

the Naturalist's Notebook

for K-5 Educators

Young Naturalist's Notebook: Collage

Each season, students learn skills in art and writing that help them become better observers of plant life. Keeping a collection of their work helps them build understanding of the variety of plant life in the Piedmont and around the world.

When students learn about a tree, they find out how it grows, what kinds of seeds or flowers it has, what color its leaves turn in the fall, and other factual information. They learn that each tree has much in common with other trees of the same species. But if students spend time observing trees and leaves, they will see that trees within a species, and even leaves on a single tree, also differ from one another in many ways.

For a fall collage, students should choose leaves in a variety of sizes and shapes from a single tree. After pressing the leaves, as discussed on the back page, they can use them directly in the collage and as models for drawings and rubbings.

Factual information can be incorporated into the collage. Short statements or descriptions about the tree can be copied onto paper cutouts that are modeled on the leaves they have already used in the collage.

Native Plant Conservation

As the natural Piedmont forest shrinks under rapid urban development, conservation practices become more and more important. How can students and teachers help conserve the rich heritage of North Carolina's native plants?

- ✿ Resist removing native plants and flowers from their natural environment, particularly in areas where the plants are in short supply.
- ✿ "Rescue" plants from building sites, with the landowner's permission, and plant them in school and home gardens.
- ✿ Collect seeds if there is a large colony of plants in the area. A simple bag, made of a fine mesh fastened onto the stem of a flower with a rubber band, is an effective seed catcher.
- ✿ Add native plants to your garden by sowing the seeds you have collected or purchasing native plants. Make sure any plants you buy were not wild-collected.



A Young Naturalist's Notebook
sample entry

Naturalist's Notebook for K-5 educators, a quarterly publication of Reynolda Gardens of Wake Forest University, enriches teachers' understanding of plant life of the Piedmont and around the world. Lesson plans designed by teachers to accompany each issue integrate plant science, art, and writing.



Why Leaves Change Color in the Fall

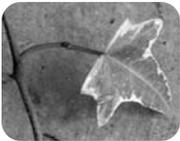
Leaves of deciduous trees convert light energy to chemical energy through photosynthesis during the growing season, which lasts from April through October in the Piedmont. This process ceases when temperatures and daylight hours decrease in the autumn, and the last of the energy the leaves have produced flows back toward the roots. At this time, deciduous trees usually form membranes that seal leaves off from the tree.

The green pigment, chlorophyll, is unstable; it breaks down and regenerates constantly during warm weather. Once the leaf is sealed off, chlorophyll cannot regenerate after breaking down. With chlorophyll absent from the leaf, the yellow pigment, carotene, is revealed. Though it is not visible while leaves are green, carotene is present throughout the life of the leaf and is thought to assist in the transfer of light energy to chlorophyll.

A red or purple pigment, anthocyanin, is sometimes produced in reaction to sugars that become trapped in the leaves when they are sealed off from the twigs. Exposure to sunlight increases the amount of anthocyanin, so leaves on the sunny side of trees are often more brilliant red or purple than those on the shady side. Coloration can vary due to the interaction of several environmental factors, mainly temperature, sun exposure, nutrients, disease, and availability of water.

Plan Ahead for Winter and Spring: Cuttings

In nature, many plants reproduce vegetatively; that is, by means other than seeds and spores. Plant growers copy natural processes by taking cuttings and providing ideal growing conditions. A mixture of peat moss and perlite (both available at garden and discount stores) is a good medium. Keep it damp, warm, and out of direct sunlight while cuttings are rooting.



IVY / *Hedera helix*

Cut a section containing a root.
Press the cutting into the medium
at the root.

COLEUS / *Solenostemum* hybrid

Cut below a node; remove leaves
at the node. Place one or two
nodes below the surface of the
medium.



SPIDER PLANT /

Chlorophytum comosum

Plant an offshoot that has begun
to form fleshy roots.

JADE PLANT /

Crassula argenteus

Cut off a leaf or stem and let it
dry for two days, then press the
cut end into the medium.

Throughout the Piedmont, there are woods, meadows, and wetlands like those at Reynolda Gardens. They're in parks, playgrounds, and neighborhoods. Plants from all parts of the world grow in the formal gardens and greenhouses at Reynolda Gardens, just as they grow in home and school gardens and on home and classroom windowsills. The places and plants of Reynolda Gardens serve as examples that help us observe and learn about the plants we see every day.

