

Envirothon Trees-Dichotomous Key

<p>1. Does your tree have needle like or scale-like leaves? <i>If Yes: Go to page 2.</i> <i>If No: You have a broad leaf tree</i></p>		
<p>2. If you have a broad leaf tree, are the leaves (buds, bud scars, twigs) Opposite or Alternate?</p>		
<p>3.Opposite 4. Are the leaves simple or Compound?</p>	<p>3. Alternate 4. Are the leaves simple or Compound?</p>	
<p><u>If Simple</u> -are they Lobed? <i>Yes: go to pg. 8</i> <i>No: go to page 7</i></p> <p><u>If Compound</u> -are they Pinnate (feather-like)? <i>Yes, go to pg. 11</i></p> <p>-are they Palmate (fan like)? <i>Yes, go to pg. 1</i></p>	<p><u>If Simple</u> -are they toothed? If Yes are they: Heart-shaped <i>pg. 13</i> Coarse-toothed <i>pg. 15</i> Fine, Double-toothed <i>pg. 16</i> Fine, Single toothed <i>pg. 19</i> Evergreen <i>pg. 24</i></p> <p>-are they not Toothed? <i>Go to pg. 23</i></p> <p>-are they Lobed? If Yes are they: Fan-shaped <i>pg. 20</i> Feather shaped <i>Pg. 21</i></p>	<p><u>If Compound</u> -Toothed & pinnate (feather-like)? <i>Go to pg. 25</i></p>

Trees with Needle-like & Scale-like Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
White Pine	<i>Pinus strobus</i>	5 needles per fascicle Long Slender 2-4" needles	Slender, gray green to orange brown in color;	Long, egg-shaped, reddish brown	Long 3-10" thornless cones	No flowers-trees are conifers and produce cones instead	Bark is Smooth when young and rough and furrowed when mature.	Uplands Important lumber tree
Red Pine	<i>Pinus resinosa</i>	2 Needles per fascicle Long Slender 3-8" needles	Medium textured, orange brown	Narrow, egg-shaped, orange-brown buds.	Stout 1.5-2.5" cones	No flowers-trees are conifers and produce cones instead	Scaly Blocky Furrowed Mature Bark. Flaky Exfoliating Young Bark	Uplands Often used to restore deforested areas
Pitch Pine	<i>Pinus rigida</i>	3 Needles per fascicle Stout 2-5" needles	Fibrous, tough 1/2-inch branches that bend rather than break; Orange brown; Kind of stout	Buds narrowly egg-shaped, light gray brown.	Stout 1-3" cones w/ thorns	No flowers-trees are conifers and produce cones instead	Rigid Deep Furrowed Bark	Dry, sandy areas

