

Roots & Reptiles

2027 · North Carolina Science Olympiad · Division A

Observe. Compare. Explain.

For fourth- and fifth-grade learners: 20 plants, 19 reptiles and 7 amphibians.

At a station

Name what you can see. Compare at least two useful clues. If a feature is hidden, ask for another view instead of assuming it is absent. Use photos for wild animals and unknown plants; do not handle them.

One partner finds evidence; the other explains it. Switch roles. The indexes list organisms and science ideas. Recheck the official event rules before competition.

Coach setup: tab the sheets containing these section starts

1 Trees	7
2 Other plants	37
3 Reptiles	46
4 Amphibians	74
5 Science & glossary	82
6 Comparisons	99

Print two-sided at Actual Size, flip on the long edge, with page 1 on the front. Margins and markers alternate for binding. An even-numbered section start is on the back of its sheet. Keep page order; do not insert or omit pages within the print run. Check the complete binder, sleeves and tabs: page count alone does not establish fit.

P-numbers identify images in the compact credits at the back. S-numbers point to science sources in the separate coach Evidence & Credits companion. Drawings are labeled models; photographs have source-identified names and stated limits.

Prepared September 29, 2026 · edition candidate-14. Print and student-use checks are recorded separately.

Find an organism

Alphabetical within plants and animals · full event names

Plants

American Beech	7
Black Gum	9
Bradford Pear / Callery Pear	11
Carolina Lily	37
Crepe Myrtle	13
Eastern Poison Ivy	38
Eastern White Pine	15
English Ivy	39
Hickory	17
Kudzu	41
Loblolly Pine	20
Longleaf Pine	22
Magnolia	24
Oak	26
Red Maple	29
River Birch	31
Scuppernong Grape	43
Shortleaf Pine	33
Sweetgum	35
Venus Flytrap	44

Find an animal

Reptiles & amphibians

American Alligator	46
American Toad	74
Banded Water Snake	54
Black Rat Snake	56
Bullfrog	75
Copperhead	57
Cottonmouth	59
Dekay's Brownsnake	61
Eastern Box Turtle	71
Eastern Diamondback Rattlesnake	62
Eastern Fence Lizard	47
Eastern Garter Snake	63
Eastern Glass Lizard	49
Eastern Hognose Snake	64
Eastern Kingsnake	65
Green Anole	51
Marbled Salamander	79
Painted Turtle	66
Pine Barrens Treefrog	77
Red-backed Salamander	80
Snapping Turtle	68
Southeastern Five-lined Skink	52
Southern Leopard Frog	78
Spotted Turtle	70
White-spotted Slimy Salamander	81
Yellow-bellied Slider	73

Find a concept or comparison

Plant and flower parts	82
Seeds and germination	83
Pollination and pine cones: plant life cycles	84
Leaves and twigs: structure and arrangement	85
Photosynthesis: light helps plants make sugar	86
Tropisms: light, gravity, touch and water	87
Reptile or amphibian? Compare groups	88
Life cycles: eggs, live birth and metamorphosis	89
Turtle shell and skeleton	90
Food webs and ecological roles	91
Gardening: water, light, air and space	92
Plant problems: diagnose before changing care	93
Nutrition and diet: minerals, sugars and fertilizer	94
Competition and fair tests	95
North Carolina state symbols	5
Event rules and permitted references	6
Glossary: plant structures	96
Glossary: growth, habitat and ecology	97
Glossary: animal structures, stages and safety	98
Compare the four listed pines	99
Compare the nine listed snakes	100
Compare the five listed turtles	101
Compare the four frog/toad entries	102
Compare the three salamanders	103
Compare the four listed lizards	104
Four vines: leaves and climbing parts	105
Bark clues need leaf clues	106
Black gum, sweetgum and red maple	107
Plant traits at a glance	108
Animal traits at a glance	109

North Carolina symbols on the event list

Use the event's common names for the listed organisms. A state symbol, a native species and a species found in NC are different ideas.

Seven event-list categories

Tree. Pine, generically.

Wildflower. Carolina lily.

Fruit. Scuppernong grape.

Carnivorous plant. Venus flytrap.

Reptile. Eastern box turtle.

Frog. Pine Barrens treefrog.

Salamander. Marbled salamander.

Current law and event wording

The law keeps pine as the state tree and names longleaf pine as its emblem. Since June 27, 2023, the law names Muscadine grape as state fruit. Scuppernong is a muscadine variety and remains the event-list name.

A useful category check

Carolina lily is the state wildflower. Dogwood is the state flower; it is a comparison example, not an added identification entry.

Coach: Checked September 28, 2026. The FAQ does not settle alternative “muscadine” answer wording or the unmarked eastern white pine entry. Do not predict scoring. Law calls turtle the state reptile and eastern box turtle its emblem; the event lists eastern box turtle.

Using your reference at stations

These are official event details checked September 28, 2026. Recheck the manual and FAQ before competition.

At the event

Team and time. Up to two students; up to 50 minutes. Move only when time is called. Do not skip ahead or return to earlier stations.

Identification. Use common names from the official list. Scientific names are for reference. Identification makes up no more than half the test.

References. Up to two commercial field guides; or two one-inch three-ring binders; or one of each. Binder pages stay secured in the rings.

Other materials. Writing instruments and up to two hand lenses or magnifying glasses. Plant/leaf samples must be enclosed in plastic sheet protectors; no animal parts in binders.

Scoring. Accuracy earns points. Selected questions, chosen beforehand by the event leader, break ties by accuracy or answer quality.

A teaching routine

One partner reads and records; the other finds evidence. Then check the answer together. Switch roles during practice. This is a learning strategy, not an official rule.

Coach: The intended audience is grades 4–5. Division A generally serves grades 3–6, with younger students permitted and a limit on sixth graders. A PDF becomes a permitted binder reference when printed and secured; it is not automatically a commercial field guide.

American Beech

Fagus grandifolia · scientific name is reference information



Straight veins end at the leaf teeth.
P1 · Katja Schulz · CC BY 2.0



Smooth gray bark on a beech trunk.
P2 · Cathy DeWitt · CC BY 4.0



Triangular beech nuts; the ruler is in millimeters.
P3 · Omar hoftun · CC BY-SA 4.0

Look for several clues

- Alternate, simple leaves have straight side veins ending at sharp teeth.
- Smooth, gray bark often stays smooth on large trunks.
- Small triangular nuts sit inside a prickly husk that splits open.

Habitat & North Carolina

Moist, well-drained woodland soil; young trees can grow in shade. Mature trees spread a broad crown. Native across North Carolina.

Life cycle

Wind moves pollen from small spring flowers. Prickly husks ripen in fall and release usually two nuts. A nut contains a seed that can sprout into a seedling.

Role in nature & with people

Nuts feed birds and mammals. The crown and trunk provide shelter. People use the hard wood for furniture and flooring.

Compare before deciding

River birch also has toothed, alternate leaves, but its young bark peels and its fruits release tiny winged nutlets. Combine the beech leaf veins, smooth bark and triangular nuts.

Native or introduced?

Native

Remember: Straight veins + smooth gray bark + triangular nuts.

Coach: Young beech trees often keep dry brown leaves through winter. This is supporting evidence, not a rule for every tree. Do not carve the bark.

More views on the following page(s).

American Beech · closer looks

1

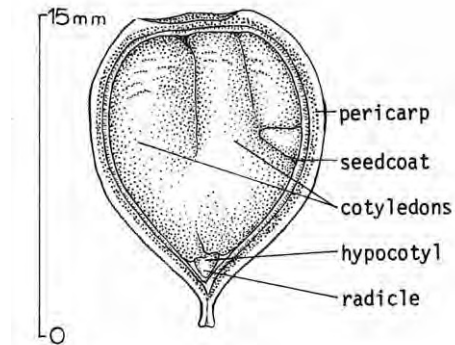
Fruit



Leaves and prickly husks on a branch.

P4 · Jim Robbins · CC BY-NC-ND 4.0

Published seed section



Published American beech seed section: the fruit wall (pericarp) surrounds the seed. Technical labels are for reference.

P5 · USDA Forest Service; chapter by Franklin T. Bonner and William B. Leak; figure artist not separately credited · Public domain (federal publication figure; no third-party credit)

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

Black Gum

Nyssa sylvatica · scientific name is reference information



Smooth-edged leaves beside small spring flowers.

P6 · Jim Robbins · CC BY-NC-ND 4.0



Ridges run along this black gum trunk; blocky plates are not clear here.

P7 · Jim Robbins · CC BY-NC-ND 4.0



Blue-black fleshy fruits; seeds are hidden inside.

P8 · Jim Robbins · CC BY-NC-ND 4.0

Look for several clues

- Alternate, simple oval leaves are glossy, usually with smooth edges.
- Older bark divides into dark, blocky plates; young bark is smoother.
- Small blue-black fruits appear on slender stalks; leaves often turn bright red in fall.

Habitat & North Carolina

Moist woods and stream edges, but also upland sites with well-drained acidic soil. Native across North Carolina.

Life cycle

Small spring flowers are visited by insects. Female flowers develop into fleshy fruits, each enclosing a hard stone with a seed. Birds carry seeds away after eating the fruit.

Role in nature & with people

Fruit feeds birds and mammals; flowers provide nectar. People plant black gum as a shade tree for its strong fall color.

Compare before deciding

Sweetgum has star-shaped leaves and spiky fruit balls. Black gum has oval leaves and fleshy fruit. The shared word “gum” does not make the leaves or fruits alike.

Native or introduced?

Native

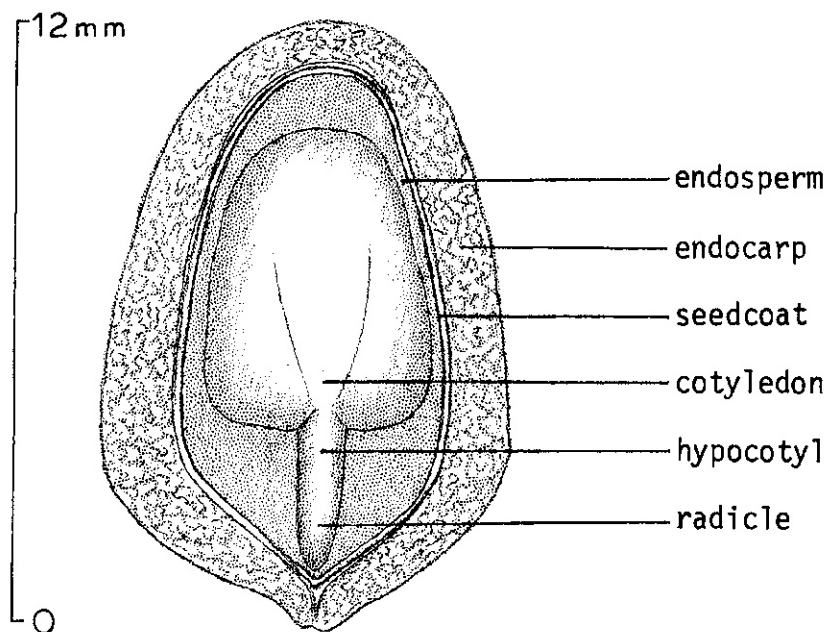
Remember: Black gum: oval leaves and dark fleshy fruit.

Coach: The event FAQ confirms *Nyssa sylvatica*. Do not substitute *Eucalyptus ovata*, a different plant also called black gum elsewhere.

More views on the following page(s).

Black Gum · closer looks

Seed section



Published seed section: a seed lies inside a hard stone (endocarp). Technical labels are for reference.

P9 · USDA Forest Service; Nyssa chapter by Franklin T. Bonner; figure artist not separately credited · Public domain (federal publication figure; no third-party credit)

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

Bradford Pear / Callery Pear

Pyrus calleryana · scientific name is reference information



Glossy leaves and small fruits. The fine leaf teeth need a closer view.

P10 · Jim Robbins · CC BY-NC-ND 4.0



Furrowed bark of a large Callery pear.

P11 · Steven J. Baskauf · CC BY 4.0



Small brown pear fruit; seeds are hidden inside.

P12 · Martin LaBar · CC BY-NC 2.0

Look for several clues

- Alternate, simple, glossy leaves are rounded to oval with finely toothed, often wavy edges.
- Clusters of five-petaled white flowers open in early spring.
- Small, hard, brownish pear fruits follow flowers. Older bark becomes ridged.

Habitat & North Carolina

Often planted along streets and in yards; escaped trees spread into disturbed ground, roadsides and field edges. Planted and escaped in North Carolina.

Life cycle

Insects pollinate flowers. Cross-pollination between compatible trees can produce seeds inside the small fruits. Birds eat the fruits and disperse the seeds.

Role in nature & with people

Formerly popular as a flowering landscape tree, Callery pear now invades open habitats and can crowd out native plants. Some forms also break easily at weak branch unions.

Compare before deciding

Black gum can also have glossy oval leaves. Check pear's toothed edges, conspicuous white flowers and small pear fruits. White flowers alone are not enough to identify a tree.

Native or introduced?

Introduced from Asia; invasive

Remember: Glossy wavy-edged leaves + white flower clusters + small pears.

Coach: Bradford is one cultivar of Callery pear. Other cultivars and their offspring belong to the same species. Escaped offspring can bear thorns.

More views on the following page(s).

Bradford Pear / Callery Pear · closer looks

1

Seed



Seeds removed from Callery pear fruits.

P13 · Steven J. Baskauf · CC BY 4.0

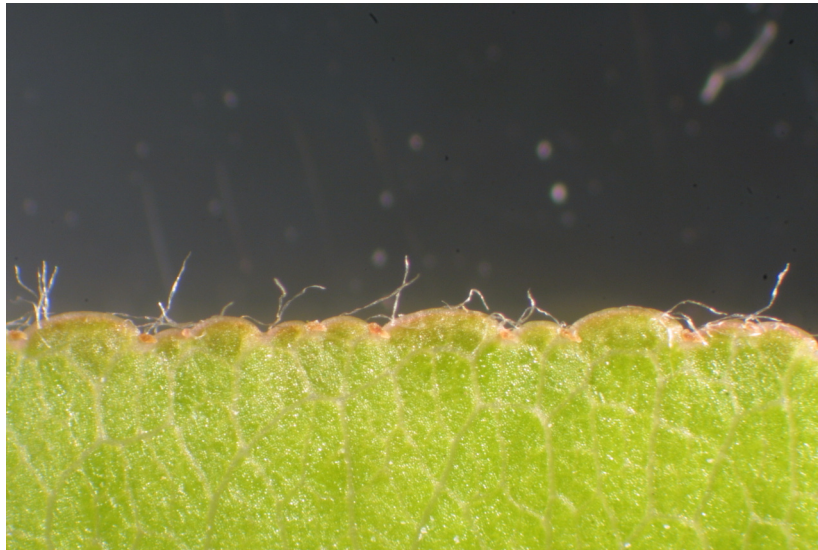
Flower



Clusters of white, five-petaled flowers.

P14 · Cathy DeWitt · CC BY 4.0

Magnified leaf edge



A magnified leaf edge shows small rounded teeth. The fine hairs are separate from the edge teeth.

P15 · Baskauf, Steven J. · CC BY 4.0

Crepe Myrtle

Lagerstroemia spp.; *L. indica* shown · scientific name is reference information



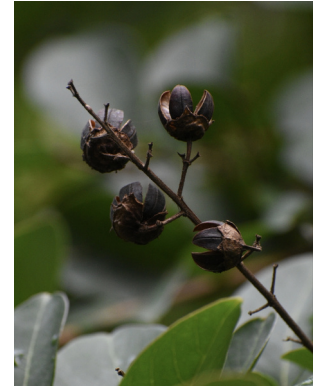
These autumn leaves have smooth edges. Their short stalks meet the twig in pairs in this view.

P16 · Kirchoff, Bruce K. · CC BY 4.0



Bark peels in patches, revealing mottled colors.

P17 · Martin LaBar · CC BY-NC 2.0



Dry capsules open after the flowers fade.

P18 · Cathy DeWitt · CC BY-NC-ND 4.0

Look for several clues

- Simple oval leaves have smooth edges and are often opposite or nearly opposite.
- Showy summer flower clusters have crinkled petals; colors vary by cultivar.
- Smooth bark peels in patches, leaving mottled colors. Dry capsules persist after flowering.

Habitat & North Carolina

Sunny, well-drained sites in yards, parks and streets. Flowering is strongest with plentiful sun. Widely cultivated in North Carolina.

Life cycle

Flowers are followed by dry capsules. Capsules open to release small winged seeds. New leaves and flowers grow after winter dormancy.

Role in nature & with people

People plant crepe myrtle for flowers and patterned bark. Flowers provide pollen for visiting insects. It is an ornamental tree or shrub, depending on the kind and pruning.

Compare before deciding

River birch also peels, but its leaves are alternate and double-toothed. Crepe myrtle usually has smooth-edged, opposite or nearly opposite leaves and crinkled summer flowers.

Native or introduced?

Introduced; common cultivated kinds originate in Asia

Remember: Crinkled flowers + mottled peeling bark.

Coach: Crape myrtle is an accepted alternate spelling. The event uses the genus: plants and hybrids vary in size, color and leaf arrangement. Some leaves can be alternate or whorled; use several clues.

More views on the following page(s).

Crepe Myrtle · closer looks

1

Seed



Crepe myrtle seeds released from dry capsules.

P19 · Gmihail · CC BY-SA 3.0 RS

Flower



Crinkled petals give crepe myrtle its name.

P20 · Jacinta Lluch Valero · CC BY-SA 2.0

Eastern White Pine

Pinus strobus · scientific name is reference information



Needle bundles emerge from short shoots on the twig.

P21 · Tom Glasgow · CC BY 4.0



Older white pine bark is deeply furrowed.

P22 · Nicholas A. Tonelli · CC BY 4.0



Long seed cone with scales lacking sharp prickles.

P23 · Forest and Kim Starr · CC BY 4.0

Look for several clues

- Soft, flexible needles grow in bundles of five, approximately 3–5 inches long.
- Long, narrow seed cones have scales without sharp prickles; cones are approximately 3–8 inches long.
- Young bark is smooth and gray; older bark becomes dark and deeply furrowed.

Habitat & North Carolina

Cool, moist, well-drained woods. Young trees tolerate some shade; established trees become tall. Native especially in the Mountains; also planted elsewhere in North Carolina.

Life cycle

Wind carries pollen from small pollen cones to seed cones. Seeds mature beneath seed-cone scales and disperse with thin wings. Pines make cones, not flowers or fruits.

Role in nature & with people

Seeds feed wildlife, and evergreen branches provide cover. People use the wood for construction and furnishings and plant the tree in landscapes.

Compare before deciding

Shortleaf needles overlap white pine in length. Count needles in a complete bundle: five supports white pine; two or three supports shortleaf. Then compare their very different cones.

Native or introduced?

Native

Remember: Five soft needles + long, narrow cones.

NC symbol: Pine — NC state tree

Coach: Needle and cone lengths are approximate and overlap other species. A photo without a scale cannot establish length; use bundle count and cone form together.

More views on the following page(s).

Eastern White Pine · closer looks

1

Seed



White pine seeds with wings removed; scale bar is 2 millimeters.

P24 · Steve Hurst, USDA-NRCS PLANTS Database · Public domain (U.S. government work)

Intact five-needle bundle



Five needles can be traced to the same base in this detached natural bundle.

P25 · NobbiP · CC BY-SA 3.0 Unported

Hickory

Carya spp.; pignut and shagbark examples · scientific name is reference information



Pignut hickory: compound leaves beside developing nuts.

P26 · Douglas Goldman, USDA · CC BY-NC 4.0



Pignut hickory: ridged bark.

P27 · Douglas Goldman, USDA · CC BY-NC 4.0



Pignut hickory: husk opened to show the hard nut.

P28 · Douglas Goldman, USDA · CC BY-NC 4.0

Look for several clues

- Alternate, compound leaves usually have 5–9 leaflets in these common examples.
- The end leaflet is often larger than nearby side leaflets.
- A husk surrounds the hard nut. Bark varies: some hickories have ridges, while shagbark peels in long strips.

Habitat & North Carolina

Woods and forest edges. Different hickory species grow in dry uplands or moister sites. Several hickory species are native to North Carolina.

Life cycle

Wind pollinates spring flowers. Nuts mature inside husks; a hard shell protects the seed. Animals move and bury nuts, and some uneaten seeds germinate.

Role in nature & with people

Nuts feed squirrels and other wildlife. Tough wood is used for tool handles and other items that must resist impacts.

Compare before deciding

Oak has simple leaves and acorns with caps. Hickory has compound leaves and husked nuts. Find the whole leaf: a bud is at its base on the twig, not at each leaflet base.

Native or introduced?

Varies by species; the illustrated pignut and shagbark are native

Remember: Compound leaf + husk around a nut.

Coach: The tested entry is Hickory, not a separate test entry for each example. Do not teach that every hickory has shaggy bark or exactly the same leaflet count.

More views on the following page(s).

Hickory · closer looks

1

Bark



Shagbark hickory: long peeling bark strips.

