

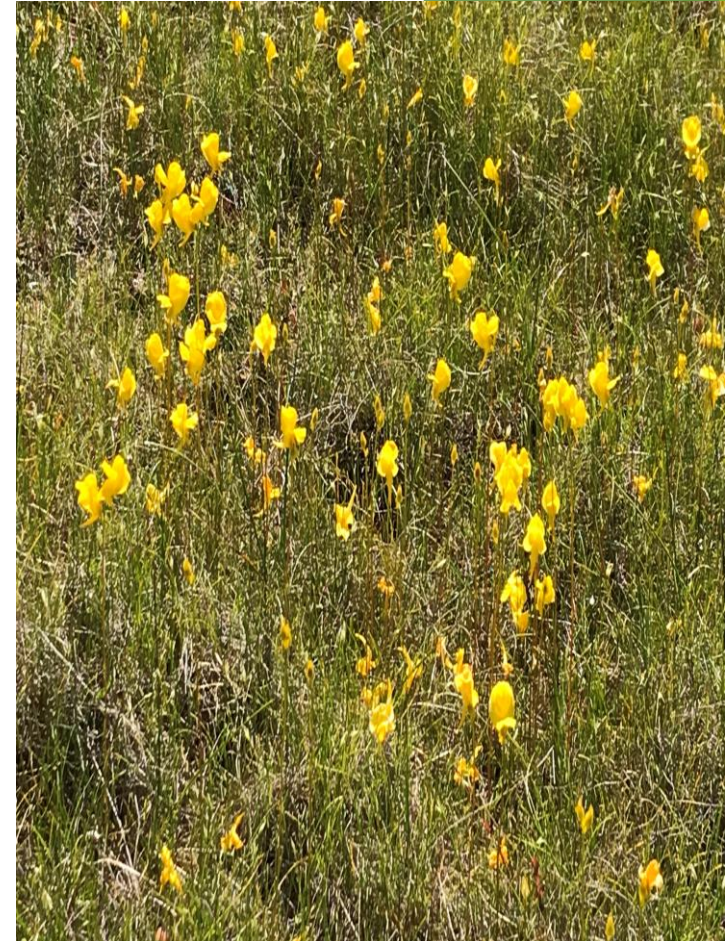


Introduction to Plant Identification

Module #2 - Plant Parts: Buds,
Leaves, Flowers, and Bark



The National Association
of Wetland Managers
welcomes you to this
remote training in
coordination with the
Region 5 Tribal Wetlands
Working Group and EPA
Region 5.



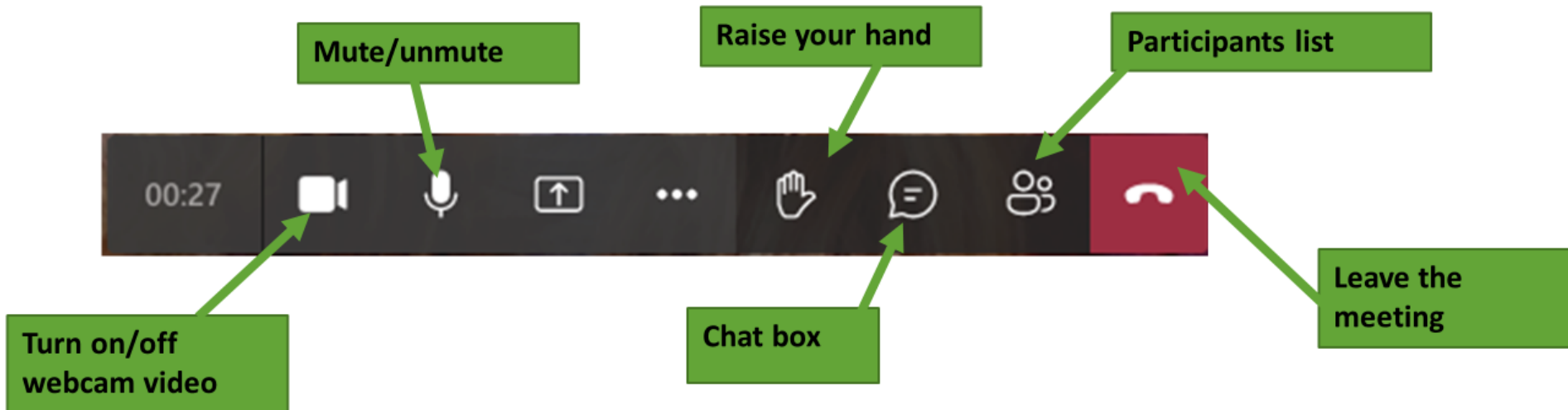


Agenda for Today's Training

- ▶ Welcome and Introductions (5 minutes)
 - ▶ Training Presentation (55 minutes)
 - ▶ Question & Answer Session (25 minutes)
 - ▶ Wrap Up and Reminders (5 minutes)
-
- ▶ Note today's session is being recorded and the recording will be shared with all Region 5 TWWG members.

