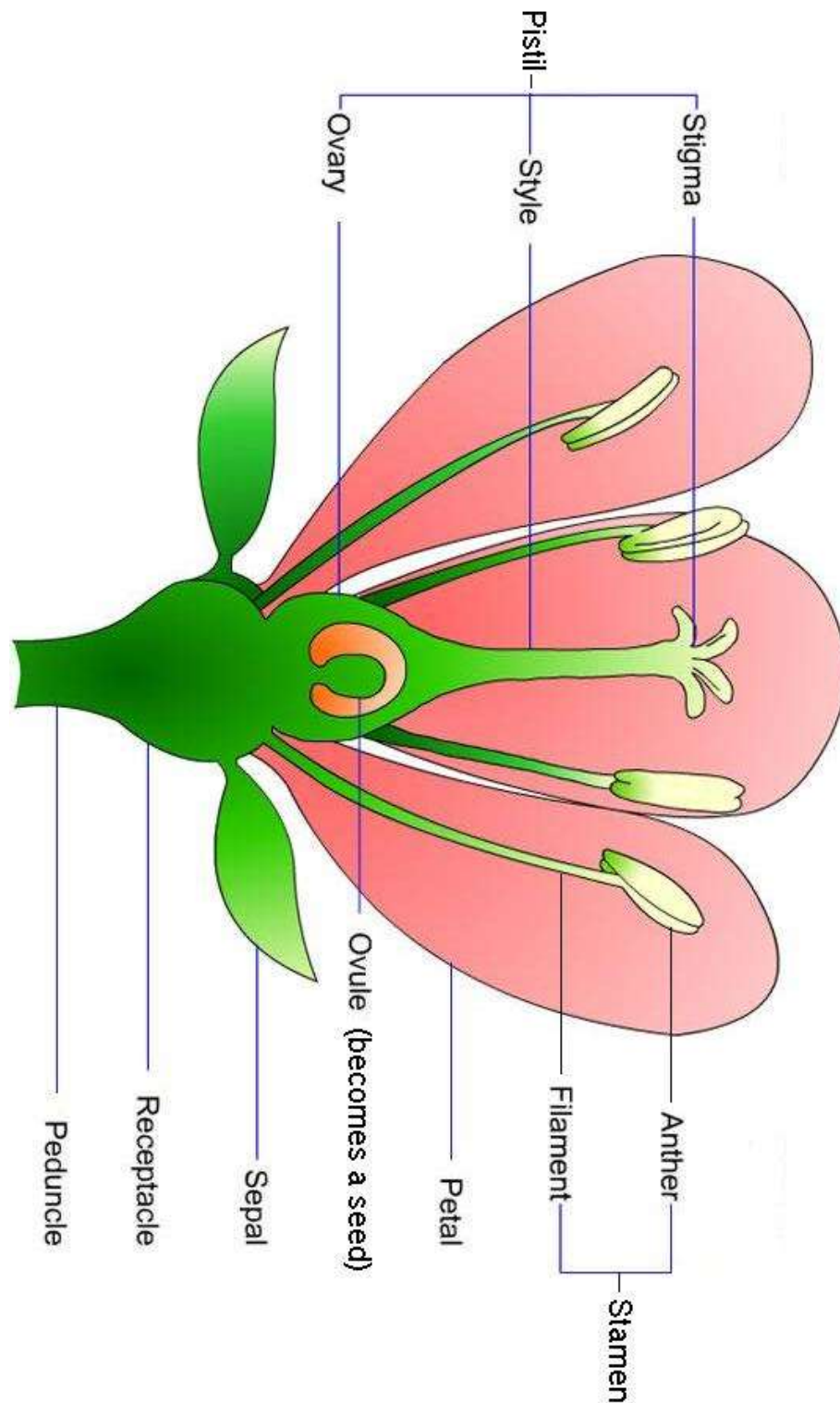


Envirothon Forestry Study Materials: diagrams