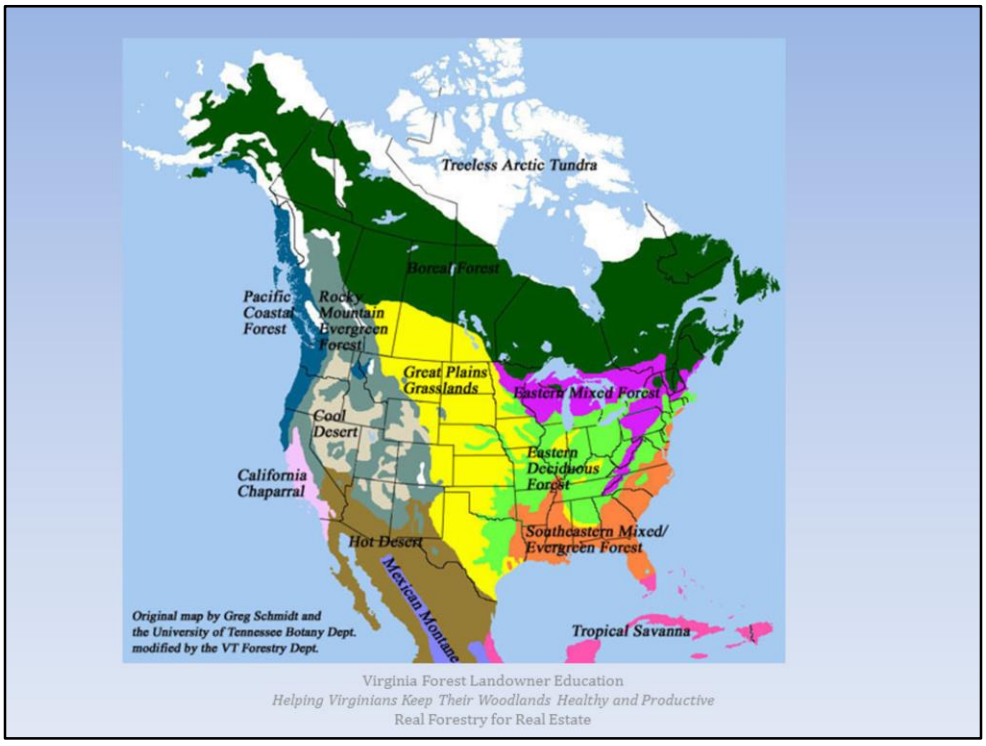
Tree Identification

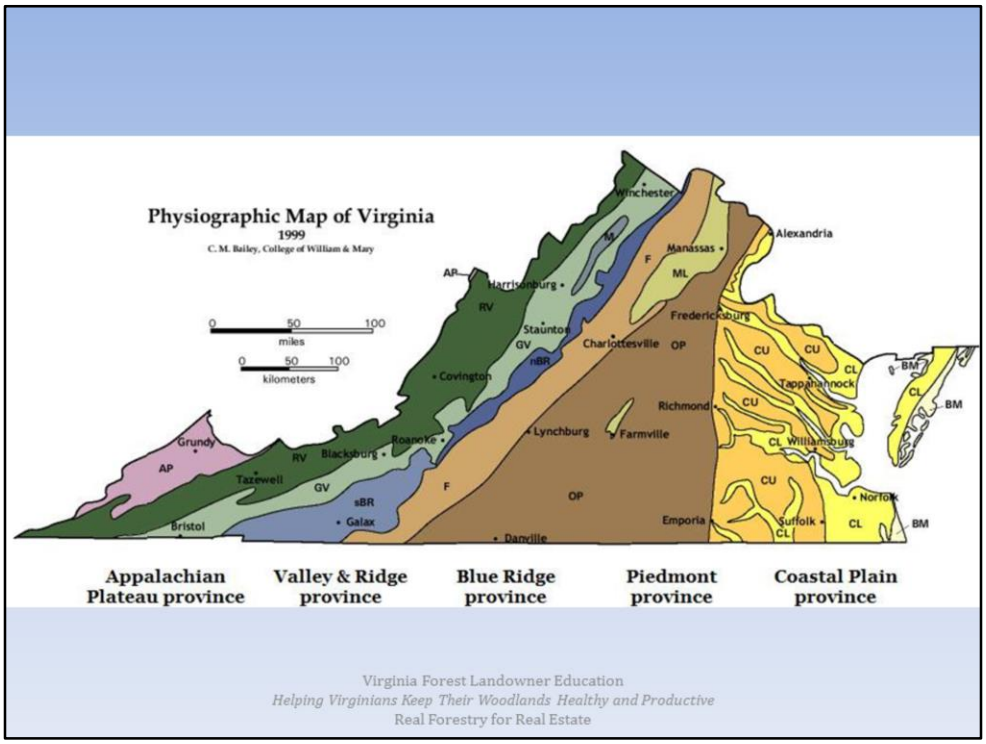
Virginia Forest Landowner Education
Helping Virginians Keep Their Woodlands Healthy and Productive
Real Forestry for Real Estate

Ideally, this entire section of the class will be held outside. The format for the outdoor portion will be the same as the following Power Point presentation, but real examples will be shown, instead of photos on slides. However, location and weather will dictate if that is feasible or not.

In the event an outdoor field trip isn't possible, we will spend the first 30 minutes of this section going through the following slides; then we will have samples in the classroom and participants will work through the dichotomous key in the "Common Native Trees of Virginia" book to identify them. The books will be provided to everyone.



Learning to identify trees in Virginia can be challenging because of the sheer number of species we have here.
Virginia intersects the southernmost edge of the range of many northern species and at the northern most edge of the range of many southern species – which results in a high diversity of flora and fauna.



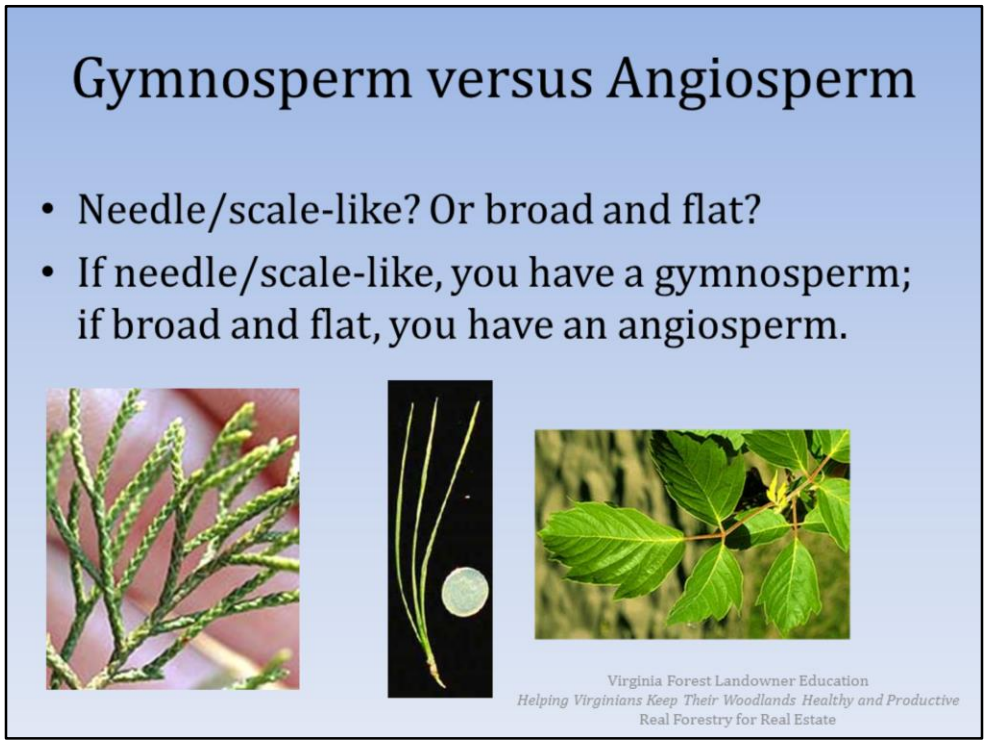
In addition to our location between the northern and southern ranges, there is a lot of variation as you move east to west across Virginia.
Virginia is divided into 5 physiographic provinces. These provinces are based on geology and soils in the area. The geological processes which formed the soils in the Coastal Plain in the eastern portion of Virginia are very different from the geological processes which formed the soils in the Ridge and Valley portion of the state. For more information on Virginia's physiographic regions, refer to Virginia's Natural Heritage Program:
http://www.dcr.virginia.gov/natural_heritage/nativeplants.shtml

