Luckiamute
WATERSHED COUNCIL

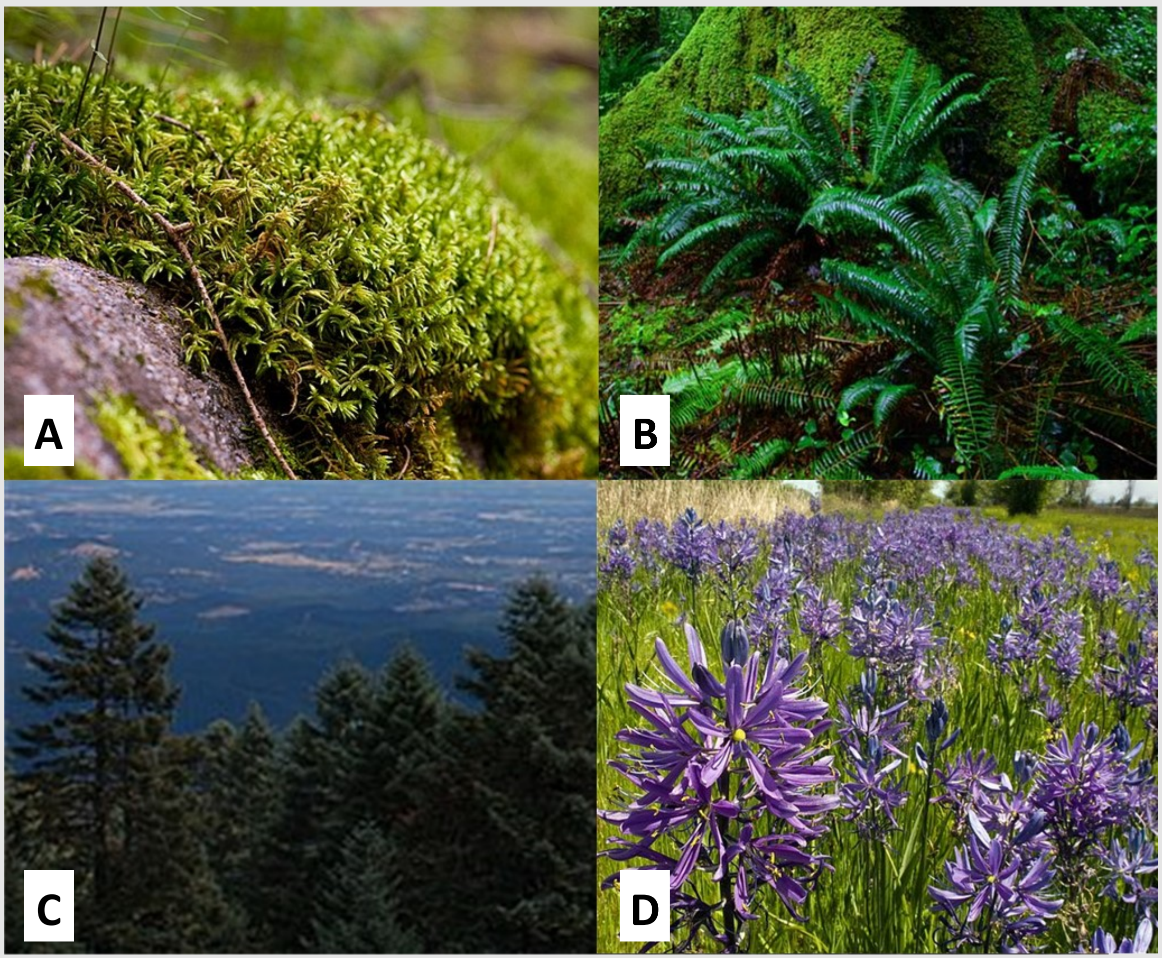
STEP ONE

An Introduction to Plant Identification in the Willamette Valley

INTRODUCTION — PLANT CLADES

A NOTE: This guide is meant as a brief primer on the basics of plant ID for those new to it. If you already know this material, the LWC has other guides and resources on its website that you may find interesting. Check them out!

