



## GETTING TO KNOW TREES

*Take the time to take in the splendor of trees.*

*The Giving Tree*, Shel Silverstein's venerable book, presents a wonderful parable of selflessness: a tree so loves a boy that it gives everything—literally gives itself—for his happiness.

But is that so far removed from reality? To a child who grows up in the company of trees, they can be so many things—a jungle gym, a hiding place, a playhouse, a sanctuary. And they can give so many things—sticks for building, leaves for piling and jumping in, and a bounty of fruits, seeds, nuts, and cones.

Fortunately, these marvelous beings are a fixture of the landscape of childhood, accessible to almost every child, everywhere. And, as kindred spirits to trees, all children should have the opportunity to really know them, through all of their changes and in all of their moods and seasons.

After all, children and trees are, in a way, very much alike. While you may not be able to chart the growth of trees in days, or even weeks, they do grow tremendously over a lifetime, from seeds to tender shoots to saplings

with the potential to transform into something of almost unimaginable stature.

## A TREE FOR ALL SEASONS

The most interesting and easily observable changes in a tree's appearance are the ones that happen seasonally. Choose a tree in your backyard or a local green space and watch for these things as the tree goes through its different phases.

### Spring

In this season of renewal, the tree buds that have lain dormant for months will begin to burst open—some will become leaves; others, flowers. What's becoming of the buds on your tree? What other signs of new growth can you see? Look for tender green shoots and shiny new twigs as the season progresses. Watch for springtime firsts—first leaf, first flower—and make note of the date you observe them. Also keep an eye out for new inhabitants in your tree, as birds construct their nests and prepare to raise their broods.



Spring

### Summer

Taking advantage of the abundance of sunlight, trees are dressed in their fullest, greenest foliage of the year. Fruits and berries may begin to appear—can you find any on your tree? Some trees flower late and might only now be displaying their blooms. Find new-growth twigs and compare their bark to older branches. Peel back a bit of bark from the trunk—have any insects made a home in your tree? Don't forget to make yourself feel at home near your tree. Take the time to enjoy sitting in its shade with a picnic lunch or a favorite book.

### Fall

This season, of course, is dominated by the turning—and the falling—of leaves. Make note of when your tree's leaves first begin to turn. What color are they? When does the last leaf drop? Some trees drop theirs early, while other trees—such as beech and red oak—cling to their leaves well into the winter, long after others have shed their foliage. Look, too, for trees dropping their fruit—



Summer



Fall



Winter

cones from pine trees, acorns from oak trees—and dispersing their seeds and seed pods.

### Winter

Unless you've chosen an evergreen tree, the most conspicuous feature on your tree most likely will be its buds. Wrapped up tight and packed with potential, the buds will become next year's flowers and leaves. Even in the dead of winter, they provide clues to a tree's identity, distinctive in their shape, color, texture, and their location and arrangement on a twig. As spring approaches, choose a bud from

your tree to watch closely, marking it with ribbon or string to help you find it each time you visit. As the bud begins to open, sketch or photograph it each day to document the changes. While your tree is still bare, look for bird or squirrel nests that otherwise might not have been visible.

### TAKING NOTES

Since most of the changes a tree goes through will unfold slowly, over time, notes are helpful for tracking its growth and stages. Here are several

## Did You Know?

THE SHOWY WHITE PETALS OF THE FLOWERING DOGWOOD—ONE OF THE MOST FAMILIAR AND DISTINCTIVE TREES TO BLOOM IN SPRING—ARE IMPOSTERS, IN A MANNER OF SPEAKING. LOVELY AS THEY ARE, WHAT APPEAR TO BE WHITE FLOWER PETALS ARE *BRACTS*, A SPECIALIZED KIND OF LEAF THAT SERVES TO PROTECT THE ACTUAL FLOWER—WHICH, IN THE CASE OF THE DOGWOOD, IS THE TINY YELLOW CLUSTER IN THE MIDDLE OF ALL THAT WHITE.

**TIP: FOR HELP IDENTIFYING YOUR TREE, CONSULT THE ONLINE TREE IDENTIFICATION GUIDE AT [WWW.ARBORDAY.ORG/TREES](http://WWW.ARBORDAY.ORG/TREES).**

ideas for getting to know your tree better by recording your observations and data.