**Compare
Pines**

White Pine



Pitch Pine



White Pine

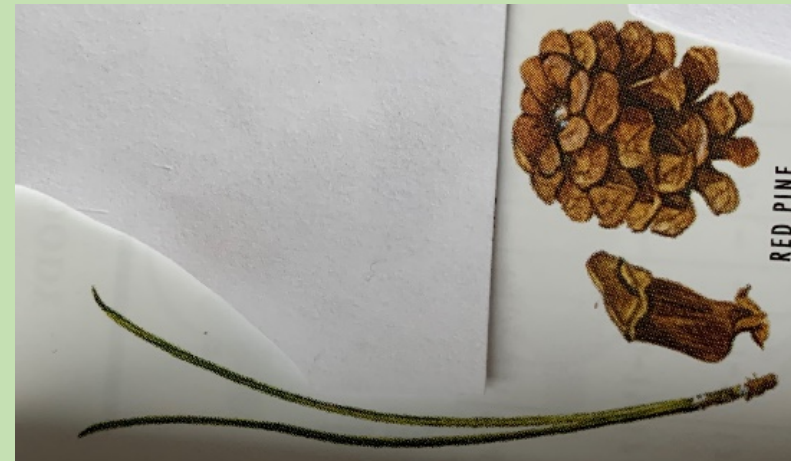
Red Pine

Pitch Pine

Hemlock

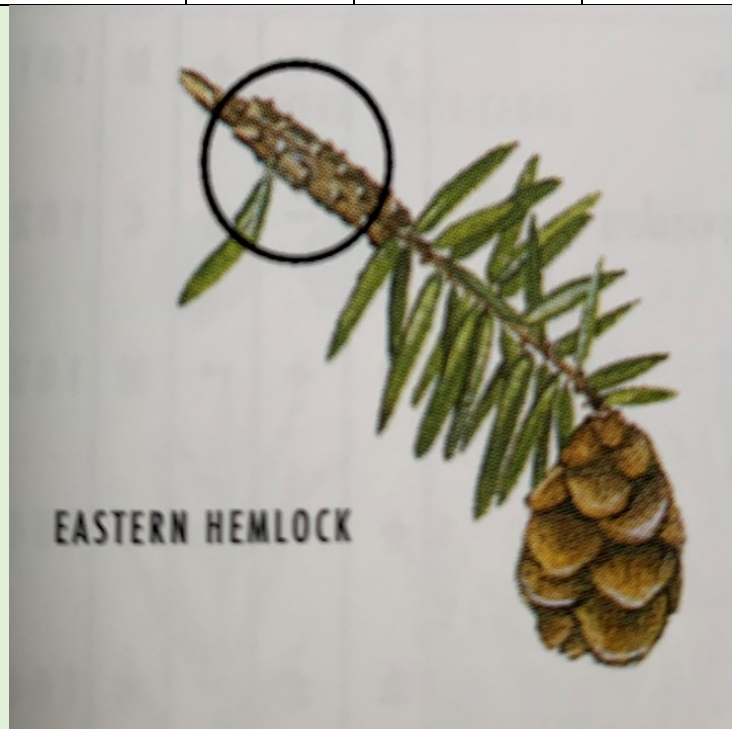
Fir

Red Pine



Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Eastern Hemlock	<i>Tsuga canadensis</i>	Twigs are in flat sprays; Needles Flat 3/8"- 3/4" & are attached to twig by small stalks making the twigs rough: 2 White Parallel Lines Underneath	Twigs and needles are in flat sprays	Egg shaped, yellow brown in color, hairy	3/4" Soft Small Cones	No flowers-trees are conifers and produce cones instead	Furrowed Scaly Ridged Bark Forming Flat Plates	Exposed places in Northern New England

In the field: The leaders (ends of branches) droop. This is unique to Hemlocks and makes this tree easy to identify from a distance.



Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Balsam Fir	<i>Abies balsamea</i>	Twigs and needles are in flat sprays Short Flat 3/8"-3/4" stalkless needles Soft needles "friendly fir"	Has a citrus – pine aroma	Resinous (sticky)	2-4" cones point upwards Purple/Reddish/Blue when young Turn tan and soft—break easily, when mature	No flowers-trees are conifers and produce cones instead	Bark has blisters that contain pitch	Moist Woods



Balsam Fir Bark with Blisters

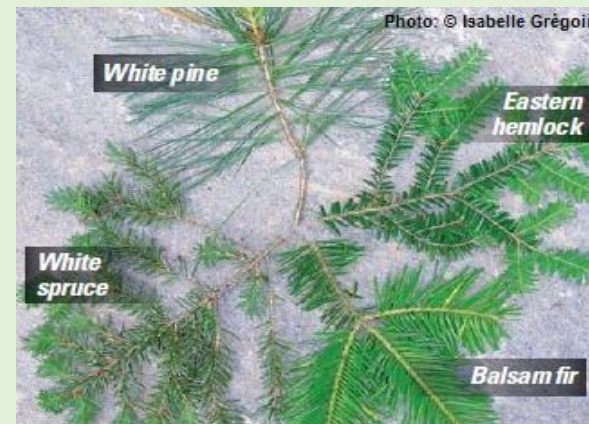


Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
White Spruce	<i>Picea glauca</i>	Needles are square, stiff and sharp, waxy coating; Blue green in color	Twigs are rough when needles are removed Pungent smell like cat urine	Most noticeable in spring, when they are bright green. Growth resumes from the bud in the spring.	Cones hang downwards 1"-2" long flexible scaly cones	No flowers-trees are conifers and produce cones instead	Bark is thin and scaly, flaking off in small circular plates	Far north on high mountains