Other factors which contribute to the large number of plant species here include:
•Elevation range from 0 to 5729 feet
•Varied land use
•Introduced species
•Mild climate

As a result of all these factors, Virginia has at least 350 species of trees. But we won't learn them all today! A listing of all the species is available from the USDA PLANTS database at: http://plants.usda.gov/adv_search.html

Before we embark on this journey of tree identification, let me issue this warning. Sometimes tree identification is tough. Really tough. Fortunately, we all love a challenge, right?

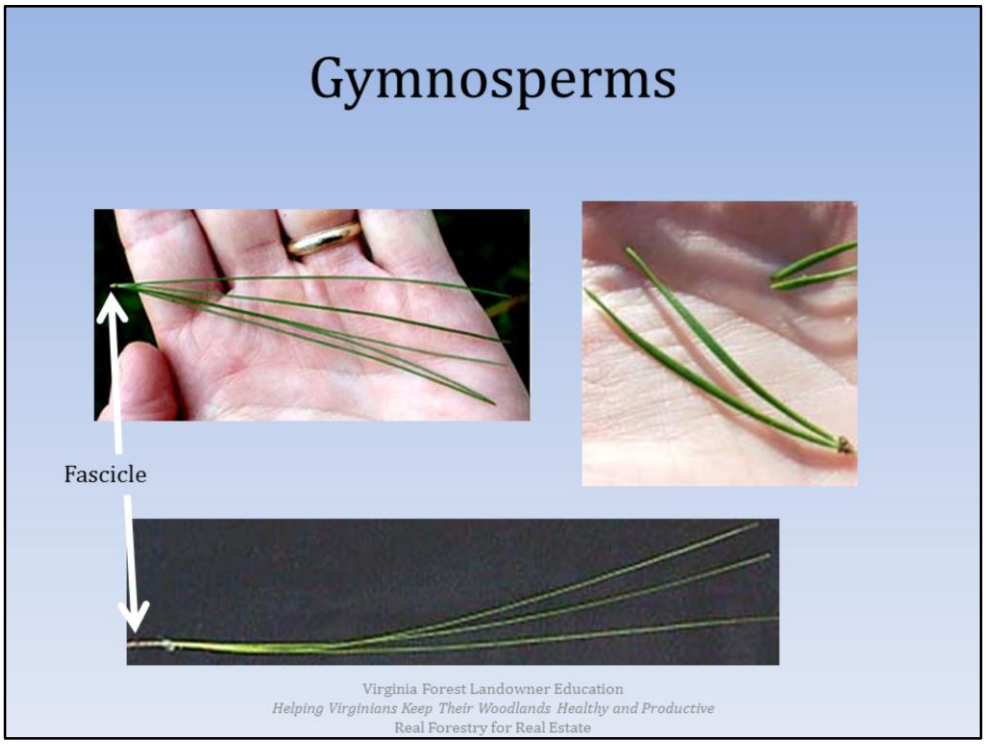
One factor that can make tree ID challenging is the fact that trees can't move – they germinate, grow and reproduce all in one location. So they must be able to adapt to their environment. Trees can adapt how they look to adjust to their environment. Oaks are notorious for this – leaf shapes change as the trees age; and within a crown leaves can be very different, as in this example of a northern red oak leaf. The leaf on the left is a leaf growing in full sun; the one on the right was growing in shade. Anyone know why a tree would make this adaptation? What is the job of a leaf? To capture sunlight so the tree can photosynthesize to make food. Is a leaf is growing in full sunlight, it doesn't need to have as much surface area to capture the same amount of sunlight as a leaf growing in shade. The take home message from this is that when you are trying to identify a tree, don't just look at a single leaf at eye level. Look at the tree as a whole else you may miss some clues.



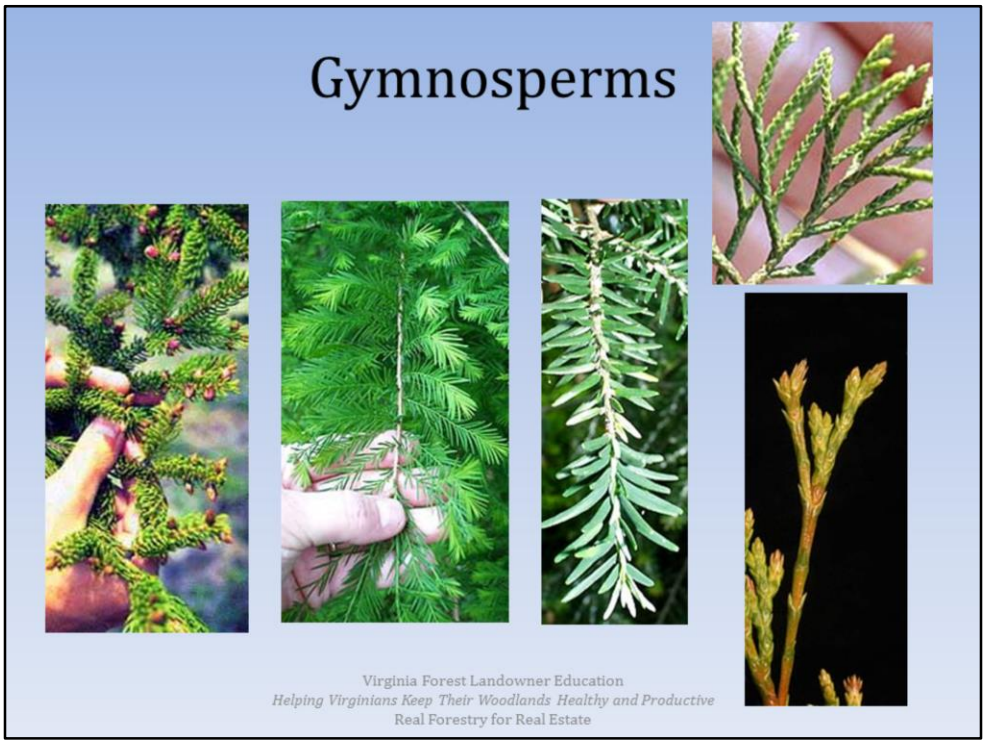
Now, we could just show you a bunch of tree photos and tell you what species they are. But what fun is that? And, actually, that is not a very effective way for you to learn. As we just mentioned, the same species of trees can look different depending on where it is growing, how old it is, etc. So, instead, we are going to teach you how to use a tool which can help you identify almost any native tree species in Virginia. This tool is called a dichotomous key. This is located on page 14 of the Common Trees of Virginia book we just passed out. Has anyone ever used one of these before? To identify plants, birds, insects? Basically a dichotomous key is just a series of choices you have to make, which can help you narrow down what species you are looking at.

The next slides go through some of the terminology you need to know to make these choices. A lot of this information is in the introduction of the book, so you don't have to memorize these terms, but hopefully this part of the presentation will help you understand what the key is asking for.