Clade: A group of organisms related by their evolution.



Science recognizes four major 'clades' of plants in the world. These are:

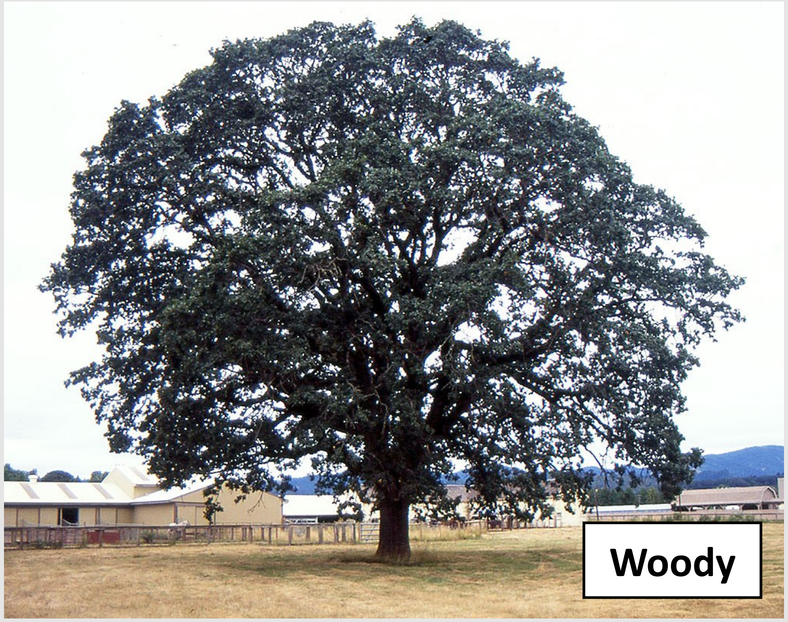
A: Bryophytes (mosses, hornworts & liverworts) These are the most 'primitive' of the plants. They reproduce with spores and lack the vascular tissue that allows other plants to get larger.

B: Polypodiophytes (ferns & horsetails) The ferns and their allies also reproduce via spores, but they have vascular tissue.

C: Gymnosperms (conifers, cycads and ginkgo) These are vascular plants that reproduce via seeds, though they lack flowers or a fruiting body encasing the seed.

D: Angiosperms (flowering plants) The most diverse and abundant plant clade. Vascular plants that reproduce via seeds that are encased in a fruiting body. All of them bear flowers. Includes grasses.

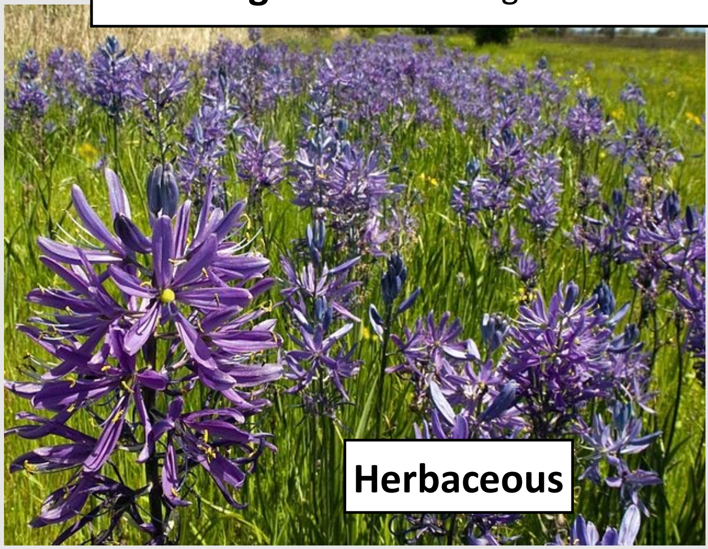
Plant Structure — Woody or Not?