Microsoft Teams Meeting Panel

Participating in a meeting



Audio and Video: You can mute yourself and turn your video off.

Raise your hand: To ask a question.

Chat box: If preferred, you can ask questions via the chat box as well. Everyone in the meeting can see what you type in the chat box and NAWM staff will be monitoring the chat.

Participant list: Allows you to see everyone who is attending the meeting.



Jeff Lapp, Sr. Science Policy Advisor for NAWM will be the presenter for today's *Module #2* training.

This training is made possible through a Cooperative Agreement with U.S. EPA Region 5.

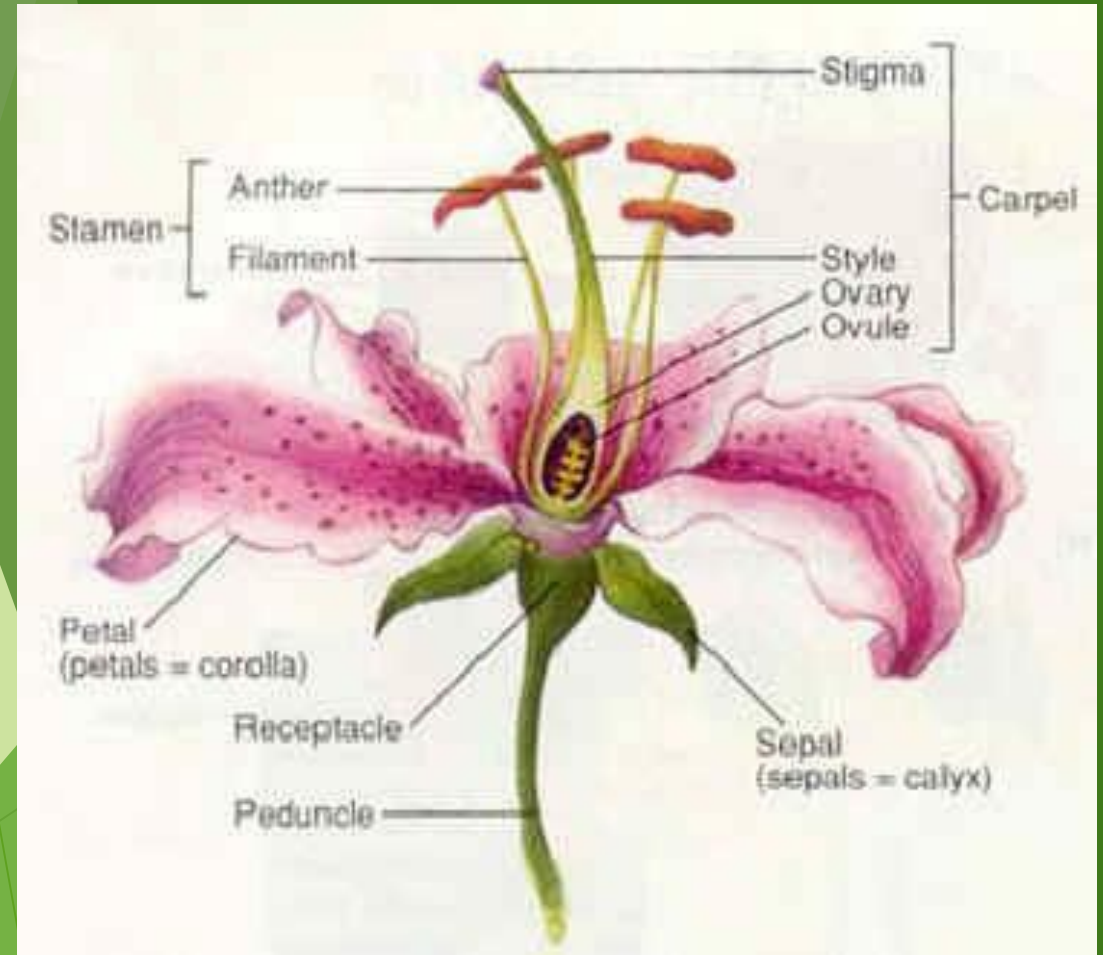
Module #2 training will review:

Plant parts and key identification features including:

- ▶ Flower parts and structures.
- ▶ Leaf forms, description, and assemblages.
- ▶ Plant buds, types, Scars, pith and characteristics.
- ▶ Bark structure and characteristics.
- ▶ Thorns or Prickles.
- ▶ Conifers.
- ▶ Ferns.
- ▶ Sedge, grass, rush.
- ▶ Fruit
- ▶ Aids to identify Genus and Specie groupings (Hints).