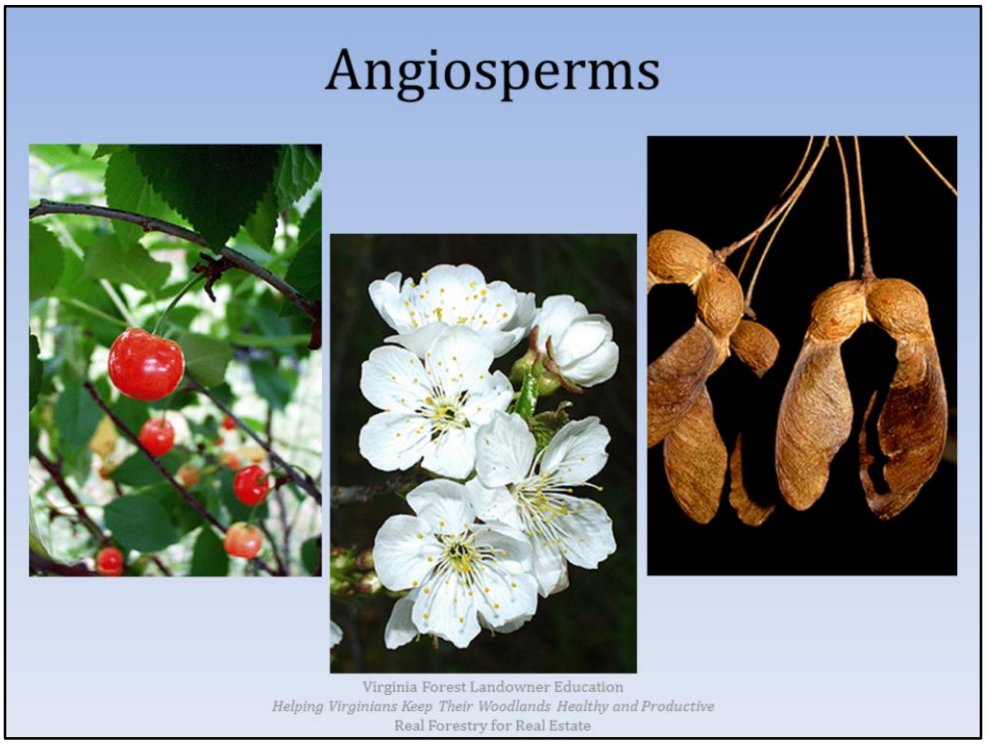
Here's the first information you will need to know for any tree identification key: Trees fall into 2 main categories, the gynmosperms (aka, conifers, mostly evergreens) naked seeds and the angiosperms (flowering trees, mostly deciduous), seeds covered, in a fruit of some sort. When you are keying out a species, this is the first thing you will be asked. To discern the difference, you will be asked "Are the leaves needle/scale like or broad and flat? Eastern red-cedar (left) is an example of scale-like leaves; loblolly pine (center) is an example of needle-like leaves. Both are gymnosperms. Boxelder (right), with its broad, flat leaves, is an angiosperm. In general, gymnosperms will have needle/scale like leaves, and angiosperms will have broad flat leaves.



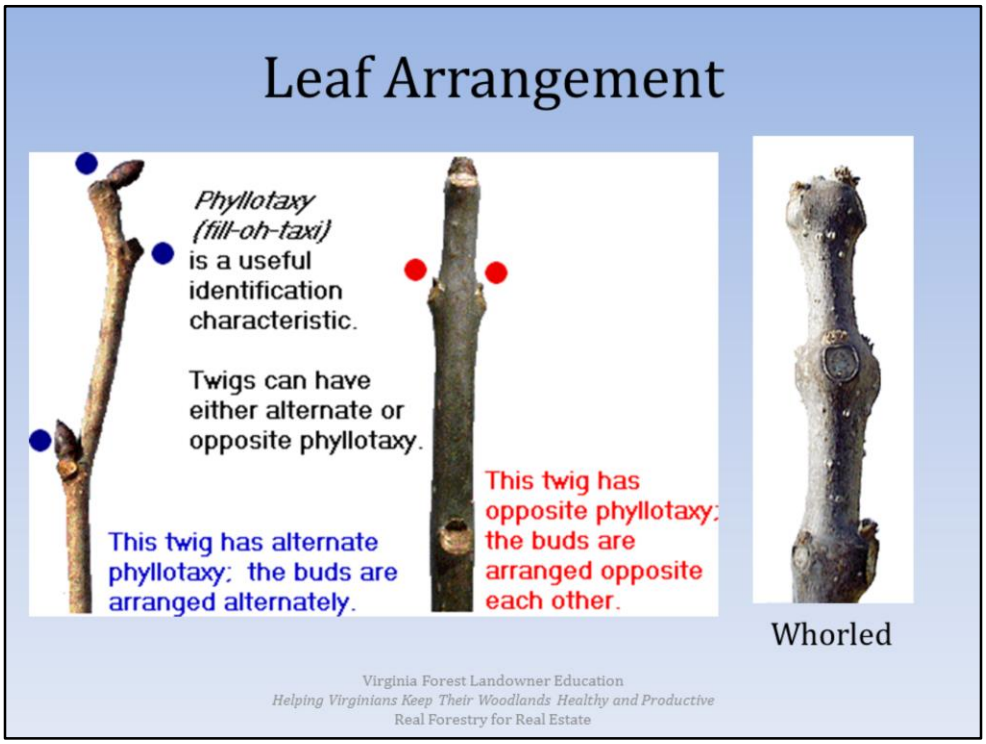
If you have a gymnosperm, the key will then ask you how many needles per fascicle it has. A fascicle is the papery sheath which holds the needles together in a bundle. In Virginia, native species have 2, 3 or 5 needles per fascicle. Pictured (clockwise) Eastern white pine – the only native 5 needle pine in Virginia; Virginia pine – 2 twisted needles per fascicle; longleaf pine – 3 needles per fascicle. Other pines which are common in Virginia include Table Mountain (mostly in 2s), pitch (in 3s), shortleaf (in 2's and 3's) and pond (in 3s). Of course, trees don't read books or use dichotomous keys; sometimes you'll find a loblolly pine with some needles in bundles of 4's or 5's! The point here is, look at more than one bundle of needles and if you still aren't sure, look for other clues, such as bark and cones. Cone shape, color, and size are all good characteristics to look at.



If you have a gymnosperm with leaves that are scale-like, your choices of native Virginia species are limited:
red spruce, baldcypress, Eastern hemlock, Eastern redcedar, Atlantic white-cedar.
Baldcypress, even though it is a gymnosperm, which we typically consider to be evergreen species, is a deciduous species!