White spruce



Compare Needles



Broadleaf Trees

Broadleaf Trees with Opposite Leaf Arrangement

Simple leaves---Not toothed

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Flowering Dogwood	<i>Cornus florida</i>	Not toothed or leathery (smooth) 2 to 5 inches long with a pointed end, slightly lighter green beneath	Reddish brown to brown; white pith	Dog claw shaped Leaf Buds; Distinctive Stalked, Onion-shaped flower buds	Red clusters	Showy Bracts (4-8) usually white; small yellow 4 petaled flower	Small discrete plates; checkerboard	Wet Areas



Broadleaf Trees with Opposite Leaf Arrangement

Lobed Leaves

Maples:

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Red Maple	<i>Acer rubrum</i>	Leaves: V-shaped 3 (to 5) lobed, finely toothed edge	Twigs: reddish With red buds with extra clusters at tips (flower buds)	Buds: rounded ends, that feel soft; reddish with extra clusters (flower buds)	Winged seeds (Samaras) are nearly parallel	Flowers: reddish, umbrella shaped	Young trees and branches: smooth bark Mature bark: rough strips	Wet lowland areas









Red Maple Flower Buds-Clusters



Red Maple Bark Often Has Circular or C-shaped structures: This is unique to Red Maple—although it isn't always present.



Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Sugar Maple (Rock Maple)	<i>Acer Saccharum</i>	Leaves U-shaped lobes firmly toothed	Twigs: brown-ish red	Buds: Brownish red, hard and pointy; feel sharp	Fruit: double Samaras (winged) Attached at 45-degree angle	Flowers: Yellow	Bark: Mature: rough strips/plates Bark-Young: mostly smooth	Uplands
Sugar Maple Bark  				Norway Maple Bark 		Norway Maple Leaf 		Norway Maple Bud 
						Norway Maple Samaras 		
Norway Maple	<i>Acer platanoides</i>	Leaves U-shaped lobes firmly toothed; Leaves exude white milky sap	Twigs greenish brown	Buds: Large Purple to green: "Turbans"	Fruit: double Samaras (winged) Attached close to a straight line (horizontal)	Flowers: Upright Clusters Yellow	Bark: shallow ridges-Cantaloupe Skin	Invasive species; grows in most places; nut not wetlands

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Striped Maple (Moose Wood, Goosefoot maple, Moosefoot maple)	<i>Acer pensylvanicum</i>	Leaves: Shallow U-shaped lobes, finely toothed edges, crinkly	Twigs: Mostly Green with Red tints	Buds: Valvate (duckbill) Red	Fruit: Samaras 45-degree angle like sugar maple	Flowers: Yellow	Bark: green, sometimes red stripes, smooth	<u>Under-story</u> (in shade of larger trees). Northern (cool Temperatures)



Crinkly Textured Leaves with Flowers



Twigs



Striped Maple Bark



Broadleaf Trees with Opposite Compound Leaves

Pinnate (Feathered) Compound Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
White Ash	<i>Fraxinus americana</i>	Leaf: feather compound leaf; 5 – 7 Leaflets- range from smooth to toothed	Twig: thick Leaf scars: U-shaped Bundle Scars: make a "smile"	Bud: Brown & Hairy "Hershey's Kiss"	Fruit: Samaras-one winged-seed at top Persist through winter on some trees	Flowers: green clusters	Bark: interwoven pattern of shallow ridges & furrows	Bottom-land; damp areas

Twig



Cluster of Samaras



Bark

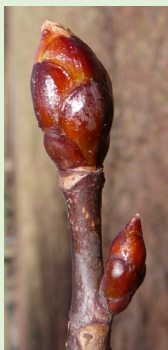


Broadleaf Trees with Opposite Compound Leaves

Palmately Compound Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Horse Chestnut	<i>Aesculus Hippocastanum</i>	Leaf: feather compound leaf; 5 – 7 Leaflets- range from smooth to toothed	Twigs: brown-ish red Leaf scar: shield shaped Bundle Scars: U-shaped	Buds: Sticky, shiny, large (1/2inch)	Fruit: Thorny capsule Large single nut	Flower: showy clusters 6 to 12 inches long	Bark: Scaly	Orna- mental tree- Found planted on lawns and in parks