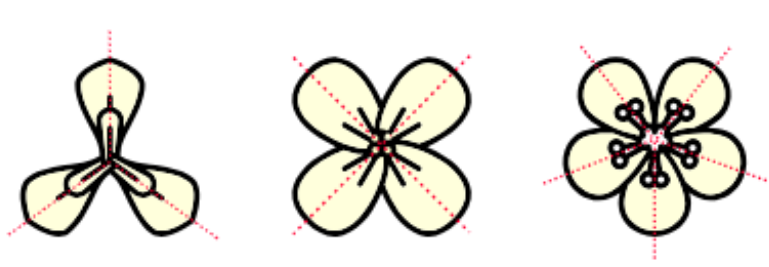
Note: This training is intended as an introduction to plant identification and is geared to the novice botanist or as a refresher for others.

Flowers:



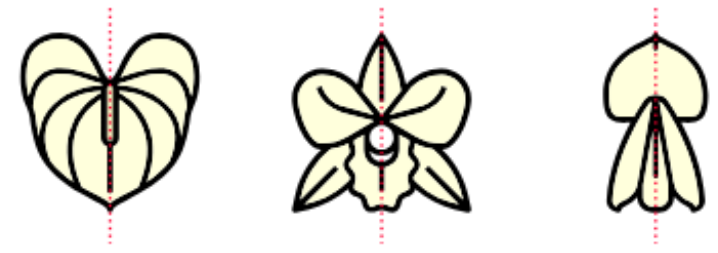
Radial Symmetry

Actinomorphic
multiple planes of symmetry



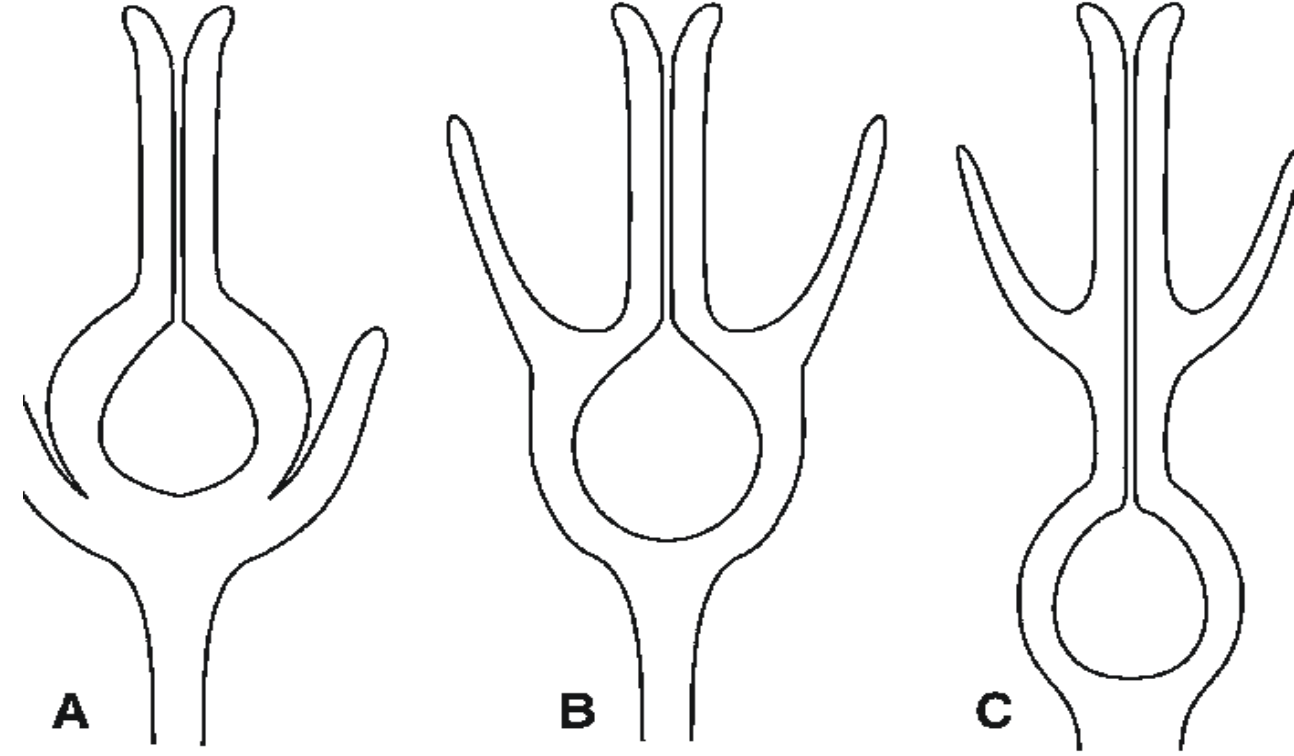