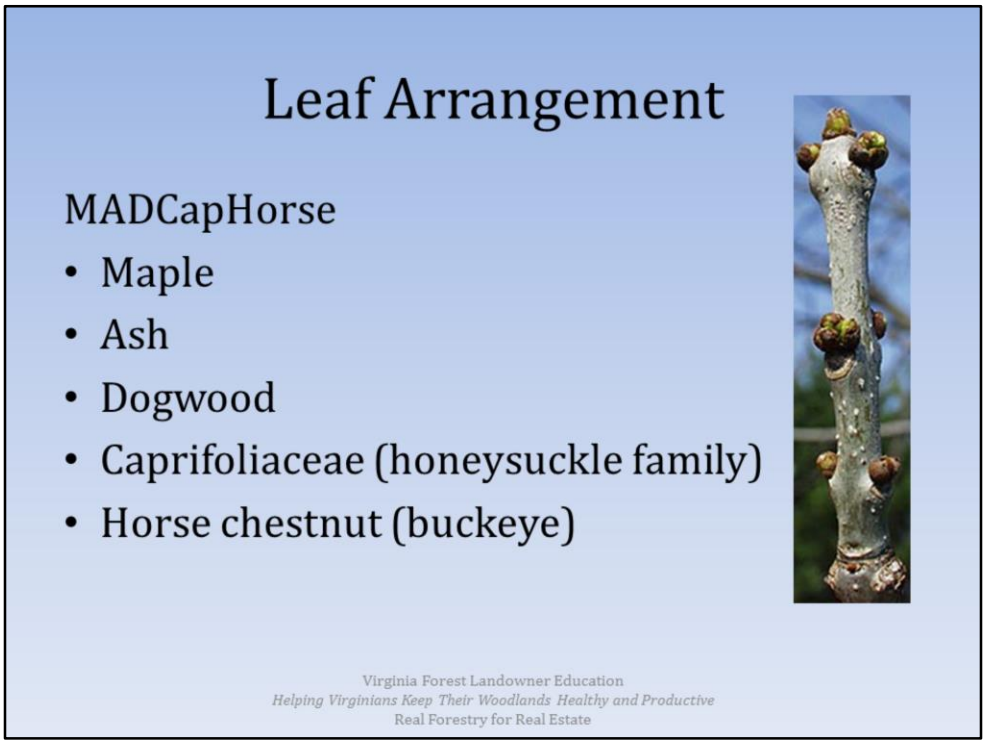


If the leaves are broad and flat, then you have an angiosperm. If you are lucky enough to find flowers, fruits or seeds, by all means use these to identify the tree. These may be the easiest clues to use; however, they are only on the tree for a short period of time, so they aren't very reliable! We will focus on leaves, twigs and bark, which are either on the tree for at least 6 months of the year or permanently.



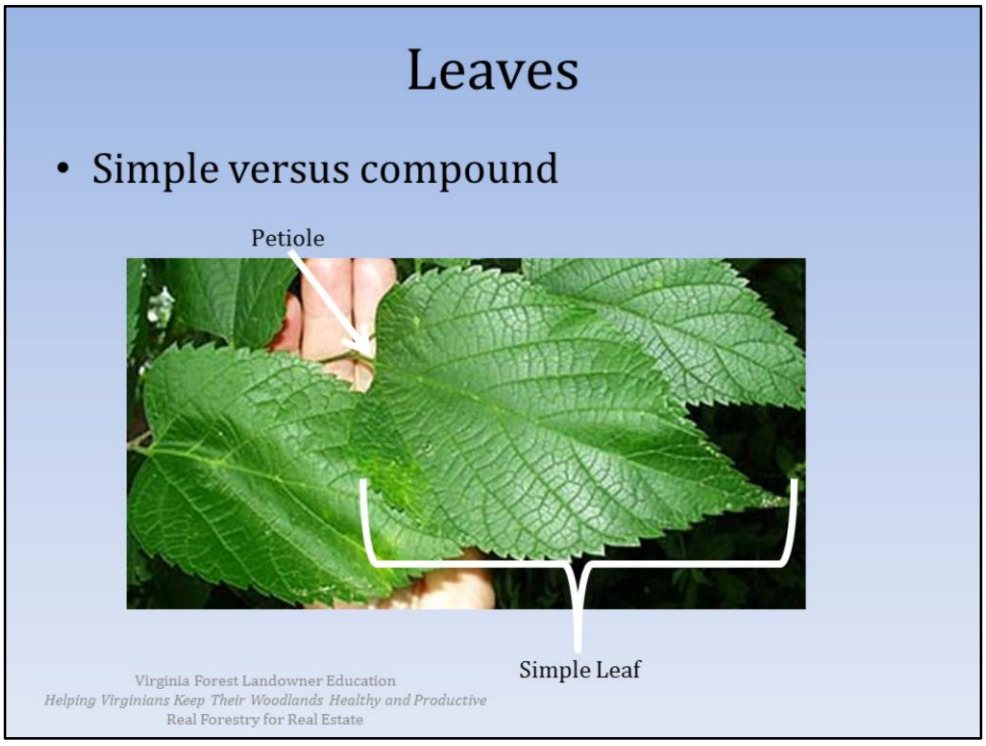
If you are going through the angiosperm section of a key, the next thing you will need to know is how the leaves/twigs/buds are arranged. The fancy terms for this is phyllotaxy. There are three choices for this: alternate, opposite or whorled. For our Virginia trees, alternate is the most common arrangement, followed by opposite. You will only occasionally see whorled.

On the same plant, leaves, twigs, and buds will all be arranged the same way (i.e., if the buds are opposite, then the twigs and leaves will also be oppositely arranged). Take a close look at these photos.

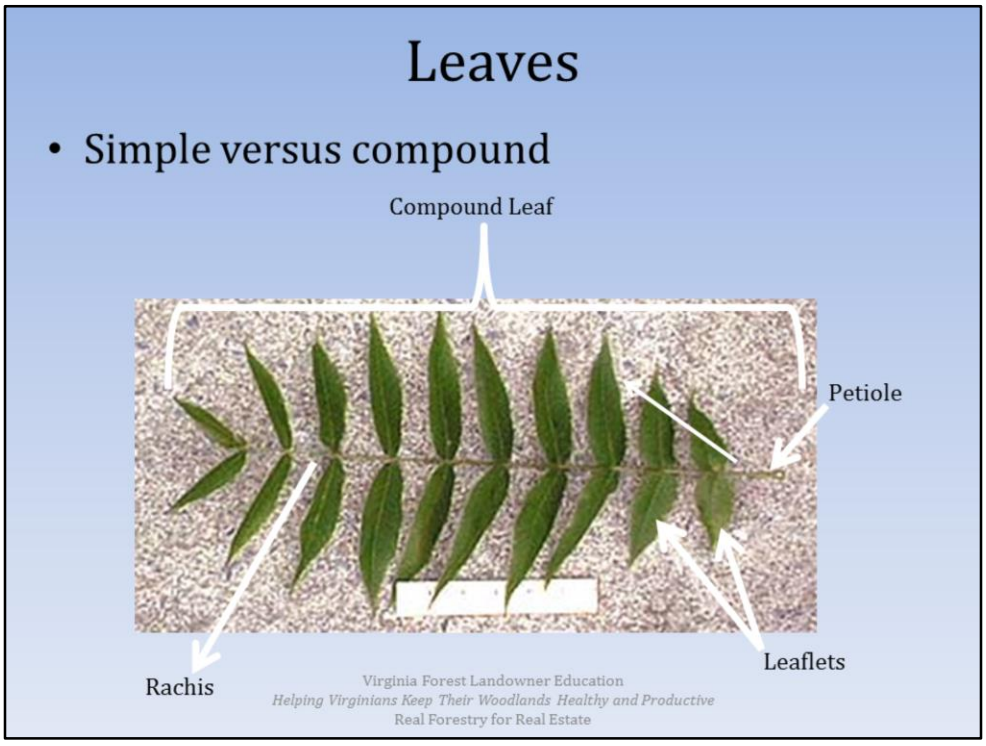


Use the pneumonic MADCapHorse to remember which species have opposite leaf arrangement. Then, if you find a species you don't know and its leaves are oppositely arranged, you can quickly narrow your choices down to: maple, ash, dogwood (except for alternate leaf dogwood), something in the honeysuckle family, or a horse chestnut or buckeye. There are exceptions to this rule, but this is a great place to start.
If your unknown species has alternate arrangement, as most species do, you need to investigate further.

The photo shows a green ash twig – note the opposite arrangement of the buds. Just a side note here, from the buds grow the branches, and leaves of the tree.