Close up of Sticky Terminal Bud



Close up of Leaf Scar



Bark



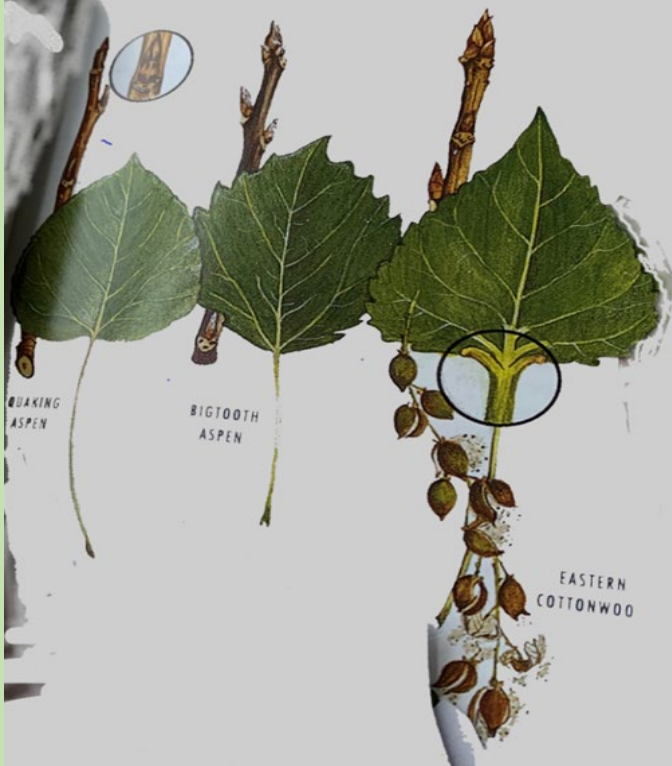



Broadleaf Trees with Alternate Arrangement

Toothed Simple Leaves---Heart Shaped

Aspen:



Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Quaking Aspen	<i>Populus tremuloides</i>	Heart-shaped with a fine-toothed margin; Flattened petioles; green above and paler below	brown	Large false end Bud: Sharp & shiny Flattened petioles	Fruit: Capsules containing hairy seeds	Flower: Catkin	Bark: Young: Smooth, milky white Bark: Mature: gray diamond shaped lenticels	Mature trees in forests; colonizes disturbed areas
Bigtooth Aspen	<i>Populus grandidentata</i>	Leaf: Egg shaped, coarsely toothed, Flattened petioles green on front, pale on back	dusty brown	Large False End Bud: Pointed tip, rounded scales dusty	Fruit: Seed capsules with fuzzy parachutes	Flowers: Catkins	Bark: Young Milky, smooth Bark: Mature: starts to form plates with gray diamond shaped lenticels	Mature trees in forests; colonizes disturbed areas
Eastern Cottonwood	<i>Populus deltoides</i>	Leaf: Triangular, coarsely blunt toothed, Flattened petioles; indented leaf base	Stems: Light gray brown-winged; Branch looks squared off	False End Buds: large shiny, slightly sticky	Fruit: Clusters of seed capsules "cotton"	Flowers: Catkins	Bark: Young: Smooth light yellowish green; Diamond shaped indents (dark gray) Bark: Mature: ridged deeply, gray	Mature trees in forests; colonizes disturbed areas

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
American Basswood (Linden)	<i>Tilia americana</i>	Leaf: Heart Shaped, Finely toothed Margin, Uneven base	Twig: Bright Red in Winter; green in summer	End bud: False; 3 scales, bulges "mouse in a helmet"	Fruit: Nutlet with attached leafy wing or parachute; present all winter	Flower: Clusters, yellow	Bark: Dark gray with shallow Grooves; Young and upper branches smooth	Fertile soils