Biateral Symmetry

Zygomorphic
one plane of symmetry



Asymmetry

no plane of symmetry



(A) Superior. (B) Inferior. (C) Inferior with neck

Flower symmetry and ovary positions

Some Common Inflorescences



Catkin



Raceme



Corymb: compound



Spadix



Head



Spike

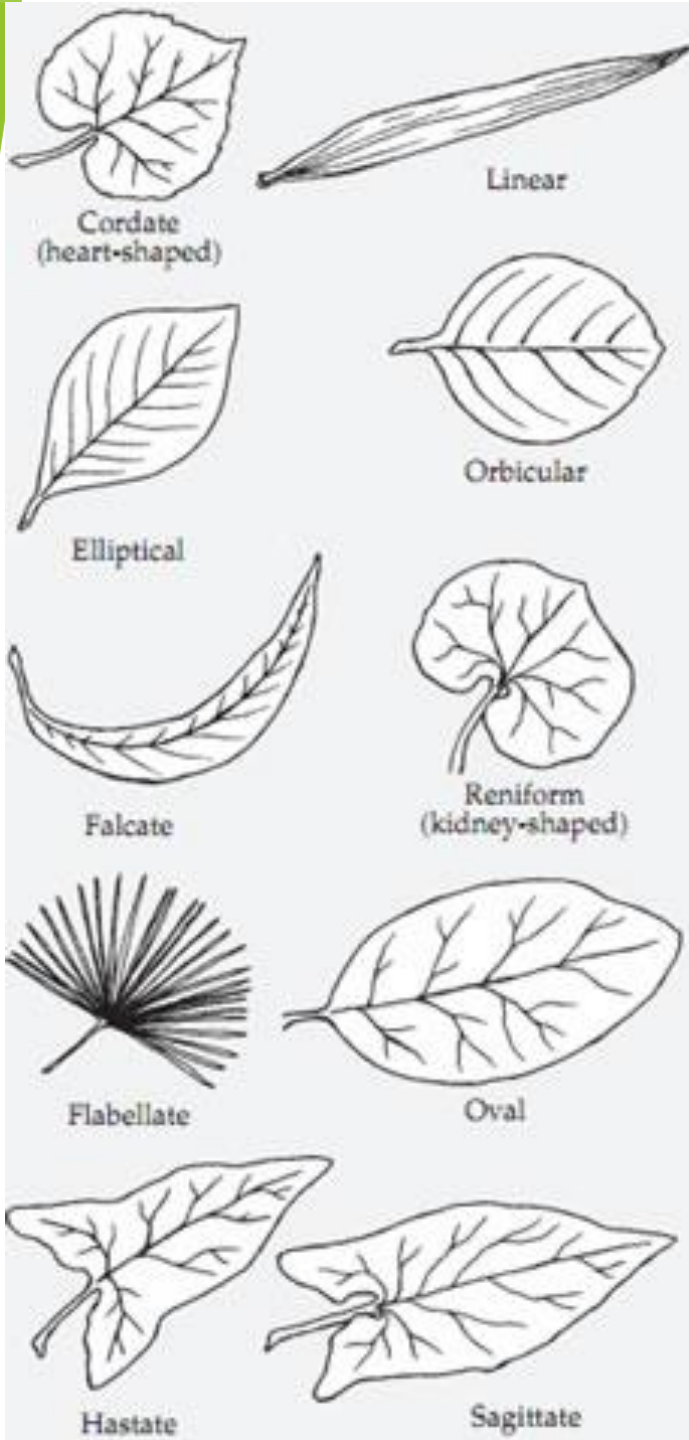


Umbel

Flower Inflorescences:



©JK Mariow

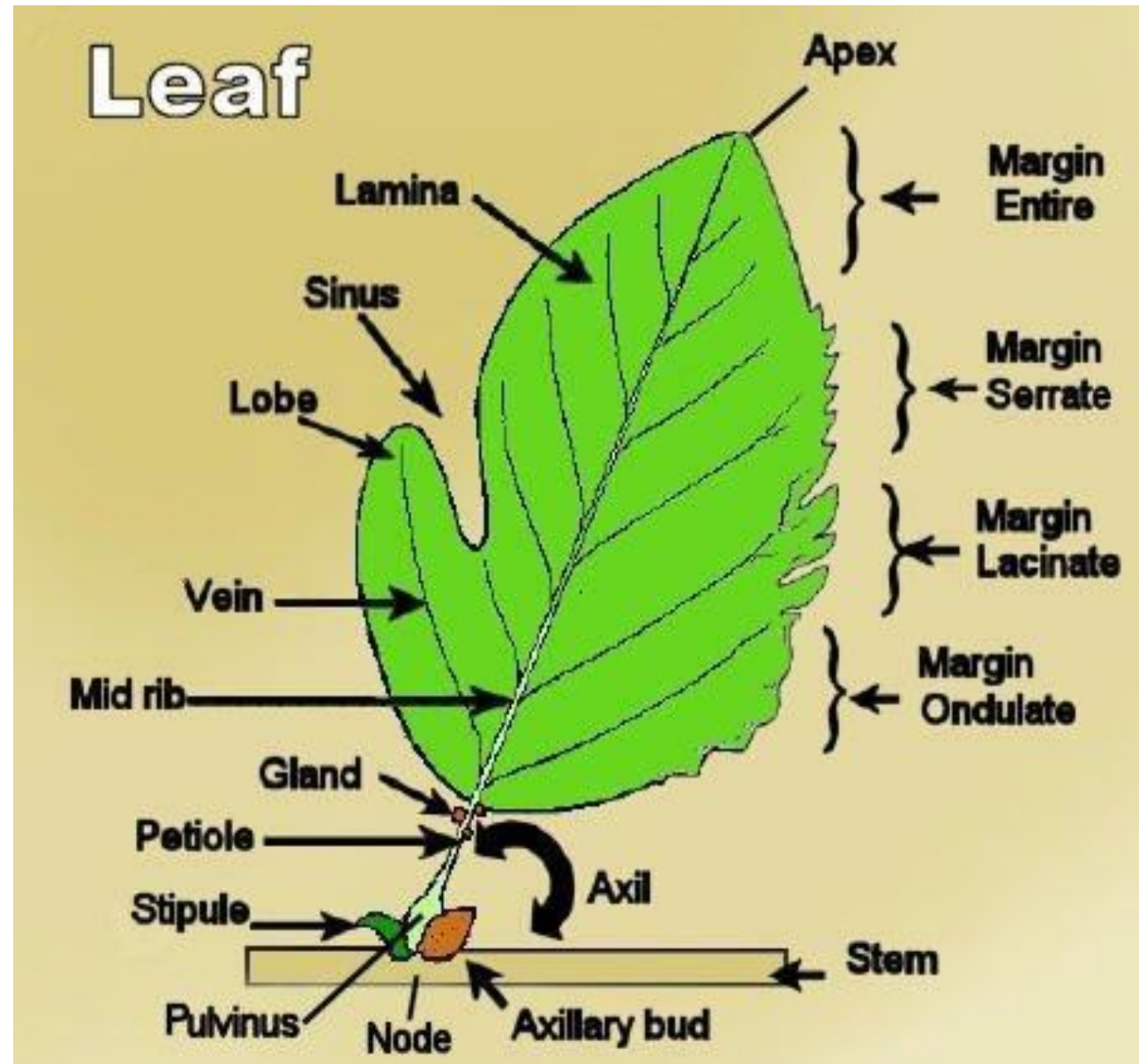


Leaves:

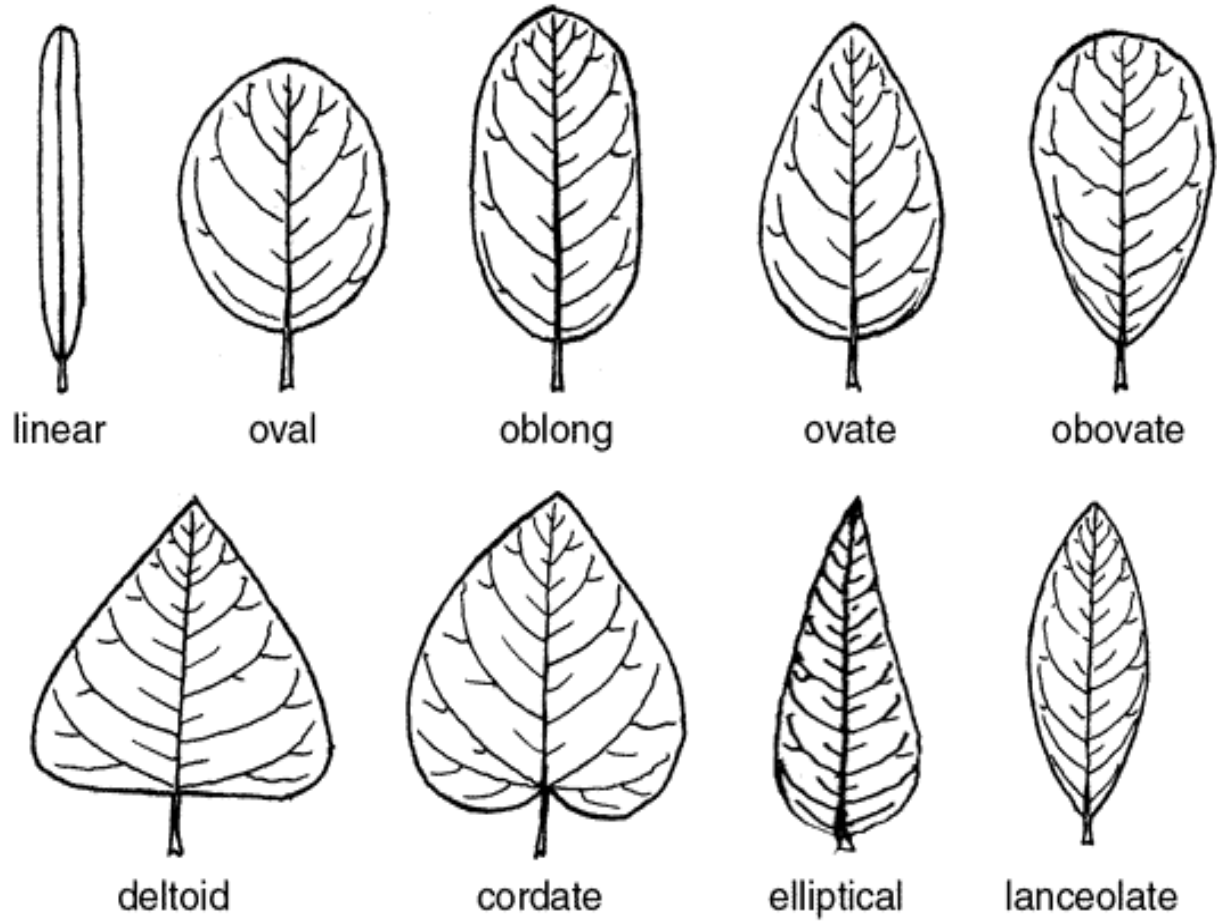
Shapes,
arrangement,
margins, etc.