### KEEP A TREE DIARY

Getting to know a tree—to take the time to really observe and understand how it changes from month to month, from season to season, and from year to year—can be a quietly rewarding experience for children. By recording their observations, measurements, and illustrations in a journal, they will create an interesting living document even as they develop the research skills that will serve them well in school and beyond.

To get started, have your child choose a tree that will be readily accessible throughout the year, whether it's in your backyard, neighborhood,

or a favorite local park. For more fun, consider having each member of your family choose a different kind of tree and visit and observe them together. Almost any tree will do, but remember that *deciduous* trees—those that shed their leaves each year—will go through much more dramatic changes as the seasons pass. Also keep in mind that younger trees may be more approachable and will exhibit more noticeable growth over time than older, established trees, especially when viewed from a child's perspective. Don't worry if you can't identify your tree at this point; you'll be gathering information that will help you to do so soon enough.

Begin by finding out firsthand as much as you can about your tree. Start with the basics of its appearance, describing its leaves (if any), branches, buds, and blooms. Touch the bark, and take note of its color and texture. Look at the tree from the ground up. Are the roots visible? If so, what do they look like? Take in the tree as a whole, and describe its general shape—round, oval, V-shaped, A-shaped. Try to sketch it in your journal, or take photographs of both the whole tree and of any details that catch your eye.

## Did You Know?

THE BRILLIANT REDS, ORANGES, AND YELLOWS OF AUTUMN LEAVES MAY SEEM TO ARRIVE WITH THE SEASON, BUT THESE COLORFUL PIGMENTS ACTUALLY HAVE BEEN PRESENT IN THE LEAVES SINCE SPRINGTIME. *CHLOROPHYLL*, THE PIGMENT THAT GIVES LEAVES THEIR GREEN COLOR, FADES WITH THE WANING LIGHT OF THE FALL SEASON, ALLOWING THE OTHER COLORS TO SHOW THROUGH AND PUT ON A SPECTACULAR, IF BRIEF, SHOW.

## MEASURING TREES

To track the growth of your tree, you first will need to record its current size. A tree's circumference, diameter, and height are three good indicators to follow—but they will change slowly, over time.

The *circumference* is a measurement of the distance around the trunk of a tree. It usually is taken at a height of four and a half feet, sometimes called *breast height*, as a way of standardizing the records of arborists and scientists. If a tree grows on a hillside or slope, its circumference is measured at a height of four and a half feet above the ground on the uphill side. Most important is to take your measurement at the same level each time for the sake of consistency. Simply wrap your tape measure snugly around the trunk of the tree to take your reading. If your tape measure isn't flexible enough for this job, wrap cord or twine around the tree. Mark the spot by pinching it carefully and measure it with the tape.

The diameter of a tree is the distance across—that is, straight through—the trunk, and it most easily can be calculated by first measuring the cir-

cumference and dividing that figure by pi (3.14). A tree that measures twenty-two inches in circumference, for instance, is approximately seven inches in diameter. Because of its resemblance to a tree's trunk, the empty tube from a roll of paper towels or bathroom tissue can help your child to visualize the concepts of circumference and diameter as they relate to a tree.

Estimating the height of a tree can be a bit trickier. Especially for tall trees, our perspective from the ground can result in some pretty wild guesses. But, with everyday objects and some basic geometry, you and your child can have fun measuring the height of your trees with a fair degree of accuracy.

Here are two different methods you might try.

### Shadow Method

#### WHAT YOU NEED:

- a sunny day
- a yardstick
- a tape measure



A tree's height can be measured by its shadow



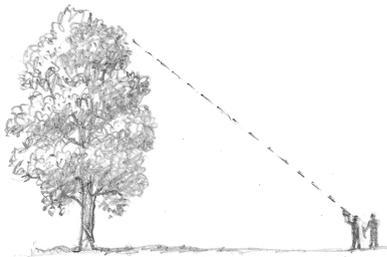
Finding the ratio between object and shadow

#### WHAT YOU DO:

1. Place one end of the yardstick on the ground and hold it so that it stands straight up. Find the length of the yardstick's shadow with the tape measure.
2. Compare the length of the yardstick to the length of its shadow. This same ratio will apply to the height of the tree and the length of its shadow.
3. Measure the length of the tree's shadow, and apply the ratio to determine its approximate height. For example: if a three-foot yardstick casts a two-foot shadow, then a tree casting a twelve-foot shadow would be eighteen feet tall.