and glossary



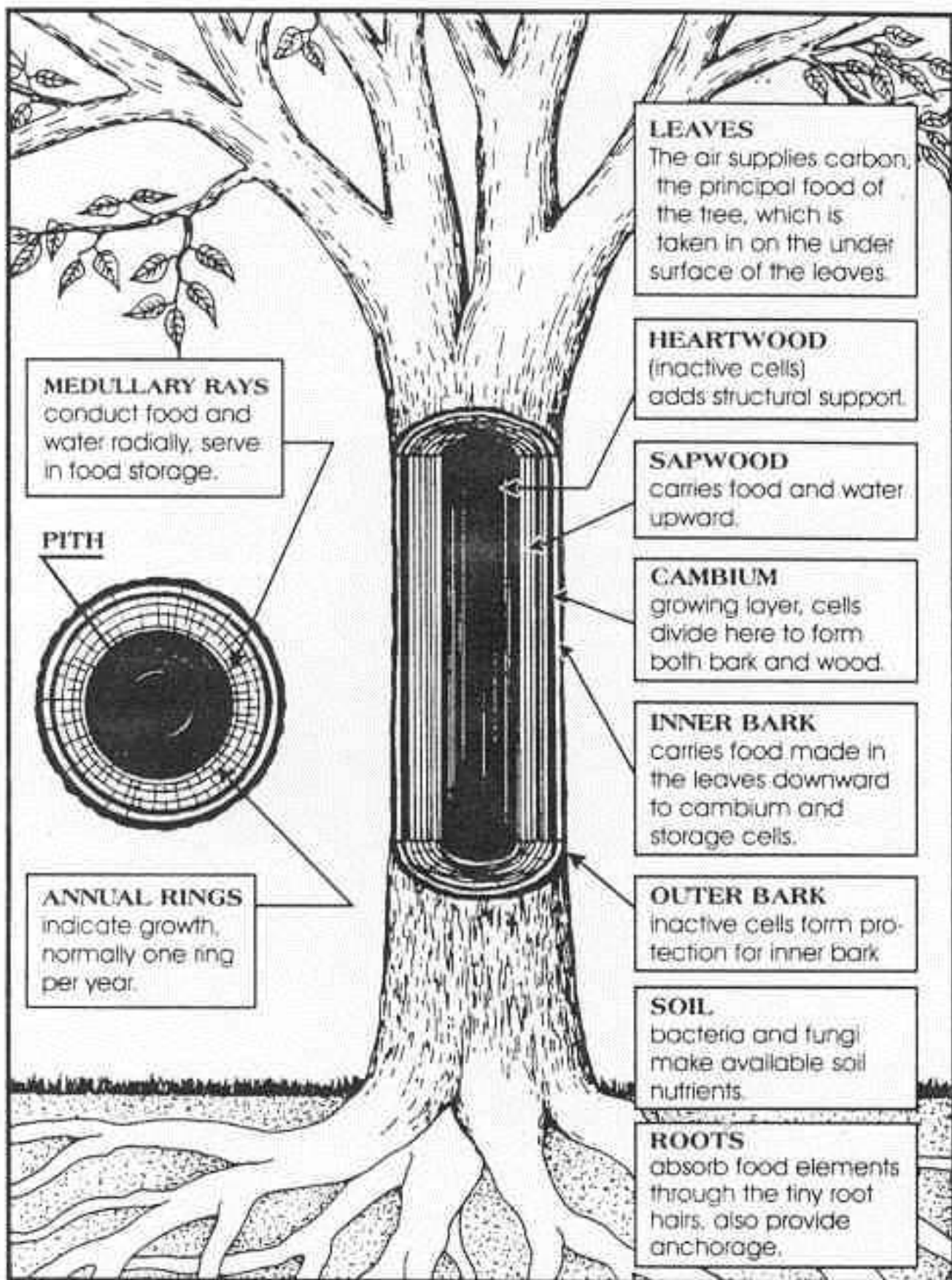
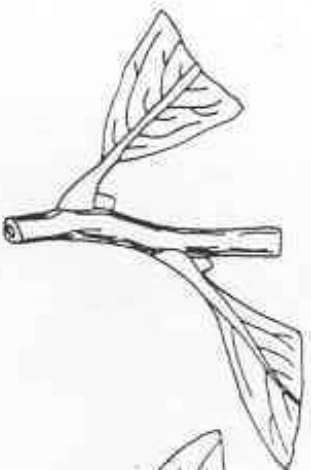
