
Twigs are for Kids!

Activity Overview

Students use twigs to identify trees on their school grounds (or in a nearby woodland area) to inform their decision-making for their schoolyard restoration.

Objectives

Students will:

- Learn the parts of a twig
- Develop observation skills
- Identify trees using field guides
- Increase awareness of different plant communities
- Apply the information learned to make restoration decisions

Subjects Covered

Science and Social Studies

Grades

3 through 12

Season

Late fall, winter, early spring

Activity Time

1-1 1/2 hours total; 5-10 minutes warm-up, 10 minutes twig/tree identification background, 35-45 minutes tree and community identification, 15-30 minutes to debrief and tie to the schoolyard restoration project

Materials

Tree field guides, pencils and clipboards, twig samples, woodland community datasheets Woodland Database

State Standards

Science:

Investigate how organisms respond to internal/external cues (F.4.2)

Find connections among living and non-living things (F.4.4)

Background

Even though people often identify trees by their leaf shape and what they look like in summer or fall, different tree species have their own distinct characteristics in the winter months. Winter (and early spring) tree identification can be a great way to improve observation skills and learn new tree terminology. This also can be a good time of year to identify what trees currently grow on the school grounds and to begin planning for future native plantings.

One common way to identify trees in winter and early spring is by their twigs, which include several important elements for plant growth that can help with identification (see illustration). Trees can be identified by looking at bud characteristics, leaf scar shape and arrangement, and bark color and texture. Deciduous trees usually produce new terminal leaf buds in summer in preparation for the next year's growth. Buds contain the next year's stems, leaves and sometimes flowers. Deciduous trees are dormant in the winter, but when the leaf buds expand in springtime, the bud scales fall off, leaving a ring of scars around the twig. The growth of a twig over the previous year can be determined by measuring the distance between the old bud scar and this new terminal bud. These terminal buds are usually larger and at the ends of branches while axillary (or lateral) buds are found above the leaf scars.

Essentially, a leaf scar is what is left when a leaf falls off during the fall season. As the end of the growing season approaches during late summer, a thin layer of more brittle cells forms across the base of the leaf where it attaches to the stem. Here the leaf eventually becomes detached, leaving a scar shaped like the base of the leaf's petiole, or stalk, on the stem below the bud. Sometimes lesser scars can be seen at each side of the leaf scar, which are called stipule scars. If you look closely at a leaf scar, you can see traces of small dots and/or lines, which are remnants of the vascular bundles that provided water and mineral nutrients from the stem's vascular system. These are called bundle scars. The number and arrangement of bundle scars can be helpful in identifying trees in winter.

The characteristics of a tree's pith, or the tissue in the center of the stem, can also be a useful identification tool. For example, sometimes the pith is solid, or homogeneous, throughout, while other tree species may have irregular cavities.

Analyzing the trees and other existing vegetation on the school grounds provides clues about the type of ecosystem(s) to restore, how to prepare the site and what management techniques to use. Other aspects of the schoolyard restoration project (educational and site goals, soil, slope, etc.) are also taken into account. The number of existing native species may form the basis for the type of community to restore. Large, open-grown trees such as oaks may be ideal for a savanna, or areas planted in trees including maple, ash or basswood could form a framework for a woodland planting.

Activity Description

Identifying what trees are growing at your site will help you to know how to proceed with your restoration project. First, you will learn how to identify tree species on the school grounds, and then you will analyze how these existing plants will affect the restoration. Follow these directions:

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Investigate structure & function of organisms (F.8.1)

Understand an organism's behavior adaptations (F.8.7)

Understand energy storage, digestion, metabolism (F.12.9)

Investigate how matter and energy are used to sustain an organism (F.12.11)

Social Studies:

Describe examples of land use, communities, shelters (A.4.4)

Use atlases, databases, charts, graphs, maps, etc. (A.4.5)

Use maps, photographs, satellite images for information (A.8.1)

Use atlases & vocabulary to describe earth & human attributes (A.12.1)

1. Collect sample twigs for classroom use and review the parts of a twig before going into the field. Review twig characteristics such as terminal buds, lateral buds, leaf scar, pith, opposite, alternate, etc.
2. Work in pairs or groups of three to identify trees and their numbers in the restoration site on the schoolgrounds. Each group takes a clipboard, field sheet, pencil, magnifying lens, tree identification books and twig key as available.
3. Identify trees on your site using field guides available. Record trees identified and three characteristics of each species that helped with identifying the tree and the total number of trees of each species. As time permits, do a bark rubbing of your “favorite” tree identified on the field sheet.
4. Return to the classroom to record your results on a master list of species for the site. Determine which trees are most common and which trees are rare.
5. Refer to the “Woodland Community Models Fact Sheet of the University of Wisconsin-Madison Arboretum Woodland Database to determine what community, if any, these trees are representative. http://wiscinfo.doit.wisc.edu/arboretum/woodland/woodland_plant_community_models.htm
6. Discuss the woodland community composition and what to consider when restoring a woodland site at your school grounds. Discuss the species composition, physical characteristics, dominant and common trees, topography, soil type as described in the Woodland Database and what implications this information might have for your schoolyard restoration project. Notice what species are missing such as other trees, shrubs and herbaceous plants that you may consider adding to your restoration.

Assessment

- Diagram a twig with parts labeled.
- Identify 1-3 features per dominant tree species that are useful for identification.
- As a class, create a rubric for the “Tree Identification Field Sheet” to use as an assessment tool.

Resources

- Harlow, W.M. (1957). Fruit key and twig key to trees and shrubs. New York. Dover Publications.
- WDNR. (1990). Forest trees of Wisconsin: How to know them. Madison. Bureau of Forestry (PUBL-FR-053 90REV)
- Wisconsin Vascular Plant Species of the Wisconsin State Herbarium: <http://www.botany.wisc.edu/wisflora>
- Basics of Tree ID Basics: <http://www.cnr.vt.edu/dendro/forsite/Idtree.htm>

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Tree Identification Field Sheet

Common Name

Scientific Name

Three Characteristics Used for Identifying the Tree

Woodland Community Type: _____

Refer to University of Wisconsin-Madison Arboretum Woodland Database:
http://uwarboretum.org/eps/woodland_rest_int_work.php

