

Teach Winter Deciduous Tree Observation

Most tree ID resources focus on using leaves to identify trees. This lesson simply introduces *how* and *what* to look for on leafless trees.

This is a fun way to learn about Minnesota trees in winter!

You DON'T need to identify the species. With this activity, it is more important to learn what to look for and be able to apply those observations to make educated guesses about a tree's identity.

Grades: 3 through 5

Minnesota 2019 Science Standards addressed

3.1.1.2.4 Construct reasonable explanations based on evidence collected from observations or experiments.

3.1.3.2.1 Understand that everybody can use evidence to learn about the natural world, identify patterns in nature, and develop tools. For example: Ojibwe and Dakota knowledge and use of patterns in the stars to predict and plan.

3.4.1.1.2 Identify common groups of plants and animals using observable physical characteristics, structures and behaviors. For example: Sort animals into groups such as mammals and amphibians based on physical characteristics. Another example: Sort and identify common Minnesota trees based on leaf/needle characteristics.

Procedure

DECIDUOUS TREES

Deciduous trees drop their leaves in the fall. This lesson will focus on observing leafless deciduous trees in the winter.

CONIFEROUS TREES

Conifers are trees that bear cones. Most are "evergreens," such as pines, spruces, and cedars. All conifer trees, except tamaracks, retain their leaves (needles) in the winter. Use the [Beginner's Guide to Minnesota Trees](#) to identify conifers.

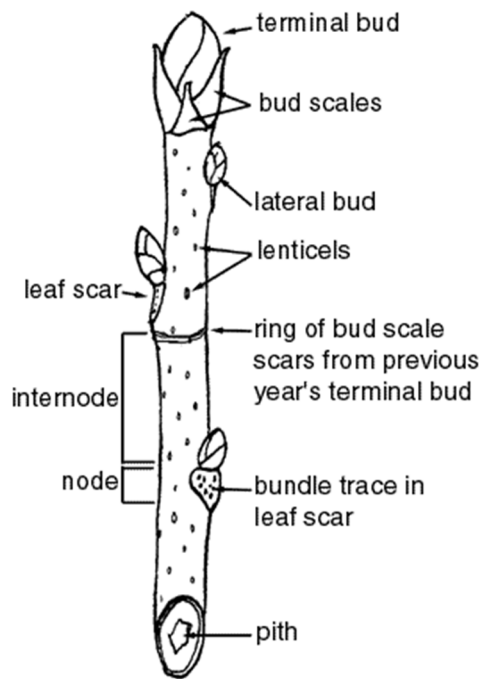
Step 1: Head into the forest. Find an area that appears that it has at least 3 different deciduous tree species and is large enough to fit your class. Ask each student to collect a twig that is no longer than their arm. Make sure they collect twigs from trees, not shrubs. They can collect twigs from the ground, or if trees have hardened off for the winter, they can carefully snap twigs off dormant trees. Trees harden for winter by dropping their leaves and moving much of their moisture into their roots. Twigs from hardened off trees should snap off easily. Natural forces in winter—ice storms, high winds, deer browsing—break twigs naturally. Allowing students to collect twigs in this manner should not harm the tree. Discuss with students the importance of not harming trees. If you only have schoolyard or boulevard landscape trees, allow students to only collect twigs from the ground.

Indoor option: If you don't have a forest nearby, before the lesson collect a variety of leafless twigs and branches and let the students use them.

Step 2: Have the students observe their twigs closely. Ask them what they are noticing. They may notice color, texture, bumps, buds, lines, spots, and even different smells. Have them compare their twig to their neighbor's twig. How are the twigs similar or different?

Step 3: Explain the parts of the twig, using the diagram and vocabulary below. Each time you introduce a twig part, have the students locate the part on their twig. Not all twigs may have all the parts.

Twig parts



NOTE: Not all twigs have terminal buds

Explain:

Lenticels are openings along the twig that allow for gas exchange. Have students take a deep breath in (animals inhale oxygen) and then blow out the air (animals exhale carbon dioxide). Plants do the same thing through their lenticels, only plants “inhale” carbon dioxide and “exhale” oxygen.

Explain:

Does your twig have two or more **bud scale scars**? The bud scale scar marks where the tree stopped growing in an earlier winter. Beyond the scar, the tree started growing again in the spring. Therefore, if your twig has 2 bud scale scars, your twig is 2 years old. (3 scars = 3 years; 4 scars=4 years, etc.)

Step 4: If students did not identify PATTERNS in step 2, introduce it now. Have the students look at the BUDS on their twigs—challenge the students to find patterns on how they are arranged on the branch.

All deciduous trees in Minnesota have either an opposite or alternate pattern. Have students decide if their twig's buds are arranged in an opposite or alternate pattern.



Opposite buds appear opposite each other along the twig, just like our arms are opposite each other on our bodies.

Sometimes, opposite twigs can appear to be alternate in places. This commonly occurs when a bud or side twig breaks off. However, the twig will show scars—also in an opposite pattern—where the bud or side twig has broken off.



Alternate buds show a staggered pattern along the main twig.

Have all students with opposite twigs stand together. Have all students with alternate twigs stand together. Ask all students to check all the twigs in the group to make sure the twig is truly opposite or alternate.

If students find a twig in their group that was mis-identified, have students re-group and check their work again.

Repeat STEP 4 a few more times—allowing students to collect new twigs or exchange twigs and categorize them as opposite or alternate—until they understand the concept.

Recognizing the basic pattern—opposite or alternate—is a key skill that students need to learn in future tree ID lessons. Trees follow their opposite or alternate patterns on their twigs, branches, and even overall tree shape.