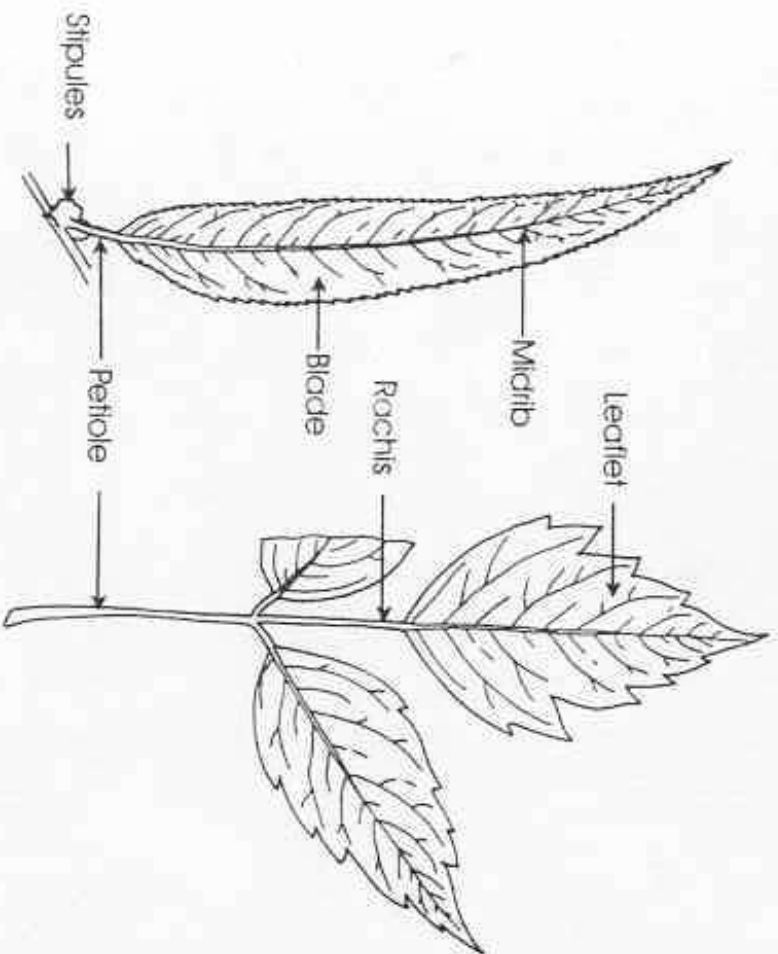
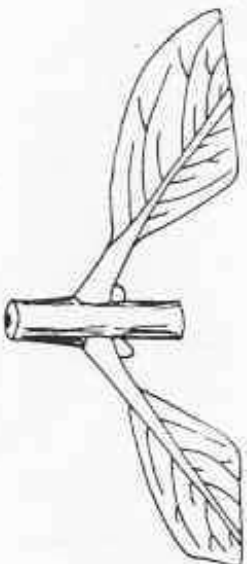