P29 · Douglas Goldman, USDA · CC BY-NC 4.0

Leaf



Shagbark hickory: compound leaves with large end leaflets.

P30 · Douglas Goldman, USDA · CC BY-NC 4.0

Hickory · closer looks

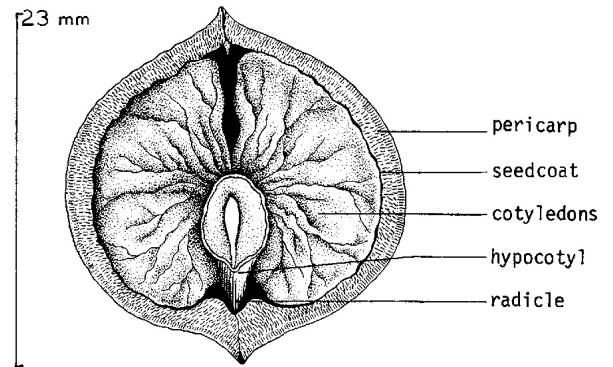
Nut



Shagbark hickory: thick husk surrounding the nut.

P31 · Douglas Goldman, USDA · CC BY-NC 4.0

Published seed section



Published shagbark hickory section: the shell surrounds the seed; much of the kernel is seed leaves (cotyledons). Technical labels are for reference.

P32 · USDA Forest Service; chapter by Franklin T. Bonner; figure artist not separately credited · Public domain (federal publication figure; no third-party credit)

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

Loblolly Pine

Pinus taeda · scientific name is reference information



Close view of the sheath around a needle-bundle base.

P33 · Tom Glasgow · CC BY 4.0



Thick, plated bark on an older loblolly pine.

P34 · Hellohowareyoudoing · CC0 1.0



Woody seed cone; its small scale prickles are hard to see here.

P35 · zizzybalooah · CC BY-NC 2.0

Look for several clues

- Usually three stiff needles per bundle, approximately 6–9 inches long.
- Oval seed cones are approximately 3–6 inches long; each scale has a sharp prickle.
- Older bark forms thick, reddish-brown plates separated by furrows.

Habitat & North Carolina

Sunny sites, including old fields and moist lowlands. It can grow rapidly where light and soil conditions suit it. Common in the Piedmont and Coastal Plain of North Carolina; also widely planted.

Life cycle

Wind carries pollen to seed cones. Woody seed cones mature over about two growing seasons and release winged seeds. A seedling grows needles before producing cones as an older tree.

Role in nature & with people

An important timber and paper tree. Seeds feed wildlife, while branches provide shelter. Dense planting and open forest provide different light conditions beneath the trees.

Compare before deciding

Longleaf usually also has three needles, but its needles and seed cones tend to be much longer. Shortleaf can have three too, so do not stop after counting needles.

Native or introduced?

Native

Remember: Usually three stiff needles + medium, prickly cones.

NC symbol: Pine — NC state tree

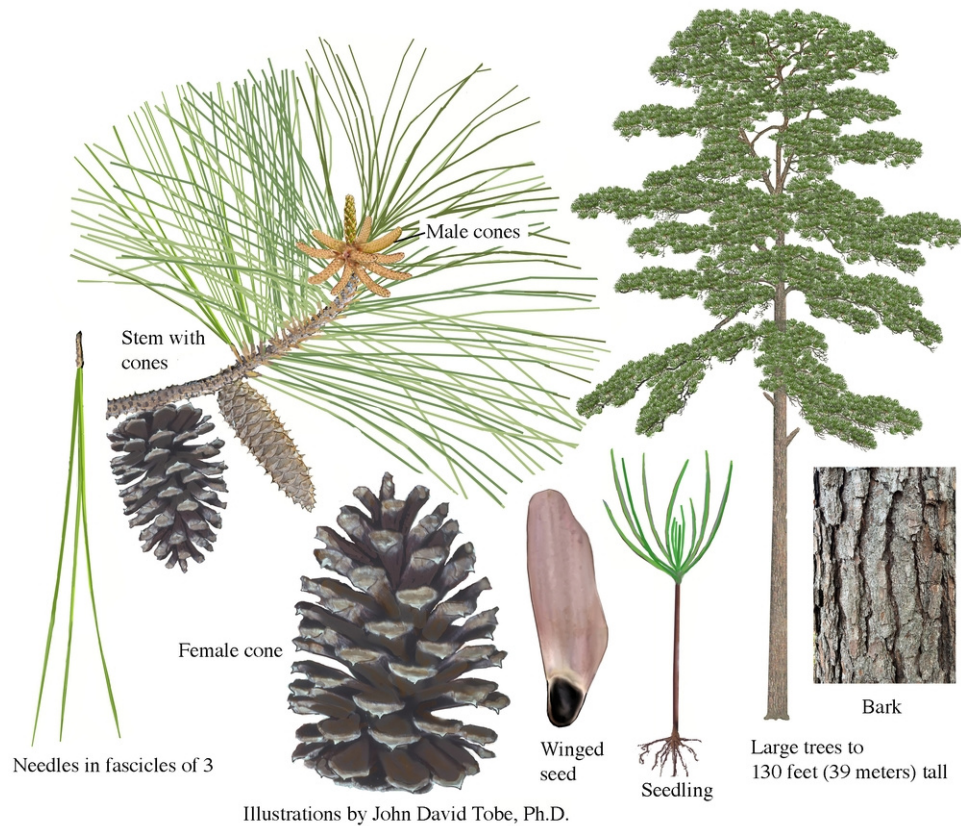
Coach: Use a ruler or a labeled scale for size. A small photograph of a large cone is not evidence of a small species.

More views on the following page(s).

Loblolly Pine · closer looks

Published botanical diagram

1



Published illustration: complete needle bundle, winged seed, cones and tree form.

P36 · John Tobe · CC BY-NC 4.0

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

Longleaf Pine

Pinus palustris · scientific name is reference information



Long needles form dense tufts near branch tips.

P37 · Cathy Dewitt · CC BY 4.0



Thick, plated bark on a longleaf pine.

P38 · Kerry Woods · CC BY-NC-ND 4.0



Large woody seed cones with pointed scales.

P39 · Cathy DeWitt · CC BY-NC-ND 4.0

Look for several clues

- Usually three very long needles per bundle, approximately 8–18 inches long.
- Large, prickly seed cones are approximately 6–10 inches long.
- Young trees can spend years in a low “grass stage.” Older trees develop thick, plated bark.

Habitat & North Carolina

Sunny, fire-maintained pine woodlands and savannas, often on sandy soil. Regular fire helps prevent dense woody plants from shading the ground. Native mainly to the Coastal Plain and Sandhills of North Carolina.

Life cycle

Wind carries pollen to seed cones. Cones release large winged seeds. During the grass stage, the young plant builds roots while its protected bud stays near the ground; later the stem grows rapidly upward.

Role in nature & with people

Longleaf habitats support many native plants and animals. People historically used longleaf wood and resin. Habitat restoration helps conserve the open woodland community.

Compare before deciding

Loblolly usually also has three needles per bundle. Compare needle length, cone size and young-plant form together. A grass-stage plant looks very different from a mature tree.

Native or introduced?

Native

Remember: Very long needles + large cones + grass-stage young.

NC symbol: Pine — NC state tree; longleaf is its official emblem

Coach: The state-tree designation remains pine generally. Longleaf’s emblem status does not turn the other three listed pines into non-state-tree species.

More views on the following page(s).

Longleaf Pine · closer looks

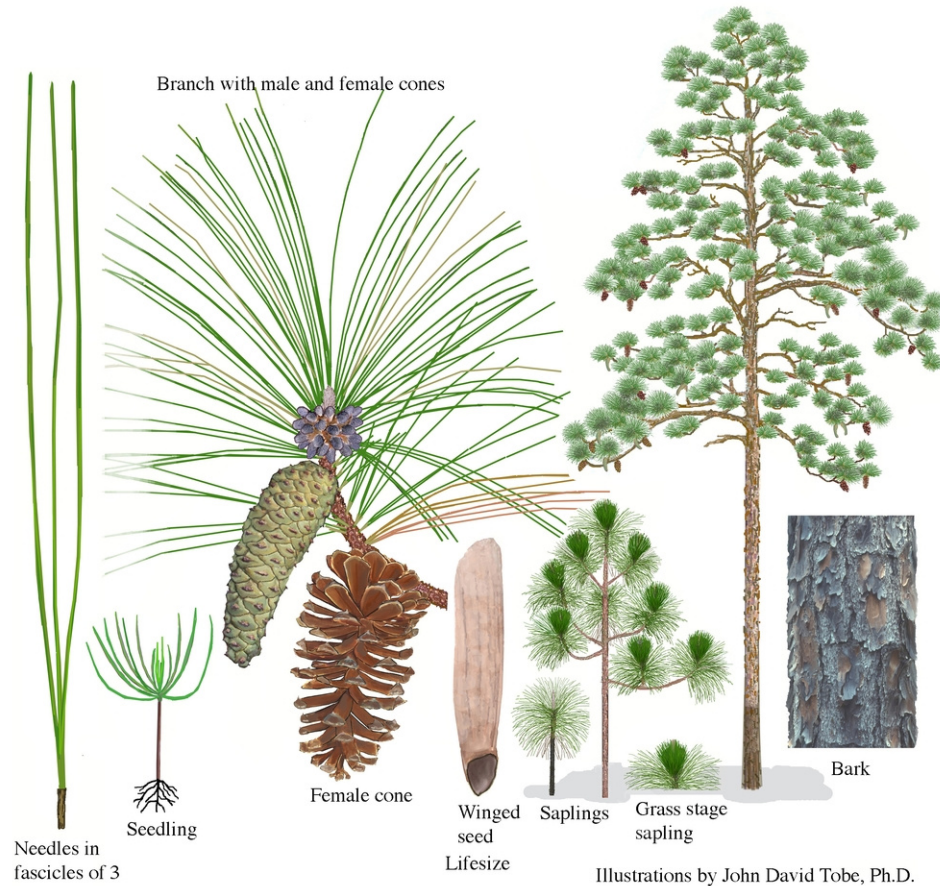
Seedling with seed



Young seedlings with seed coverings and wings still attached.

P40 · Douglas Goldman, USDA · CC BY-NC 4.0

Published botanical diagram



Published illustration: winged seed, needle bundle, cones and grass-stage young. Original size labels are retained, but this resized page is not a measuring scale.

P41 · John Tobe · CC BY-NC 4.0

Compare the low grass-stage tuft with the taller saplings. Small original labels are coach reference.

Magnolia

Magnolia grandiflora · scientific name is reference information



Thick evergreen leaves; undersides may be rusty.

P42 · Cathy Dewitt · CC BY 4.0



Southern magnolia trunk and bark.

P43 · Jim Robbins · CC BY-NC-ND 4.0



Red-coated seeds emerge from the cone-shaped fruit cluster.

P44 · Cathy Dewitt · CC BY-NC 4.0

Look for several clues

- Alternate evergreen leaves are thick, glossy and smooth-edged; undersides are often rusty and fuzzy.
- Large, fragrant white flowers open in warm months.
- Cone-shaped clusters of fruit release bright red-coated seeds; these are not pine cones.

Habitat & North Carolina

Moist, well-drained woods and sunny or partly shaded landscapes. Evergreen leaves are replaced gradually rather than all falling together in autumn. Native to the southeastern United States, including coastal North Carolina; widely planted beyond its native sites.

Life cycle

Insects, especially beetles, pollinate the flowers. Many small fruits develop together. Red-coated seeds emerge as the fruits open and may hang by thin threads before dispersing.

Role in nature & with people

Birds and mammals eat seeds. People value the tree for evergreen cover, shade and large flowers. Its thick leaves make a useful comparison with thinner deciduous leaves.

Compare before deciding

Black gum's leaves are usually thinner and its fruit is small and fleshy. Magnolia has thick evergreen leaves, large white flowers and a cone-shaped fruit cluster.

Native or introduced?

Native

Remember: Thick glossy leaves + white flowers + red-coated seeds.

Coach: The event's scientific reference specifies southern magnolia. Other magnolias can lose their leaves in winter or have different flowers. Rusty leaf undersides vary among cultivars.

More views on the following page(s).

Magnolia · closer looks

Flower



Large white southern magnolia flower.

P45 · Cathy DeWitt · CC BY-NC-ND 4.0

TREES

Oak

1

Quercus spp.; white oak and willow oak examples · scientific name is reference information



White oak: alternate leaves with rounded lobes.

P46 · Bruce Kirchoff · CC BY 2.0



White Oak example: pale gray bark forms long ridges and shallow plates.

P47 · Jim Robbins · CC BY-NC-ND 4.0



Willow oak acorns; an acorn is a nut containing a seed.

P48 · US Government employee · Public Domain Mark 1.0

Look for several clues

- Alternate, simple leaves vary greatly: many are lobed, but willow oak has narrow, unlobed leaves.
- Acorns are nuts with a cup or cap at one end.
- Bark varies with species and age; many mature oaks have ridges or plates.

Habitat & North Carolina

Forests, woodland edges and landscapes. Oak species differ in soil and moisture needs; some prefer dry uplands and others moist lowlands. Many oak species are native to North Carolina; other oaks are planted.

Life cycle

Wind carries pollen from spring flowers. Acorns develop and fall when mature. Animals eat, carry and bury them. Some buried acorns sprout when moisture, oxygen and temperature are suitable.

Role in nature & with people

Acorns feed many birds and mammals. Oaks also support many leaf-eating insects that become food for other animals. People use oak wood for furniture and flooring.

Compare before deciding

Hickory has compound leaves and nuts enclosed by husks. Oak leaves are simple and the nuts have caps. Do not reject an oak merely because its leaf lacks lobes.

Native or introduced?

Varies by species; the illustrated examples are native

Remember: Look for acorns; oak leaves have many shapes.

Coach: The tested entry is the oak group. Rounded lobes often suggest the white-oak group; bristle tips often suggest the red-oak group. These are comparison aids, not a requirement that all oak leaves be lobed.

More views on the following page(s).

Oak · closer looks

Leaf



Willow oak: narrow, unlobed leaves and an acorn.

P49 · Michael Wolf · CC BY-SA 3.0

Germinating nut



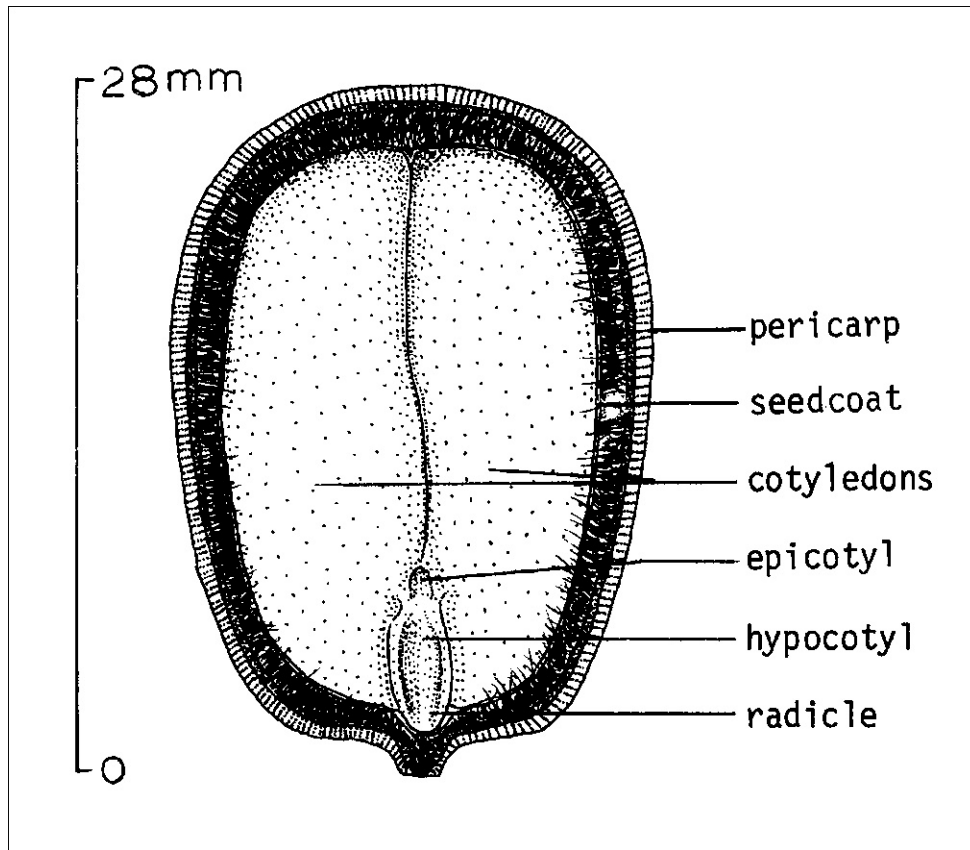
White oak: a root emerges from a germinating acorn.

P50 · Hope Duckworth · CC BY 4.0

Oak · closer looks

1

Published seed section



Published northern red oak section: the acorn wall surrounds the seed. One example within the oak group. Technical labels are for reference.

P51 · USDA Forest Service; chapter by Franklin T. Bonner; figure artist not separately credited · Public domain (federal publication figure; no third-party credit)

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

Red Maple

Acer rubrum · scientific name is reference information



Toothed, lobed leaves in fall color. Their attachment to the twig is hidden.

P52 · Frankenschulz · CC BY-NC-SA 2.0



Bark becomes more furrowed as a maple ages.

P53 · Jim Robbins · CC BY-NC-ND 4.0



Paired winged fruits, called samaras; each half contains a seed.

P54 · Carol Jacobs-Carre · CC BY-SA 3.0

Look for several clues

- Opposite, simple leaves usually have three to five lobes and toothed edges.
- Buds, young twigs and small early-spring flowers often show red.
- Paired winged fruits, called samaras, contain seeds and can spin as they fall.

Habitat & North Carolina

A wide range of sites, from wet woods to uplands. It is also widely planted as a shade tree. Native across North Carolina.

Life cycle

Spring flowers are followed by paired samaras. Each half of the pair is a fruit containing a seed. Wind helps carry them from the parent tree; seeds can then germinate.

Role in nature & with people

Seeds feed wildlife and branches provide cover. People plant red maple for shade and fall color, which can be red, yellow or orange.

Compare before deciding

Sweetgum also has lobed leaves, but they are alternate and star-shaped. Red maple has opposite leaves and paired winged fruits; sweetgum has woody, spiky fruit balls.

Native or introduced?

Native

Remember: Opposite lobed leaves + paired winged fruits.

Coach: Red fall color alone does not identify red maple. Black gum and other trees can also turn red. Young bark is smoother than older, furrowed bark.

More views on the following page(s).

Red Maple · closer looks

1

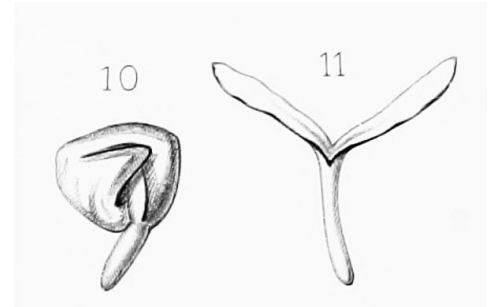
Opposite leaf-stalk attachment



Two leaf stalks meet opposite sides of the twig at a node. Follow each stalk toward its leaf.

P56 · Baskauf, Steven J. · CC BY 4.0

Published fruit and seed sections



Published red maple sections: 8, winged fruit cut open; 9, seed cut open; 10, folded embryo; 11, embryo spread out. Enlarged drawings, not a size scale.

P55 · Charles Edward Faxon (artist), in Charles Sprague Sargent, *The Silva of North America*, vol. II (1891); digitization: Missouri Botanical Garden / Botanicus / Internet Archive · Public domain (published 1891)

Published drawing: find the seed and its covering. The small technical labels are for coach reference, not memorization.

River Birch

Betula nigra · scientific name is reference information



Triangular to diamond-shaped, toothed leaves. The smaller teeth need a closer view.

P57 · Kathleen Moore · CC BY 2.0



Peeling layers on a river birch trunk.

P58 · Kathleen Moore · CC BY 2.0



A mature fruit cluster releases many tiny winged nutlets.

P59 · Steven J. Baskauf · CC BY 4.0

Look for several clues

- Alternate, simple leaves are triangular to diamond-shaped with doubly toothed edges.
- Young bark peels into papery curls, often salmon, cream and brown.
- Female flower clusters develop into small upright, cone-like fruit clusters; older trunks may be dark and ridged.

Habitat & North Carolina

Moist stream banks, floodplains and other sunny wet sites. Landscaped trees can also grow in well-watered soil. Native in North Carolina, especially along streams and lowlands.

Life cycle

Wind moves pollen from male catkins to female flowers. Fruiting clusters release many tiny winged nutlets in spring. Each nutlet contains a seed, and water or wind helps disperse it.

Role in nature & with people

Roots help hold soil along waterways. Seeds and other parts support wildlife. People plant it for attractive bark and tolerance of wet ground.