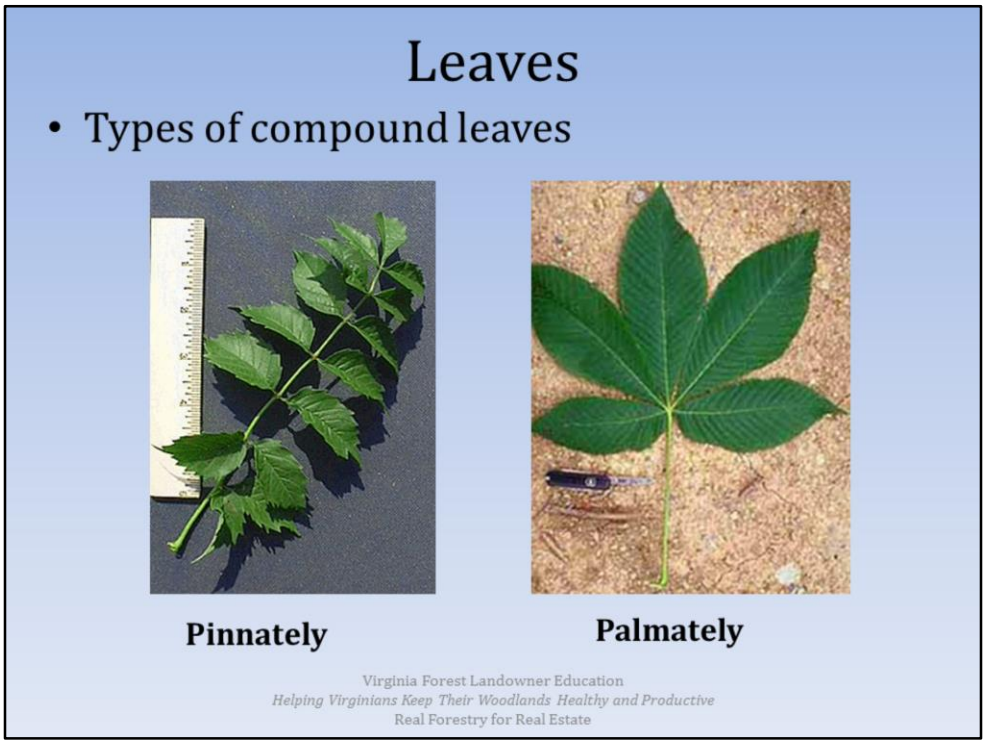
Once you know the leaf arrangement, it's time to take a closer look at the leaves; leaves can be either simple or compound.
Simple leaves are just what you envision a leaf to be – like this hackberry leaf.



A compound leaf is made up of many leaflets held together by a rachis (which is an extension of the petiole – the structure that attaches a leaf to a stem). Black walnut leaves are compound – generally made up of 10-24 leaflets.

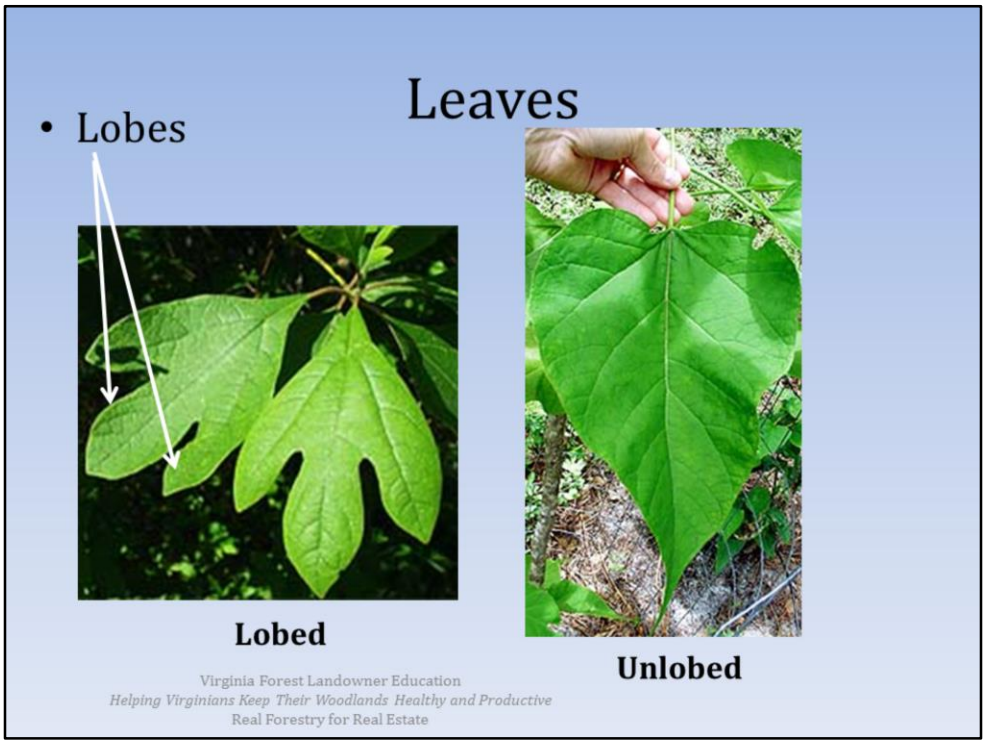
Being able to determine if a leaf is simple or compound takes some practice. One way to think about it, is the leaf is the entire unit which falls from the tree in the autumn. Leaves arise from buds along the stem, so look for the bud swell/bud scar; leaflets in compound leaves do not arise from buds.

Leaflets are not necessarily arranged the same way as leaves, buds and twigs. In fact, if you look at the leaflet arrangement on this black walnut leaf, you can see they have opposite arrangement. However, the leaves themselves (as well as the buds and twigs) on a black walnut are alternately arranged. So it's really important to figure out is you have a simple or compound leaf or you may get your leaf arrangement wrong.

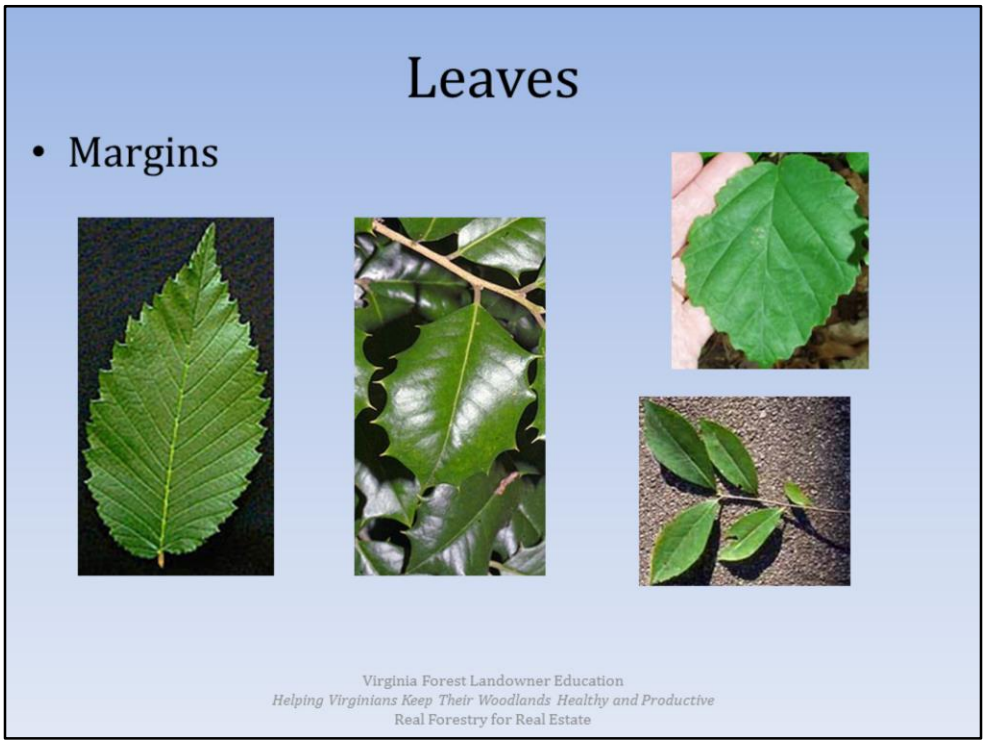


Now, if you have a compound leaf, there are two types you could have. You could have a pinnately compound leaf, like the trumpet creeper on the left, where the leaflets are attached opposite of each other in a long row; or you could have a palmately compound leaf, life the yellow buckeye leaf on the right. The leaflets here are attached like the palm of a hand. Buckeye also has another distinguishing characteristic – recall MADCapHorse….oppositely arranged tree!