Leaf Morphology

- ▶ Describing the characteristics of leaves and their arrangement is a primary element in most identification guides.

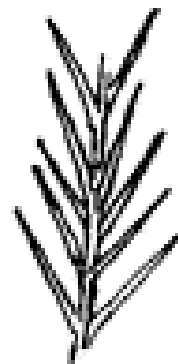


Broad Leaf Types:





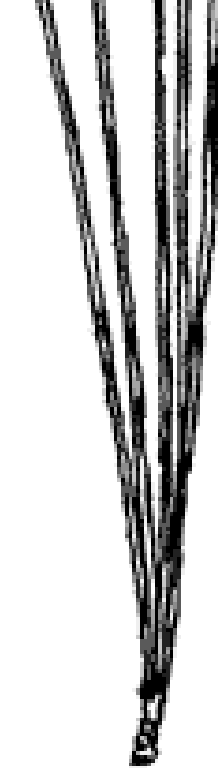
scale-like



awl-like



linear



needle-like

Leaf Types: Conifers

Leaf Margins:

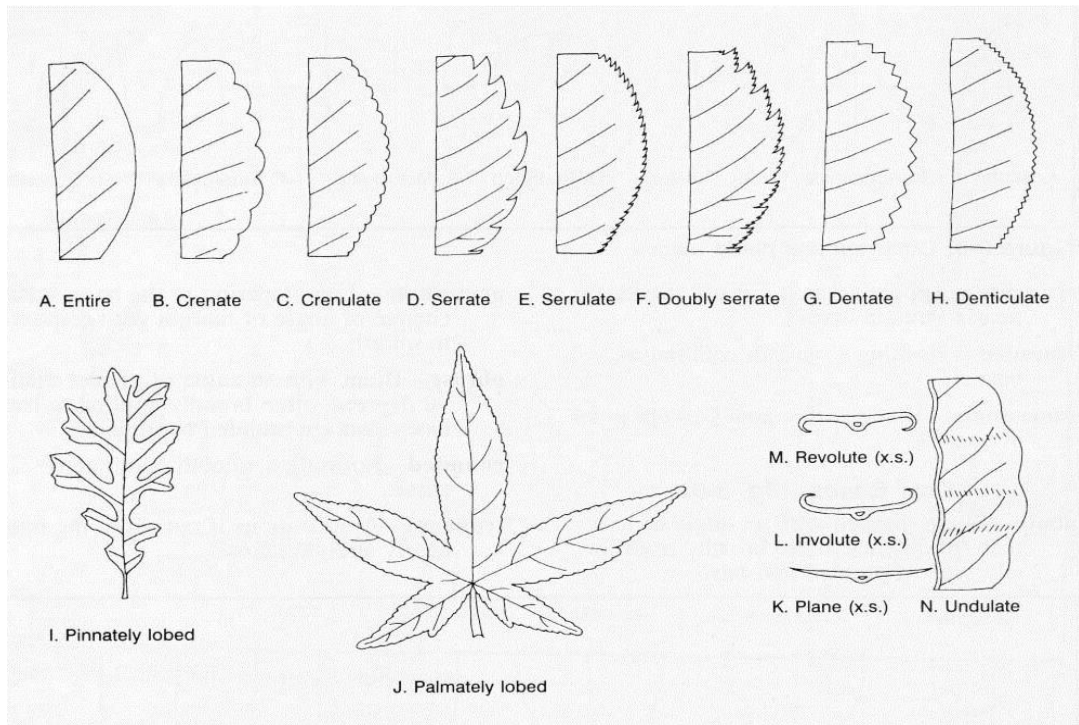
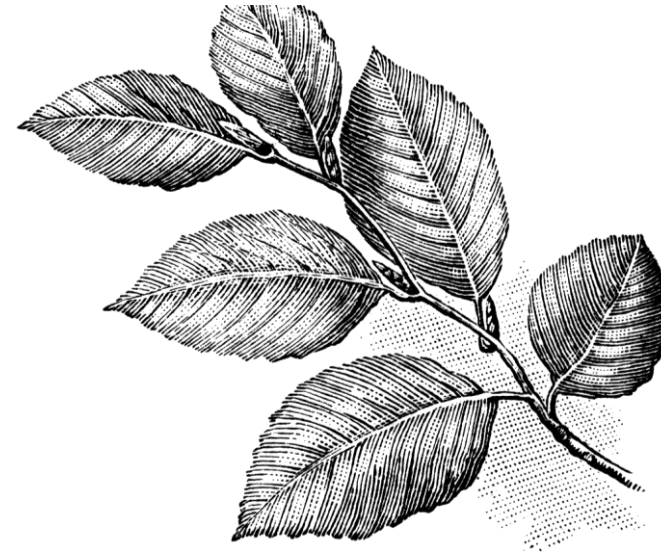