This method will give you a reasonable estimate of your tree's height, so long as the shadows fall on relatively level ground and the measurements are taken within a few minutes of each other.

Of course, not every day can be a sunny one, and not every tree casts a shadow that can easily or conveniently be measured. Here's another simple approach that requires only a clear line of sight to the top of your tree.



Using the triangulation method to estimate the height of a tree

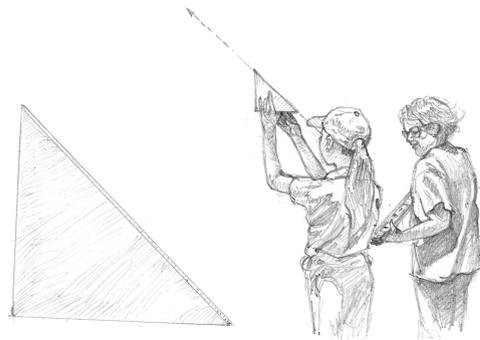
#### Triangulation Method

#### WHAT YOU NEED:

- a piece of paper or cardboard
- a level
- a tape measure

#### WHAT YOU DO:

1. Square off a letter-sized sheet of paper or cardstock by folding the top edge over so it lines up perfectly with the left-hand edge. Crease the paper and remove the excess. This creates a *right isosceles triangle* with two sides of equal length. (Cutting a triangle from a piece of corrugated cardboard works even better. The size of the triangle isn't important—that it has two equal sides separated by a right angle is.)
2. Start by standing in a spot that seems to be about as far from the tree as the tree is tall.
3. Hold the triangle so that the two sides of equal length are vertical and horizontal.
4. Looking along the long edge (the *hypotenuse*) of the triangle, move forward or backward until you can just sight the top of the



Your triangle should have two equal sides separated by a right angle

tree along its length. Use the level to fine-tune your instrument; if the triangle is tipping up or down, your measurement will be inaccurate.

5. Once the top of the tree is lined up, measure the distance from the observer to the base of the tree. Then, add the distance from the ground to the observer's eye level. The total will give you the height of the tree.

If you don't have a level, you can create a self-leveling triangle. Tie a weight—such as a paper clip or a small washer—to a length of string. Tape the end of the string to the top corner of the vertical side of your triangle. As you're sighting the

tree, the weight and string should hang parallel to the vertical side of your triangle.

**TIP: PUT YOUR FAMILY'S TREE OBSERVATIONS TO WORK IN THE INTEREST OF SCIENCE. TO LEARN ABOUT OR TO TAKE PART IN A PHENOLOGY PROJECT, VISIT PROJECT BUDBURST AT [WWW.BUDBURST.ORG](http://WWW.BUDBURST.ORG) OR THE NATIONAL PHENOLOGY NETWORK AT [WWW.USANPN.ORG](http://WWW.USANPN.ORG).**

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### More to Explore: Phenology

Keeping an eye on the changes a tree goes through each year makes for some great backyard science. But it also can be helpful to the scientists who are working on some of the biggest environmental challenges we face today.

Observing and studying the timing of recurrent events in the lives of plants and animals is called *phenology*. Things a phenologist would watch for and record might include the appearance of migratory birds or the seasonal emergence of certain kinds of insects. For trees and other plants, easy to study because

of their immobility, it might be the opening of the first flower and the appearance of the first leaf in spring—or the dropping of the last one in the fall.

As we learn more and more about the effects of a changing climate, we've been finding out that the timing of many of these periodic events is a bit out of whack. A tree that used to bloom at the end of April, for example, now might begin to bloom at the beginning of the month. Or a songbird species might arrive at its breeding ground several weeks earlier—or begin its

fall migration several weeks later—than it did just a few decades ago.

These changes are creating patterns that can give scientists important clues about the effects of climate change on wildlife—and, ultimately, on people. If you'd like to help them tackle the problem, consider joining a citizen science monitoring project and share your family's observations. Most programs are conducted online, provide plenty of background information, and don't require much time or effort—but every bit of data they receive helps.