One of the easiest ways to distinguish plants is to note if they're 'woody' or not. Wood comes from a structural support compound, called lignin, that plants have in their tissues. We call plants with a lot of lignin, like trees or shrubs, 'woody'. Plants lacking it, like grasses or wildflowers, are called 'herbaceous'.

Remember: The presence or absence of wood is not a diagnostic feature of any of the plant clades (except Bryophytes, which are never woody). An oak tree is more closely related to the grass around it than it is to a fir tree.

Challenge: Bamboo is a grass. Would you call it woody or herbaceous?



Woody Growth Forms — Tree or Shrub?

‘Tree’ and ‘shrub’ are useful ways to describe a plant’s growth habit, even though they can’t tell you what clade that plant belongs to.

The main distinction is the number of stems coming out of the ground. Trees typically have one primary stem, which everything else branches off of. Shrubs are generally multi-stemmed, with no single stem being distinguishable as primary compared to the others.

Size can be a factor as well. Trees are generally considered to be larger, and shrubs are typically smaller. These are vague terms though, and there is much overlap in the middle.

Challenge: Some wildflowers only send up a single stalk. Does this make them trees? Why or why not?

Branching Structure

Alternate

Opposite

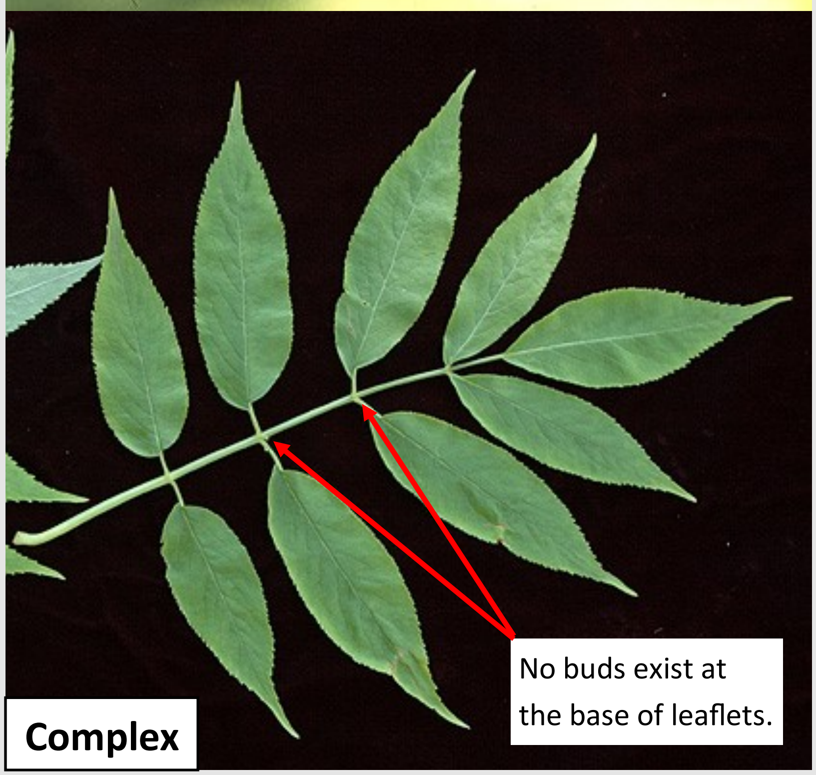
The point where a leaf or branch grows out of the stem that holds it is called a ‘node’. In most plants, these nodes are arranged in a regular pattern, called the ‘branching structure’.

The two most common branching structures are ‘alternate’ and ‘opposite’.

Alternate: One leaf or branch comes out of each node. At the next node, it will branch in the other direction. This creates an *alternating* pattern.

Opposite: Two leaves or branches come out of every node, on *opposite* sides of the stem from each other.

Leaves — Simple or Complex?