DIAGRAM SHOWING FUNCTIONS OF DIFFERENT PARTS OF A TREE

Courtesy of the *New Tree Experts Manual* by Richard R. Fenska



Alternate



Opposite



Needle-like
(White Pine)



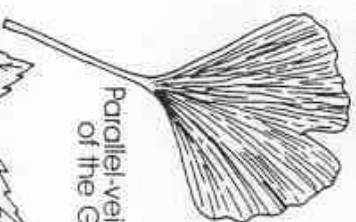
Scale-like
(Red Cedar)



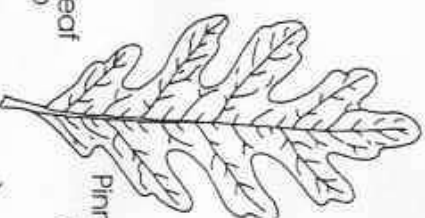
Awl-like
(Red Cedar)



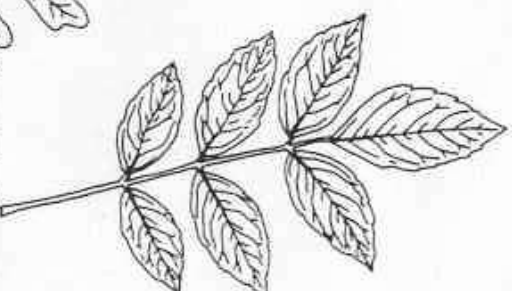
Linear
(Hemlock)



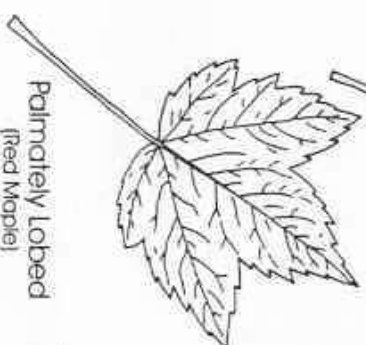
Parallel-veined leaf
of the Ginkgo



Pinnately Lobed
(White Oak)



Pinnately Compound
(White Ash)



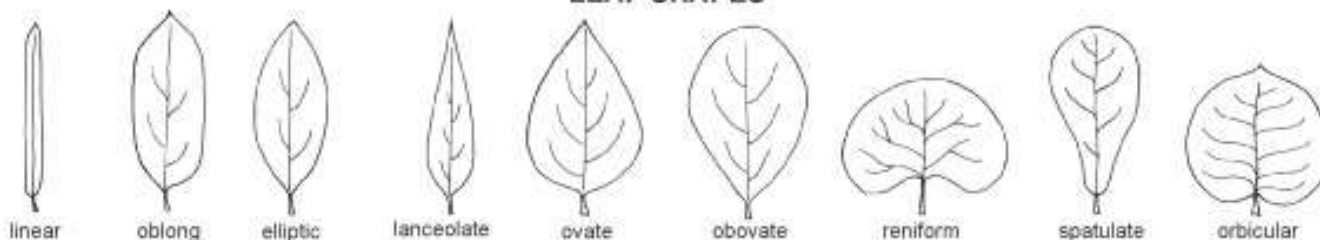
Palmately Lobed
(Red Maple)



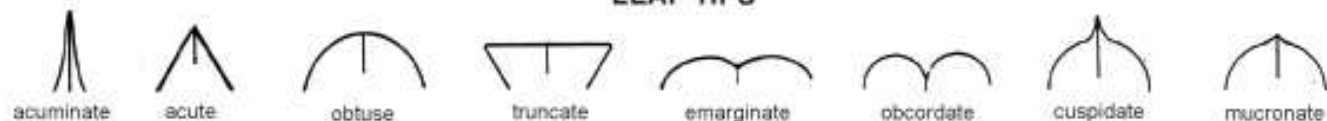
Palmately Compound
(Ohio Buckeye)