Compare:	<i>Populus</i>	<i>Tilia</i>						
Quaking	Bigtooth	Eastern Cottonwood	American Basswood			Basswood Twig in Winter		
								
						Basswood Bud: "Mouse in a Helmet" 		

Broadleaf Trees with Alternate Arrangement

Coarse-Edged Toothed Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
American Beech	<i>Fagus grandifolia</i>	Leaf: Egg Shaped with pointed tip; coarse distinctly pointed toothed margin Shiny, waxy, smooth surface	Twigs: Slender, brown with tan lenticels	Buds: Very long & Slender with multiple scales	Fruit: Triangular nut (2) in spiny bract (husk or capsule)	Flowers: Yellow Clusters	Bark: Very Smooth; Silvery gray	Fertile Woods
 								
American Chestnut	<i>Castanea dentata</i>	Leaf: Coarse toothed margin; Long (6 inches) & narrow; leathery	Twig: Slender golden brown	Bud: False End bud, 3 scales, golden brown	Fruit: Spiny Husk; Flattened nuts (3)	Flowers: Catkins	Gray & Shiny, small tan lenticels Mature, Gray with Deep Furrows	Uplands

Broadleaf Trees with Alternate Arrangement

Finely Toothed Edges-Double-Toothed Leaf Edges

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
American Elm	<i>Ulmus americana</i>	Leaf: Pointed tip with uneven base, not symmetrical; Margin finely double-toothed, sharp point; sandpaper texture, hairy back	Twig: zig-zagged glabrous (dusty) brown	Bud: False terminal; Axial buds lay close to the twig	Fruit: Single seed in single winged samara	Flowers: Cluster, long stems	Bark: Light brown, crisscrossed shaggy layers; spongy Bark on inside alternating light and layers "Oreo cookie"	Likes wet areas

Spongy Bark



Bark Layers "Oreo Cookie"



Birches:

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Gray Birch	<i>Betula populifolia</i>	Long pointed slightly hairy deltoid leaf	rough-warty looking twigs	Scaled buds	Catkins produce fruit	Single Catkins	White Non-peeling bark with black chevrons	Open woods, disturbed areas

Leaf: "Elephant Face with Trunk"




Gray Birch Bark



Paper Birch Bark

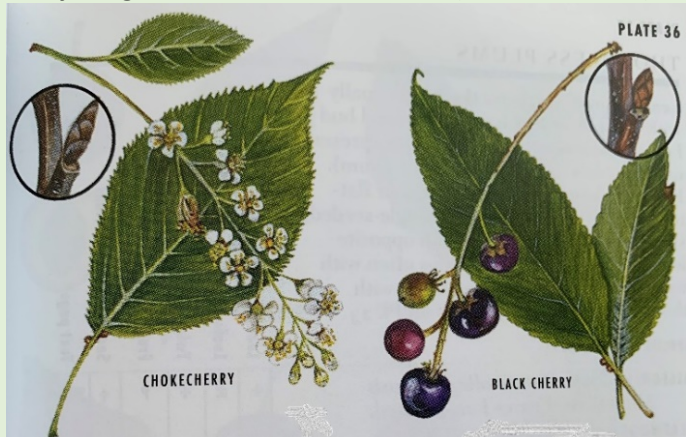


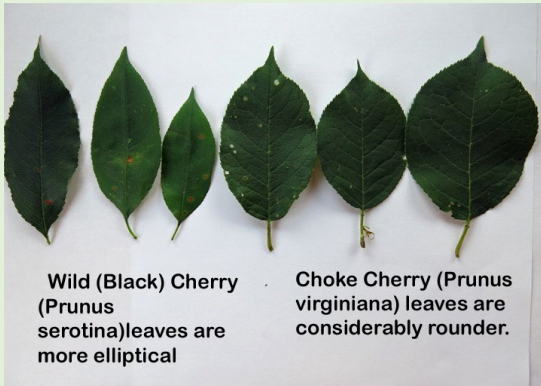


White (Paper) Birch	<i>Betula papyrifera</i>	Toothed Pointed Oval Pinnate Slightly Hairy Leaves	Slightly rough, warty no scent	Buds are hairless and have 3+ scales	Catkins produce fruit	2 - 3 Catkins	White bark with horizontal peeling strips as it matures	Open woods and cut-over areas
---------------------	--------------------------	--	--------------------------------	--------------------------------------	-----------------------	---------------	---	-------------------------------