Compare before deciding

Crepe myrtle also has peeling bark. River birch has alternate, double-toothed leaves and catkins; crepe myrtle often has opposite, smooth-edged leaves and crinkled showy flowers.

Native or introduced?

Native

Remember: Papery bark + alternate, double-toothed leaves.

Coach: A long dangling male catkin is a pollen-producing flower cluster, not a seed cone. Birch is a flowering plant even though its fruiting clusters look cone-like.

More views on the following page(s).

River Birch · closer looks

1

Leaf edge detail



A closer leaf view shows larger edge teeth with smaller teeth between them.

P62 · Baskauf, Steven J. · CC BY 4.0

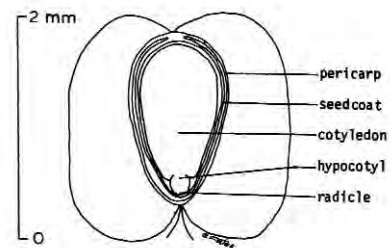
Seed-bearing nutlet



Winged nutlets released from a river birch fruit cluster.

P60 · Steven J. Baskauf · CC BY 4.0

Published seed section



Published river birch section: a winged fruit wall surrounds the tiny seed. Technical labels are for reference.

P61 · USDA Forest Service; chapter by Robert P. Karrfalt; figure artist not separately credited · Public domain (federal publication figure; no third-party credit)

Shortleaf Pine

Pinus echinata · scientific name is reference information



Shortleaf twig. Crossing needles hide the bundle bases here; use the intact-bundle models in the pine comparison to practice counting.

P63 · Nate Hartley · CC BY-NC 4.0



The source identifies small bark pits as resin pockets. Shiny resin is visible; this photo alone cannot explain every opening.

P64 · Laura Clark · CC BY 4.0



Small mature seed cone; seeds develop beneath the scales.

P65 · Joshua Hodge · CC BY-NC 4.0

Look for several clues

- Needles grow in bundles of two or three, approximately 3–5 inches long.
- Small seed cones, approximately 1.5–2.5 inches long, have tiny prickles.
- Older reddish-brown bark forms plates with small resin pockets.

Habitat & North Carolina

Sunny upland woods and dry or rocky slopes. Deep roots help established trees tolerate drought. Native in North Carolina, particularly the Piedmont and upland sites.

Life cycle

Pollen travels by wind to seed cones. Mature cones release winged seeds. Young shortleaf pines can sprout again after damage to the stem, an unusual ability among the listed pines.

Role in nature & with people

Seeds and branches support wildlife. People use the wood for lumber and other products. It is part of pine and mixed hardwood forests.

Compare before deciding

White pine needles overlap shortleaf in length, so “shortest needles” is unreliable. White pine has five needles per bundle and long narrow cones; shortleaf has two or three and much smaller cones.

Native or introduced?

Native

Remember: Shortleaf: bundles of 2–3; usually the smallest mature seed cones of these four pines.

NC symbol: Pine — NC state tree

Coach: Needle length alone cannot reliably separate the four pines. Count complete bundles and compare cones, bark and scale.

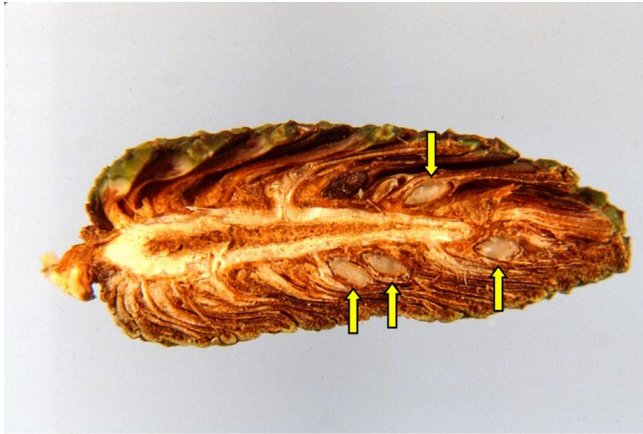
More views on the following page(s).

Sources: S23

Shortleaf Pine · closer looks

1

Exposed seeds



Cut shortleaf cone; the original yellow arrows point to seeds.

P66 · Pinethicket at English Wikipedia · CC BY-SA 3.0

Intact natural needle bundles



These detached brown bundles keep their shared bases. Trace the lowest pair back to one base. Living needles are green.

P67 · Leila Dasher · CC BY 4.0

Sweetgum

Liquidambar styraciflua · scientific name is reference information



Star-shaped leaves, shown here in fall color.

P68 · Maggie · CC BY-NC 2.0



Ridged sweetgum bark.

P69 · skdavidson · CC-BY-SA 2.0



Spiky woody fruit balls on long stalks; tiny seeds are released through openings.

P70 · Cathy DeWitt · CC BY-NC 4.0

Look for several clues

- Alternate, simple leaves are star-shaped, usually with five to seven pointed lobes.
- Round, woody, spiky fruit clusters hang on long stalks.
- Bark becomes ridged; some twigs develop corky wings.

Habitat & North Carolina

Moist woods, floodplains and sunny disturbed sites. Young trees can grow quickly where light is available. Native across much of North Carolina.

Life cycle

Wind pollinates small spring flowers. Many fruits join into a woody ball. Openings in the mature ball release small winged seeds; the empty ball may remain on the tree or fall.

Role in nature & with people

Seeds feed birds and small mammals. People use the wood and plant the tree for shade and varied fall colors. Fallen fruit balls are a clue beneath a tree.

Compare before deciding

Red maple has opposite leaves and paired winged fruits. Black gum has oval leaves and blue-black fleshy fruits. Sweetgum combines alternate star-shaped leaves with spiky fruit balls.

Native or introduced?

Native

Remember: Alternate stars + woody spiky balls.

Coach: The spiky ball is a cluster of fruits, not one giant seed. The actual seeds are much smaller and are released through openings.

More views on the following page(s).

Sweetgum · closer looks

1

Seed



Winged sweetgum seeds released from the fruit balls.

P71 · Gmihail · CC BY-SA 3.0 RS

Carolina Lily

Lilium michauxii · scientific name is reference information



Nodding, spotted flower with strongly curved-back tepals.
P72 · Darrel Brown · CC BY-NC 4.0



Leaves arranged in a whorl around a young stem.
P73 · Andrea Laine · CC BY-NC 4.0



Flat seeds released from a dry lily capsule.
P74 · Evan Raskin · CC BY-NC 4.0

Look for several clues

- Nodding orange to reddish flowers have dark spots and six strongly curved-back petal-like parts.
- Leaves occur in whorls around the stem and are often widest above the middle.
- A flowering stem often has one to three flowers, but can have as many as six.

Habitat & North Carolina

Open woods and dry to moist woodland edges with well-drained soil and some sunlight. Native in North Carolina and other southeastern states.

Life cycle

A perennial bulb survives underground. Flowers are pollinated by insects; dry capsules later release many flat seeds. A new seedling takes time to develop into a flowering plant.

Role in nature & with people

Flowers provide nectar for pollinators. North Carolina chose this native wildflower as its official state wildflower. Appreciate wild plants in place and use photographs for study.

Compare before deciding

Turk's-cap lily can look similar. Its flowers usually have a green star at the center; Carolina lily lacks that star and often has fewer flowers and broader, thicker leaves. Flower counts overlap, so combine clues.

Native or introduced?

Native

Remember: Nodding spotted flowers + curled-back parts + whorled leaves.

NC symbol: NC state wildflower

Coach: The six petal-like parts are called tepals: three petals and three similar-looking sepals. Being a state symbol does not itself establish a plant's legal protection status.

Eastern Poison Ivy

Toxicodendron radicans · scientific name is reference information

2



At upper left, three leaflets share one long leaf stalk. The middle leaflet has a longer stalk of its own.

P75 · R. A. Nonenmacher · CC BY-SA 4.0



Aerial rootlets on a stem. Their attachment to a support is not shown.

P76 · Jim Robbins · CC BY-NC-ND 4.0



Pale fruits provide a second clue. Study photographs; do not touch.

P77 · Jim Robbins · CC BY-NC-ND 4.0

Look for several clues

- Each compound leaf has three leaflets; the middle leaflet usually has a longer stalk.
- Leaflet edges vary from smooth to toothed or lobed.
- May trail, grow as a shrub or climb using dense aerial rootlets. Small fruits become pale or whitish.

Habitat & North Carolina

Woods, woodland edges, stream banks, fences and disturbed places, in sun or shade. Native across North Carolina.

Life cycle

Small flowers develop into pale fruits that contain seeds. Birds eat the fruit and spread seeds. Established plants can also spread through underground stems.

Role in nature & with people

Birds benefit from the fruit, and plants provide cover. Its oil can cause an itchy skin reaction in people; even leafless stems can be a problem. Use photographs, not touch, for classroom identification.

Compare before deciding

Kudzu also has three leaflets. Kudzu climbs by twining stems and has pea-like purple flowers and hairy pods. Poison ivy can climb with rootlets and has pale fruits. Leaf size alone is unreliable.

Native or introduced?

Native

Remember: Three leaflets: pause and use more evidence.

Coach: Do not handle, taste or burn suspected poison ivy. Three leaflets are a caution clue, not proof of identity: other plants also have three.

English Ivy

Hedera helix · scientific name is reference information



Juvenile ivy: a single lobed leaf blade, not three leaflets.

P78 · Douglas Goldman, USDA · CC BY-NC 4.0



Dense aerial rootlets attach English ivy to a tree trunk.

P79 · Hladac · CC BY-SA 4.0



Mature flowering ivy has unlobed leaves.

P80 · Forest and Kim Starr · CC BY 2.0

Look for several clues

- Evergreen, alternate leaves usually have three to five lobes on juvenile shoots.
- Adult flowering shoots have unlobed leaves: one plant can show both forms.
- Aerial rootlets attach climbing stems to surfaces; mature shoots can bear greenish flowers and dark fruits.

Habitat & North Carolina

Shady or partly shaded ground and tree trunks; often escapes from gardens into woods. Introduced and invasive in North Carolina.

Life cycle

Insects visit flowers on mature shoots. Dark fruits contain seeds that birds can carry. Creeping stems can also root where they contact suitable ground.

Role in nature & with people

It is planted as an ornamental groundcover, but escaped growth can cover native plants and climb trees. Dense growth changes the light and space available to other plants.

Compare before deciding

Poison ivy has three separate leaflets, not one lobed blade. English ivy's juvenile leaf is a single blade with lobes. Check where the blade joins its stalk before counting "parts."

Native or introduced?

Introduced from Europe, western Asia and northern Africa; invasive

Remember: One lobed blade; adult leaves may be unlobed.

Coach: Rootlets attach the vine; they do not make it a parasite that steals food from a tree. Do not taste the leaves or fruit.

More views on the following page(s).

English Ivy · closer looks

Growth form

2



Evergreen ivy climbs and can cover large areas.

P81 · Donald Hobern · CC BY 2.0

OTHER PLANTS

Kudzu

Pueraria montana var. *lobata* · scientific name is reference information



Complete leaves on a trailing vine show three leaflets.

P82 · CameliaTWU · CC BY-NC-ND 4.0



Close view of leaflet lobes; the upper leaflet tip is outside the frame.

P83 · Martin LaBar · CC BY-NC 2.0



A flattened, hairy kudzu pod.

P84 · Yamatsu · CC0

Look for several clues

- Alternate compound leaves have three broad leaflets; some leaflets have lobes.
- Long stems climb by twining around supports or trail across the ground.
- Fragrant purple pea-like flowers can be followed by flattened, hairy pods.

Habitat & North Carolina

Sunny roadsides, field edges and disturbed land. Fast-growing vines can climb over shrubs and trees. Introduced and invasive in North Carolina.

Life cycle

Flowers can produce seeds in pods. Much spread occurs as stems root at nodes that touch soil. Established root crowns survive and send out new vines.

Role in nature & with people

Introduced for ornamental uses and soil cover, kudzu became invasive and can shade other plants. Like other legumes, it can partner with root bacteria that turn nitrogen gas into forms the plant can use.

Compare before deciding

Poison ivy also has three leaflets and can have thick, hairy-looking stems. Use kudzu's twining habit, purple flowers and hairy pods versus poison ivy's attaching rootlets and pale fruits. Size alone is not decisive.

Native or introduced?

Introduced from Asia; invasive

Remember: Three broad leaflets + twining vine + hairy pods.

Coach: Do not teach that a thick, hairy vine proves kudzu. The hairs on a young kudzu stem differ from the clinging rootlets of poison ivy.

More views on the following page(s).

Kudzu · closer looks

Flower

2



Purple pea-like flowers in an upright cluster.

P85 · Cathy Dewitt · CC BY 4.0

Scuppernong Grape

Vitis rotundifolia 'Scuppernong' · scientific name is reference information



Muscadine species view: rounded leaves with toothed edges.

P86 · Cathy Dewitt · CC BY 4.0



Muscadine species view: an unbranched tendril curls; no support is shown.

P87 · Cathy Dewitt · CC BY 4.0



Fruit labeled Scuppernong by the photographer; bronze muscadines.

P88 · Randal Cooper · CC BY-SA 2.0

Look for several clues

- Alternate, simple, rounded leaves have toothed edges.
- The woody vine climbs using unbranched tendrils. Bark stays attached rather than peeling in strips.
- Scuppernong is a bronze muscadine: round, thick-skinned grapes ripen in small, loose clusters.

Habitat & North Carolina

Sunny woodland edges and cultivated vineyards with well-drained soil and support for climbing. The muscadine species is native to North Carolina; Scuppernong is a cultivated selection.

Life cycle

Flowers are pollinated, then develop into grapes containing seeds. Growers use vegetative propagation to preserve a named cultivar's traits; seedlings may differ from the parent.

Role in nature & with people

People eat muscadines fresh and use them for juice, jelly and wine. Wild muscadine fruit also feeds wildlife. The Scuppernong name connects this cultivated grape with North Carolina history.

Compare before deciding

Many other grapes have branched tendrils and bark that shreds or peels. Muscadines have simple tendrils and attached bark. Bronze fruit alone cannot prove the specific Scuppernong cultivar.

Native or introduced?

Cultivar of a native species

Remember: Unbranched tendrils + attached bark + bronze muscadine fruit.

NC symbol: Event fruit entry; current NC state fruit is muscadine grape

Coach: Use Scuppernong Grape for the official event entry. The current statute names muscadine grape; Scuppernong is a muscadine cultivar. Older bark may be furrowed while remaining attached.

Venus Flytrap

Dionaea muscipula · scientific name is reference information

2



Short, dark trigger hairs stand inside the trap. The long pale teeth grow around its edges.

P89 · Noah Elhardt · CC BY-SA 2.5 Generic



A low rosette of leaves ending in hinged traps.

P90 · Cathy Dewitt · CC BY 4.0



White flowers stand above the traps on tall stalks. Follow a stalk down toward the leafy rosette.

P91 · NC Orchid · CC BY 2.0 Generic

Look for several clues

- A low rosette has hinged traps at the ends of leaves.
- Each trap has sensitive trigger hairs inside and tooth-like extensions along the edges.
- White flowers grow on taller stalks above the traps.

Habitat & North Carolina

Sunny, wet, acidic, nutrient-poor savannas near the coast. Periodic fires keep shrubs from shading it. Native near Wilmington in coastal North and South Carolina; planted or naturalized elsewhere.

Life cycle

Insects pollinate flowers, which produce seeds. This perennial survives year to year and becomes dormant in winter.

Role in nature & with people

Leaves make sugars by photosynthesis. Trapped insects and spiders supply extra nutrients, especially nitrogen. This unusual coastal Carolina plant is a conservation teaching example.

Compare before deciding

A trap closing after stimulation is a rapid touch response, not directional growth. A tendril slowly growing around a support is thigmotropism. Both respond to touch but work differently.

Native or introduced?

Native

Remember: Sunlight supports sugar-making; captured prey adds nutrients.

NC symbol: NC state carnivorous plant

Coach: Grow only nursery-propagated plants. Use bright light, rain or distilled water and a suitable low-nutrient medium; no fertilizer. Never collect wild plants or repeatedly trigger traps for play.

More views on the following page(s).

Venus Flytrap · closer looks

Trigger hairs and marginal teeth



Short, dark trigger hairs stand inside the trap. The long pale teeth grow around its edges.

P89 · Noah Elhardt · CC BY-SA 2.5 Generic

Flowers above trap rosette



White flowers stand above the traps on tall stalks. Follow a stalk down toward the leafy rosette.

P91 · NC Orchid · CC BY 2.0 Generic

American Alligator

Alligator mississippiensis · scientific name is reference information



Armored body and broad head beside an NC wetland.
P92 · al_bennett · CC BY-NC 4.0



Bands are still visible along this smaller alligator's sides and tail.
P93 · dogbowlbookpile · CC BY-NC 4.0

Look for several clues

- Broad, U-shaped snout and a dark, armored body. Eyes and nostrils sit high on the head.
- Most lower teeth are hidden when the mouth closes.
- Young alligators have bright yellow bands that fade as they grow.

Habitat & North Carolina

Freshwater swamps, marshes, ponds and slow rivers. Coastal Plain, especially the southeastern part of NC.

Food

Fish, turtles, birds and mammals; young eat insects and small aquatic animals.

Life cycle

Female builds a vegetation nest and guards eggs and hatchlings; young resemble small adults.

Role in nature & with people

Top wetland predator. It digs hollows that can hold water and shelter other animals.

Compare before deciding

American crocodiles have a narrower snout and a lower fourth tooth that remains visible with the mouth closed. They are not native to NC. Use several features; never approach either animal.

Remember: Broad snout + armored body; yellow bands in the young.

Coach: Observe from a distance. Never feed alligators: feeding can draw them toward people.

Eastern Fence Lizard

Sceloporus undulatus · scientific name is reference information



Side view of a source-identified eastern fence lizard in NC.

P94 · Creator not stated; uploaded by Mark Connolly (w_mark_c) · CC0 1.0



Pointed, overlapping scales give the head and body a rough look.

P95 · Quintin Ellison · CC BY-NC 4.0

Look for several clues

- Gray or brown lizard with pointed, overlapping scales that look rough.
- Dark, wavy back bars are often clearest in females and young lizards.
- Adult males may show blue patches on the throat and sides of the belly.

Habitat & North Carolina

Dry open woods, forest edges, logs, rocks and fences; needs sunny basking places. Found across NC.

Food

Mostly insects and spiders.

Life cycle

Lays eggs in soil; hatchlings look like tiny adults and grow without metamorphosis.

Role in nature & with people

Controls insects and is food for snakes, birds and mammals.

Compare before deciding

Anoles have toe pads and finer-looking scales. Skinks look smooth and shiny. A hidden belly does not mean a fence lizard lacks blue patches.

Remember: Rough scales + wavy bars; some males show blue underneath.

More views on the following page(s).

Eastern Fence Lizard · closer looks

Male blue throat



Blue under the throat of an NC male; females need not show this color.

P96 · rabbit · CC BY-NC 4.0

Eastern Glass Lizard

Ophisaurus ventralis · scientific name is reference information



A legless body and long tail; a closer head view is needed to distinguish it from a snake.

P97 · grinnin · CC BY-NC 4.0

The dark ear opening sits behind and below the eye. The rim of the eyelid is also visible.

P98 · Josiah Londerée · CC BY 4.0

Look for several clues

- A legless lizard with a long body and an especially long tail.
- A close head view can show an ear opening behind the eye and an eyelid. Snakes lack external ear openings and movable eyelids.
- Color may be greenish or brown; markings vary with age.

Habitat & North Carolina

Sandy grasslands, marsh edges and open grassy habitats. Mainly the Coastal Plain.

Food

Mostly insects, spiders, snails and other small animals; also some eggs and small vertebrates.

Life cycle

Lays eggs; female may remain with the nest. Young look like smaller adults.

Role in nature & with people

Predator of invertebrates and prey for larger animals.

Compare before deciding

A snake has no external ear openings or movable eyelids. These details need a clear head view. A photograph alone cannot demonstrate blinking.

Remember: Legless lizard: look for the ear opening and eyelid.

Coach: Its tail may break during an attack and regrow. Do not handle one to test this. A still picture cannot prove how a body part moves.

More views on the following page(s).

Eastern Glass Lizard · closer looks

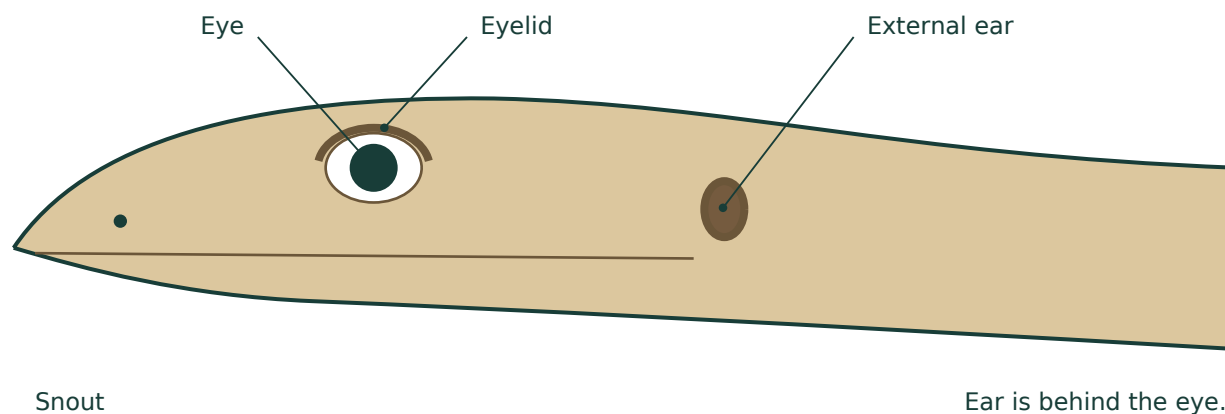
Eye and ear opening



Find the eye, then the separate ear opening behind and below it. A still image cannot show blinking.