ILLUSTRATED GLOSSARY OF LEAF SHAPES

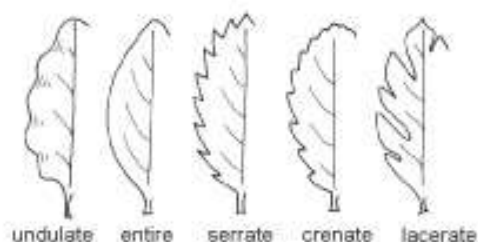
LEAF SHAPES



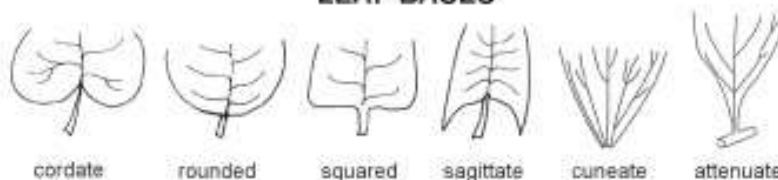
LEAF TIPS



LEAF MARGINS



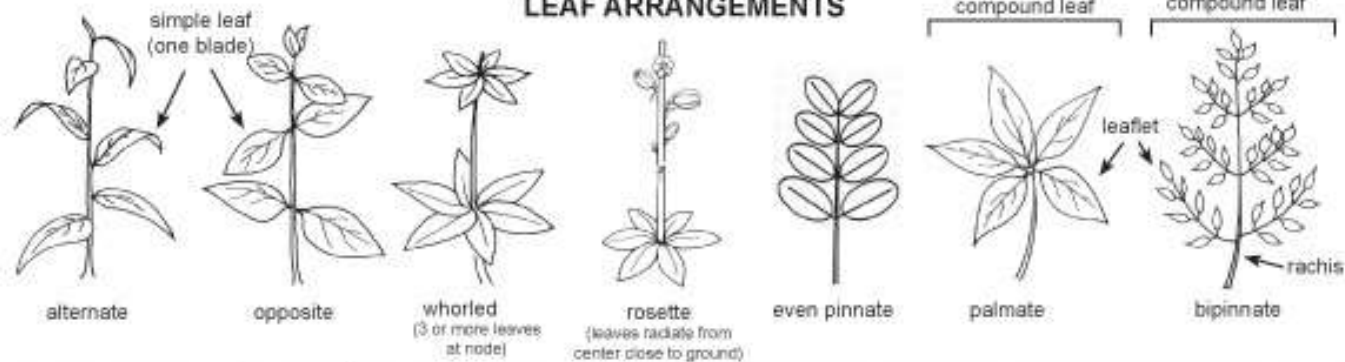
LEAF BASES



LEAF ATTACHMENTS

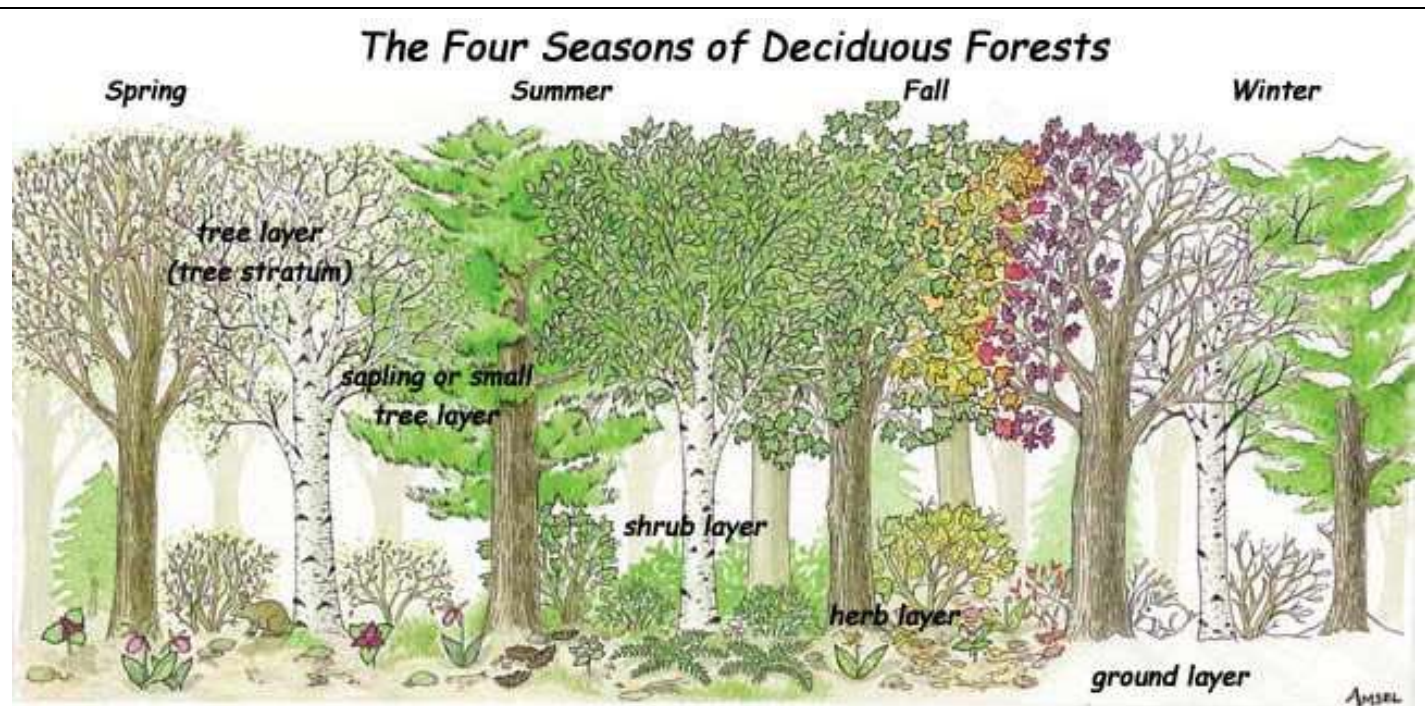


LEAF ARRANGEMENTS



HABIT





Layers in a Deciduous Forest

Ground Layer – leaf litter, fallen branches, lichens, clubmosses, and true mosses

Herb Layer – short plants like ferns and trillium

Shrub Layer – shrubs like rhododendrons, azaleas, mountain laurels, and huckleberries

Understory (sapling or small tree layer) – short tree species (dogwood, sassafras) and young trees

Canopy (tree layer) – the tallest layer, 60 -100 feet high, with large oak, maple, beech, hickory, elm, basswood, linden, walnut, white pine, hemlock, cedar

GLOSSARY

alternate	The arrangement of leaves along a stem where consecutive leaves alternate along different sides of the stem. Taken together, all of the leaves plus the stem lie in roughly the same geometric plane. In winter (after leaf drop for deciduous plants), the arrangement can be determined by looking at the leaf scars or buds on the dormant twigs.
axil	The area between a leaf and stem, where an axillary bud forms. The axillary bud can be a floral bud that becomes a flower, or a vegetative bud that may produce a lateral stem (or remain dormant).
basal	Located at or near the base of a plant stem, or at the base of any other plant part:
biodiversity	Biological diversity: the variety of plants and animals, the communities they form, and the ecological functions they perform at the genetic, stand, landscape, and regional levels.
browse	Parts of woody plants, including twigs, shoots, and leaves, eaten by forest animals.