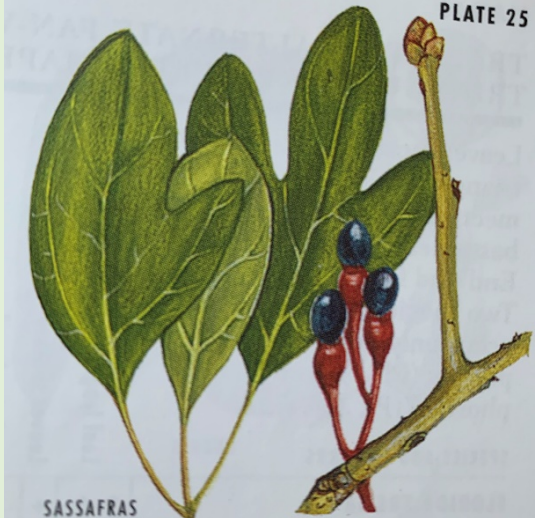
Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Black (Sweet) Birch	<i>Betula lenta</i>	Toothed Pointed Long Oval Pinnate Hairless Leaves	Broken twigs have Winter-green scent and taste	Buds are hairless and have 3+ scales	Catkins produce upright fruit	2+ Catkins Male Female Catkin: Looks like a cone	Dark grayish non-peeling bark that becomes plated at maturity	Wet Areas, riverbanks to uplands; Shade tolerant
								
Yellow Birch	<i>Betula alleghaniensis</i>	Toothed Long Oval Pinnate Hairless Leaves	Broken twigs have Winter-green scent and taste	Slightly hairy buds with scales	Catkins produce fruit	2 Catkins	Shiny yellow grayish bark with thin horizontal peeling strips as it matures	Moist, cool Areas, riverbanks

Finely Toothed Edges-Single-Toothed Leaf Edges

Cherries:

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Choke Cherry	<i>Prunus virginiana</i>	Leaf: egg shaped, fine, single, sharp teeth, on margin; not hairy on back of midrib; vein pairs 8 - 11	dark brown with tan raised dots (lenticels)	Buds: ¼ in. fish-scale; pointed scales	Fruit: Long Clusters of Drupes	Flowers: long Clusters (racemes)	Bark: Gray, partially peels to show orange brown under layer	Young woods and thickets
<div> <div>Cherry Twigs: Bad odor when broken (Bitter almonds)</div> <div>  <p>CHOCHEERRY</p> <p>BLACK CHERRY</p> <p>PLATE 36</p> </div> <div> <div>Choke Cherry Bark</div>  </div> <div> <div>Black Cherry Bark</div>  </div> <div>  <p>Wild (Black) Cherry (<i>Prunus serotina</i>) leaves are more elliptical</p> <p>Choke Cherry (<i>Prunus virginiana</i>) leaves are considerably rounder.</p> </div> </div>								
Black Cherry	<i>Prunus serotina</i>	Leaf: Shiny, blunt incurved single teeth, narrow; often hairy on back of midrib; vein pairs 13 +	brown with tan raised dots (lenticels)	Buds: ¼ in. fish-scale; pointed scales	Fruit: Clusters of drupes black when ripe	Flowers: long clusters (racemes)	Young: shiny dark Gray brown with light Stripes, lenticels; Mature Scaly "burnt potato chips"	Woods and thickets