P98 · Josiah Londerée · CC BY 4.0

How to read a lizard head



Simplified head model, not an identification photograph. The external ear is behind the eye. Eyelids and ear openings support lizard rather than snake; these traits alone do not identify the species.

Green Anole

Anolis carolinensis · scientific name is reference information



A male displays its pink-red throat fan, or dewlap.

P99 · Michael J. Papay · CC BY 4.0



The same species can be brown; use body structure as well as color.

P100 · Tommy Farquhar · CC BY-NC 4.0

Look for several clues

- Slender lizard with long toes and tail; can change from green to brown.
- Male has a pink-red throat fan called a dewlap.
- Toe pads help it climb leaves, fences and branches.

Habitat & North Carolina

Shrubs, vines, yards and woodland edges; warm sunny perches with nearby cover. Coastal Plain and southern Piedmont.

Food

Small insects and spiders.

Life cycle

Female lays one egg at a time during warm months; hatchlings are miniature adults.

Role in nature & with people

Controls insects and is prey for birds, snakes and larger lizards.

Compare before deciding

The eastern fence lizard has rough, spiny-looking scales. Anoles have finer scales and climbing toe pads. Green and brown individuals can be the same species.

Remember: Green-or-brown climber + long toes + red male dewlap.

Coach: Also called Carolina anole. Color change does not make it a chameleon; use the official event name Green Anole.

Southeastern Five-lined Skink

Plestiodon inexpectatus · scientific name is reference information



Pale stripes and a blue tail; this angle does not show all five stripes for counting.

P101 · Robby Deans · CC BY-NC 4.0

An adult with a red-orange head and faded body stripes.

P102 · Ty Smith · CC BY-NC 4.0

Look for several clues

- Young skinks have smooth, shiny scales, five pale stripes and a blue tail.
- Stripes may fade in adults; breeding males can have reddish heads.
- On a clear tail-underside view, the scales are about the same size.

Habitat & North Carolina

Dry woods, stumps, logs and buildings.
Coastal Plain and parts of the Piedmont.

Food

Insects, spiders and other small invertebrates.

Life cycle

Lays eggs under cover; female guards them.
Young resemble adults but are more striped and blue-tailed.

Role in nature & with people

Controls insects and is important prey; can drop its tail to escape.

Compare before deciding

Common five-lined and broad-headed skinks can share the stripes and blue tail. They have an enlarged middle row of scales beneath the tail. A top view may not settle the species.

Remember: Shiny striped youngster; underside scales help settle close look-alikes.

Coach: This is the roster's only skink, but roster choices are not proof of a wild animal's identity. Use a source-verified close-up; do not catch one for this view.

More views on the following page(s).

Southeastern Five-lined Skink · closer looks

Underside tail scales



Reference underside: tail scales are similar in size, without a wide middle row.

P103 · Ty Smith · CC BY-NC 4.0

Banded Water Snake

Nerodia fasciata · scientific name is reference information



Western form of this species: follow a dark band from its broad top on the back to its narrower side. Compare the other photo; colors and patterns vary.

P104 · Jennifer Linde · CC BY-NC 4.0

A dark individual still shows a face stripe; that stripe is not unique to cottonmouths.

P105 · kaynine35 · CC BY-NC 4.0

Look for several clues

- Dark crossbands usually widen across the back and narrow toward the sides. Older snakes may become very dark.
- A dark stripe may run from the eye to the jaw; it is not unique to cottonmouths.
- Scales have raised ridges. The pale belly has dark, squarish marks.

Habitat & North Carolina

Ponds, swamps, marshes and slow streams.
Coastal Plain.

Food

Fish and amphibians.

Life cycle

Gives birth to live young; babies are more brightly patterned than adults.

Role in nature & with people

Important aquatic predator; often killed because it is mistaken for a cottonmouth.

Compare before deciding

Both this snake and cottonmouths may have an eye stripe and a broad-looking head. Cottonmouths have a facial pit; banded water snakes do not. Use clear supplied photos and several clues.

Remember: Broad-backed bands + squarish belly marks; never handle.

Coach: Head shape changes when a water snake flattens its head defensively. Do not use head shape, swimming style or behavior alone to decide whether a snake is venomous.

More views on the following page(s).

Banded Water Snake · closer looks

Belly markings



Reference underside: dark, blocky marks on a pale belly. Never handle a snake for this view.

P106 · Robert Russo · CC BY-NC 4.0

Black Rat Snake

Pantherophis alleghaniensis · scientific name is reference information



NC black-form rat snake with a pale chin. Fine scale ridges are hard to see here.

P107 · Zane Fish · CC BY-NC 4.0



A young NC rat snake has dark blotches on a pale background.

P108 · Catherine Bollinger · CC BY-NC 4.0

Look for several clues

- Many NC adults are mostly black, with a pale chin. Young snakes are gray with dark blotches.
- Scales have slight ridges, called keels.
- The front of the belly is often checkered black and white.

Habitat & North Carolina

Forests, farms, barns and suburbs; climbs trees and buildings. Found across NC.

Food

Rodents, birds and eggs; kills prey by constriction.

Life cycle

Lays eggs; hatchlings are gray with dark blotches and look very different from adults.

Role in nature & with people

Controls rodents and is harmless to people when left alone.

Compare before deciding

Racers may also have white chins. Racers have smooth scales; rat snakes have slightly keeled scales. Use body shape, scales and belly pattern together.

Remember: Adult often black; young blotched; chin color is shared.

Coach: Keep the event name Black Rat Snake. Scientific-name treatments vary: the 2025 SSAR list uses *P. alleghaniensis* for Central Ratsnake and *P. quadrivittatus* for Yellow Ratsnake. Names are reference information.

Copperhead

Agkistrodon contortrix · scientific name is reference information



Dark bands narrow across the back and widen along the sides.

P109 · Shreybae · CC BY-NC 4.0



Supplied close-up shows the pit between the eye and nostril. Never approach for this view.

P110 · Shreybae · CC BY-NC 4.0

Look for several clues

- Tan to copper body with dark hourglass bands: narrow across the spine, wide on the sides.
- Broad triangular head, vertical pupils and heat-sensing pit.
- Young have a bright yellow-green tail tip.

Habitat & North Carolina

Wooded hillsides, rocky areas, stream edges and suburban leaf litter. Widespread across NC.

Food

Rodents, frogs, lizards and insects; young may lure prey with the colored tail.

Life cycle

Gives birth to live young; young resemble adults except for the tail tip.

Role in nature & with people

Predator that controls small animals.

Venomous: observe only from a safe distance.

Compare before deciding

Banded water snake bands usually widen across the back. Copperhead bands narrow there and widen at the sides. Head shape alone cannot decide; never approach to examine eyes or facial pits.

Remember: Hourglass bands narrow on the spine. Never handle.

Coach: Venomous. Use photographs for comparisons. A snake need not show a threat display to be dangerous.

More views on the following page(s).

Copperhead · closer looks

Juvenile tail

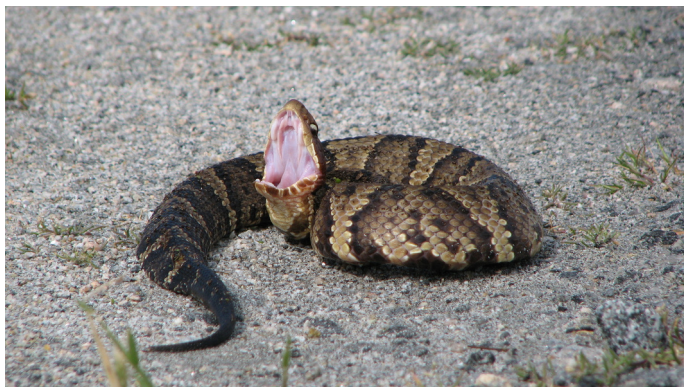


A young NC copperhead has a yellow tail tip and hourglass bands.

P111 · jaries · CC BY-NC 4.0

Cottonmouth

Agkistrodon piscivorus · scientific name is reference information



Banded body and white-mouth display. A closed mouth would not rule out cottonmouth.

P112 · railprof · CC BY-NC 4.0



Side view of the head; the facial pit is too small to locate clearly here. Never approach for this view.

P113 · Karen Szafrajda · CC BY 4.0

Look for several clues

- Heavy-bodied snake; young have visible dark bands and a yellow-green tail tip. Adults may become almost solid dark.
- When visible, dark bands narrow across the back and widen down the sides.
- Clear head photos show a heat-sensing pit between the eye and nostril. A dark eye stripe is shared with some water snakes.

Habitat & North Carolina

Swamps, marshes, lakeshores and slow waterways. Coastal Plain.

Food

Fish, frogs, snakes, turtles, birds and small mammals.

Life cycle

Gives birth to live young; juveniles have brighter patterns.

Role in nature & with people

Aquatic predator and scavenger. Venomous: keep a safe distance.

Compare before deciding

Banded water snakes lack facial pits, and their dark bands tend to be widest across the back. Both can look broad-headed. A closed mouth does not rule out cottonmouth.

Remember: Pit viper; use several photo clues, never just the eye stripe.

Coach: Venomous. Never approach to inspect a pit or pupil. Very dark animals or poor views may leave too little evidence for an identification.

More views on the following page(s).

Cottonmouth · closer looks

Young bands



A younger cottonmouth shows contrasting bands that can fade with age.

P114 · Jake · CC BY-NC 4.0

Dekay's Brownsnake

Storeria dekayi · scientific name is reference information



Top view of a small brown snake with paired back spots.
P115 · Michael J. Papay · CC BY 4.0



Back-scale close-up: fine raised lines run down the middle of keeled scales. Study photos; do not handle wildlife.

P116 · Tigran Tadevosyan · CC BY 4.0

Look for several clues

- Small, slender brown or gray snake, usually under 15 inches.
- Two rows of small dark spots border a lighter stripe down the back.
- Head is small; scales are keeled.

Habitat & North Carolina

Leaf litter, gardens, parks and city lots; hides under logs, rocks and debris. Most of NC, except the northwestern mountains.

Food

Earthworms, slugs and snails.

Life cycle

Gives birth to live young; babies are tiny and may have a pale neck collar.

Role in nature & with people

Helpful garden predator that eats slugs; harmless to people.

Compare before deciding

Young rat snakes have stronger, larger blotches. A brownsnake usually has paired small spots beside a pale back stripe. Size needs a scale; a close photograph can make a tiny snake look large.

Remember: Tiny brown garden snake + paired dark spots + pale back stripe.

Eastern Diamondback Rattlesnake

Crotalus adamanteus · scientific name is reference information



Dark diamonds are outlined in pale cream.

P117 · Steven IGAS Landseadel · CC BY-NC 4.0

A pale-bordered dark cheek stripe and the rattle are visible.

P118 · natalie_likes_snakes · CC BY-NC 4.0

Look for several clues

- Large, heavy body with dark diamonds outlined in cream.
- A dark cheek stripe has pale borders. The tail ends in a rattle.
- Diamonds fade or become dark bands near the brown or gray tail.

Habitat & North Carolina

Longleaf pine flatwoods, sandy scrub and coastal habitats. Southeastern Coastal Plain; state-listed as Endangered.

Food

Rabbits, rats and other mammals.

Life cycle

Gives birth to live young; rattles gain a segment when the snake sheds, but segments do not equal age.

Role in nature & with people

A predator of rodents and other mammals. Habitat loss and persecution threaten it. Leave all wild snakes undisturbed.

Compare before deciding

Timber rattlesnakes have dark chevrons or crossbands and usually a dark tail. Eastern diamondbacks have cream-edged diamonds. Do not use a black-and-white “zebra tail” rule.

Remember: Cream-edged diamonds + pale-bordered cheek stripe + rattle.

Coach: Venomous. Rattle segments count sheds, not years; segments may break off.

Eastern Garter Snake

Thamnophis sirtalis sirtalis · scientific name is reference information



Three light stripes run along a dark body.

P119 · tewsc1 · CC BY-NC 4.0



Side stripes and dark checkering are visible behind the head.

P120 · Kevin · CC BY-NC 4.0

Look for several clues

- One light stripe down the back and one along each side.
- Dark checkered spots may appear between stripes.
- Slender body; color ranges from greenish to brown or black.

Habitat & North Carolina

Gardens, meadows, woods and wetland edges; often near water but also common in yards. Found across NC.

Food

Earthworms, amphibians, fish and other small prey.

Life cycle

Gives birth to live young; young look like miniature adults.

Role in nature & with people

Controls pests and links aquatic and land food webs; generally harmless.

Compare before deciding

Ribbon snakes are generally slimmer with cleaner stripes and long tails. Garter snakes often show checkering between the stripes. Compare several traits; color varies.

Remember: Three pale stripes with checkering between them.

Eastern Hognose Snake

Heterodon platirhinos · scientific name is reference information



The upturned snout is clearer in a head view than in a distant body photo.

P121 · Shreybae · CC BY-NC 4.0

An orange, patterned individual shows how much body color can vary.

P122 · Joshua Liverman · CC BY 4.0

Look for several clues

- Distinct upturned snout used for digging.
- Color is extremely variable: blotched, orange, brown, gray or nearly black.
- May flatten its neck, hiss, bluff-strike and then play dead.

Habitat & North Carolina

Sandy woods, fields and coastal dunes where it can dig. Across much of NC.

Food

Especially toads; also frogs and small animals.

Life cycle

Lays eggs in sandy soil; hatchlings have the same upturned snout.

Role in nature & with people

A predator of toads and other small animals. Its dramatic defenses often frighten people, but it is generally not dangerous to people.

Compare before deciding

Do not rely on color or a flattened neck. The upturned snout is a useful clue, together with body pattern and a verified source. Never provoke the defensive display.

Remember: Upturned digging snout; color varies widely.

Coach: NC Wildlife describes it as nonvenomous. Its prey-specialized oral secretions are a technical nuance, not a reason for handling it.

Eastern Kingsnake

Lampropeltis getula · scientific name is reference information



An NC Eastern Kingsnake with pale chain-like bands.

P123 · Shreybae · CC BY-NC 4.0



Glossy, smooth scales and a small head; photographed in NC.

P124 · Shreybae · CC BY-NC 4.0

Look for several clues

- Glossy black body with thin white or yellow chain-like bands.
- Smooth scales and a small head not much wider than the neck.
- Pattern can vary, but linked pale bands are the classic clue.

Habitat & North Carolina

Forests, fields, wetlands and farms; often uses logs, burrows and debris for cover. Mainly the Coastal Plain and Piedmont in NC.

Food

Rodents, lizards, turtle eggs and other snakes, including venomous snakes; constrictor.

Life cycle

Lays eggs; hatchlings resemble small adults.

Role in nature & with people

Controls rodents and other snakes; nonvenomous and beneficial.

Compare before deciding

A black rat snake has slightly keeled scales and lacks the kingsnake's typical pale chain pattern. Both may be dark; use the scales and pattern together.

Remember: Black snake wrapped in pale chain links.

Coach: The photographs must be Eastern Kingsnake, *Lampropeltis getula*. Other kingsnakes with older overlapping names do not establish this species.

Painted Turtle

Chrysemys picta · scientific name is reference information



Red along the low shell edge and yellow lines on the head.

P125 · Suzanne Cadwell · CC BY-NC 4.0

In this eastern form, pale seams line up across the shell.

P126 · smmcdonald · CC BY-NC 4.0

Look for several clues

- Smooth, low, dark shell with red along the edge.
- Yellow stripes mark the head and legs; red may also show on the limbs.
- In the eastern form common in NC, the middle shell plates line up across the back.

Habitat & North Carolina

Quiet ponds, marshes and slow streams with basking logs and aquatic plants. The eastern form occurs in NC.

Food

Aquatic insects, snails, tadpoles, carrion and plants.

Life cycle

Lays eggs in soil on land. Some hatchlings remain in the nest through winter before moving to water.

Role in nature & with people

Consumes plants and small animals and provides prey; basking helps regulate body temperature.

Compare before deciding

Yellow-bellied sliders have a broad yellow patch behind the eye and a more raised shell. The painted turtle's red shell-edge markings and head pattern are useful together.

Remember: Dark smooth shell painted with yellow lines and red edges.

Coach: The event entry includes *Chrysemys picta*. Shell-plate alignment describes the eastern form, not every painted-turtle subspecies.

More views on the following page(s).

Painted Turtle · closer looks

Young underside



A young turtle's yellow lower shell and marked legs. Do not handle turtles for identification.

P127 · frankyj · CC BY-NC 4.0

Snapping Turtle

Chelydra serpentina · scientific name is reference information

3



Large head and strong beak; much of the neck remains exposed.

P128 · taylordeckard · CC BY-NC 4.0

A snapping turtle underwater: broad shell and long neck.

P129 · smmcdonald · CC BY-NC 4.0

Look for several clues

- Large head, powerful hooked jaws and very long saw-toothed tail.
- Top shell is rough with three low ridges in younger turtles.
- Bottom shell is small, so the turtle cannot close itself inside.

Habitat & North Carolina

Ponds, marshes, lakes and slow rivers with muddy bottoms. Widespread across NC.

Food

Fish, frogs, invertebrates, carrion and aquatic plants; opportunistic omnivore.

Life cycle

Female leaves water to lay eggs on land; hatchlings head toward water.

Role in nature & with people

Scavenger and predator that helps recycle nutrients; defensive on land but usually avoids people in water.

Compare before deciding

Alligator snapping turtles have three prominent shell ridges and are not native to North Carolina. Young common snapping turtles also have ridges, so compare the head, tail and shell together.

Remember: Huge head + tiny lower shell + long dinosaur-like tail.

Coach: A small bottom shell leaves much of the body exposed. Do not pick up a snapping turtle or lift any turtle by its tail.

More views on the following page(s).

Snapping Turtle · closer looks

Juvenile shell ridges and tail



A young snapping turtle with an uncovered, ridged shell and a long, saw-edged tail.

P130 · Sam Stukel / USFWS · Public domain (U.S. federal work; PDM 1.0)

Spotted Turtle

Clemmys guttata · scientific name is reference information



Separate yellow dots on a smooth, dark shell.

P131 · smmcdonald · CC BY-NC 4.0

Spots also mark the head and legs.

P132 · Shreybae · CC BY-NC 4.0

Look for several clues

- Small smooth black shell sprinkled with round yellow spots.
- Yellow or orange spots also mark the head and limbs.
- Adults are usually only about 3.5-5 inches long.

Habitat & North Carolina

Shallow wetlands, bogs, marshes and wet meadows; may move over land between wetlands. Mostly Coastal Plain; also scattered sites in the Piedmont.

Food

Snails, worms, insects, tadpoles and some plants.

Life cycle

Lays a small clutch of eggs on land; grows slowly and matures late.

Role in nature & with people

Wetland predator and prey; vulnerable to habitat loss and collection.

Compare before deciding

Among the five listed turtles, separate yellow dots on a small black shell are especially useful. Spots can be faint or few, so use shell shape and a verified source too.

Remember: Small black turtle with polka-dot yellow spots.

Eastern Box Turtle

Terrapene carolina carolina · scientific name is reference information



High dome and orange-yellow markings on a land turtle.
P133 · Joshua Liverman · CC BY 4.0



The front lower-shell lobe is raised toward the top shell.
P134 · Shreybae · CC BY-NC 4.0

Look for several clues

- High domed shell with yellow or orange markings on brown.
- Hinged bottom shell can close tightly like a box.
- Stout feet for walking on land; each turtle's markings vary.

Habitat & North Carolina

Moist forests, woodland edges and meadows; mostly terrestrial but needs humid cover and shallow water. Found across NC.

Food

Berries, mushrooms, worms, insects, slugs and carrion; omnivore.

Life cycle

Female lays eggs in soil; young are small and duller. Individuals may live for many decades.

Role in nature & with people

Disperses seeds and eats invertebrates. Roads, habitat loss and collection are major threats.

Compare before deciding

The listed aquatic turtles have flatter shells and swimming feet. Box turtles have a high dome and a hinged lower shell. Their colors and markings vary greatly.

Remember: Domed land turtle that closes like a box.

NC symbol: NC State Reptile — event entry

Coach: NC law designates the turtle as state reptile, with Eastern Box Turtle as its emblem. Box turtles belong to the pond-turtle family; living on land does not make them tortoises.

More views on the following page(s).