bud	The tightly wrapped structure that contains miniaturized forms of leaves and stems (vegetative bud) which may open at a later date or remain dormant forever, or flowers (floral bud) which open the following spring.
bundle	The grouping together of needles on a pine tree into a unified cluster, bound by a sheath (or fascicle) at the base, and attached at a single point to the twig. Individual species of pine trees are known by the number of needles in a bundle; for example, White Pine has five, Loblolly Pine has three, and Scotch Pine has two.
bundle scar	Any small mark left on the leaf scar from the vascular tissue, where the leaf was once attached to the stem
catkin	Elongated cluster of single-sex flowers bearing scaly bracts and usually lacking petals
cavity tree	A tree with cavities in which birds, mammals, or insects such as bees may nest (also called den tree).
compound leaf	In a compound leaf, the leaf blade is completely divided, forming leaflets, as in the locust tree. Each leaflet is attached to the rachis (middle vein) but may have its own stalk.
conifer	A plant that has cones, rather than fruits, as its method of dispersing seeds. Most conifers are needle-foliaged (evergreens such as the Spruces and Pines, or deciduous versions such as Larch) that have relatively large cones that spread open at maturity. However, others have a miniature berry-like cone (such as the Junipers) or a ball-like cone (such as Bald Cypress, a deciduous conifer) instead.
deciduous	A woody plant that drops its leaves in autumn. Most deciduous trees are broad-leaved, but several are "deciduous conifers" that have needles that drop in autumn. These include Eastern Larch and Bald Cypress.
defoliate	To strip (a tree, bush, etc.) of leaves.