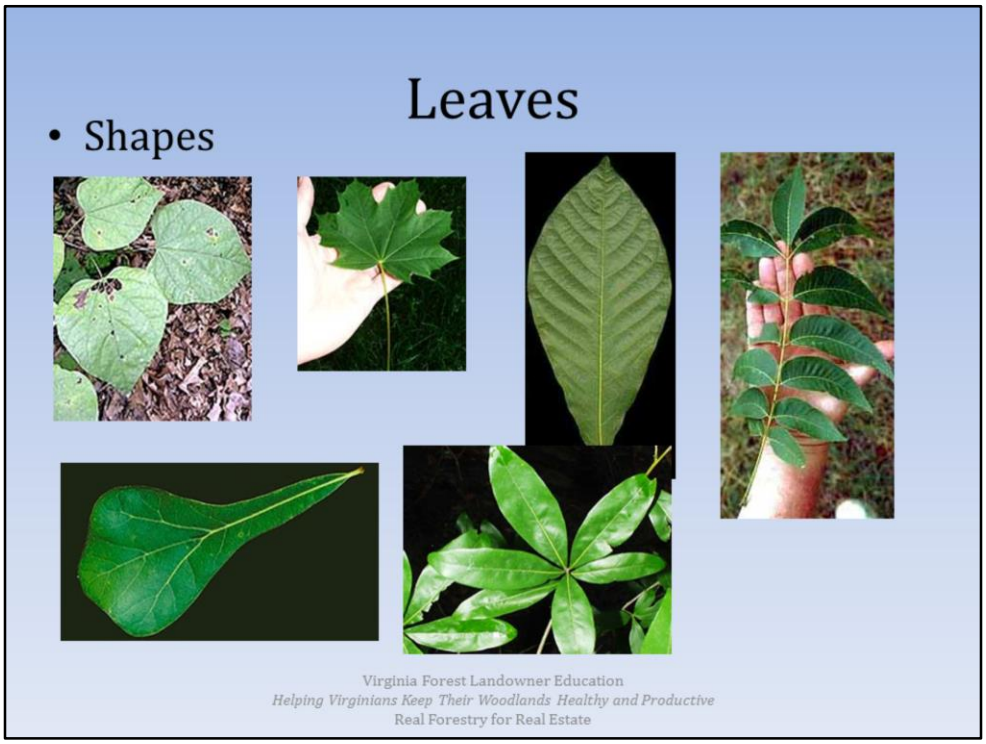
Once you get comfortable determining if leaves are simple or compound, you will be happy when you find a compound leaf – there are fewer trees in Virginia with this leaf type, so this can help you further narrow down what species you have.



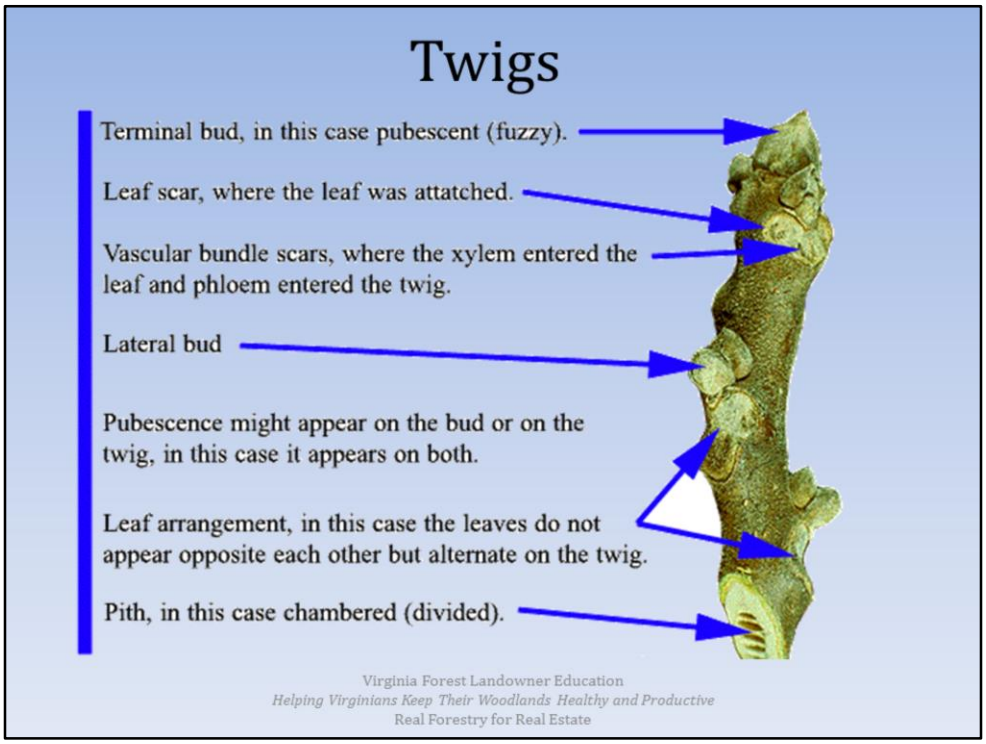
Once you have determined the phyllotaxy or leaf arrangement (opposite versus alternate) , and the leaf type (simple or compound) you need to examine the leaves themselves (if you can).
Leaves can be either lobed or not lobed.
Lobes are divisions or protrusions along the leaf edge, as indicated on these sassafras leaves on the left. The number, shape and size of lobes can vary, even on leaves on the same tree. Other species have leaves which are not lobed, such as this catalpa (right).



Leaf margins are the actual edges of the leaves. Leaves can have many different types of margins, including (pictured from left to right) serrate, spiny, wavy (top right), or entire (bottom right).
Pictured: American elm, oak, American holly, witch hazel, swamp tupelo.
Again, definitions for these terms can usually be found in the front pages of a key.



Leaves also come in a variety of shapes. Common shapes include (pictured clockwise): Heart-shaped (redbud), round-outline (Norway maple), oval, widest above the middle (obovate, pawpaw)
Oval, widest at base (pecan), long and narrow (laurel oak) and wedge-shaped (water oak).



The key in the book you have is based on leaves. It is useful for part of the year. But what do you do when you have a deciduous tree in the winter? Wait until the summer to id it?

Not very practical. Fortunately, there are other characteristics we can look at to help us made a correct identification.

