

# Leaves: Hidden Colors

Activities for children and  
adults that build upon PlayTrail  
experiences outdoors



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## Activities for children and adults that build upon PlayTrail experiences outdoors

Getting children comfortable in the outdoors may be one of the greatest gifts we can offer the next generation. Given what we know about the physical and psychological consequences of a sedentary, electronic media-dominated lifestyle, it also might be one of greatest health tips we can offer. A childhood rich in outdoor experiences provides an inexpensive antidote for a number of medical problems, including depression, attention deficit disorder, and obesity.

But there is more. Letting young children freely explore their world outdoors can instill a lifelong connection to the environment. It can also help cultivate an ethic of caring for the environment.

The role of adults in this process focuses less on teaching and more on coaching. While most children want to explore their world, some may be hesitant or even fearful. Parents and other caregivers need to be there to offer encouragement and guidance without stifling the important work called play.

# Tips for adults

We offer the following tips to help make the most of your PlayTrail explorations.

1. Find activities in these booklets that are appropriate for your child's age and interests, as well as environments that are readily accessible to you.
2. Share the booklet with your child in advance.
3. Let your child initiate the exploration, but be ready to offer suggestions in the event encouragement is needed. Consider the booklet's investigations to be jumping-off points that pique curiosity.
4. Avoid the tendency to teach. Share the information you glean from these booklets as "incidental" points of interest.
5. Model positive behaviors and respectful attitudes toward nature.
6. Respect your child's fears. Never force a child to touch something they do not want to touch. Courage and interest come about through positive, graduated experiences.
7. Foster play and accept the fact that dirty hands, mud-caked shoes, and wet clothes often come with it.
8. Avoid the tendency to "helicopter." Too often we over-protect and stifle explorations inadvertently.

## Many shapes and sizes

Have you ever stopped and thought about all the shapes and sizes leaves come in? Some, like the leaves of duck weed and clover, are small. Others, like the leaves of southern catalpa trees and pads of giant water lilies, are huge. Some leaves have edges that are lobed or rounded. Some have edges that are pointed. And some have edges that are straight.

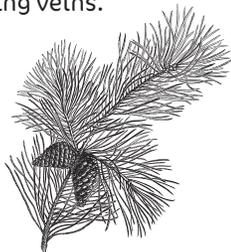
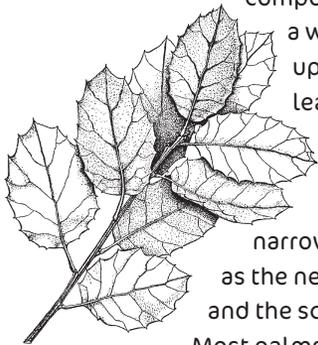
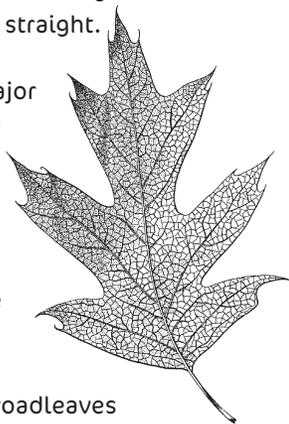
Tree leaves are organized into three major groups: 1. broadleaves, 2. conifers, and 3. palms and yuccas. Broadleaves include the simple leaf of an oak that hangs from a single stem and the

compound leaf of a walnut made up of smaller leaves called

leaflets. Broadleaves having branching veins.

Conifers have narrow leaves such as the needles of pines and the scales of cedars.

Most palms have broad fronds shaped like a fan and yuccas have narrow, spike-like leaves.



## Leaf scavenger hunt

Grab a paper bag and go on a scavenger hunt in search of fallen broad leaves. When your child finds a suitable leaf, look at it closely. Is it a simple leaf attached to a single stem or a compound leaf made up of smaller leaves? Compare it to the needles of a pine tree or the fronds of a palm. How is it different? How is it similar?

## Leaf prints

**Materials:** Crayons or colored pencils, white paper

**Procedures:** When you return home from your scavenger hunt, lay out all of the leaves. Have your child select one and place a sheet of white paper over it. Firmly hold the paper in place and rub a crayon or colored pencil over the area of the paper that covers the leaf. The rubbing that is created records the shape of the leaf and the pattern of its veins.

**Safety tip:** Make sure you know what plants in your region are poisonous and avoid touching them.

## Leaf scrapbook

Start a leaf scrapbook or a nature journal. Have your child select a few favorite leaves and place them between two sheets of white paper. Place the white paper between two sections of a newspaper (to absorb any excess moisture) and stack heavy books on top of them. Wait a week or more for your makeshift plant press to dry and flatten your leaves.