Eastern Box Turtle · closer looks

Plastron hinge



Reference underside: a hinge crosses the lower shell so it can close.

P135 · Koaw Nature · CC BY-NC 4.0

Yellow-bellied Slider

Trachemys scripta scripta · scientific name is reference information



A small slider shows a yellow cheek marking and yellow lower shell.

P136 · Joshua Liverman · CC BY 4.0



The broad yellow patch behind the eye is clearer from the side.

P137 · Aaron P. · CC BY-NC 4.0

Look for several clues

- A broad yellow patch behind the eye is clearest in young and normally patterned animals.
- Shell is greenish to brown with yellow markings.
- The lower shell is yellow, often with dark spots. Some older males become very dark.

Habitat & North Carolina

Ponds, lakes, swamps and slow rivers with basking sites and vegetation. Mainly the Coastal Plain and Piedmont.

Food

Young eat more animals; adults eat more aquatic plants, plus insects, snails and fish.

Life cycle

Female lays eggs on land; young hatch as small aquatic turtles.

Role in nature & with people

Common wetland omnivore and prey; often basks in groups.

Compare before deciding

Red-eared sliders have a red patch behind the eye. Painted turtles show red around the shell edge. Use head and shell markings together; dark adults may hide them.

Remember: Big yellow cheek patch + yellow belly.

American Toad

Anaxyrus americanus · scientific name is reference information



Top view shows bumpy skin and the large glands behind the eyes.

P138 · jlemmonds · CC BY-NC 4.0



A side view shows the oval gland behind the eye and warty skin.

P139 · Alex Shure · CC BY-NC 4.0

Look for several clues

- Dry-looking, bumpy skin, usually with one or two warts in each dark back spot.
- Large oval parotoid glands sit behind the eyes; these make defensive chemicals.
- The pale chest and belly are often spotted.

Habitat & North Carolina

Woodlands, gardens and fields; breeds in shallow ponds and pools. Mainly the Mountains and Piedmont; also parts of the northeastern Coastal Plain.

Food

Adults eat insects, worms and slugs; tadpoles graze algae and organic matter.

Life cycle

Eggs are laid in long jelly strings; aquatic tadpoles metamorphose into tiny land-dwelling toadlets.

Role in nature & with people

Controls garden pests and is prey for many animals; permeable skin makes amphibians sensitive to pollution.

Compare before deciding

Fowler's toads often have several warts per dark spot and a plainer belly. Southern toads, common in the Coastal Plain, have large knobs on their head ridges. Use several clues; individual toads and hybrids can be difficult.

Remember: Warty skin + often 1-2 warts per spot + spotted belly.

Bullfrog

Lithobates catesbeianus · scientific name is reference information



The long back folds are absent; a short fold curves around each eardrum.

P140 · Nell Cant · CC BY 4.0



Whole-body view of a bullfrog beside aquatic plants.

P141 · Creator not stated; uploaded by Ken Kneidel (kenkneidel) · CC0 1.0

Look for several clues

- Very large NC frog with a conspicuous round eardrum behind the eye.
- A skin fold curves around the eardrum; long raised folds do not run down the back.
- Green or brown body; males make a deep “jug-o-rum” call.

Habitat & North Carolina

Permanent ponds, lakes and slow rivers with vegetation. Found across NC.

Food

Almost any animal it can swallow: insects, crayfish, frogs, fish, small snakes and mice.

Life cycle

Egg masses float at the surface; tadpoles may take one to three years to metamorphose.

Role in nature & with people

Major aquatic predator and prey; can disrupt ecosystems where introduced outside its native range.

Compare before deciding

Green frog has dorsolateral folds that run partway down the back; bullfrog lacks them.

Remember: Largest NC frog + round eardrum + no long back folds.

Coach: Tadpoles may take one to three years to change into frogs. Most NC tadpoles spend one winter in the water; local conditions affect timing.

More views on the following page(s).

Bullfrog · closer looks

Tadpole with hind legs



A source-identified tadpole has grown hind legs but still has its swimming tail.

P142 · bamalachia · CC BY-NC-SA 4.0

Pine Barrens Treefrog

Dryophytes andersonii · scientific name is reference information



The pale-edged side stripe, toe pads and orange inner leg are visible.

P143 · Kevin · CC BY-NC 4.0



A breeding pair shows the same stripe pattern in another posture.

P144 · Kevin · CC BY-NC 4.0

Look for several clues

- Green treefrog with a purple-brown or lavender stripe from the snout through the eye and along each side.
- A pale border outlines the stripe. Hidden inner legs can show orange.
- Round toe pads help it climb.

Habitat & North Carolina

Acidic shrub bogs, pocosins and seepage areas. Sandhills and south-central Coastal Plain.

Food

Insects and other small invertebrates.

Life cycle

Eggs are laid in shallow acidic water; tadpoles develop in water and metamorphose into climbing adults.

Role in nature & with people

A specialized wetland predator and prey; habitat drainage and fire suppression threaten its habitat.

Compare before deciding

Green treefrog usually has a light side stripe but not the Pine Barrens frog's strong dark mask bordered in white.

Remember: Green frog + pale-bordered dark side stripe + toe pads.

NC symbol: NC State Frog

Coach: Color varies with lighting and posture. Orange belongs on the hidden legs, not a bright orange lip stripe.

Southern Leopard Frog

Lithobates sphenoccephalus · scientific name is reference information



Rounded body spots are clear; the pale eardrum spot is tiny in this view.

P145 · Joshua Liverman · CC BY 4.0

Raised pale folds run along a browner individual's back.

P146 · Amy Padgett · CC BY-NC 4.0

Look for several clues

- Green or brown frog with rounded dark spots, often outlined in pale color.
- Raised folds run from behind the eyes down each side of the back.
- A pale spot often appears in the center of the round eardrum.

Habitat & North Carolina

Marshes, ponds, wet fields and ditches; often forages on land near water. Mainly the Coastal Plain and Piedmont.

Food

Insects, spiders, worms and other small animals.

Life cycle

Egg masses often attach to vegetation just below the water surface; tadpoles metamorphose into spotted froglets.

Role in nature & with people

Controls insects and feeds fish, snakes, birds and mammals.

Compare before deciding

Pickerel frog has squarer spots in two neat rows and yellow-orange color inside the hind legs.

Remember: Leopard-like round spots + pale back folds.

Marbled Salamander

Ambystoma opacum · scientific name is reference information



Broad pale crossbands on a stocky black body.
P147 · Robby Deans · CC BY-NC 4.0



A female beside rounded eggs on land. This close view shows the eggs; the life-cycle text explains her care.
P148 · John P Clare · CC BY-NC-ND 2.0 Generic

Look for several clues

- Stocky black salamander with broad white or silvery crossbands.
- Bands are often whiter in males and grayer in females.
- Adults have lungs and no external gills. Aquatic larvae have gills.

Habitat & North Carolina

Forests near seasonal fish-free pools; adults spend much of the year underground or under logs. Found across NC.

Food

Worms, insects and other small invertebrates; larvae eat tiny aquatic animals.

Life cycle

In fall, lays eggs on land in a moist, unflooded seasonal-pool basin. The female may guard them. Flooding triggers hatching; larvae grow in water before becoming land-living juveniles.

Role in nature & with people

Predator and prey in forest-pool food webs; depends on both intact woods and temporary wetlands.

Compare before deciding

The two listed woodland salamanders hatch from land eggs without a swimming larval stage. Marbled salamanders need temporary water for their larvae.

Remember: Broad pale bands + fall nest + larvae in a seasonal pool.

NC symbol: NC State Salamander

Coach: “Dry pool” means not flooded, not dried-out eggs. Females may leave before flooding. This life cycle differs from most other mole salamanders.

Red-backed Salamander

Plethodon cinereus · scientific name is reference information



The striped form has a red-orange back stripe.

P149 · Shreybae · CC BY-NC 4.0

The lead-backed form lacks the red stripe.

P150 · Ty Smith · CC BY-NC 4.0

Look for several clues

- Small woodland salamander; one form has a red or orange stripe down a dark back.
- The lead-backed form lacks the red stripe.
- Belly is mottled black and white. It has no lungs and breathes through moist skin and mouth lining.

Habitat & North Carolina

Cool moist forests under logs, rocks and leaf litter; does not need a pond. Northwestern mountains, a small area of the central Piedmont, and much of the Coastal Plain.

Food

Mites, springtails, insects, worms and other tiny invertebrates.

Life cycle

Female guards eggs on land; young hatch as miniature adults with no free-swimming larval stage.

Role in nature & with people

Extremely important forest predator and prey; helps move energy through leaf-litter food webs.

Compare before deciding

A striped two-lined salamander is yellower and associated with streams; red-backed is a woodland *Plethodon*.

Remember: Tiny woodland salamander; red stripe or lead-gray form; direct development.

Coach: Do not infer exact species just from a red stripe. Similar woodland salamanders occur in NC; source identification and geographic context matter.

White-spotted Slimy Salamander

Plethodon cylindraceus · scientific name is reference information



Separate pale spots cover the back and sides.

P151 · Kevin Metcalf · CC BY-NC 4.0



Side grooves between the legs are clear. This unusual animal has very few spots; compare the other photo.

P152 · Henry Seilheimer · CC BY-NC 4.0

Look for several clues

- Black woodland salamander with many separate pale spots, rather than broad bands.
- Grooves run down the sides between the front and back legs.
- Lungless; makes sticky defensive slime when disturbed.

Habitat & North Carolina

Moist mature forests, ravines and rocky slopes under logs and stones. Piedmont and northern Blue Ridge; locality helps distinguish similar slimy salamanders.

Food

Insects, spiders, worms and other invertebrates.

Life cycle

Female guards eggs on land; young hatch as miniature adults without an aquatic larval stage.

Role in nature & with people

Forest-floor predator and prey; sensitive to drying and forest disturbance.

Compare before deciding

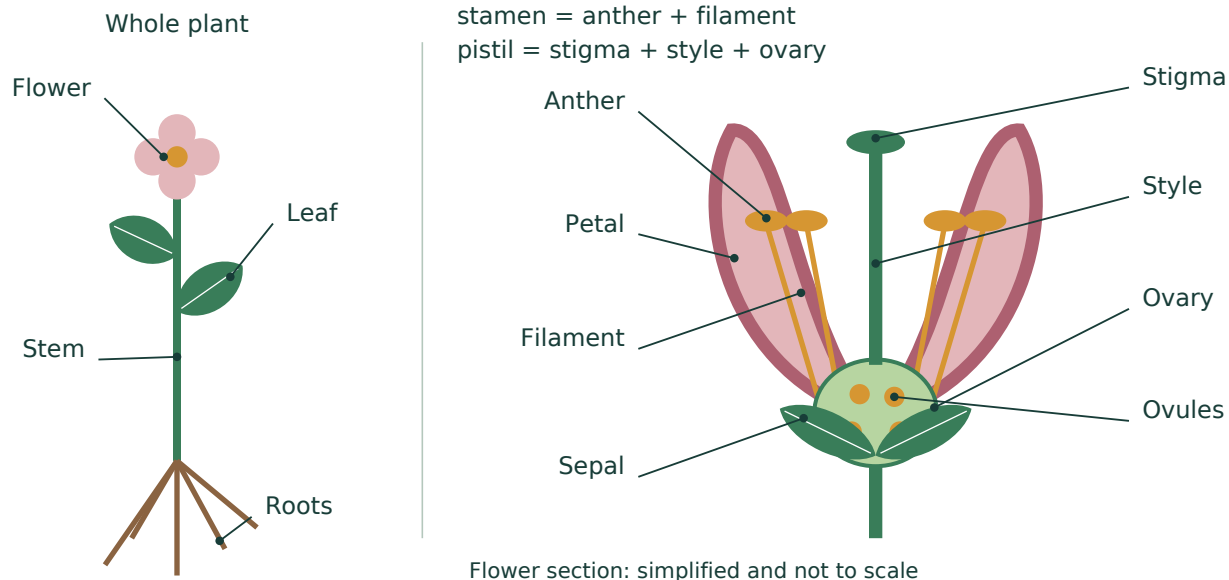
Marbled salamanders have broad pale bands. Several slimy-salamander relatives share white spots, so a general photo may not establish the exact species.

Remember: Black body dusted with white spots + sticky defensive slime.

Coach: Breathe through moist skin and mouth lining. Do not handle one to test slime. Exact species identification can require geographic or other evidence beyond visible spots.

Plant parts and flower parts

Look for a structure, then ask what job it does. A tree trunk is a woody stem.



The whole plant

Roots. Hold the plant in place; take in water and minerals. Some store food.

Stem. Supports leaves and flowers; carries water, minerals and sugars.

Leaves. Usually make most of the plant's sugar using light.

Flowers, fruits and seeds. Flowers take part in reproduction. Fruits surround seeds in flowering plants. A seed contains a young plant.

Inside a flower

Anther + filament = stamen. The anther makes pollen. The filament holds the anther up.

Stigma + style + ovary = pistil. The stigma receives pollen. The style links it to the ovary. Ovules lie inside the ovary.

After fertilization. An ovule develops into a seed. The ovary develops into a fruit.

Petals and sepals. Petals may attract pollinators. Sepals protect the flower bud.

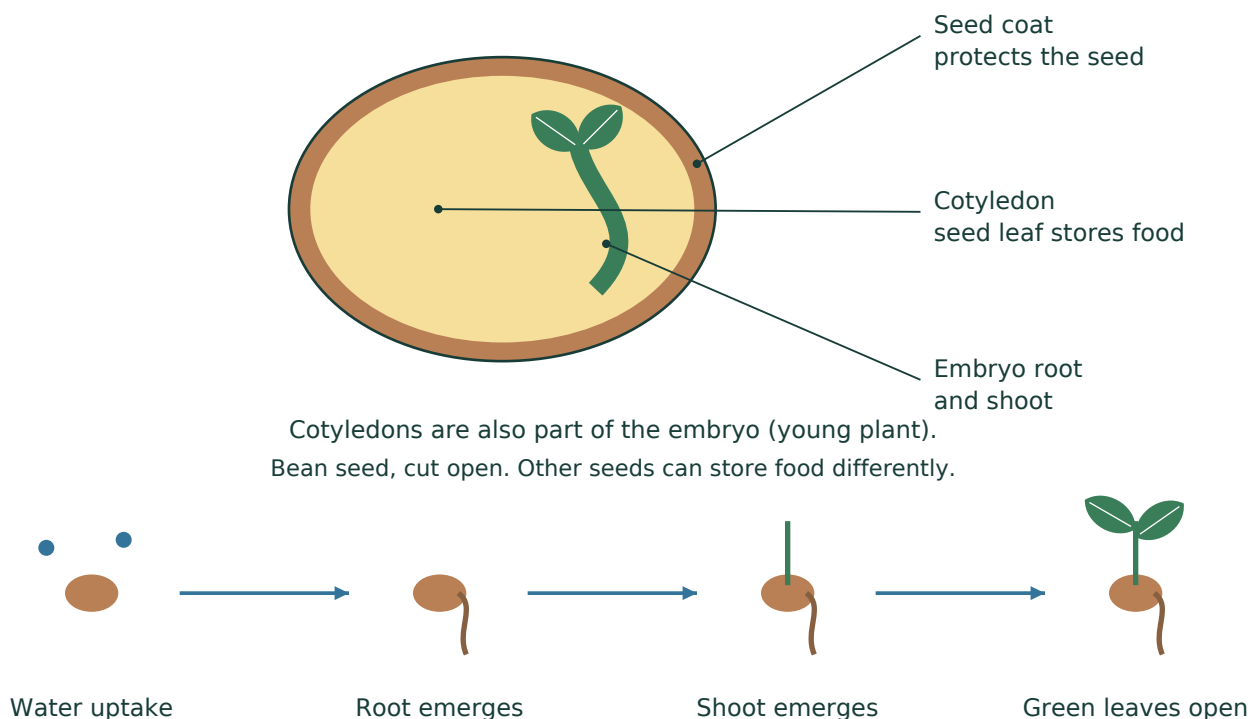
Use the evidence

If a flower loses its anthers before they release pollen, which job could be affected? Locate the pollen-making part in the diagram.

Coach: This is a model flower. Some flowers lack parts or have them joined. Lily petals and similar-looking sepals are called tepals. Some fruits also include other flower parts. Not every plant makes flowers.

A seed starts a new plant

Germination is the start of growth from a seed. The seedling first uses food stored in the seed.



Inside a bean seed

Seed coat. Protective outer covering.

Embryo. The young plant, including its early root, shoot and cotyledons (seed leaves).

Cotyledons. Seed leaves that hold stored food in this bean example. Other kinds of seeds store food differently.

What germination needs

A living seed needs water, oxygen and a suitable temperature. Some seeds also need particular light or dark conditions or a rest period. Needs differ among plants.

Use the evidence

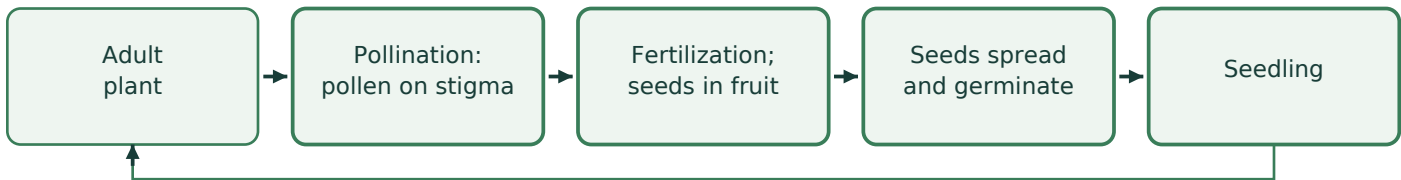
A seed in soaked, airless soil may fail even though it has water. What needed condition could be missing?

Coach: This bean example stores food in its cotyledons; other seeds differ. Seed reserves came from the parent plant. Seeds do not all sprout on the same day.

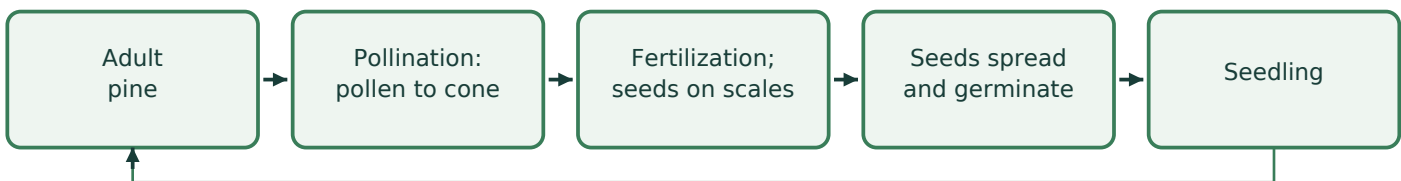
Flowers and pine cones: two seed cycles

Both flowering plants and pines make seeds. Pines do not make flowers or fruits.

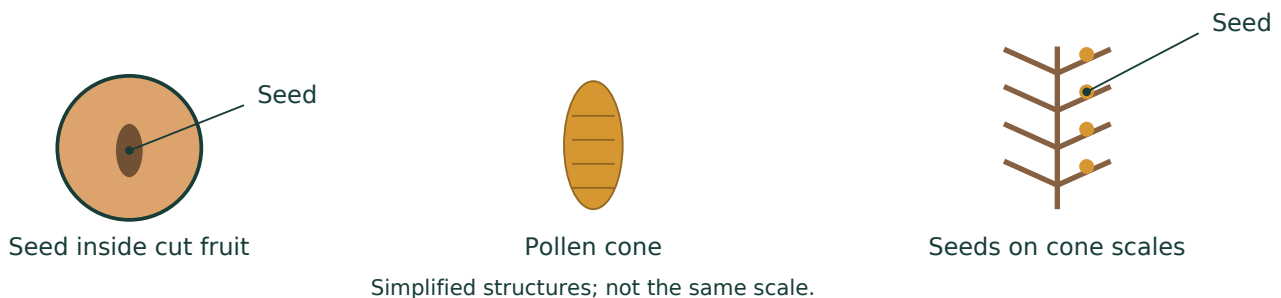
FLOWERING PLANT



PINE



5



Flowering plant

Pollen from anthers reaches a stigma. A pollen tube lets a sperm cell reach an egg in an ovule; their joining is fertilization. The ovule develops into a seed, and the ovary becomes a fruit.

Pine

Pollen cones release pollen that wind can carry to ovules on seed-cone scales. Fertilization occurs later. Seeds develop on those scales, outside any fruit. Released seeds can germinate, grow and eventually make cones.

Use the evidence

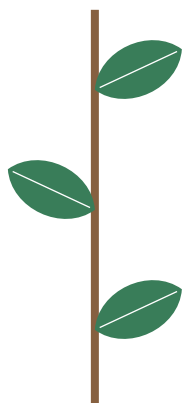
An acorn is a fruit with a seed inside. A pine cone is a seed-bearing structure, not a fruit. Where does each plant protect or carry its seeds?

Coach: Times differ by plant; these arrows do not mean each stage lasts one day. Pollination and fertilization are separate steps.

