Cornell University
Cooperative Extension
Department of Natural Resources

Tree Identification - Components of Learning

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- ***LEARNING FUNDAMENTALS*** - The success and thrill of learning tree identification comes with spending lots of time in the woods with self-quizzing and using index "flash" cards with the name on one side and tree features on the other. New learners need to spend sufficient time looking at trees so that a descriptive term becomes a visual image (e.g., be able to mentally picture "ridged and furrowed bark").

- ***UNDERSTANDING VARIATION*** - A critical element for developing tree identification skills is not only to introduce a species and all its features, but also to illustrate the range of variation within a species. Tree features change during the year (leaf and twig color), as trees mature (juvenile vs. adult), and among different locations. Beginning learners can become frustrated by thinking that one specimen looks different than the specimen used for the introduction. After the initial introduction, spend time looking at other specimens, highlighting the constant features and the features that can vary.

- ***TERMINOLOGY*** - Terminology can become excessive, but some is necessary for detailed learning and communicating. Focus initially on terms that describe: leaf shape; leaf margins; fruit types; and twig features. Advanced study can use terms that describe: leaf surface features; fruit components; pith features; and bud scale features. The 4-H Bulletin "Know Your Trees" does not have a glossary, but does have a picture guide on pages 5 and 6. Most tree identification guides include a glossary, and dendrology text book glossaries are generally comprehensive.

- ***DICHOTOMOUS KEYS*** - Identification keys that use paired questions to eliminate certain species based on the selected characteristics are *di*chotomous and commonly available. Keys are available for summer vs. winter features, and for a variety of plant parts (flowers, fruits, twigs, and leaves). Youth gain valuable skills in learning to use keys as many fields of the biological sciences use keys for organism identification, such as birds, butterflies, flowering plants, and reptiles. Using keys for learning tree identification provide youth a framework to think through when identifying trees without the use of a key. The first few times a youth identifies trees with a key their progress may be quite awkward, but practice will make the process simpler. Start by keying known samples. The 4-H Bulletin includes nontechnical keys for summer (leaves) and for winter trees (twigs). Other tree identification guides also include keys. Teach the concept of a dichotomous key by dividing and subdividing the audience based on hair color, glasses, jeans vs. not jeans, etc. A useful exercise is to have the audience make their own key for a group of plant parts they collect,

focusing on paired questions (i.e., dichotomous) and questions that use reliable plant part features for distinguishing species.

- ***LEAVES*** - Leaves are common and easy to obtain. Children especially find leaves easy to work with, but leaves are only available 5 - 6 months each year. Leaves tend to be highly variable within a species and even on a single tree. Thus, they not a reliable feature, but help narrow the options. Learning can be accomplished through leaf collections (4-H Bulletin page 67-71). Variations of collections during different times of the year can be used to illustrate the way leaves grow and how their function changes during the year. Another variation is a leaf collection for trees of the same group (e.g., all oaks or all maples), alternatively make a collection of "maple-like" leaves that aren't maples to illustrate the limitations of tree id by leaf.

- ***TWIGS*** - Twigs are a very useful plant part for identification as features are diagnostic 11 months of the year. Twigs are somewhat difficult to use for about a month in the spring when leaves are emerging from the buds. Twig features are reliable and consistent, but are more difficult to learn and understand than leaves. Learning tree identification by twigs uses twig features such as stoutness, smell, surface features, bud shape, and colors. As with leaves, twig collections are valuable as a learning aid, both during the making of the collection and its use once the collection is established. Twig features are most reliable between approximately late June and early May (descriptive colors may be most valid from October to March); other times are when the buds are breaking and forming and they don't always provide reliable features for beginning learners.

- ***FRUIT*** - Fruits are a reliable plant part when present, but often are not available or in poor condition. Because fruits form from flowers (flowers are the basis for tree species taxonomy), they can be diagnostic as an identification tool. However, I generally have trouble locating fruits that are representative of species characteristics due to premature dropping, small animal consumption, fragmentation, dispersal by animals, and other events. Even so, fruit collections, added to leaf and twig collections, are valuable as a learning aid. Use small boxes to hold fruits of various species.

- ***BARK*** - Bark is the common feature used by people working in the woods (foresters, loggers) as it allows for quick identification from long distances. Leaves and twigs are good starting points for beginning learners, but bark features should be included and emphasized as learners become more proficient. As for learning tree identification with other plant parts, I find the initial introduction is easiest by contrasting visually different features (e.g., smooth bark beech versus a hickory). Bark is usually reliable to the species level, but sometimes bark cannot be used to separate two closely related species (e.g., white vs.

green ash; sugar vs. black maple). Bark features in particular change with tree age from saplings to mature trees.

- ***CROWN ARCHITECTURE/TREE STRUCTURE*** - These features are useful when you identify trees from a distance (while driving, looking across a creek, etc.). Use features such as the diameter and stoutness of younger branches, crown shape (e.g., vase-like, spherical, conical); needle texture; and branching patterns. Trees have different maximum potential for growth regardless of site productivity. Some species always are small in size (e.g., crabapples), while others can become very large (e.g., sycamore, white oak) or massive (bur oak, swamp white oak). This feature of trees is somewhat useful for tree identification, but even more useful when thinking about the tree as a component of the landscape. In urban landscapes tree shape and size are important for the tree to blend with the desired design. Similarly in rural/woodland settings, the tree shape and size (i.e., structure) is important as habitat for wildlife.

- ***HABITAT*** - Particularly for advanced learners, recognizing the tendency for some species to be associated with a specific environment (e.g., dry, moist, lower slope, north slope, etc.) is useful for both identification as well as for forest and wildlife habitat management. Historically, a common problem has been planting a desired species on the wrong site, a site that is too dry, wet, shaded, clayey, etc. for the given species. Once the basics of tree identification have been learned, spend time during woods outings on matching which species occur repeatedly on just one site (for example sycamore on streambanks) and which species will occur on almost any site (for example red maple on dry or wet sites). The Cornell Cooperative Extension bulletin by Lassoie et al. is a good reference for this.

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RECOMMENDATION FOR TREE IDENTIFICATION BOOKS:

Cope JA and FE Winch. 2002 (revised by E. Cope). Know Your Trees. Cornell Cooperative Extension 4-H Bulletin 147-J-85 $6.35. Cornell University Resource Center (607) 255 – 2115. Online version at <http://bhort.bh.cornell.edu/tree/trees.htm>

Lassoie, JP, VA Luzadis, and DW Grover. 1996. Forest Trees of the Northeast. Cornell Cooperative Extension Information Bulletin 235. Cornell University Media Services (607) 255 – 2115. Approx. $18.00 list price.

[out of print…look on-line for used copies. The best of the resources available] Leopold, DJ, WC McComb, RN Muller. 1998. Trees of the Central hardwood Forests of North America – An identification and cultivation guide. Timber Press. Portland, Oregon. ISBN 0-88192-406-7. Approx. $50.00. 469 pp. (800) 327 – 5680. Send email orders to <orders@timber-press.com> or visit web site at www.timber-press.com

Leopold, D. J. 2003. Trees of New York State Native and Naturalized. Syracuse University Press. (This is a "coffee table" quality book with exceptional photographs and detailed descriptions. Not a field book, but a great resource)

Virginia Tech Dendrology http://dendro.cnre.vt.edu/ Available online and as a phone app.