Alternate Leaved Trees: Lobed Leaves—Fan Shaped

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
American Sycamore	<i>Platanus occidentalis</i>	6"-10" leaves have 3 – 5 Lobes and are toothed	Leafy saucer like toothed stipules clasp and encircle twigs.	Has 1 hairless bud scale; Leaf stalk base is hollow, covering buds	Fruits small and hairy in tight brown long-stalked hanging balls	Small round flower clusters	Peeling Exfoliating White/Green mottled bark	Lowlands
<div>  <p>EASTERN SYCAMORE</p> </div> <div> <p>Sycamore Bark</p>  </div> <div> <p>Sassafras Twigs</p>  </div> <div> <p>PLATE 25</p>  <p>SASSAFRAS</p> </div>								
Sassafras	<i>Sassafras albidum</i>	3 Leaf Patterns: 1, 2 or 0 Lobes	Twigs: are Green, hairy, plume; Spicy Aroma	Buds: rounded and yellowish green with purplish outlined scales	Fruits: blue fleshy berries	Greenish yellow flowers	Bark is Brown-red and deeply furrowed	Moist, well drained sandy soil in woods, fields, open areas

Alternate Leaved Trees: Lobed Leaves—Pinnate (Feather)

Oaks: *Leaves without Bristle Tips*

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
White Oak	<i>Quercus alba</i>	2"-9" Evenly lobed hairless leaves with rounded tips with pale underside	Twigs are hairless	End buds are small, red-brown, blunt and hairless	Bowl-shaped bumpy cup covering 1/3 or less of acorn; mature over 1 year	Clusters of Catkins	Whiteish, Slightly furrowed, Scaly Bark	Well drained soils; eastern slopes preferred

Oaks: *Leaves with Bristle Tips*

Scarlet Oak	<i>Quercus coccinea</i>	3"-6" Deeply lobed leaves with bristle-tips Can have tufts of hair along underside veins	Twigs are hairless	End buds are scraggly-hairy and blunt	Brown and hairless cup encloses ½ to 1/3 of acorn; mature over 2 years	Clusters of Catkins	Dark and finely grooved furrows	Well drained acidic soil; likes full sun
Red Oak	<i>Quercus rubra</i>	4"-10" Lobed, hairless, thin and dull leaves with bristle-tips	Twigs are hairless	End buds are 3/16"-5/16" Hairless and not angled	Acorn cup is flat, saucer-like and hairless; mature over 2 years	Clusters of Catkins	Dark furrowed bark often laced with broad shiny strips	Well drained, loamy, moist, sand & clay soils
Black Oak	<i>Quercus velutina</i>	4"-10" Thick, glossy, moderately lobed leaves with bristle-tips and somewhat hairy underside	Twigs are hairless	End buds are ¼" – ½", densely hairy, gray and sharply angled	Finely gray-hairy, rough edged cup with fringelike scales; mature over 2 years	Clusters of Catkins	Dark, blocky bark with shiny ridges	Poor dry soils

Compare Oaks:

