



10. *A Rose by Any Other Name*

Description: Students learn about the process of naming and studying plants by selecting and observing a plant, naming it, and sharing their observations and names with fellow students.

Objective: Students learn:

- that they do not need prior knowledge to identify and enjoy plants;
- about methods of identification and classification of plants;
- some common terms used to describe plants; and
- some methods of plant identification and classification.

Materials: Although this activity can be conducted without any materials, the following items may be useful to have:

paper and clipboards

colored pencils

magnifying glasses or hand lenses

copies of student pages

field guides (see *Resources* for suggestions)

Background: Have you ever wondered why plants have the names they have? Is there anything special about the names of plants? The world of plant names is a fascinating realm to explore. Often, understanding the name(s) of a plant helps us understand and appreciate the plant itself.

Most plants have several names. The common name is the name most people use for a plant. Each language may have its own common name for an individual plant, and often, especially for plants that have wide geographic ranges, there is more than one common name for each plant. These common names are also used

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Grades: 4–8

Time: 45 minutes to an hour and half, depending on class size

Subjects: science

Terms: *scientific nomenclature, genus, species, binomial*



for different plants, especially in different regions. Using only common names can result in much confusion. Since many plants have important properties, such as medicinal or food uses, it is important to communicate very clearly about which plant you are discussing.

Carolus Linnaeus (1707–1778), a Swedish scientist, developed a system (*Species Plantarum*, 1753) for giving each plant species its own unique name. This name is called the plant's "scientific name" and follows Linnaeus's formula for "scientific nomenclature." The species name, sometimes called a binomial, has two main parts: the genus and the specific epithet (descriptor). Other parts of the species name include the author(s) who have first identified the plant and the family name that groups related genera (plural of genus) together.

The genus is the first word in the binomial and is always capitalized. Although it comes first, it is more like a person's last name. The genus describes a group of plants that are related. The second word, or the specific epithet, is unique within that genus to one species of plant. It is usually not capitalized. It is easy to think of the specific epithet like

someone's first name. For example, at school there may be several people named Katie, but in a family there is usually only one person with that name. To keep the Katies straight at school, a last name is often used. This is usually the same last name as other members of each Katie's family. People familiar with Katie's brother may be able to recognize that she is related to him either by her last name or by similar features.

Plants are like that too. The scientific name for the cottonwood found in the Middle Rio Grande bosque is *Populus deltoides* var. *wislizenii*. These names mean it is a tree (wood) with cottony seed. The genus *Populus* shows it is a poplar tree; *deltoides* refers to the leaf shape (deltoid or triangular); and the last name is for Frederick A. Wislizenus, who collected plant specimens in New Mexico in 1846.

There are several kinds of poplars or cottonwoods that grow in New Mexico. The Fremont cottonwood found in the San Juan and Gila Rivers is *Populus fremontii*. *Populus angustifolia* or narrowleaf



Virgin's bower (*Clematis ligusticifolia*)



cottonwood grows along mountain streams. Another mountain tree is quaking aspen, or *Populus tremuloides*. Although these trees are all in the same genus (*Populus*), they are each individual species. When both the genus and the specific epithet are used together, they are known as the species name.

When scientists discover a plant that has not been described before, they get to name the plant. Sometimes they name the plant for themselves or for people they admire. Sometimes they name the plant for some unique features that the plant has. Often the location where the first plant of that species was found is part of the name.

In order for scientists to claim the “discovery” of a new plant, and thus get the honor of naming the plant, they must write and publish a description of the new species. They need to describe what the species looks like, including the features of the flowers, fruits, leaves, etc. They need to explain where it grows and attempt to describe the geographic range of the plant. They need to explain what other plants this new species is related to, and what makes it different from its closest relatives. They must do this writing all in Latin!

Sometimes more than one person will assign a plant a name. The International Association of Plant Taxonomy governs the process of naming and has rules for resolving naming disputes. There are two codes (The St. Louis code and the Tokyo code) for deciding the proper name. Botanical congresses convene regularly to sort out any confusion.

Botanists have many words to describe very specific features of plants. The Guide to Observing Plants in this activity illustrates some of these terms for identifying various plant features, leaf shapes and arrangements, and flower and fruit types. The sidebar defines some common botanical terms.

Procedure:

1. Ask students to name some of the plants they know. Does anyone know why the plant has that name? Discuss the kinds of names that plants have (see **Background**).
2. Explain that scientists and explorers sometimes name plants. Today the students are going to be explorers and find “new” plants (actually, it is okay for students to select any plant, but preferably a plant that is new to the student.) They will make up their own names for the plants based on their observations. Explain that once the students find, make observations on, and name a plant, the group will take a “guided nature hike” and every student will get to show his or her classmates a plant and explain its new name.