When the leaves are completely dry, your child can glue them into place in the scrapbook or journal. Encourage your child to write something about the leaves or share something you can write for them. Date the journal entry.

## The colors behind the color

While leaves appear green most of the year, they actually contain three different pigments. Chlorophyll gives them their green color. Carotene gives them their yellow, orange, and brown colors. Anthocyanin gives them their red color. Chlorophyll masks the other colors in spring and summer, which is why you cannot see them.



## Chromatography

**Materials:** Acetone-based nail polish remover, glass jar, coffee filter, ruler, tape

**Procedures:** You can separate the green and yellow pigments in a leaf with the help of filter paper and acetone. Have your child tear three green leaves into small pieces and place them in a glass jar. Mash them with a spoon. Cut a coffee filter into a piece one inch wide and long enough to reach the leaves from the mouth of the jar. Tape the top edge of the filter paper to the ruler.

In a well-ventilated area, have an adult pour just enough nail polish remover into the jar to cover the mashed leaves. Lay the ruler across the mouth of the jar so that the filter paper is “standing” in the jar. Make sure just the bottom edge of the filter paper touches the liquid. When half of the filter paper strip absorbs the liquid, remove the paper and lay it on a clean sheet of paper. When the strip is dry, green and yellow bands of pigment will show. (The leaves’ red pigment is rarely present until temperatures begin to drop in autumn. You likely will not see a red band on the strip.)

## Food factory

Unlike other living things, plants make their own food. With the help of sunlight and chlorophyll, a leaf converts water and carbon dioxide into glucose, or sugar. Lucky for us, a leaf releases oxygen in the process!

A leaf has small pores called stomata. These stomata allow the carbon dioxide to flow into the leaf and oxygen to flow out. As this happens, some water is lost. Water flows out of the stomata and evaporates in the air.

Go on a leaf walk and bring a plastic sandwich bag and tie. Place the bag around a small cluster of living leaves and seal it with the tie. Leave the bag on the tree overnight. Return in the morning. Moisture likely collected on the inside of the bag. It flowed from the stomata through a process called transpiration.



## Autumn brings changes



In autumn, cooler and drier conditions bring about change. Broadleaf trees cut off the water supply to their leaves, sealing them off from their stems to prevent what moisture the trees have from escaping. Without water, the chlorophyll breaks down and the green color recedes. Other colors begin to

dominate, turning a once green tree like a maple into a vibrant display of yellows, oranges, and reds.

## Splatter leaf art

**Materials:** Leaf stencil or real leaves (pressed), red, orange, and yellow tempera paint, three bowls, white construction paper, stapler, wire screen, nail brush, old picture frame, large cardboard box (the top just a bit smaller than the picture frame)

**Procedures:** Collect and press leaves if you are not using stencils. Staple the wire screen to the picture frame. Wearing a smock or old clothes and old shoes (not minding if they get painted in the process), let your child arrange the leaves on the paper. Place the paper in the cardboard box and place the framed screen over the top. Pour one color of paint into a bowl; dip the nail brush into it; and let your child use it to brush the screen. The paint will splatter onto the paper below. Rinse the brush and repeat the process for the second and third colors of paint. Let the paint dry before removing the leaves.

**Conservation message:** Leaves are the food factories of trees and plants. They are also the “lungs of Earth.” In the process of making sugar, they release oxygen and in turn, absorb carbon dioxide, a greenhouse gas linked to higher temperatures and global climate change.

## Citizen Science

Biologists conduct large research studies to catalog how many different kinds of plants or trees exist regionally or even nationally. Sometimes they just focus on one particular species. Often they ask for help because the scope of their research is so large. “Citizen science” invites individuals to record their observations about a certain kind of plant or tree on a website. By doing this, ordinary people contribute important information to a central database that is analyzed by trained biologists.

Your family can become involved in a plant- or tree-based “citizen science” project. Project BudBurst, for example, is a national program that invites citizens to report on the timing of leafing and flowering of common plant species. By noting these “phenological” events, scientists collect climate change data. Other projects focus on inventorying nonnative invasive plant species that are crowding out native plants.

The best way to find out about active projects in your area is to look them up on the Internet or check them out at [www.thedailygreen.com](http://www.thedailygreen.com). Citizen science projects often are conducted by natural history museums, botanical gardens, and national parks.

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