby, you can number trees at random throughout the forest, or assign different kinds of numbers to different areas. A deciduous forest, for example, might become a Forest of Integers, while a pine forest might become a deep, dark Forest of Fractions.

Quick and simple activities
When you have only a short period of time for an outdoor lesson, numbered trees provide a focus for simple activities such as the following. Related concepts and skills are noted for each activity.

Number searches
- Challenge students to find as many numbered trees as they can and record the numbers in a journal or keep track orally. (Number recognition, counting, recording)
- Ask students to look for numbers that meet certain criteria. Depending on how you numbered the trees, you can have students look for multiples of three, prime numbers, even numbers, and so forth. Younger students may look for numbers with one, two, or three digits. (Number recognition, mathematical concepts)

Attribute scavenger hunt
Build vocabulary skills by taking students on attribute scavenger hunts. Create a list of words that signify tree attributes such as “crimson,” “enormous,” and “gnarled,” and ask the students to find numbered trees that have these attributes. (Building vocabulary)

Tree ID
Have students use field guides to identify numbered trees. Then ask them to defend their identifications to the group, referring both to the details noted in the field guide and to the observable features of the trees. Heated debates can arise over whether a tree is a sugar maple or a red maple! (Observation, language arts, plant studies)

Mapping the forest
Give students maps of the area and ask them to find and mark the locations of all of the numbered trees. (Mapping skills)

Tree food webs
Ask students to sit beside a tree and draw the food chains that they can deduce from their observations. Remind them to look carefully for evidence of decomposers. As a class, discuss factors that might influence the types of wildlife and interactions that students see, such as the species and forms of the trees or their locations. (Observation, drawing, ecological relationships)

Tree house tales
Have students select a tree to observe every day over a period of time. Ask them to make a list of the various organisms that inhabit or visit the tree, using it for shelter, food, escape from predators, structural support, or for some other purpose. Have students write and illustrate stories or create skits about the creatures that use the tree or call it their home. (Observation, identification, drawing, creative writing, dramatic arts)

Giving directions
In the outdoor classroom, ask students to choose a point of interest (something other than a numbered tree). Then have them write clear directions for getting to their site, using a nearby numbered tree as a starting point; for example, “From Tree 23, walk four paces
toward the path and then turn left.” Have students test the clarity of their directions, as well as their ability to read and follow others’ directions, by trading with one another. This activity works well in helping students get acquainted with an outdoor site. (Writing skills)

Extended investigations
The following are more detailed activities and longer-term projects for those who have more time or are able to take students outdoors frequently through the year.

Trees in all seasons
Read the book Sky Tree: Seeing Science Through Art by Thomas Locker (HarperCollins, 1995) and discuss how trees change through the seasons. Then ask each student to choose a tree to observe, describe, and draw as it changes through the year. (With younger students, you may wish to choose one tree to monitor as a class.) This activity could take the form of an “adopt-a-tree” project in which students complete a tree-adoption form and then make drawings, write poems or songs, and jot down observations and facts about their tree throughout the year. Many students feel an immense sense of ownership for their trees and even return to visit them after they have moved on to other schools. (Observation, drawing, language arts)

Numbered tree tours
Have students use numbered trees as focal points in creating an illustrated trail guide to the natural features of the outdoor classroom. The guide could be in the form of a pamphlet, booklet, or large map, which members of the school community can use for self-guided tours of the grounds. (Science, writing, drawing)

Growing concern
Students can practice the skills of estimation and measurement by tracking the growth of numbered trees. Have students measure the circumference of trees and then calculate the “dbh,” or diameter at breast height, a standard height measurement taken at a point 1.37 meters (4 feet) from the ground. This information, recorded in a journal from year to year, will allow students to track the annual growth of individual trees and to compare the growth rates of different species of trees. (Measurement, math, recordkeeping)

Signs of discovery
Have students use the numbered trees as reference points in recording where they make observations and discoveries throughout the year. Finding “a rotten stump next to Tree 106” is far easier than finding “a rotten stump halfway down the path, over the ditch, a bit to the left of a big bush.” If classes record observations each year, students can monitor changes in many different sites of interest, such as a nesting site, a patch of spring ephemerals around the base of a tree, the encroachment of invasive species, or the natural succession that occurs after a disruption. (Data collection, environmental monitoring)

Emily Kissner teaches elementary school in Maryland and lives in Gettysburg, Pennsylvania. She credits the idea of using numbered trees to Charles Pearce, a former Grade 5 teacher at Manchester Elementary School in Manchester, Maryland, and author of Nurturing Inquiry: Real Science for the Elementary Classroom (Heinemann, 1999).