3. Designate boundaries for the area where students can search for plants. This could be as simple as “do not get out of sight of this ‘designated landmark’.” Also designate a meeting time and a meeting place for students to return to start the nature hike.
 4. Ask students to select a plant that they would like to observe and name. Students should draw the plant or take notes about it. Students may want to refer to the Guide to Observing Plants student page to help describe the shape and arrangement of its leaves and characteristics of the flower or fruit. Students can also look for clues about where the plant grows. Does it seem to like the sun or the shade? Does it appear to need lots of moisture? Are there any plants that it seems to grow next to? What does the plant feel like? Does it have a smell? Does it make a noise when the wind blows? Once students have at least three interesting observations about the plant, they can create a name or names (common and/or scientific, or in other languages) for their plant.
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- Sacred datura (*Datura wrightii*)
5. While students are exploring the designated area and selecting, observing, and naming plants, circulate among the students to assist with individual questions. Most students will need five to 10 minutes for this part of the activity.
 6. Assemble the group together again, and explain that the group is going on a guided nature walk to each person’s plant. Ask a student to lead the group to his or her plant. Have the student introduce the group to his or her plant and explain his or her name for the plant. Ask if any other students selected the same kind (species) of plant. What was their name? Ask the students to share at least two of the special observations they have made. If you know the plant, you can add additional information about the plant here, but the activity works well without any previous plant knowledge. Ask if any other students have a plant nearby and move on to the next plant until all students have shown and discussed their plant.

Assessment: Assessment can be based on participation and noting the care and quality of the students’ observations.

**Extensions:**

1. Students may want to learn more about their plants. With field guides, and even the plant identification cards in the “Who Grows Where?” activity, they can try to identify the plants they have become familiar with on their nature hike. An easy way to learn new plants is to invite someone who knows the plants of an area along to teach them to you.
2. Students may want to research the different names for their plants. Most field guides give both the English common name or names and the scientific name. Spanish plant names can be found in many sources as well. Interviews are another excellent way to collect common names for plants. A list of web sites for plants is included below.

**Resources/
References:**

There are many references to help with plant study and plant identification. Complete citations can be found in Appendix B, but here is a quick list of field guides that have plants that occur in the bosque.

Allred, Kelly. 1997. *A Field Guide to the Grasses of New Mexico*, 2nd. ed. Agricultural Experiment Station, New Mexico State University, Las Cruces.

Dunmire, William, and Gail Tierney. 1995. *Wild Plants of the Pueblo Province*. Museum of New Mexico Press, Santa Fe.

Ivey, Robert DeWitt. 1986 and 1995. *Flowering Plants of New Mexico*. R.D. Ivey, Albuquerque.

There are also many web pages that contain information about plants. Here is a list of some of them:

A Working Index of New Vascular Plant Names is maintained by Kelly Allred at NMSU. All alien species are marked with an asterisk (*). This list is available on the web at <http://web.nmsu.edu/~kallred/herbweb/>

Here are some other web sites as well.

www.hcs.ohio-state.edu

www.noble.org

www.desertusa.com

www.biosurvey.ou.edu

www.laspilates.com

www.fs.fed/database

www.nrcs.gov/plants



Annual sunflower (*Helianthus annuus*)

Guide to Observing Plants

When you are trying to identify a plant, there are several observations you can make. Follow this guide and answer the questions to help you identify your plant.



1. Is your plant a tree, a shrub, a forb, a graminoid, or other?



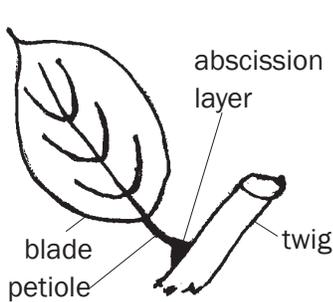
If it has a woody base, it is a tree or a shrub.

If it has a woody base and, when mature, it is over 10 feet (3 m) tall, it is a tree; otherwise it is a shrub.

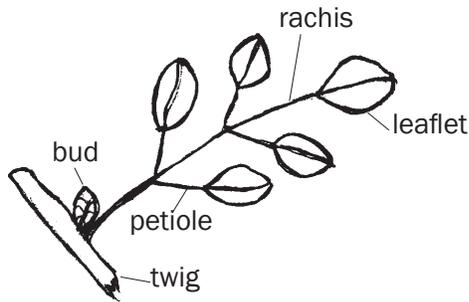
If it does not have a woody base but it looks like a grass, call it a graminoid. If it doesn't look like a grass but it is an herb, call it a forb.

If it doesn't fit any of these categories, call it other.