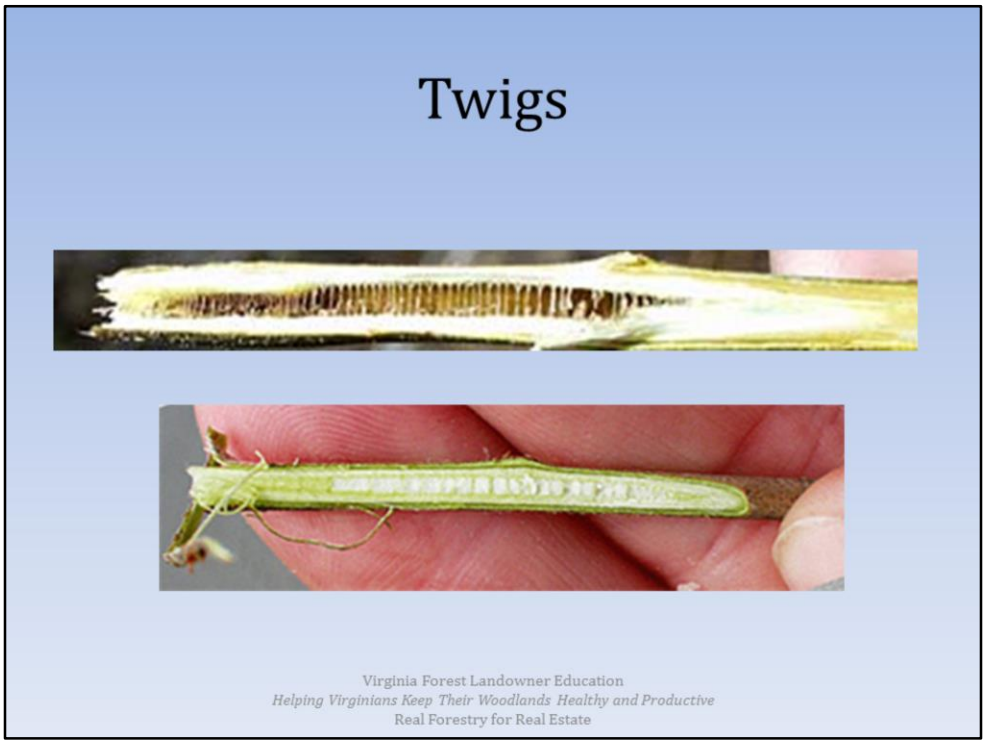
A lot of information can be gleaned from the twigs (branches).

•The terminal bud, or bud at the end of the twig, is often used for identification. From this bud, the twig will grow longer in the spring; often much larger than the lateral buds, but may not be present on all twigs.

•Lateral buds – from this bud a side branch will grow

•Leaf scars – where leaves were attached to the twig

•Pith – soft center of stems – can be chambered (see above), diaphragmed, or solid.

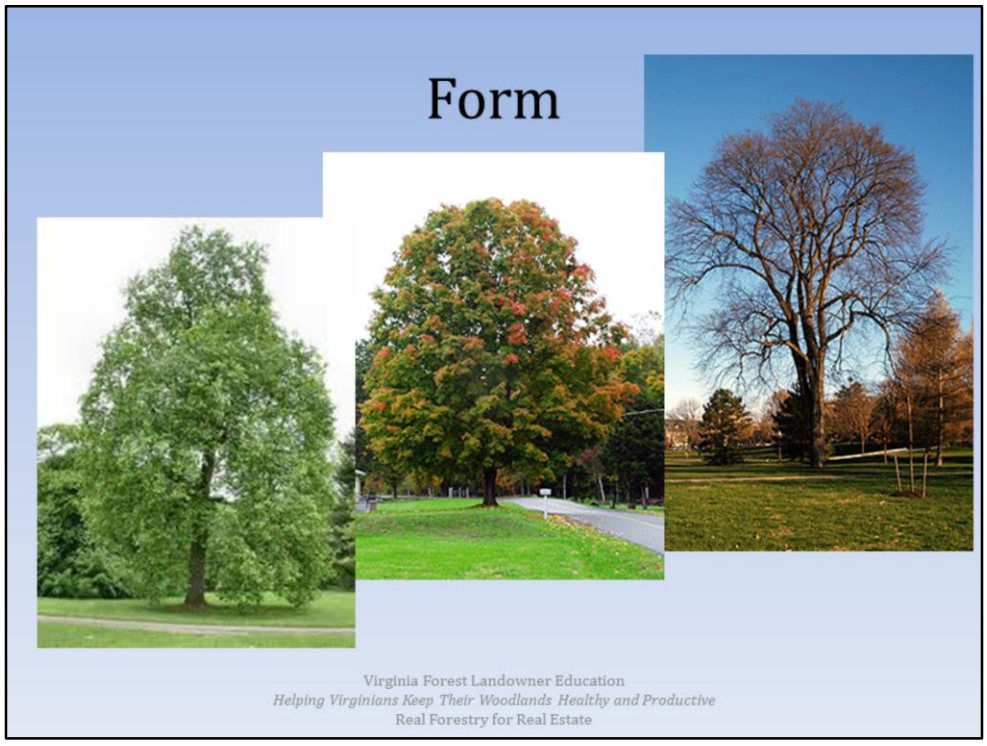


Walnut (top) and blackgum (bottom) have distinctive chambered (left) and diaphragmed piths.

Bark is a fantastic way to identify trees. When you recognize the bark, you can walk through the woods in the winter and identify species without even looking up. Some words used to describe bark include scaly, peeling, rough, smooth, dark, interlacing, and quirky protuberances.

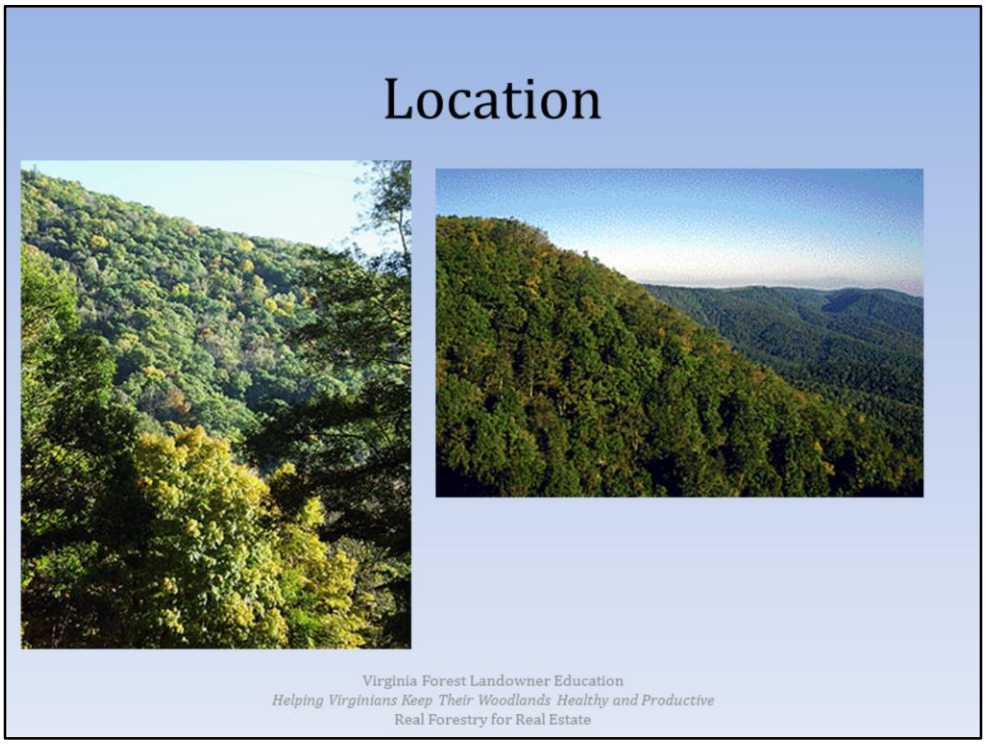
The barks shown here are from (left to right) yellow birch, cherry, and shagbark hickory.

But keep in mind, the bark of some species can change significantly as the tree ages – young white oak bark looks very different from old white oak bark.