Without Bristles: White Oak



White Oak
Bark



With Bristles: Scarlet, Red and Black Oak



Scarlet Oak
Bark



Red Oak
Bark



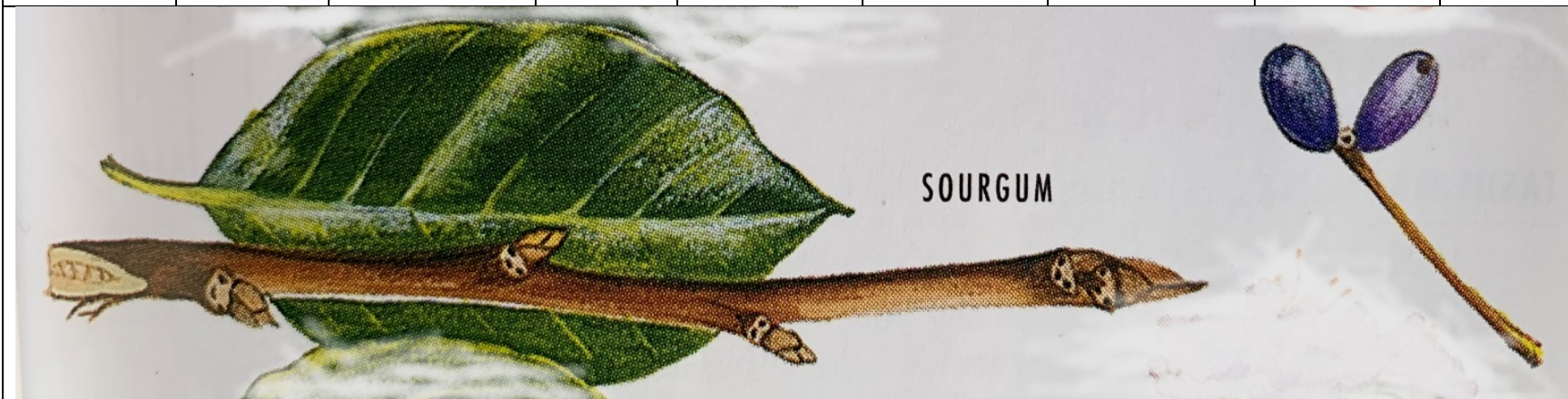
Black Oak
Bark



Broadleaf Trees with Alternate Arrangement

Not Toothed (Entire or Smooth) Simple Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Tupelo (Black Gum or Sourgum)	<i>Nyssa sylvatica</i>	Leaf: egg-shaped, leathery	Twigs and buds: brown to reddish brown; some lenticels Leaf Scar: U-shaped Bundle scars: 3	buds: brown to reddish brown	Fruit: Clusters of drupes; green in summer blue when ripe in Fall; 1 seed in each	Flowers: Greenish-Yellow Clusters	Bark: Deeply Checkered	Wet areas



Broadleaf Trees with Alternate Arrangement

Toothed Evergreen Leaves

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
American Holly	<i>Ilex opaca</i>	2"- 4" long, oblong/wedge-shaped Prickly, very shiny Evergreen Leaves	Slender, with rust-colored hair	Small reddish brown, pointed	Red berries, rarely Yellow	Small White (almost translucent) Flowers	Smooth gray bark with white and green blemishes	Bottom-lands



Alternate Arrangement and Compound Leaves

Toothed Pinnately (Feather) Compound Leaves

Hickories:

Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Shagbark Hickory	<i>Carya ovata</i>	5-7 finely toothed Leaflets	Stout, sometimes hairy at end leaf scar: "monkey face"	Buds have overlapping scales with bracts at the base	1"-3" Nuts with thick husk that splits into 4 down to the base	Catkins	Deeply Grooved Furrows	Dry Woods
Pignut Hickory	<i>Carya glabra</i>	5 - 7 Hairless Leaflets	More slender than other hickories; dusty; leaf scar: "monkey face"	Buds have overlapping scales—often drop during the winter, leaving a white underlying bud	Pear-shaped nuts with thin husk	Catkins	Dark Tight Scaly Furrows	Dry Woods
Bitternut Hickory	<i>Carya cordiformis</i>	5 – 11 Leaflets Somewhat Hairy Underneath	Moderately stout, when compared to other hickories; 3-lobed leaf scar	Bright Yellow-Powdery Naked Buds with naked valvate-looking end	Cylindrical Nuts with Thin Husk that have ridges	Catkins	Tight Fine Smooth Furrows	Woods

Compare Hickories





Shag bark:



Pignut bark

Bitternut bark



Common Name	Latin Name	Leaves	Twigs	Buds	Fruit	Flowers	Bark	Habitat
Black Walnut	<i>Juglans nigra</i>	7 – 17 Toothed narrow leaflets slightly hairy underneath with end leaflet often missing Spicy scent when crushed	Bundle scars in 3 groups; Chambered Pith	Whiteish and Woolly Buds	Large Spherical Nuts	Catkins	Deeply Grooved Furrows	Areas with fertile soils
Compare:								
Black Walnut—darker bark				Butternut (White Walnut)-lighter bark				
								
Butternut (White Walnut)	<i>Juglans cinerea</i>	7 – 17 Toothed narrow leaflets with end leaflet present	Prominent hairy fringe on top of leaf scar; Bundle scars in 3 groups	Whiteish and Woolly Buds	Oblong and Sticky Nuts	Catkins	Smooth-topped Furrows, Slightly Shiny	Well drained soils of hillsides and stream beds in mixed hardwood forests

Compiled by Teresa Wolcott for Envirothon 2020 to 2021