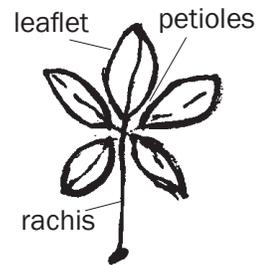
2. Now look closely at the leaves. Identify the basic leaf parts: blade, leaflets (if compound), petiole, etc. Determine if your leaf is simple or compound. If it is compound, is it pinnately compound or palmately compound?



simple leaf



pinnately compound leaf

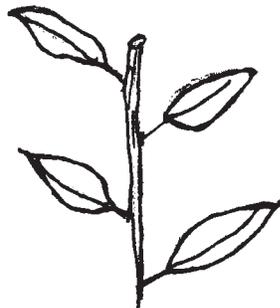


palmately compound leaf

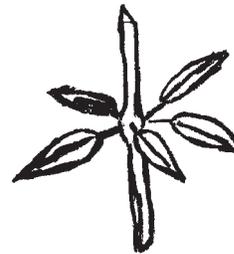
3. How are the leaves arranged on your plant?



opposite



alternate



whorled



4. If your plant is a forb, where do the leaves grow?



rosette



basal



along the stem

5. What shape is your leaf or leaflets?



needle



thread



linear



ovate



lanceolate



obovate



oblanceolate



elliptic



deltoid



spatulate

6. What kind of margin (or edge) does your leaf have?



entire



wavy



sinuate



serrate



double
serrate



dentate
(toothed)



lobed



7. What kind of pattern do the veins in your leaf make?



parallel



net



pinnate



palmate



Common Botanical Terms

Botanists use many special words to describe plants in very precise ways. Many of these words are very specific to distinct features, so they are not used in normal conversation. They are true English words, though (and legal for use in Scrabble®!).

Here is a list of some of the more common botanical terms that are used in this Guide to Observing Plants. Most of these terms are from *Plant Identification Terminology: An Illustrated Glossary*, by James G. Harris and Melinda Woolf Harris, published in 1994 and 2001 by Spring Lake Publishing of Payson, Utah.

tree: a large, woody plant that at maturity is over 10 feet (3 meters) tall

shrub: a woody plant, usually with several stems, that is generally under 10 feet (3 meters) tall

herb: a non-woody plant; stems die back to the ground at the end of the growing season; herbs include graminoids and forbs

grass: an herb that is in a family of plants that has jointed, tubular stems, leaf parts that include a sheath, ligule, and blade, and modified flowers that produce grains

graminoid: an herbaceous plant that either is a grass or looks like a grass

forb: a non-grasslike, herbaceous plant

simple: undivided, as a leaf blade not separated into leaflets

compound: with two or more parts in one organ

opposite: having two parts across from each other at each node, as in leaves on a stem

alternate: having only one part at each node, as in leaves on a stem

blade: the broad part of a leaf or petal

petiole: a leaf stalk

rachis: the main axis of a structure, such as a compound leaf or an inflorescence (cluster of flowers)

abscission layer: a thin wall of cells at the base of the leaf petiole that breaks down and causes the leaf to fall

node: the position on the stem where leaves or branches originate

internode: the portion of the stem between two nodes

rosette: a dense, radiating cluster of leaves

basal: positioned at or arising from the base, as leaves arising from the base of the stem

clasping: wholly or partly surrounding the stem

pinnate: resembling a feather, as in a compound leaf with leaflets arranged on opposite sides of an elongated axis



palmate: divided from a common point, like fingers on a hand

lanceolate: lance-shaped; much longer than wide, with the widest point below the middle

oblanceolate: inversely lanceolate; much longer than wide, with the widest point above the middle

deltoid: with the shape of the Greek letter delta; shaped like an equilateral triangle

needle: a slender, needle-shaped leaf, as in pine trees

thread: a thin leaf, like a thread without fleshy tissue on each side of the blade

linear: resembling a line; long and narrow with more or less parallel sides

ovate: egg-shaped in outline and attached at the broad end

obovate: egg-shaped in outline and attached at the narrow end

elliptic: in the shape of an ellipse, or narrow oval; broadest in the middle and narrower at two equal ends

spatulate: like a spatula in shape, with a rounded blade above gradually tapering to the base

sinate: with a strongly wavy margin

serrate: saw-like, toothed along the edges, the sharp teeth pointing forward

dentate: toothed along the margin or edge, the teeth directed outward rather than forward

lobed: bearing rounded divisions or segments which are cut less than half-way to the base or mid-vein

net-veined: in the form of a network; reticulate

flower: the reproductive part of a plant

petal: generally the showy, colored part of a flower, yet determined by position in relation to other plant parts (i.e., above the sepal)

sepal: the outer parts of a flower, typically a green bract that is below the colored petal

stamen: the male reproductive organ in a flower, consisting of a stem called a filament and the head called the anther which contains the pollen

pistil: the female reproductive organ in a flower, consisting of the ovary where the seed develops, the stigma where the pollen enters, and the style that transports the pollen from the stigma to the ovary

annual: a plant that grows from a seed, flowers, sets seed, and dies in the same year

biennial: a plant that lives two years, usually forming a basal rosette of leaves the first year; the second year it flowers and fruits, and then dies

perennial: a plant that lives three or more years