You can use form to indentify trees from a distance. Some species have very distinctive shapes. For example, open grown yellow poplar tend to have very conical crowns, growing off of tall, branch-free straight main stems. (left). Sugar maple (center) has a dense oval shaped crown, and for American elm grown in the open (right) , the trunk is usually divided into several large, ascending and arching limbs, ending in a maze of graceful drooping branchlets

Don't get discouraged if using form to identify trees takes you a long time – you need to look at a lot of trees before you can successfully use this one. Yellow poplar is a pretty easy one, so maybe start there.



Finally, a wonderful way to narrow down what species you might be seeing, is to think about where you are. As Realtors know, it's all about location, location, location! Certain locations tend to have pretty specific groups of species associated with them. In the next section of this class, we will cover site characteristics in detail. But for now, know that elevation, aspect, soil types and fire history will all affect the species groupings on a particular site.

Location

- **Rivers**
  - sycamore
  - silver maple
  - willows
  - boxelder
  - hackberry
  - green ash
  - red maple

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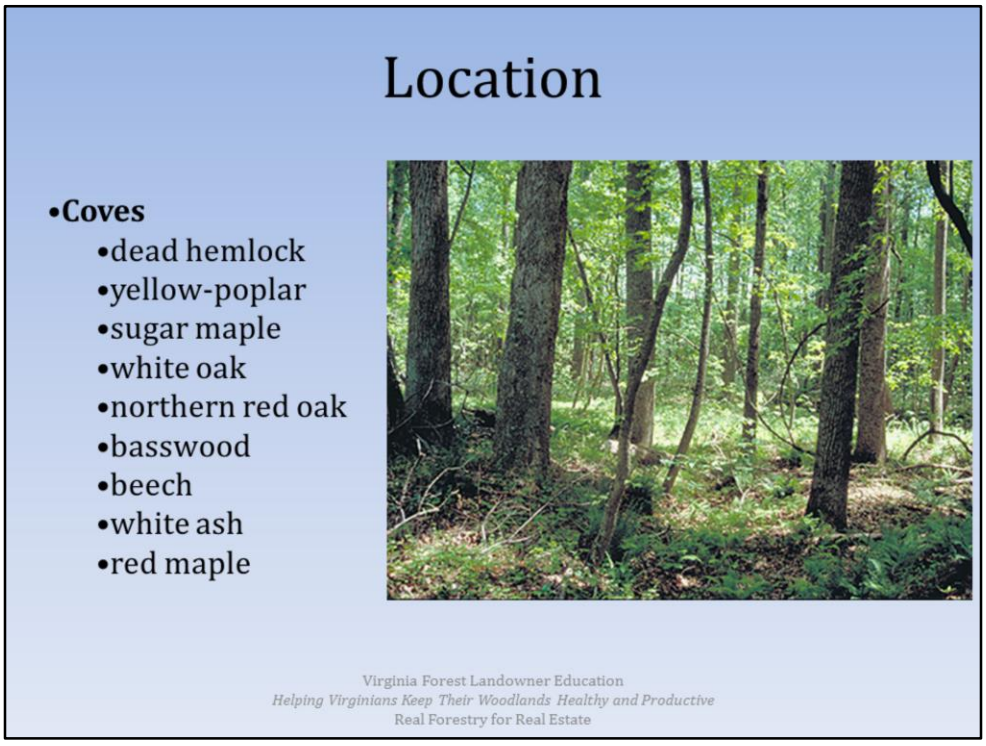
For example, if you paddling down the New River, you would expect to find the species listed on this slide.



If you are in a cove, which we will define in the next section on site quality, you would expect to find some of the species listed above. For those of you who attended Part 1 of this program, why are the hemlocks you would find in coves dead? (Answer: hemlock wooly adelgid, exotic invasive species).

Location

- **Hillsides**
  - pignut hickory
  - mockernut hickory
  - white oak
  - black oak
  - chestnut oak
  - scarlet oak
  - blackgum
  - sassafras
  - sourwood
  - white pine
  - Virginia pine
  - red maple

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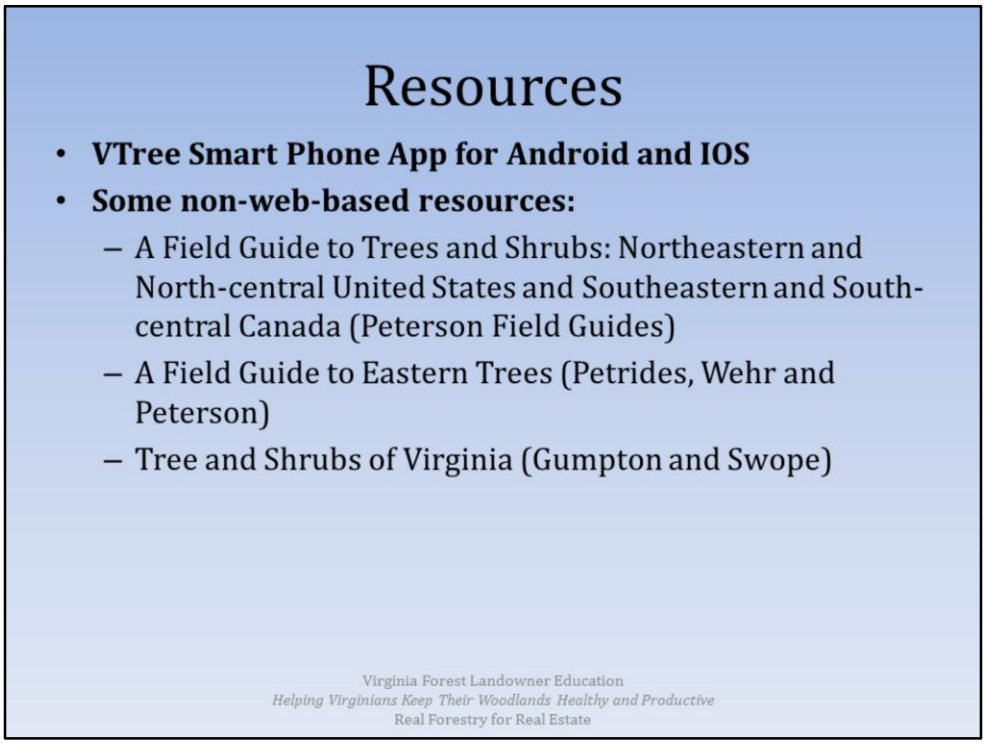
On hillsides, it really depends on the aspect, or which way the hill faces. We'll also go over this in the next section.

Finally, on dry rocky ridges, you'll find the species listed above.
This is not to say you won't find different species in these areas, but knowing how certain groups of trees are related to certain sites can help a lot. Also, keep in mind, a lot of these rules go out the window when you are in an urban or developed landscape. People plant all sorts of species off-site; and use a lot of exotics and hybrids. Identifying horticultural plantings is another class entirely.



There are numerous resource available for you if you are really interested in learning your trees. Everyone will get to bring home their "Common Native Trees of Virginia" book, which is a great resource to start with. You can also visit the Virginia Tech dendro website to learn about 100's of species. This list shows some reputable websites for tree id as well as some well-known field guides which are available at your local book seller.
Another resource, which has been in the works for some time, and which should be available in 2012, is a comprehensive guide to 3500 plant species in Virginia' – *Flora of Virginia.* Some of us are ridiculously excited about this project.

As with anything worth doing, practice is essential. And right now, you are going to get to do just that. We are going to use the dichotomous key in the front of your Native Trees book to determine which species you have in front of you.

Here we will work through the key as a group to identify a common species. Then, as small groups they will each work to identify 2 other species. Instructors will assist with the process. Approximate time 20 minutes.