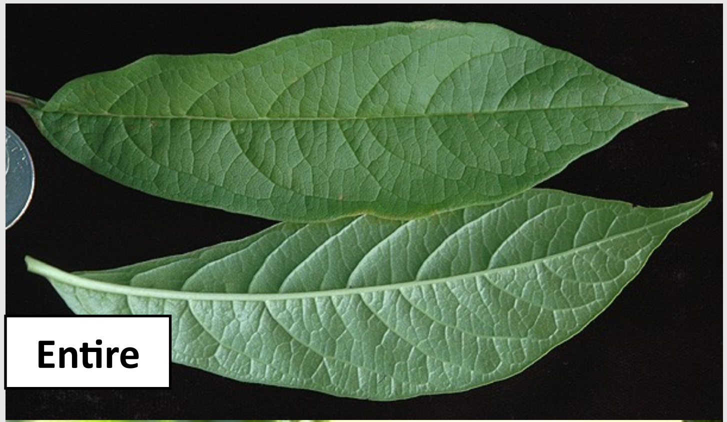


All leaves can be classified as either simple or complex. It is an important part of describing different plants.

Simple: A simple leaf will only present a single leaf-like structure once it branches off the node it came from. It may have distinct lobes, like the Oregon white oak leaf pictured here. However, unless those lobes reach all the way to the midvein in the center of the leaf, it is still considered a simple leaf.

Complex: A complex leaf will present multiple leaf-like structures once it branches off the node it came from. These smaller structures are called 'leaflets'. The thing to watch for is that leaflets lack a bud, since they're all part of the same leaf. True leaves will always be coming out of a node with observable buds or bud scars.

On the Edge — Leaf Margins



Another important feature of leaves to describe is their edges, which are called ‘margins’. There are a many different types of leaf margin, but some of the most commonly encountered are ’entire’, ’lobed’ and ‘serrated’.

Entire: The simplest leaf margin. ‘Entire’ leaves are smooth all the way around their edges, with no significant shapes or textures. It is the archetypal leaf.

Lobed: Leaves with lobed margins have irregular shapes, with distinctive projections, or lobes, that are separated by valleys that stay much closer to the midvein of the leaf.

Serrated: A serrated leaf margin has a sharp, jagged texture that resembles a saw blade. A consistent texture is called ‘serrated’, but a less dense pattern, with only occasional points, is called ‘toothed’.

Leaf Margins — Combining Traits

One thing to watch out for: Sometimes leaf margins exhibit more than one trait.

For example, how would you describe the margins on the vine maple leaf pictured to the left? Would you say it has lobed margins? Or would you call them serrated (or possibly toothed)?

The answer is both! Vine maple leaves are characterized by lobed, serrated margins.

Careful though! Not every trait can be combined. For example, a leaf with entire margins by definition cannot have serrations, lobes, or other marginal traits.

Leaf Shape

In addition to describing a leaf's margins, it is important to note its basic shape. As with margins, there are a wide range of leaf shapes that exist. However, the binary of 'palmate' or 'pinnate' is often a good way to start, and can usually give people a firm sense of what you're talking about.

Palmate: A palmate leaf will 'spread out' from the leaf stem, like the palm of a hand spreading its fingers out. They are often wider towards the leaf stem, but not always.

Pinnate: A pinnate leaf tends to extend away from the leaf stem in more of a line. Think of a needle or a pin. They are usually longer than they are wide.

Botany Lingo: The technical term for a leaf stem is '**petiole**'. Don't get confused if you hear or read this in a plant's description.

Test Your ID — Describe This Leaf

Is this leaf simple or complex?

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Is this an alternate or opposite branching structure?

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Pacific ninebark (*Physocarpus capitatus*), a native shrub. Delicate white flowers not blooming in this picture would reveal it to be an angiosperm.

How would you describe the leaf's margins?

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Is this leaf palmate or pinnate?

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