Piedmont Soil

The variety and abundance of plant life in the Piedmont is due in part to the nature of the region's soil.

The next time you're near a major construction site in the Piedmont, study an area that has recently been excavated, and you will see the characteristic Piedmont soil profile. The bottom layer of soil is made up of coarse particles of weathered rock washed from the Piedmont uplands (the parent material). Above that is the subsoil, which contains large particles of parent material and some organic matter. The top layer is the surface soil, a looser mixture of fine particles of inorganic and organic matter.

Much of the soil in and near Forsyth County is classified as Cecil soil. It has high clay content, but much of the clay has been pushed deep below the surface by rainwater, leaving sandy loam (a mixture of sand, silt, and clay in roughly equal parts) near the surface. The exact makeup and depth of soil varies, depending on topography, environmental conditions, and disturbances. Because of the high clay content, Piedmont soil remains relatively cool, retains water during dry periods, and contains high levels of nutrients, although they are not always readily available to plants. This soil is porous and drains well, so there is enough oxygen and water in the soil for iron-rich clay particles near the surface to rust, giving the soil its characteristic red color.

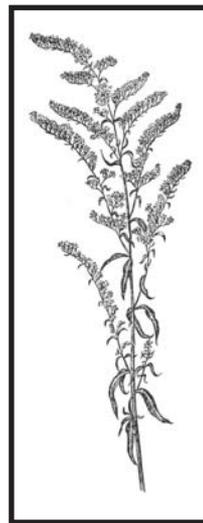
Typical Piedmont soil, which is acidic, is favorable for a wide array of long-lived native plants, including pines and hardwoods, blueberries, native honeysuckle, and mosses. Many nonnative plants such as vegetable crops, garden flowers, and lawn grasses, which have short-term, intensive need for nutrients, often cannot utilize those that are present because they are bound up in the soil. To be released naturally into the soil, these nutrients must be broken down by decay and activity by soil organisms, but such activity is reduced in acid soil. Soil fertility can be increased for these plants by mixing lime into garden soil, thereby reducing acidity and allowing soil organisms to increase activity.

Perennials

All perennials complete a cycle of growth, rest, and dormancy each year. The timing of each stage in the cycle is triggered by day length, temperature, and other variables.

Goldenrod,
Solidago sp.

grows through spring and summer, blooms in late summer and early fall, rests in late fall, and is dormant in winter.



Biennials

Biennials complete a life cycle in two years. The life cycle of the pansy, *Viola tricolor* begins in the summer, when seeds are planted.

Through the fall and winter, it produces leaves and a strong root system. Blooms appear sporadically through the winter months. Warmer weather and other factors trigger increased blooming and seed production, signaling the end of the life cycle.



Tree Identification

There are many ways to identify trees, including locations where they are commonly found; size and shape of the mature tree; leaf shape; and fall leaf color. These four trees are native to the eastern U. S.



Collecting and Pressing Leaves

A herbarium specimen prepared by a scientist includes parts of a plant that can be pressed and dried, such as leaves, flowers, and flat seedpods; it is accurately labeled; and it is carefully mounted on the page. Students can emulate this scientific exercise in their own schoolyards. Focusing on a few trees helps students understand the process and learn tree names. An old book is a good press. Prepared labels help speed the process.

Setting Limits

Choose a few trees around the schoolyard that are very different from each other and that you can identify easily, such as hickory, dogwood, and oak.

Collecting

Each student chooses two or three fresh, fallen leaves, plus flowers or flat seedpods, from each tree you have selected and places them between pages, along with the appropriate label.

Finishing

When leaves are dry (about two weeks), students remove them from the book; glue them onto pages; and label them.



Learning about plants through art and writing experiences; strengthening art and writing skills through science activities.

Reynolda Gardens of Wake Forest University is located within the boundaries of the 1,067-acre estate that was established by Mr. and Mrs. R. J. Reynolds in the early twentieth century. Today, RGWFU consists of 125 acres of woodlands, open fields, and wetlands; four acres of formal gardens; and a greenhouse range with conservatory. Student visit times are limited. Reservations are taken only in early August for the following school year.

Call the education office (336.758.3485) for information on programs and scheduling.