Read a leaf with its twig

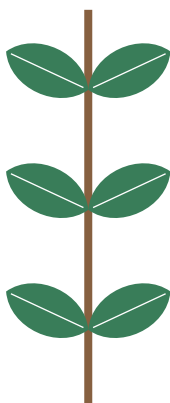
A detached blade may hide useful evidence. Find where the whole leaf joins a twig. These models compare leaf arrangement, structure and edges.

ALTERNATE



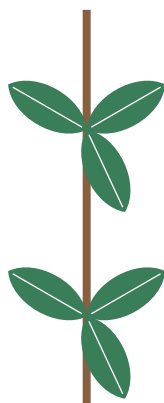
One leaf per node

OPPOSITE



Two leaves per node

WHORLED

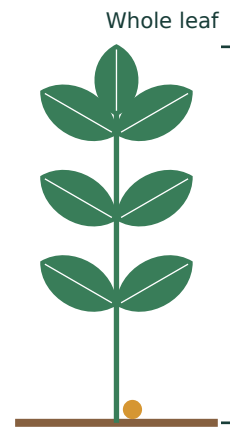
Three or more leaves
per node

SIMPLE, LOBED



One lobed blade

COMPOUND

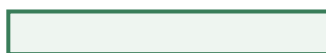


Separate leaflets

Brown = twig. Gold dot = bud beside the base of a whole leaf.

EDGE MODELS

→ toward leaf tip



Entire: no teeth

→ toward leaf tip



Serrated: sawlike teeth

Whole leaf or leaflet?

Simple leaf. One blade. Deep lobes can still belong to one simple leaf, as in many oaks.

Compound leaf. One leaf has separate leaflets. Hickory is an example.

Axillary bud. A bud where a whole leaf meets the twig helps locate the leaf boundary. Leaflets do not each have a twig bud at their bases.

Edge and shape

Entire means no teeth. Serrated means sawlike teeth. Lobed means large outward sections with dips between them; a lobe is not a separate leaflet.

Use the evidence

Ask for the twig and leaf base when a detached piece cannot show whether it is a whole leaf or one leaflet.

Light helps plants make sugar

Photosynthesis uses light energy to make sugars from water and carbon dioxide. Oxygen is released.

Follow the inputs

Light. Supplies energy. Green chlorophyll helps capture it.

Water. Usually enters through roots.

Carbon dioxide. A gas that enters through small openings, often in leaves.

Sugar. Stores energy and supplies material for growth. Plants can store some as starch.

Plants also use oxygen

Plant cells use sugars and oxygen in respiration to release energy for life. This happens in roots as well as other living parts, during day and night.

A flytrap is still a green plant

A Venus flytrap gets mineral nutrients from prey and makes sugars by photosynthesis. Captured insects do not replace light. Prey is not its main energy source.

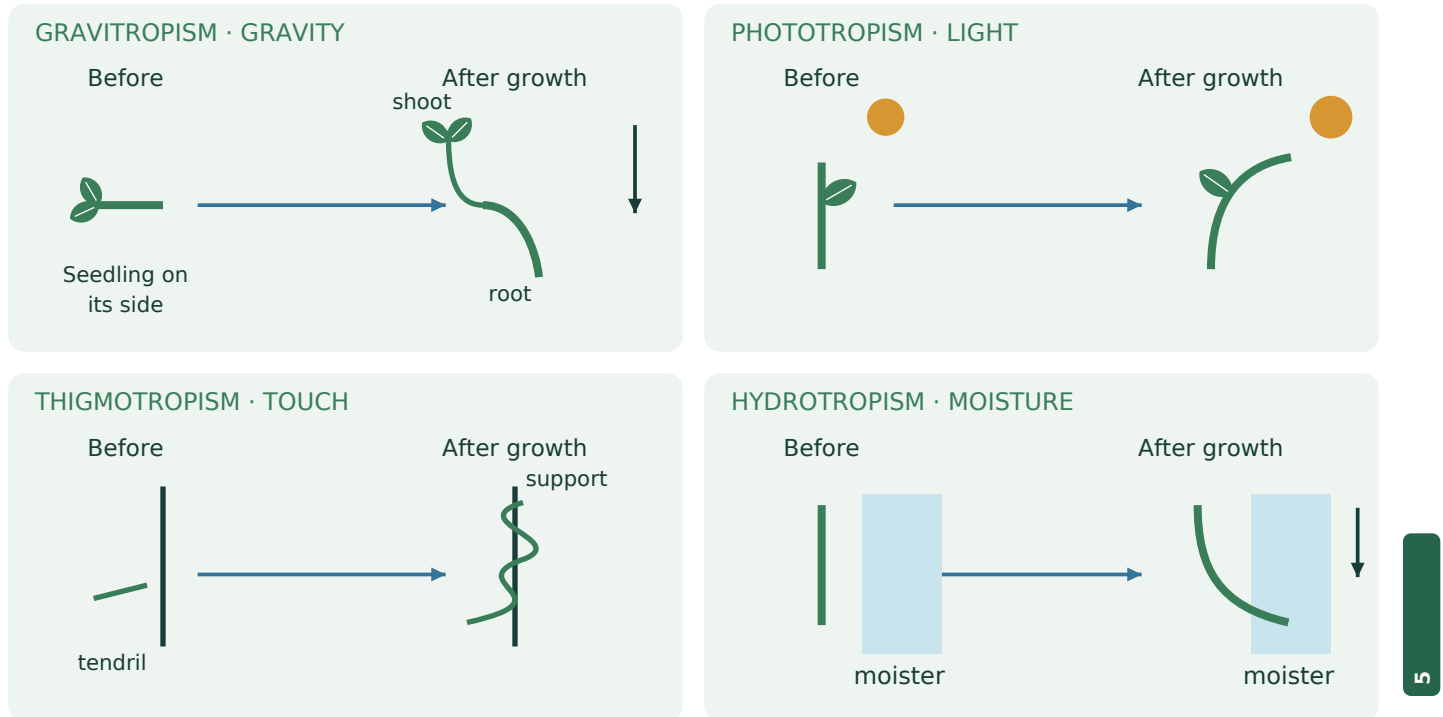
Use the evidence

A green plant stays in a dark cupboard. Adding fertilizer does not restore the missing light. Explain which process still lacks its energy source.

Coach: Chemical equations are not required by this event. Avoid saying prey supplies absolutely no carbon or energy.

Four ways plants grow in response

A tropism is growth toward or away from a stimulus. Compare the same part before and after growth.



Touch → rapid flytrap closure: movement, not a tropism.

Responses can work together

Roots commonly grow downward and shoots upward in response to gravity. Roots can also grow toward moisture. Name the stimulus, then use the before-and-after views to describe growth relative to it.

Use the evidence

If both gravity and moisture could explain a root's direction, what extra comparison would help? Change the moisture pattern while keeping the plant's position alike.

Coach: Rapid flytrap closure is not directional growth. Hydrotropism uses prepared evidence here, not a tested classroom procedure; visible change in one meeting is not promised.

Reptile or amphibian?

Use several traits. Having four legs cannot settle the question: salamanders have legs, and eastern glass lizards do not.

Compare the groups

Reptiles on our list. Alligator, lizards, snakes and turtles. Skin has scales or scutes. All breathe with lungs.

Amphibians on our list. Frogs, a toad and salamanders. Skin allows water and gases to pass through more readily. Many have aquatic larvae.

Eggs and young. Listed turtles, alligator and lizards lay eggs on land. Some listed snakes have live young. Frogs have tadpoles; two listed salamanders develop directly in land eggs.

Body temperature. Both groups are ectotherms. Outside heat strongly affects body temperature. Moving into sun, shade or shelter helps them regulate it.

Moisture matters

Many amphibians need damp places for skin and eggs. Reptiles still need water; their skin reduces water loss better.

Use the evidence

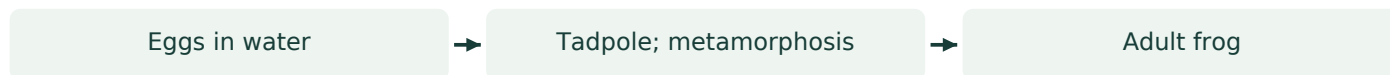
A legless animal has movable eyelids and external ear openings. These support a lizard identification, not a snake. Use its other features to choose the species.

Coach: Ectotherms do not have exactly the same temperature as the air at every moment. Lungless salamanders exchange gases through skin and mouth tissues.

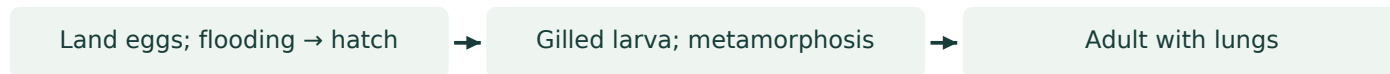
Five paths from young to adult

Eggs, birth and metamorphosis are different steps. Use the named example rather than one rule for every animal.

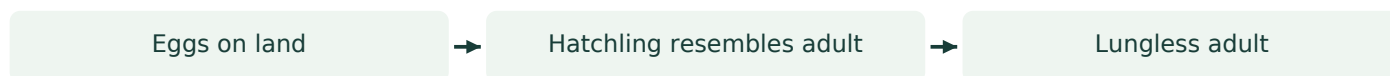
Frog



Marbled salamander



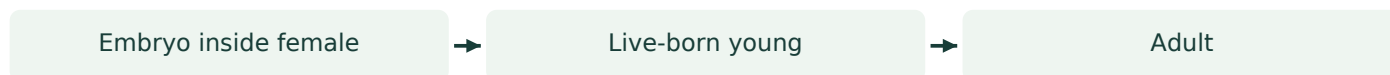
Red-backed and white-spotted slimy salamanders



Egg-laying reptile



Live-bearing reptile



Read each path

Frog or toad. Eggs in water → tadpole with gills → legs grow and tail is absorbed → young frog or toad → adult.

Marbled salamander. Eggs in a damp nest on land → flooding allows aquatic larvae to hatch → gilled larvae grow → metamorphosis → land adult with lungs.

Red-backed and white-spotted slimy salamanders. Eggs in damp places on land → small salamanders hatch → adults. No free-swimming larval stage; these species are lungless.

Egg-laying reptiles. Eggs → hatchlings → juveniles → adults. Listed turtles, alligator and lizards follow this route, as do some listed snakes.

Live-bearing snakes. Young develop inside the mother → live birth → juveniles → adults. Copperhead is one listed example.

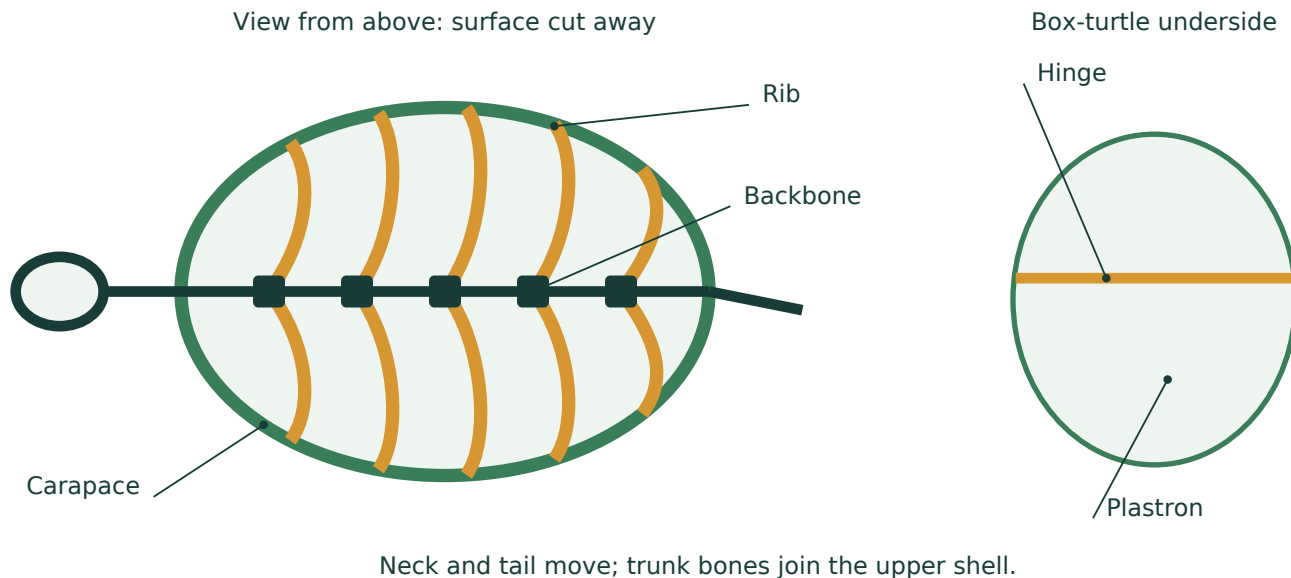
Use the evidence

Protecting only adult habitat can miss a nursery. Which animal in the chart needs a seasonal pool even though its eggs begin on land?

Coach: A female marbled salamander may stay with her eggs; nest attendance varies. Direct development happens within the egg. Young reptiles can have different colors and diets from adults.

A turtle grows its shell

A shell is living body structure and part of the skeleton. It is not a house a turtle can leave.



Shell words

Carapace. Upper part of the shell.

Plastron. Lower part of the shell.

Ribs and trunk backbone. Joined with the upper shell. The neck and tail can still move.

Scutes. Outer plates covering the shells of the listed turtles. They cover bone beneath.

Box turtle hinge. A joint in the plastron lets an adult box turtle close much of its shell. Other listed turtles do not close this way.

Growth and protection

The shell grows with the turtle. A snapping turtle has a small plastron and cannot tuck all of its body inside. Shell size and shape alone do not show whether a turtle lives mostly on land or in water.

Use the evidence

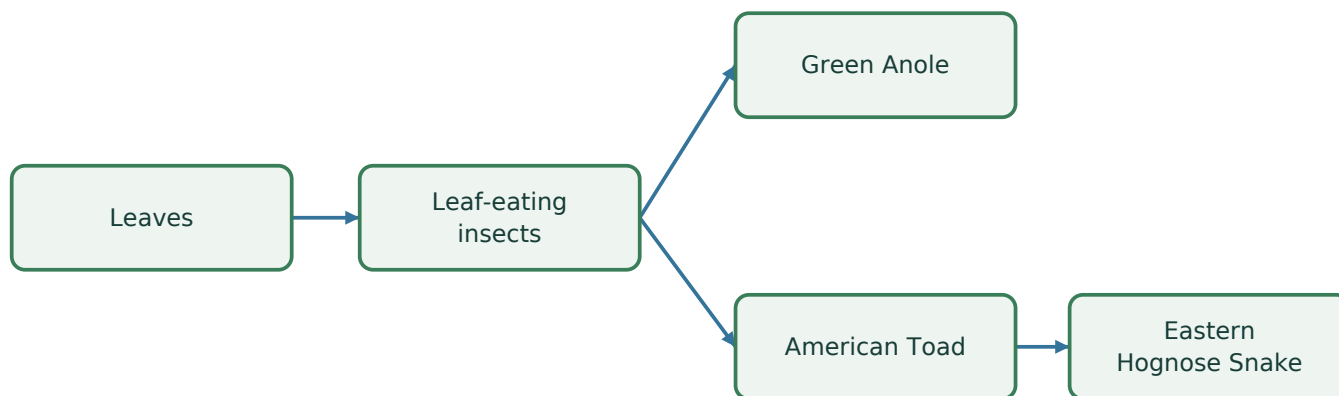
Explain why removing a turtle's shell would injure it. Point to its connection with the skeleton.

Coach: The hinge is an Eastern Box Turtle example, not a feature of every turtle. Neck and tail movement does not mean the trunk backbone is separate from the shell.

Food webs connect wildlife and people

An arrow points from food to the animal that eats it. The diagram shows some feeding links, not every meal.

Arrows point from food to the animal that eats it.



This model shows some feeding links, not everything each animal eats.

Read the food web

Plant leaves → leaf-eating insects. Plants make sugars. Some insects eat plant tissue.

Insects → American toad and green anole. Both animals eat insects; their diets include other small animals too.

Toads → Eastern hognose snake. Toads are this snake's main prey. An animal can be both predator and prey.

How animals affect people

Insect-eating animals and rodent-eating snakes can help limit pests. Wildlife also supports food webs and outdoor learning. Venomous snakes can injure people who approach or handle them. Watch wild animals from a distance.

How people affect animals

Removing damp cover, draining pools, roads and polluted water can harm wildlife. Keeping connected habitat and clean water helps. Leave wild animals in their habitats.

Use the evidence

If insects decline, toads may have less food, and hognose snakes may be affected later. This is a prediction, not a certainty. Check other foods and habitat changes too.

Coach: The web uses supported prey groups. The supporting insects and plant leaves are food-web examples, not added identification entries.

What a garden plant needs

Match care to the kind of plant. More water, sun or fertilizer is not always better.

Need → job

Light. Supplies energy for photosynthesis. Shade plants can scorch in intense sun.

Water. Keeps cells firm and helps carry minerals. Roots also need air.

Air. Leaves use carbon dioxide. Living roots use oxygen in respiration.

Soil or growing medium. Holds roots and provides spaces for water and air. Soil conditions affect mineral supply.

Mineral nutrients. Help build and run plant cells. They are different from sugars made with light.

Suitable temperature. Supports growth. Heat, frost or cold roots may slow or harm a plant.

Space. Reduces competition for light, water, minerals and root room.

A special case: cultivated Venus flytrap

Use the bright light and low-mineral, moist growing conditions recommended for this plant. Use rainwater or distilled water; do not add fertilizer. Ordinary rich potting soil is unsuitable. Use nursery-grown plants.

Use the evidence

A pot can hold wet soil but too little air. Explain why adding more water may worsen that problem.

Diagnose before you change care

A symptom can have several causes. Combine soil moisture, light, leaf changes, root condition and recent care.

Observation → possible cause → next check

Wilted; soil dry. Too little water may be reaching roots. Check moisture below the surface and how water drains.

Wilted; soil stays wet. Roots may lack oxygen. Check drainage and root condition before adding water.

Pale, stretched shoots. Too little light is possible. Compare light levels and the plant's needs.

Scorched patches after a move. Sudden strong light or heat may be involved. Check exposure and provide suitable conditions.

Yellow leaves or slow growth. Nutrients, root damage, water or other causes may be involved. Check conditions before fertilizing.

Brown edges after fertilizer. Excess salts may injure roots. Stop adding fertilizer; ask an adult to check the label and drainage.

Crowded, weak plants. Competition may limit light, water or minerals. Compare with well-spaced plants.

Build an explanation

“Overwatering is possible because the plant is wilted while its soil is wet. I would check drainage and roots next.” State a supported possibility, not a diagnosis from color alone.

Coach: These are clues for reasoning, not universal treatments. A soil test can help identify nutrient and pH problems.

Minerals, sugars and fertilizer

Plants make sugars. Fertilizer adds mineral nutrients; it cannot replace light or repair every plant problem.

Three familiar nutrients

Nitrogen: N. Used in proteins and chlorophyll. A shortage can slow growth and yellow older leaves.

Phosphorus: P. Helps energy transfer and growth. Low supply can limit growth; purple leaves can also have other causes.

Potassium: K. Helps water balance and many cell processes. Brown leaf edges alone do not prove a shortage.

Use evidence before adding more

Read the plant's needs and test soil when appropriate. Too much fertilizer can harm roots and wash into waterways. Correct poor light, drainage or damaged roots rather than adding nutrients by guesswork.

Plant and animal nutrition

Green plants use light to build sugars. Animals get energy and body-building materials by eating. Herbivores eat plants; carnivores eat animals; omnivores eat both. A diet may change as an animal grows.

Use the evidence

Explain why a flytrap still needs light after catching an insect, and why a young slider may eat a different mix of foods from an adult.

Competition and fair tests

Plants can compete above and below the soil. A fair test helps us separate possible causes.

Competition

Leaves may shade neighbors. Roots may compete for water, minerals and room. Invasive vines can cover other plants and reduce their light.

Plan a test

Ask one question. For example: how does the amount of light affect these seedlings?

Change one factor. This is the independent variable. Use safe, suitable conditions.

Measure an outcome. This is the dependent variable: leaf number or growth in centimeters, for example.

Keep other factors alike. Use the same plant type, age, pots, soil, watering, temperature and length of time.

Use a comparison group. Keep it under the usual suitable conditions. Test several plants in each group if possible.

Record and repeat. Measure the same way, note units and compare patterns. One sick plant is weak evidence.

Use the evidence

If one group gets less light and less water, a growth difference cannot tell you which change caused it.

Coach: This is a planning model. No classroom growth results or timing have been measured for this guide.

Plant words to look up

Use these meanings with the diagrams and full profiles.

Structures and stages

Bud. A small growing point that may form a shoot or flower.

Catkin. A cluster of small flowers, often narrow and hanging.

Compound leaf. One whole leaf divided into leaflets.

Drupe. A fleshy fruit with a hard inner stone around a seed.

Evergreen / deciduous. Evergreen plants keep leaves through the year, but still replace them. Deciduous plants shed their leaves for a season.