dioecious	Plants that have male flowers (or staminate flowers) on one plant, and female flowers (or pistillate flowers) on another plant. Therefore, a pollinating male plant bears no fruits or seeds, whereas a female plant may have fruits, if pollination and favorable environmental conditions occur. Examples of dioecious trees include Green Ash and Osage Orange. An advantage of dioecious trees is that seedless males can be selected and propagated.
drupe	A type of fruit having a single seed enclosed in a hard layer and covered with soft, often juicy flesh, as in cherries and peaches
ecology	The study of interactions between living organisms and their environment.
ecosystem	A natural unit comprising living organisms and their interactions with their environment, including the circulation, transformation, and accumulation of energy and matter.
evergreen	A woody plant that retains its leaves throughout the winter. These include broad-leaved evergreens (such as most rhododendrons and bayberries) and the more common needle evergreens (the pines, spruces, firs, and hemlocks).
exfoliate	Exfoliating or peeling bark describes the natural process and condition of the bark peeling away from a tree trunk. A sycamore tree has exfoliating bark.
floral bud	A bud that develops into a flower the following year. Although often occurring as a lateral bud, it can also be a terminal bud (as in European Horsechestnut) or even on the bark of trunks (as in Redbud).
fruit	The reproductive structure that includes the inner seeds. Mature fruits can be moist (such as the fleshy fruit of Pawpaw), mealy (such as the nuts of the Hickories), or dry (such as the wafers of the Elms).
glaucous	Covered with a grayish, bluish, or whitish waxy coating or bloom that is easily rubbed off
hardwood	A term used in reference to the relative hardness of wood in a tree. Examples of hardwoods include the oaks, hickories, and ashes.
herbaceous	Pertaining to non-woody vegetation, such as grasses and wildflowers.
introduced and invasive species	An introduced species is a nonnative species that was intentionally or unintentionally brought into an area by humans. An invasive species is a nonnative species that can move aggressively into a habitat and monopolize resources such as light, nutrients, water, and space to the detriment of other species.
lateral bud	A bud that originates just above the point of leaf attachment to the stem. A lateral bud may be a floral bud that flowers the following year, or a vegetative bud that can potentially become a lateral stem.
leaf scar	The scarred portion of a twig where a leaf once attached. After several years, the enlarging twig becomes a branch, and the bark of the branch overwhelms the leaf scars, rendering them non-existent.

leaflet	In compound leaves such as the ashes, the green blades that attach to the central rachis are termed leaflets (a simple leaf like Redbud, on the other hand, does not have leaflets, but instead has only a single leaf blade attached to a petiole).
legume	A pod, such as that of a pea or bean, that splits into two valves with the seeds attached to one edge of the valves.
lenticel	A small opening (either a pore or a slit) in the bark of the tree, through which the tree "breathes" air into the cambium and other living tissues of the outer trunk. While all trees have lenticels, some are more easily observed on twigs and young branches (such as those of Black Cherry and River Birch) than others.
litter	The uppermost layer of the forest floor consisting chiefly of decaying organic matter.
lobe	A division or projecting part of the blade of a leaf
mast	All fruits of trees and shrubs used as food by wildlife. Hard mast includes nut-like fruits such as acorns, beechnuts, and chestnuts. Soft mast includes the fleshy fruits of black cherry, dogwood, and serviceberry.
monoecious	Plants that have male flowers (or staminate flowers) and female flowers (or pistillate flowers) on the same plant. Therefore, a monoecious plant will bear fruit from some of the female flowers scattered throughout its growth, if favorable environmental conditions occur. Examples of monoecious trees include American Beech and Black Walnut.
node	The place along a stem or twig where a structure (such as a leaf, leaf scar, or lateral bud) is attached. Nodes may have single structures (alternate arrangement), dual structures (opposite arrangement), or multiple structures (whorled arrangement). Usually, the apex of a twig is considered the terminal node. The areas of a twig between the nodes are called the internodes and constitute the majority of the twig.
opposite	The arrangement of leaves along a stem where a pair of leaves are opposite one another, with the stem in-between. Taken together, all of the leaves plus the stem lie in roughly the same geometric plane. In winter (after leaf drop for deciduous plants), the arrangement can be determined by looking at the leaf scars or buds on the dormant twigs.
palmately compound	The arrangement of leaflets in whorled fashion around the top of the petiole, which then attaches to the stem of the plant. This resembles the arrangement of fingers attached to the palm of a hand, which itself attaches to the arm (at the wrist). Ohio Buckeye and European Horsechestnut are good examples of palmately compound leaves.
pedicel	The stem-like structure that attaches a developing flower (or fruit) to the twig (or peduncle, which then attaches to the twig).
petiole	In a simple leaf, the petiole is the structure that attaches the leaf blade to the stem. In a palmately compound leaf, the petiole attaches the leaflets to the stem. In a pinnately compound leaf, the petiole attaches the leaflets to the rachis, which attaches to the stem.
phloem	In vascular plants, the downward flowing food conducting tissue