STEP 5: Explain the MAD rule. In Minnesota, only Maples, Ashes, and Dogwoods have opposite patterns. Everything else is alternate. Therefore, students holding a twig that has an opposite pattern is most likely to be a maple, ash, or dogwood! (*In southeastern Minnesota, think of the MADHorse rule...horsechestnut trees such as buckeyes are also opposite.*)

STEP 6: Have students guess which tree their twig came from (if outside). If you are in a forest, show students how to follow the twig/branch on a tree to the tree's trunk. Because branches overlap in forests, students need to practice how to identify precisely the tree they are observing. Repeat this step again by have students exchange twigs and find the tree it came from.

STEP 7: Once the student has identified the tree their twig came from, have the student identify the bark. Ask students what they observe about the bark. (Do they see colors, patterns, textures, etc.).

Have students find other trees in the forest that have similar bark. It is likely those are the same kind of tree. Bark is like our skin. Young bark is smooth and unblemished. Old bark is much more bumpy and can show signs of flaking or damage.

STEP 8: Have the students step back from their tree to observe the overall shape of the trunk and crown.

STEP 9: Bring it all together with the student worksheet.

STEP 10 (OPTIONAL): Help students make educated guesses about their tree's species, using the teacher hints below. Not all Minnesota deciduous trees are covered by the hints.

Teacher hints:

1. Stress that students are learning how to make an educated guess using their observations.
2. Always stress opposite vs. alternate pattern.
3. Ashes have thicker twigs/branches than maples.
4. Most ashes in and near the Twin Cities show signs of damage from emerald ash borer beetles. Signs of damage include woodpecker holes, blonding where out bark has fallen off, shoots of young branches at the base of the tree, and death.
5. Dogwoods in Minnesota seldom grow higher than 10-15 feet.
6. The trunks of box elder (maples) are often bowed, rarely straight. Box elders in forests may also have more than one trunk. Boxelder twigs can be green in color, especially in the spring..
7. Buckthorn, a non-native, highly invasive tree, is tricky because it may have both alternate and opposite branching patterns, even on the same tree. However, it is categorized as alternate. It's generally a shorter tree, seldom exceeding 10-15 feet, and has distinctive thorn-like protrusions on twigs. It will be the last understory tree to lose its leaves in the fall and the first understory tree to green up in the spring.
8. Maples have opposite branching. Sugar maple trunks are straight, and often have dark black sap stains on them. Minnesota Indian tribes easily located sugar maple groves and visited them every year to collect maple sap.
9. Trees with compound leaves leaf out later in the spring (walnut, locust, ashes) and generally have thicker twigs than trees with single leaves.
10. Oaks have thick twigs (an exception to hint #7), usually straight trunks, and fat buds. (The fat buds of oak seedlings and saplings makes them a popular target for deer and rabbit browse.)
11. Red oak and ironwood often keep their browned leaves during the winter.
12. Basswoods in forests often have more than one trunk. Trunks often bend out from each other.
13. Elm bark has a diamond pattern.
14. Mature cottonwood trees are often the largest, tallest deciduous trees in a forest. Twigs are lighter gray in color, with fat buds that turn sticky in early spring. Locate your cottonwood trees as a good place to share the Dakota story, [The Star in the Cottonwood Tree](#) (ELA and social studies lesson).

These hints don't cover all Minnesota trees, but are a list of noticeable features often seen in Minnesota.

Teacher hints: Bark images



Chevrons (upside-down V) are common on aspen trees



Paper birch bark easily peels off the trunk.



Bark on mature sugar maples. Maple twigs are *opposite*.



Bark on older silver maple trees flake off in large, wide strips. Maple twigs are *opposite*



Bark on a mature white oak has deep fissures



Hackberry. An alternate-branched tree that has distinctive bark with warty ridges.



Mature black cherry trees have "potato chip" bark



You might notice long triangle patterns on elms. Photo: Siberian elm, a non-native, invasive tree that is common in forests and near schoolyards.

Student page

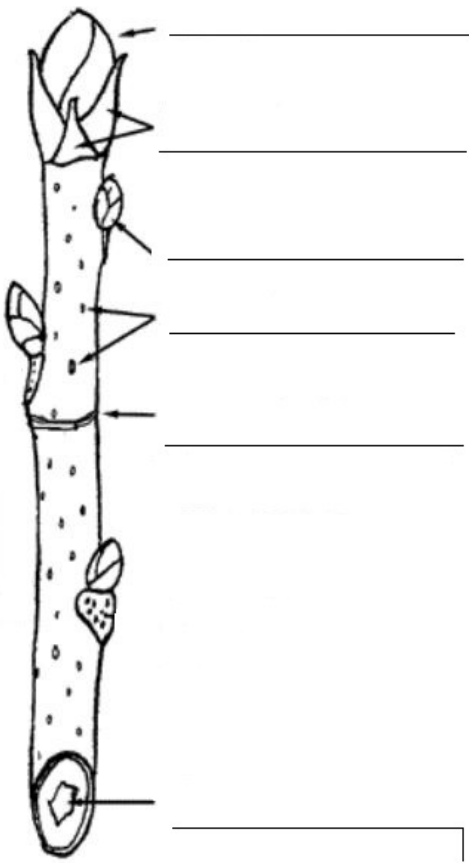
Name:

My deciduous tree

Draw a picture of your twig.

Are the buds opposite or alternate? _____

Label the parts of this twig.



Draw a picture of your tree's shape from a distance.

What is interesting about your tree? Describe.