Fertilization. Joining of reproductive cells; in a plant, this can start seed development.

Germination. Beginning of growth from a seed.

Lobe / leaflet. A lobe is part of one blade. A leaflet is a separate blade within a compound leaf.

Margin. The edge of a leaf.

Node / petiole. A node is where a leaf joins a stem. A petiole is a leaf stalk.

Ovule / ovary. An ovule can become a seed. A flower's ovary surrounds ovules and can become fruit.

Pollination. Transfer of pollen to a flower's stigma or to a seed cone.

Samara. A dry winged fruit, such as a maple helicopter.

Tendrill. A slender plant part that can coil around a support.

Tepal. A flower part used when petals and sepals look alike, as in lilies.

Growth and ecology words

Explain an unfamiliar example with the same idea, not only a memorized word.

Processes and relationships

Chlorophyll. Green pigment that helps capture light energy.

Nastic movement. A movement whose direction does not depend on the direction of the stimulus; flytrap closure is an example.

Photosynthesis. Using light to make sugars from water and carbon dioxide.

Phloem / xylem. Phloem carries sugars to parts that use or store them. Xylem carries water and minerals, mainly upward from roots.

Respiration. Cells release usable energy from food; plants do this too.

Stomata. Tiny openings that help control gas exchange and water loss.

Stimulus / tropism. A stimulus is a signal such as light or touch. A tropism is directional growth in response.

Abiotic / biotic. Abiotic means nonliving, such as water or temperature. Biotic means living, such as a competitor.

Habitat. A place and its conditions that meet an organism's needs.

Native / introduced. Native means occurring naturally in a region. Introduced means brought there by people, on purpose or by accident.

Invasive. An introduced organism whose spread causes harm. Introduced does not always mean invasive.

Pocosin. A type of shrub wetland found in the Coastal Plain.

Predator / prey. A predator eats another animal; that animal is its prey.

Producer / consumer. A producer makes food, usually with light. A consumer gets food by eating other organisms.

Evidence / inference. Evidence is what is observed or measured. An inference is an explanation drawn from it.

Animal words and safety words

Use close-up features only in provided photographs or known specimens. Never approach wildlife to inspect them.

Bodies and life stages

Carapace / plastron. The upper / lower parts of a turtle's shell.

Clutch. A group of eggs laid at one time.

Costal grooves. Vertical grooves along a salamander's sides, between the rib areas.

Direct development. Young develop in the egg and hatch looking like small adults, without a free-living larval stage.

Dorsolateral fold. A raised skin fold along the upper side of a frog's back.

Ectotherm. An animal whose body temperature is strongly affected by outside heat.

Facial pit. Heat-sensing opening between the eye and nostril in a pit viper.

Keeled scale. A scale with a raised ridge down its center.

Larva / metamorphosis. A larva is an early stage, such as a tadpole. Metamorphosis is the major change into a different body form.

Parotoid gland. A raised gland behind a toad's eye that produces defensive chemicals.

Scute. A large plate-like outer scale, as on the listed turtles' shells.

Venomous / poisonous. Venom is delivered into another animal, often by a bite or sting. Poison harms when taken in or contacted. Neither word makes an animal safe to handle.

Urushiol. The oil in poison ivy that can cause an itchy skin rash.

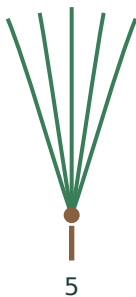
Coach: Urushiol refers to a plant chemical, included here to keep safety vocabulary easy to find.

QUICK COMPARISONS

Compare the four listed pines

Count needles from one intact bundle. Then check a cone and the bark. Measurements are approximate. Cone measurements refer to mature seed cones.

Eastern White Pine



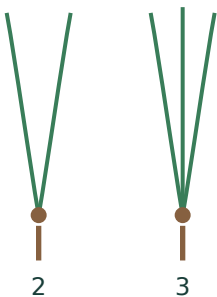
Loblolly Pine



Longleaf Pine



Shortleaf Pine



Bundle models, not photographs or size scales. Count needles at one shared base.

Compare the evidence

Eastern White Pine	Usually 5 soft needles per bundle, about 3–5 inches long. Cones are slender, about 3–8 inches, without sharp prickles. Bark becomes furrowed with age.
Shortleaf Pine	Usually 2 or 3 needles, about 3–5 inches. Small cones, about 1.5–2.5 inches. Mature bark plates may show resin pits. Needle lengths overlap white pine.
Loblolly Pine	Usually 3 fairly stiff needles, about 6–9 inches. Cones about 3–6 inches with prickly scale tips. Mature bark has thick plates and deep grooves.
Longleaf Pine	Usually 3 very long needles, about 8–18 inches, in dense tufts. Large cones, about 6–10 inches. Young plants can spend years in a low grass stage.

Use the evidence

A three-needle bundle alone does not separate shortleaf, loblolly and longleaf. Request cone size or another useful view. A picture without a known scale cannot prove length.

Coach: Pine is the generic state-tree designation. Longleaf is its statutory emblem. These are typical ranges, not fixed boundaries; age and growing conditions change appearance.

Compare the nine listed snakes

Use supplied photos. Never approach a snake to check its eyes, pits or scales. No one color or head shape makes an identification certain.

Compare the evidence

Copperhead	Brown hourglass bands usually narrow across the back and widen at the sides. Young often have a yellow-green tail tip. Venomous; live young.
Cottonmouth	Heavy body; visible bands are narrower across the back. Adults may look very dark. A clear photo can show a facial pit. Venomous; live young.
Eastern Diamondback Rattlesnake	Large, cream-edged dark diamonds and a rattle. Diamonds fade or become dark bands on a brown/gray tail; a black-and-white zebra rule is unreliable. Venomous; live young.
Banded Water Snake	Bands tend to be wider across the back. Belly has dark squarish spots. Eye stripe and widened defensive head can resemble cottonmouth. Live young.
Black Rat Snake	Many NC adults are black; young are blotched. Slightly keeled scales and a checkered belly help. A white chin also occurs in racers. Constrictor; eggs.
Dekay's Brownsnake	Small, brown or gray; often a pale middle stripe bordered by paired dark spots. Check body pattern and scale texture. Live young.
Eastern Garter Snake	Usually three lengthwise pale stripes, often with dark checks between them. Pattern varies. Live young.
Eastern Hognose Snake	Upturned snout; color may be blotched or nearly black. A flattened neck is defensive behavior, not proof of a cobra or pit viper. Eggs.
Eastern Kingsnake	Typical NC form is glossy dark with pale chainlike bands. Smooth scales; a constrictor. Eggs. Dark regional forms need extra context.

Use the evidence

An eye stripe, wet habitat or triangular-looking head is not enough to choose cottonmouth over water snake. If the needed evidence is hidden, say what view is missing.

Coach: The three venomous species named here are those on this roster, not all venomous snakes in NC. “Not medically dangerous to people” is not an invitation to handle an animal.

Compare the five listed turtles

Look at the shell, head, legs and tail together. A wetland location alone cannot name a turtle.

Compare the evidence

Painted Turtle	Low, smooth dark shell, with red along the shell edge and yellow head stripes. In the eastern form common in NC, central shell plates line up across the back.
Snapping Turtle	Large head, long saw-edged tail and a small lower shell. The back edge of the upper shell is jagged. Young have more noticeable shell ridges than old adults.
Spotted Turtle	Small, smooth dark shell with separate yellow spots. Head may also have spots. The number of spots varies; some can be faint or absent.
Eastern Box Turtle	High domed shell; yellow or orange markings vary. A hinged lower shell helps an adult close up. Mostly a land turtle, not a tortoise.
Yellow-bellied Slider	Broad yellow cheek patch behind the eye and a yellow lower shell, often with dark spots. Older males can darken enough to hide bright markings.

Use the evidence

All five lay eggs on land, including those that spend much of their lives in water. Ask for a head or lower-shell photo if the upper shell alone is not enough.

Coach: Painted Turtle is a species-level event entry; do not present one regional form's scute alignment as universal.

Compare the four frog/toad entries

Toads are frogs too. The event lists four frog/toad entries in total. Use markings and body structures together.

Compare the evidence

American Toad	Bumpy skin, often 1-2 large warts per dark back spot. Large parotoid glands behind the eyes. Chest and belly often spotted.
Bullfrog	Large body and visible round eardrum. A fold curves around the eardrum; it does not continue as a pair of long folds down the back.
Pine Barrens Treefrog	Toe pads; green body with a pale-bordered dark stripe along each side. Orange or yellow occurs on hidden inner-leg areas, not as the main upper-lip clue.
Southern Leopard Frog	Dark rounded spots on green or brown; pale raised folds run down the back. Often a small pale spot in the eardrum. Long hind legs.

Use the evidence

All four have aquatic tadpoles. A photo must show the relevant fold, stripe or gland; “green frog” is not enough.

Coach: Color, size and markings vary. These comparisons separate listed entries with adequate evidence; they do not identify every frog in the wild.

Compare the three salamanders

All need suitable moist shelter. Their bodies and life cycles give different kinds of evidence.

Compare the evidence

Marbled Salamander	Stocky, with broad pale bands across a dark body. Adults have lungs. Eggs begin in a damp land nest; flooding allows aquatic, gilled larvae to hatch.
Red-backed Salamander	Small and slender. One form has a red or orange back stripe; the lead-backed form lacks it. Belly is mottled. Lungless; land eggs and direct development.
White-spotted Slimy Salamander	Dark body with many separate pale spots and side grooves. Lungless; land eggs and direct development. Similar slimy salamander species require geographic/source context.

Use the evidence

Broad bands, a stripe and separate spots are useful comparisons, but a dark unstriped photo may need a belly view and source information. Do not handle a salamander to test its slime.

Coach: Use verified locality or a source-established identity for the white-spotted slimy salamander. A generic black salamander with white dots is not species proof.

Compare the four listed lizards

All four lay eggs and breathe with lungs. One has no legs. Smooth-looking and rough-looking scales are useful only when a photo resolves them.

Compare the evidence

Eastern Fence Lizard	Rough, spiny scales and dark wavy crossbars. Often gray or brown. Adult males may show blue belly and throat patches.
Eastern Glass Lizard	Legless, with a very long tail. A clear head view can show an external ear opening and movable eyelid. These separate lizards from snakes, not every glass lizard species.
Green Anole	Can be green or brown. Toe pads help climbing; a throat fan may be visible. Scales look finer and smoother than a fence lizard's.
Southeastern Five-lined Skink	Young have five pale stripes and a blue tail; adults can lose strong colors. Tail-underside scales are about equal in size, unlike close relatives with an enlarged middle row.

Use the evidence

A blue tail and five stripes fit more than one skink species. Without a good underside view, rely on a verified source identification or state that evidence is insufficient.

Coach: An ear opening and eyelid support “lizard,” not necessarily “Eastern Glass Lizard.” Never collect animals for these close views.

Four vines: leaves and climbing parts

Compare the whole leaf and the way the plant climbs. Use photographs for poison ivy and unfamiliar vines.

Compare the evidence

Eastern Poison Ivy	Each leaf has three leaflets of variable shape. Climbing stems attach by many aerial rootlets and can look hairy. Pale fruits. Urushiol can cause a rash.
Kudzu	Each leaf also has three leaflets, often large or lobed. Stems twine around supports; young stems are hairy. Hairiness alone does not separate it from poison ivy.
English Ivy	A simple leaf, often lobed on climbing shoots; adult flowering shoots have unlobed leaves. Attaches by rootlets. Evergreen; mature plants make dark fruits.
Scuppernong Grape	Simple, toothed, broadly rounded leaves. Climbs with simple, unforked tendrils. Bark stays tight rather than peeling in strips. Correctly identified ripe Scuppernong fruit is bronze.

Use the evidence

Three leaflets alone cannot settle poison ivy versus kudzu. Request the whole leaf, its attachment, and a clear climbing-stem view.

Coach: Scuppernong is a cultivated muscadine selection; an unripe green grape photograph cannot establish that cultivar.

Bark clues need leaf clues

Two listed trees shed bark in sheets or patches. Another has notably smooth bark. Always check leaves or seeds too.

Compare the evidence

Crepe Myrtle	Smooth-looking, patchy peeling bark. Simple leaves usually attach opposite, with smooth edges; upper leaves may vary. Dry seed capsules.
River Birch	Papery curls or sheets of bark, especially on younger trunks. Alternate leaves with double-toothed edges. Small seeds come from seed-bearing catkins.
American Beech	Usually smooth gray bark that does not peel like river birch. Alternate, toothed leaves with straight side veins; bristly husks enclose nuts.

Use the evidence

Bark changes with age. A close-up patch without leaf, branch or seed context may be insufficient.

Coach: Crepe Myrtle is a genus-level entry. These features describe the common *Lagerstroemia indica* example; use qualified comparisons for other representatives.

Black gum, sweetgum and red maple

Similar names or autumn colors are not enough. Leaf shape, twig arrangement and fruits work together.

Compare the evidence

Black Gum	Simple, usually unlobed leaves with mostly smooth edges; alternate on twigs. Small dark fleshy fruits. Mature bark often forms blocky plates.
Sweetgum	Simple star-shaped leaves with pointed lobes; alternate on twigs. Round, spiky fruit clusters hold many small seeds.
Red Maple	Simple leaves, usually with 3-5 lobes; opposite on twigs. Paired winged fruits called samaras. Red color can appear in several plant parts.

Use the evidence

Ask for a twig when leaf arrangement is missing. Sweetgum's “gumball” and maple's “helicopter” are fruits, not bare seeds.

Coach: The FAQ identifies Black Gum as *Nyssa sylvatica*. Neither a red autumn leaf nor the word “gum” establishes the species.

Plant traits at a glance

These are selected listed examples, not a complete key. Genus-level entries can include several kinds of plants.

Compare the evidence

Compound leaves	Hickory; Eastern Poison Ivy; Kudzu. Poison ivy and kudzu have three leaflets per leaf.
Opposite leaves	Red Maple; commonly Crepe Myrtle, with some arrangement variation.
Evergreen needles	Eastern White Pine, Loblolly Pine, Longleaf Pine, Shortleaf Pine.
Evergreen broad leaves	English Ivy; the Southern Magnolia specified by the event's Magnolia reference name.
Winged fruits	Red Maple has paired samaras. A fruit can be dry.
Nuts and seeds	Oak acorns and hickory nuts are fruits containing seeds. Pine seeds develop on cone scales, not in fruit.
Introduced examples	Bradford Pear / Callery Pear, Crepe Myrtle, English Ivy and Kudzu. Introduced is not automatically invasive.
Native-status limits	Oak and Hickory are broad entries: check the actual representative species. Scuppernong is a cultivated selection of a native grape species.

Use the evidence

A species can be native without being a state symbol. It can be planted in NC without being native. Check each question separately.

Animal traits at a glance

These groups apply to this event roster. Use the full profiles for appearance, habitat, diet and exceptions.

Compare the evidence

Live young: six snakes	Copperhead; Cottonmouth; Eastern Diamondback Rattlesnake; Banded Water Snake; Dekay's Brownsnake; Eastern Garter Snake.
Eggs: other listed reptiles	Black Rat Snake, Eastern Hognose Snake and Eastern Kingsnake; all four listed lizards; all five listed turtles; American Alligator.
Venomous snakes on the roster	Copperhead, Cottonmouth and Eastern Diamondback Rattlesnake. This is not a complete list of NC's venomous snakes.
Constrictors	Black Rat Snake and Eastern Kingsnake squeeze prey. Not every snake uses this feeding method.
Lungless, direct development	Red-backed Salamander and White-spotted Slimy Salamander. Moist skin and land nesting sites matter.
Aquatic larvae	All four listed frogs/toad; Marbled Salamander. Adults may use land, but their larvae need water.
Diet changes	Many turtles eat both animal and plant foods. Yellow-bellied Sliders commonly eat more plant material as they mature.
A legless lizard	Eastern Glass Lizard. Legs alone cannot define reptile groups.

Use the evidence

For an unfamiliar life-cycle question, name the species before applying a group shortcut.

Image credits

Keep these pages with the guide. Full identity checks, source notes and originals are in the coach companion.

P-numbers match the pictures. Source and license links are printed below. Photographs are reproduced without cropping or retouching; PDF encoding resizes and compresses images. Published figure excerpts are identified. Some licenses permit noncommercial use only.

- L1: CC BY 2.0** · <https://creativecommons.org/licenses/by/2.0/>
- L2: CC BY 4.0** · <https://creativecommons.org/licenses/by/4.0/>
- L3: CC BY-SA 4.0** · <https://creativecommons.org/licenses/by-sa/4.0/>
- L4: CC BY-NC-ND 4.0** · <https://creativecommons.org/licenses/by-nc-nd/4.0/>
- L5: Public domain (federal publication figure; no third-party credit)** · <https://www.usa.gov/government-copyright>
- L6: CC BY-NC 2.0** · <https://creativecommons.org/licenses/by-nc/2.0/>
- L7: CC BY-SA 3.0 RS** · <https://creativecommons.org/licenses/by-sa/3.0/rs/>
- L8: CC BY-SA 2.0** · <https://creativecommons.org/licenses/by-sa/2.0/>
- L9: Public domain (U.S. government work)** · <https://creativecommons.org/publicdomain/mark/1.0/>
- L10: CC BY-SA 3.0 Unported** · <https://creativecommons.org/licenses/by-sa/3.0/>
- L11: CC BY-NC 4.0** · <https://creativecommons.org/licenses/by-nc/4.0/>
- L12: CC0 1.0** · <https://creativecommons.org/publicdomain/zero/1.0/>
- L13: Public Domain Mark 1.0** · <https://creativecommons.org/publicdomain/mark/1.0/>
- L14: CC BY-SA 3.0** · <https://creativecommons.org/licenses/by-sa/3.0/>
- L15: CC BY-NC-SA 2.0** · <https://creativecommons.org/licenses/by-nc-sa/2.0/>
- L16: Public domain (published 1891)** · <https://creativecommons.org/publicdomain/mark/1.0/>
- L17: CC-BY-SA 2.0** · <https://creativecommons.org/licenses/by-sa/2.0/>
- L18: CC0** · <https://creativecommons.org/about/cc0/>
- L19: CC BY-SA 2.5 Generic** · <https://creativecommons.org/licenses/by-sa/2.5/>
- L20: CC BY 2.0 Generic** · <https://creativecommons.org/licenses/by/2.0/>
- L21: Public domain (U.S. federal work; PDM 1.0)** · <https://creativecommons.org/publicdomain/mark/1.0/>
- L22: CC BY-NC-SA 4.0** · <https://creativecommons.org/licenses/by-nc-sa/4.0/>
- L23: CC BY-NC-ND 2.0 Generic** · <https://creativecommons.org/licenses/by-nc-nd/2.0/>

Image credits · source list

P1 · American Beech

Leaves · Katja Schulz · L1
<https://plants.ces.ncsu.edu/plants/fagus-grandifolia/>

P2 · American Beech

Bark - Fall - Warren Co., NC · Cathy DeWitt · L2
<https://plants.ces.ncsu.edu/plants/fagus-grandifolia/>

P3 · American Beech

nuts · Omar hofun · L3
https://commons.wikimedia.org/wiki/File:Fagus_grandifolia_nuts_by_Omar_Hofun.jpg

P4 · American Beech

Leaf and Fruit · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/fagus-grandifolia/>

P5 · American Beech

published seed section · USDA Forest Service; chapter by Franklin T. Bonner and William B. Leak; figure artist not separately credited · L5
https://www.fs.usda.gov/rm/pubs_series/wo/wo_ah727.pdf#page=534
 Figure excerpt; original drawing/labels retained.

P6 · Black Gum

Nyssa sylvatica · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/nyssa-sylvatica/>

P7 · Black Gum

Nyssa sylvatica Bark · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/nyssa-sylvatica/>

P8 · Black Gum

Nyssa sylvatica. Fruit and Leaves · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/nyssa-sylvatica/>

P9 · Black Gum

Figure 3 — Nyssa sylvatica, black tupelo: longitudinal section through a seed. Printed page 746; PDF page 759. · USDA Forest Service; Nyssa chapter by Franklin T. Bonner; figure artist not separately credited · L5
https://www.fs.usda.gov/rm/pubs_series/wo/wo_ah727.pdf#page=759
 Figure excerpt; original drawing/labels retained.