pinnately compound	The situation where a leaf is not simple, but rather composed of leaflets attached to a central rachis, which then attaches to the true twig of the plant. In autumn for woody plants, the leaflets detach from the rachis, and the rachis falls off from the twig, completing leaf drop. Black Locust and White Ash are good examples of pinnately compound leaves.
pistillate	Having female flower parts (pistil) but no male flower parts (stamens)
pith	The spongy material in the center of twigs and young trunks (may be solid, diaphragmed, chambered, star-shaped, etc.)
pubescence	The fuzziness found on some leaves, stems, buds, floral structures, and fruits, especially when they are immature.
pulp wood	Timber used to make paper and wood products other than lumber.
riparian zone	An area adjoining a body of water, normally having soils and vegetation characteristic of floodplains or areas transitional to upland zones. These areas help protect the water by removing or buffering the effects of excessive nutrients, sediments, organic matter, pesticides, and pollutants.
samara	A type of dried fruit that has a seed attached to a wing, which often causes the fruit to spin downward when it falls from a tree. Most Maples have paired samaras in clusters, while most Ashes and Tree-of-Heaven have single samaras in large clusters.
sapling	A small tree, usually defined as being between 2 and 4 inches in diameter at breast height.
seedling	A young tree originating from seed that is less than 4 feet tall and smaller than 2 inches in diameter at ground level.
shade intolerant	The inability of a tree to become established and survive at relatively low levels of sunlight. Shade-intolerant species, such as black cherry, aspen, and yellow poplar, germinate and grow best in full sunlight.
shade tolerant	The ability of a tree to become established and survive at relatively low levels of sunlight. Sugar maple, Eastern hemlock, and beech can persist for many years in the shady understory.
simple leaf	The most common type of leaf, where a single leaf blade attaches to a petiole, which then attaches to a twig of the plant. In autumn, both the leaf blade and the petiole detach from the twig as a single unit, completing leaf abscission.
sinus	A recess or indentation between lobes of a leaf
snag	A standing dead tree with few branches, or the standing portion of a broken-off tree. Snags may provide feeding and nesting sites for wildlife.
softwood	A term used in reference to the relative softness of the wood in a tree. Examples of softwoods include Colorado Spruce, and White Pine.
staminate	Having male flower parts (stamens) but no female flower part (pistil)

stand	A grouping of vegetation sufficiently uniform in species composition, age, and condition to be distinguished from surrounding vegetation types and managed as a single unit.
stipule	Very small, leaf like structures that occur at the base of the petiole on the leaves of a very few trees, usually appearing briefly in early spring with leaf emergence, and soon falling away. Examples include the large stipules of Tulip tree and the very small ones of some American Chestnuts.
succession	The natural series of replacements of one plant community (and the associated fauna) by another over time and in the absence of disturbance.
suckers	Tree suckers are vegetative growths that stem from a tree's root system. Essentially, suckers are a tree's attempt to grow more branches, often in response to stress or injury.
sustainable forestry	The management of forests to meet the needs of the present without compromising the ability of future generations to meet their own needs.
tendrils	A tendril is a slender whiplike or threadlike strand, produced usually from the node of a stem, by which a vine or other plant may climb.
terminal bud	A bud that occurs at the end of a stem. Although it is usually a vegetative bud that will continue the growth of the stem the following year, it can also be a floral bud that will flower the following year. Some trees do not have a true terminal bud (Tree of Heaven is a good example), in which case the uppermost lateral bud serves its purpose.
threatened species	A species likely to become endangered in the foreseeable future, throughout all or a significant portion of its range, unless protected.
vegetative bud	A bud that develops into a stem with leaves, either originating as a terminal bud or as a lateral bud.
whorled	The arrangement of leaves along a stem where a cluster of three or more leaves occurs at the same juncture on the stem. In winter (after leaf drop for deciduous plants), the arrangement can be determined by looking at the leaf scars on the dormant twigs, such as in Catalpa.
xylem	In vascular plants, the wood tissue that conducts water and minerals up through the plant