P10 · Bradford Pear / Callery Pear

'Bradford' Fruit and Leaves · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/pyrus-calleryana/>

P11 · Bradford Pear / Callery Pear

bark · Steven J. Baskauf · L2
<https://bioimages.vanderbilt.edu/baskauf/31920.htm>

P12 · Bradford Pear / Callery Pear

Fruit · Martin LaBar · L6
<https://plants.ces.ncsu.edu/plants/pyrus-calleryana/>

P13 · Bradford Pear / Callery Pear

Pyrus calleryana (Rosaceae) - seed - general view · Steven J. Baskauf · L2
<https://bioimages.vanderbilt.edu/baskauf/43578.htm>

P14 · Bradford Pear / Callery Pear

Leaves & flowers in late March - Warren Co. - NC · Cathy DeWitt · L2
<https://plants.ces.ncsu.edu/plants/pyrus-calleryana/>

P15 · Bradford Pear / Callery Pear

Pyrus calleryana (Rosaceae) - leaf - margin of upper + lower surface · Baskauf, Steven J. · L2
<https://zenodo.org/records/11029862>

P16 · Crepe Myrtle

Lagerstroemia indica (Lythraceae) - leaf - showing orientation on twig · Kirchoff, Bruce K. · L2
<https://zenodo.org/records/11005741>

P17 · Crepe Myrtle

Bark detail · Martin LaBar · L6
<https://plants.ces.ncsu.edu/plants/lagerstroemia-indica/>

P18 · Crepe Myrtle

Seed Pods Closeup - December - Warren Co., NC · Cathy DeWitt · L4
<https://plants.ces.ncsu.edu/plants/lagerstroemia-indica/>

P19 · Crepe Myrtle

Lagerstroemia indica_seeds.jpg · Gmihail · L7
https://commons.wikimedia.org/wiki/File:Lagerstroemia_indica_seeds.jpg

P20 · Crepe Myrtle

Espumilla * Lagerstroemia indica · Jacinta Lluch Valero · L8
<https://www.flickr.com/photos/70626035@N00/7825618540/>

P21 · Eastern White Pine

Close up of stem and fascicles · Tom Glasgow · L2
<https://plants.ces.ncsu.edu/plants/pinus-strobus/>

P22 · Eastern White Pine

bark · Nicholas A. Tonelli · L2
<https://plants.ces.ncsu.edu/plants/pinus-strobus/>

P23 · Eastern White Pine

seed cone · Forest and Kim Starr · L2
<https://plants.ces.ncsu.edu/plants/pinus-strobus/>

P24 · Eastern White Pine

Pinus strobus_seeds.jpg · Steve Hurst, USDA-NRCS PLANTS Database · L9
https://commons.wikimedia.org/wiki/File:Pinus_strobus_seeds.jpg

Image credits · continued

P25 · Eastern White Pine

Weymouthkiefer Pinus strobus 5er Büschel 0111.jpg · NobbiP · L10

https://commons.wikimedia.org/wiki/File:Weymouthkiefer_Pinus_strobus_5er_B%C3%BCschel_0111.jpg

P26 · Hickory

Branch and leaves (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-glabra/>

P27 · Hickory

Bark close-up (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-glabra/>

P28 · Hickory

Husk and nut (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-glabra/>

P29 · Hickory

Shaggy bark (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-ovata/>

P30 · Hickory

Compound leaves (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-ovata/>

P31 · Hickory

Husk and nut (Guilford County, NC)-Early Fall · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/carya-ovata/>

P32 · Hickory

published seed section · USDA Forest Service; chapter by Franklin T. Bonner; figure artist not separately credited · L5
https://www.fs.usda.gov/rm/pubs_series/wo/wo_ah727.pdf#page=347

Figure excerpt; original drawing/labels retained.

P33 · Loblolly Pine

Fascicle sheath (Pinus taeda) · Tom Glasgow · L2

<https://plants.ces.ncsu.edu/plants/pinus-taeda/>

P34 · Loblolly Pine

Mature bark · Hellohowareyoudoing · L12

<https://plants.ces.ncsu.edu/plants/pinus-taeda/>

P35 · Loblolly Pine

Female cone · zizzybaloobah · L6

<https://plants.ces.ncsu.edu/plants/pinus-taeda/>

P36 · Loblolly Pine

Pinus taeda · John Tobe · L11

<https://plants.ces.ncsu.edu/plants/pinus-taeda/>

P37 · Longleaf Pine

Needles (Wake County, NC) · Cathy Dewitt · L2

<https://plants.ces.ncsu.edu/plants/pinus-palustris/>

P38 · Longleaf Pine

Bark · Kerry Woods · L4

<https://plants.ces.ncsu.edu/plants/pinus-palustris/>

P39 · Longleaf Pine

Pinecones - December - Wake Co., NC · Cathy DeWitt · L4

<https://plants.ces.ncsu.edu/plants/pinus-palustris/>

P40 · Longleaf Pine

Seedlings with seed still attached (Chesterfield County, SC)-Early Winter · Douglas Goldman, USDA · L11

<https://plants.ces.ncsu.edu/plants/pinus-palustris/>

P41 · Longleaf Pine

Pinus palustris · John Tobe · L11

<https://plants.ces.ncsu.edu/plants/pinus-palustris/>

P42 · Magnolia

Leaves Underside. Wake County Late Spring · Cathy Dewitt · L2

<https://plants.ces.ncsu.edu/plants/magnolia-grandiflora/>

P43 · Magnolia

Trunk Close-up · Jim Robbins · L4

<https://plants.ces.ncsu.edu/plants/magnolia-grandiflora/>

P44 · Magnolia

Fruit with bright red seed pods Wake County October · Cathy Dewitt · L11

<https://plants.ces.ncsu.edu/plants/magnolia-grandiflora/>

P45 · Magnolia

Flower - Summer - Wake Co., NC · Cathy DeWitt · L4

<https://plants.ces.ncsu.edu/plants/magnolia-grandiflora/>

P46 · Oak

Leaves with alternate arrangement on the stem · Bruce Kirchoff · L1

<https://plants.ces.ncsu.edu/plants/quercus-alba/>

P47 · Oak

Bark (Williamsburg, VA) · Jim Robbins · L4

<https://plants.ces.ncsu.edu/plants/quercus-alba/>

P48 · Oak

Quercus phellos. Acorns · US Government employee · L13

<https://plants.ces.ncsu.edu/plants/quercus-phellos/>

Image credits · continued

P49 · Oak

Quercus phellos · Michael Wolf · L14
<https://plants.ces.ncsu.edu/plants/quercus-phellos/>

P50 · Oak

Acorn sprouting (Cabarrus County, NC)-Fall · Hope Duckworth · L2
<https://plants.ces.ncsu.edu/plants/quercus-alba/>

P51 · Oak

published seed section · USDA Forest Service; chapter by Franklin T. Bonner; figure artist not separately credited · L5
https://www.fs.usda.gov/rm/pubs_series/wo/wo_ah727.pdf#page=945
 Figure excerpt; original drawing/labels retained.

P52 · Red Maple

Leaves · Frankenschulz · L15
<https://plants.ces.ncsu.edu/plants/acer-rubrum/>

P53 · Red Maple

Bark (Ashville, NC) · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/acer-rubrum/>

P54 · Red Maple

Double-winged samaras have a red color. · Carol Jacobs-Carre · L14
<https://plants.ces.ncsu.edu/plants/acer-rubrum/>

P55 · Red Maple

published fruit and seed sections · Charles Edward Faxon (artist), in Charles Sprague Sargent, The Silva of North America, vol. II (1891); digitization: Missouri Botanical Garden / Botanicus / Internet Archive · L16
<https://archive.org/details/mobot31753000329224/page/n208/mode/1up>
 Figure excerpt; original drawing/labels retained.

P56 · Red Maple

Acer rubrum (Aceraceae) - twig - orientation of petioles · Baskauf, Steven J. · L2
<https://zenodo.org/records/11019970>

P57 · River Birch

Betula nigra. Leaves. · Kathleen Moore · L1
<https://plants.ces.ncsu.edu/plants/betula-nigra/>

P58 · River Birch

Betula nigra. Exfoliating bark. · Kathleen Moore · L1
<https://plants.ces.ncsu.edu/plants/betula-nigra/>

P59 · River Birch

fruit cluster · Steven J. Baskauf · L2
<https://bioimages.vanderbilt.edu/baskauf/34037.htm>

P60 · River Birch

seeds · Steven J. Baskauf · L2
<https://bioimages.vanderbilt.edu/baskauf/34042.htm>

P61 · River Birch

published seed section · USDA Forest Service; chapter by Robert P. Karrfalt; figure artist not separately credited · L5
https://www.fs.usda.gov/rm/pubs_series/wo/wo_ah727.pdf#page=319
 Figure excerpt; original drawing/labels retained.

P62 · River Birch

Betula nigra (Betulaceae) - leaf - whole upper surface · Baskauf, Steven J. · L2
<https://zenodo.org/records/11027999>

P63 · Shortleaf Pine

Needles and cones · Nate Hartley · L11
<https://plants.ces.ncsu.edu/plants/pinus-echinata/>

P64 · Shortleaf Pine

Photo 248261070 · Laura Clark · L2
<https://www.inaturalist.org/photos/248261070>

P65 · Shortleaf Pine

Mature seed cone · Joshua Hodge · L11
<https://plants.ces.ncsu.edu/plants/pinus-echinata/>

P66 · Shortleaf Pine

Shortleaf_cone.jpg · Pinethicket at English Wikipedia · L14
https://commons.wikimedia.org/wiki/File:Shortleaf_cone.jpg

P67 · Shortleaf Pine

Photo 259459693 · Leila Dasher · L2
<https://www.inaturalist.org/photos/259459693>

P68 · Sweetgum

Fall leaf detail · Maggie · L6
<https://plants.ces.ncsu.edu/plants/liquidambar-styraciflua/>

P69 · Sweetgum

bark in spring Brunswick Nature Park · skdavidson · L17
<https://plants.ces.ncsu.edu/plants/liquidambar-styraciflua/>

P70 · Sweetgum

Long stemmed, woody, burr-like fruit · Cathy DeWitt · L11
<https://plants.ces.ncsu.edu/plants/liquidambar-styraciflua/>

P71 · Sweetgum

Liquidambar_styraciflua_seeds.jpg · Gmihail · L7
https://commons.wikimedia.org/wiki/File:Liquidambar_styraciflua_seeds.jpg

P72 · Carolina Lily

Flowers · Darrel Brown · L11
<https://plants.ces.ncsu.edu/plants/lilium-michauxii/>

Image credits · continued

P73 · Carolina Lily

Whorled leaves (Durham County, NC)-Mid Spring · Andrea Laine · L11
<https://plants.ces.ncsu.edu/plants/lilium-michauxii/>

P74 · Carolina Lily

Seeds · Evan Raskin · L11
<https://plants.ces.ncsu.edu/plants/lilium-michauxii/>

P75 · Eastern Poison Ivy

Leaf spread · R. A. Nonenmacher · L3
<https://plants.ces.ncsu.edu/plants/toxicodendron-radicans/>

P76 · Eastern Poison Ivy

Rootlets · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/toxicodendron-radicans/>

P77 · Eastern Poison Ivy

Fruits · Jim Robbins · L4
<https://plants.ces.ncsu.edu/plants/toxicodendron-radicans/>

P78 · English Ivy

Leaves and stem (The Meadows, Charlottesville, VA)-Late Winter · Douglas Goldman, USDA · L11
<https://plants.ces.ncsu.edu/plants/hedera-helix/>

P79 · English Ivy

climbing rootlets · Hladac · L3
[https://commons.wikimedia.org/wiki/File:\(ms\)_Hedera_helix_9.jpg](https://commons.wikimedia.org/wiki/File:(ms)_Hedera_helix_9.jpg)

P80 · English Ivy

Flowers · Forest and Kim Starr · L1
<https://plants.ces.ncsu.edu/plants/hedera-helix/>

P81 · English Ivy

Hedera helix · Donald Hobern · L1
<https://www.flickr.com/photos/dhobern/14353016572/>

P82 · Kudzu

Leaf and vine · CameliaTWU · L4
<https://plants.ces.ncsu.edu/plants/pueraria-montana-var-lobata/>

P83 · Kudzu

Leaf · Martin LaBar · L6
<https://plants.ces.ncsu.edu/plants/pueraria-montana-var-lobata/>

P84 · Kudzu

Fruit · Yamatsu · L18
<https://plants.ces.ncsu.edu/plants/pueraria-montana-var-lobata/>

P85 · Kudzu

Flower (Halifax County, NC) · Cathy Dewitt · L2
<https://plants.ces.ncsu.edu/plants/pueraria-montana-var-lobata/>

P86 · Scuppernong Grape

Leaves · Cathy Dewitt · L2
<https://plants.ces.ncsu.edu/plants/vitis-rotundifolia/>

P87 · Scuppernong Grape

Vine · Cathy Dewitt · L2
<https://plants.ces.ncsu.edu/plants/vitis-rotundifolia/>

P88 · Scuppernong Grape

Scuppernongs · Randal Cooper · L8
<https://commons.wikimedia.org/wiki/File:Scuppernongs.jpg>

P89 · Venus Flytrap

Venus Flytrap showing trigger hairs.jpg · Noah Elhardt · L19
https://commons.wikimedia.org/wiki/File:Venus_Flytrap_showing_trigger_hairs.jpg

P90 · Venus Flytrap

Dionaea muscipula (Wake County, NC) · Cathy Dewitt · L2
<https://plants.ces.ncsu.edu/plants/dionaea-muscipula/>

P91 · Venus Flytrap

Dionaea muscipula in flower (16977455134).jpg · NC Orchid · L20
[https://commons.wikimedia.org/wiki/File:Dionaea_muscipula_in_flower_\(16977455134\).jpg](https://commons.wikimedia.org/wiki/File:Dionaea_muscipula_in_flower_(16977455134).jpg)

P92 · American Alligator

whole body · al_bennett · L11
<https://www.inaturalist.org/photos/11707137>

P93 · American Alligator

banded body · dogbowlbookpile · L11
<https://www.inaturalist.org/photos/422345040>

P94 · Eastern Fence Lizard

whole body · Creator not stated; uploaded by Mark Connolly (w_mark_c) · L12
<https://www.inaturalist.org/photos/123858448>

P95 · Eastern Fence Lizard

rough scales · Quintin Ellison · L11
<https://www.inaturalist.org/photos/622189534>

P96 · Eastern Fence Lizard

male blue throat · rabbitier · L11
<https://www.inaturalist.org/photos/123707472>

P97 · Eastern Glass Lizard

whole body · grinnin · L11
<https://www.inaturalist.org/photos/322159117>

Image credits · continued

P98 · Eastern Glass Lizard

Eastern Glass Lizard · Josiah Londerée · L2
<https://www.inaturalist.org/photos/181342075>

P99 · Green Anole

dewlap · Michael J. Papay · L2
<https://www.inaturalist.org/photos/498849521>

P100 · Green Anole

brown form · Tommy Farquhar · L11
<https://www.inaturalist.org/photos/44877514>

P101 · Southeastern Five-lined Skink

striped young · Robby Deans · L11
<https://www.inaturalist.org/photos/4551694>

P102 · Southeastern Five-lined Skink

adult coloration · Ty Smith · L11
<https://www.inaturalist.org/photos/39804150>

P103 · Southeastern Five-lined Skink

underside tail scales · Ty Smith · L11
<https://www.inaturalist.org/photos/67883010>

P104 · Banded Water Snake

Broad-banded Water Snake · Jennifer Linde · L11
<https://www.inaturalist.org/photos/61676308>

P105 · Banded Water Snake

dark form and head · kaynine35 · L11
<https://www.inaturalist.org/photos/267617835>

P106 · Banded Water Snake

belly markings · Robert Russo · L11
<https://www.inaturalist.org/photos/509735705>

P107 · Black Rat Snake

black form · Zane Fish · L11
<https://www.inaturalist.org/photos/631968885>

P108 · Black Rat Snake

juvenile blotches · Catherine Bollinger · L11
<https://www.inaturalist.org/photos/238128650>

P109 · Copperhead

hourglass bands · Shreybae · L11
<https://www.inaturalist.org/photos/366253359>

P110 · Copperhead

facial pit · Shreybae · L11
<https://www.inaturalist.org/photos/395750537>

P111 · Copperhead

juvenile tail · jaries · L11
<https://www.inaturalist.org/photos/224282207>

P112 · Cottonmouth

body bands · railprof · L11
<https://www.inaturalist.org/photos/38881235>

P113 · Cottonmouth

head · Karen Szafrajda · L2
<https://www.inaturalist.org/photos/483991135>

P114 · Cottonmouth

young bands · Jake · L11
<https://www.inaturalist.org/photos/277359008>

P115 · Dekay's Brownsnake

back pattern · Michael J. Papay · L2
<https://www.inaturalist.org/photos/422007190>

P116 · Dekay's Brownsnake

DeKay's Brownsnake · Tigran Tadevosyan · L2
<https://www.inaturalist.org/photos/39249456>

P117 · Eastern Diamondback Rattlesnake

diamond pattern · Steven IGAS Landseadel · L11
<https://www.inaturalist.org/photos/183332662>

P118 · Eastern Diamondback Rattlesnake

head and rattle · natalie_likes_snakes · L11
<https://www.inaturalist.org/photos/125431484>

P119 · Eastern Garter Snake

striped body · tewsc1 · L11
<https://www.inaturalist.org/photos/184875878>

P120 · Eastern Garter Snake

checkering and head · Kevin · L11
<https://www.inaturalist.org/photos/404709614>

P121 · Eastern Hognose Snake

upturned snout · Shreybae · L11
<https://www.inaturalist.org/photos/393302291>

P122 · Eastern Hognose Snake

color variation · Joshua Liverman · L2
<https://www.inaturalist.org/photos/15852091>

P123 · Eastern Kingsnake

chain pattern · Shreybae · L11
<https://www.inaturalist.org/photos/637917906>

P124 · Eastern Kingsnake

head and scales · Shreybae · L11
<https://www.inaturalist.org/photos/661778801>

P125 · Painted Turtle

shell edge and head · Suzanne Cadwell · L11
<https://www.inaturalist.org/photos/46288357>

Image credits · continued

P126 · Painted Turtle

eastern shell alignment · smmcdonald · L11
<https://www.inaturalist.org/photos/49642243>

P127 · Painted Turtle

young underside · frankyj · L11
<https://www.inaturalist.org/photos/366255207>

P128 · Snapping Turtle

head · taylordeckard · L11
<https://www.inaturalist.org/photos/387927157>

P129 · Snapping Turtle

whole body · smmcdonald · L11
<https://www.inaturalist.org/photos/49642591>

P130 · Snapping Turtle

Common Snapping Turtle Juvenile · Sam Stukel / USFWS · L21
<https://www.flickr.com/photos/usfwsmtnprairie/52827391228/>

P131 · Spotted Turtle

shell spots · smmcdonald · L11
<https://www.inaturalist.org/photos/55141680>

P132 · Spotted Turtle

head and limbs · Shreybae · L11
<https://www.inaturalist.org/photos/482847922>

P133 · Eastern Box Turtle

domed shell · Joshua Liverman · L2
<https://www.inaturalist.org/photos/55805257>

P134 · Eastern Box Turtle

closing shell · Shreybae · L11
<https://www.inaturalist.org/photos/432691330>

P135 · Eastern Box Turtle

plastron hinge · Koaw Nature · L11
<https://www.inaturalist.org/photos/74644769>

P136 · Yellow-bellied Slider

head and lower shell · Joshua Liverman · L2
<https://www.inaturalist.org/photos/66948582>

P137 · Yellow-bellied Slider

yellow cheek · Aaron P. · L11
<https://www.inaturalist.org/photos/735753803>

P138 · American Toad

back and glands · jlemmonds · L11
<https://www.inaturalist.org/photos/461936458>

P139 · American Toad

side and glands · Alex Shure · L11
<https://www.inaturalist.org/photos/130773208>

P140 · Bullfrog

adult folds and eardrums · Nell Cant · L2
<https://www.inaturalist.org/photos/161936314>

P141 · Bullfrog

whole frog · Creator not stated; uploaded by Ken Kneidel (kenkneidel) · L12
<https://www.inaturalist.org/photos/223217347>

P142 · Bullfrog

tadpole with hind legs · bamalachia · L22
<https://www.inaturalist.org/photos/245804146>

P143 · Pine Barrens Treefrog

side and leg markings · Kevin · L11
<https://www.inaturalist.org/photos/378056276>

P144 · Pine Barrens Treefrog

breeding pair · Kevin · L11
<https://www.inaturalist.org/photos/644192746>

P145 · Southern Leopard Frog

side and eardrum · Joshua Liverman · L2
<https://www.inaturalist.org/photos/25942533>

P146 · Southern Leopard Frog

back folds · Amy Padgett · L11
<https://www.inaturalist.org/photos/288021076>

P147 · Marbled Salamander

adult bands · Robby Deans · L11
<https://www.inaturalist.org/photos/2809928>

P148 · Marbled Salamander

Marbled Salamander with Eggs (*Ambystoma opacum*) · John P Clare · L23
<https://www.flickr.com/photos/johnclare/31055091111/>

P149 · Red-backed Salamander

striped form · Shreybae · L11
<https://www.inaturalist.org/photos/469235339>

P150 · Red-backed Salamander

lead-backed form · Ty Smith · L11
<https://www.inaturalist.org/photos/183836724>

P151 · White-spotted Slimy Salamander

spotted body · Kevin Metcalf · L11
<https://www.inaturalist.org/photos/252713663>

P152 · White-spotted Slimy Salamander

White-spotted Slimy Salamander · Henry Seilheimer · L11
<https://www.inaturalist.org/photos/103674258>