Figure 3-10. Common leaf blade margins.



acute



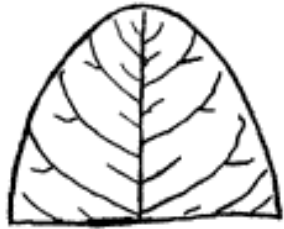
acuminate



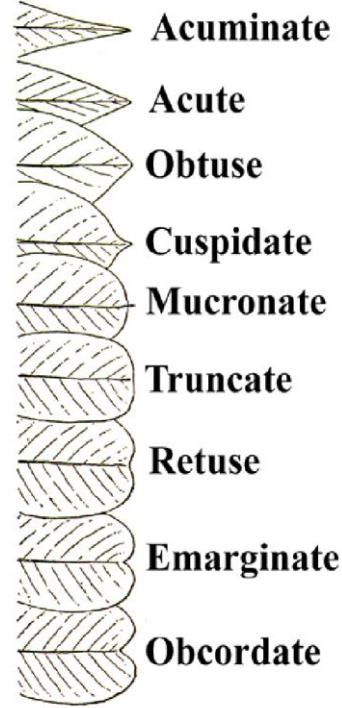
bristle-tipped



truncate



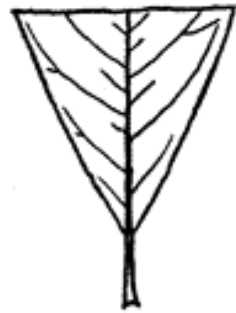
obtuse



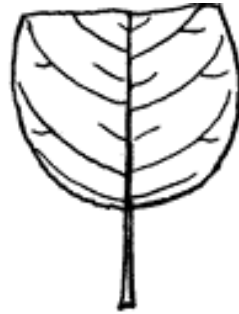
- Acuminate**
- Acute**
- Obtuse**
- Cuspidate**
- Mucronate**
- Truncate**
- Retuse**
- Emarginate**
- Obcordate**

Leaf Tips:

Leaf Bases:



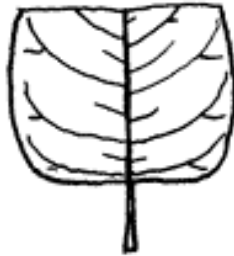
cuneate



obtuse



cordate



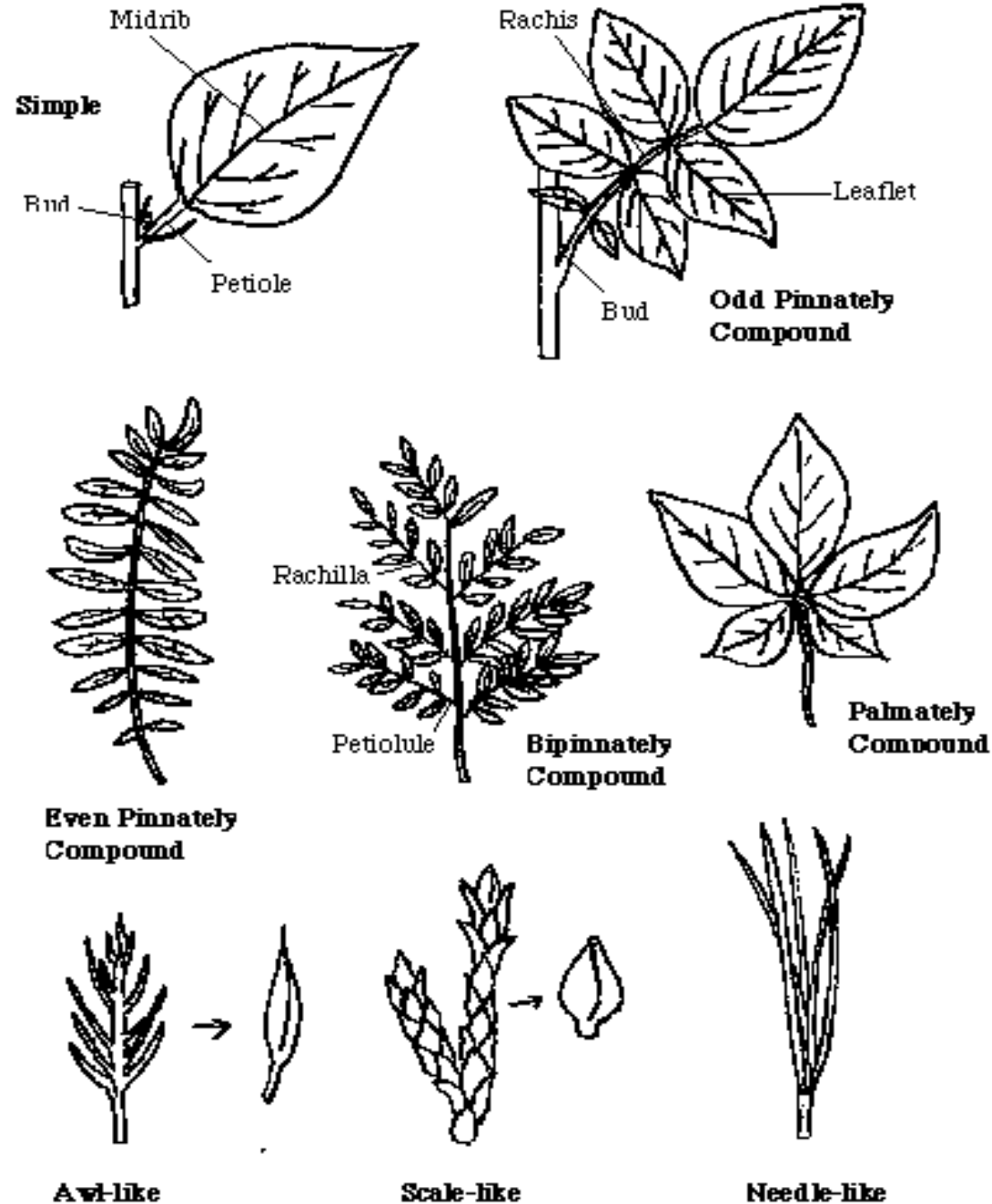
truncate



oblique

- ▶ **cuneate** – wedge-shaped
- ▶ **obtuse** – rounded
- ▶ **cordate** – heart-shaped
- ▶ **truncate** – squared or abruptly cut off
- ▶ **oblique** – asymmetrical, unequally sided

Leaf Types:





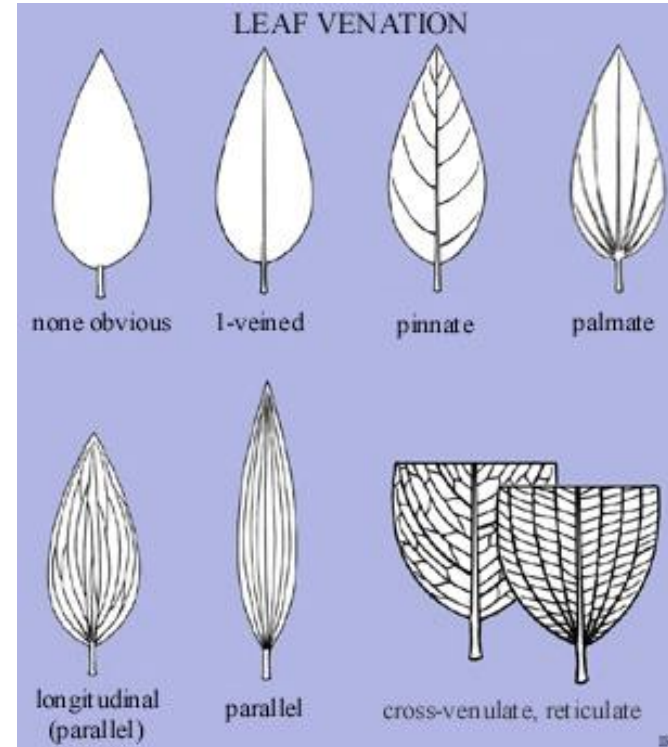
Alternate
(one leaf/node)



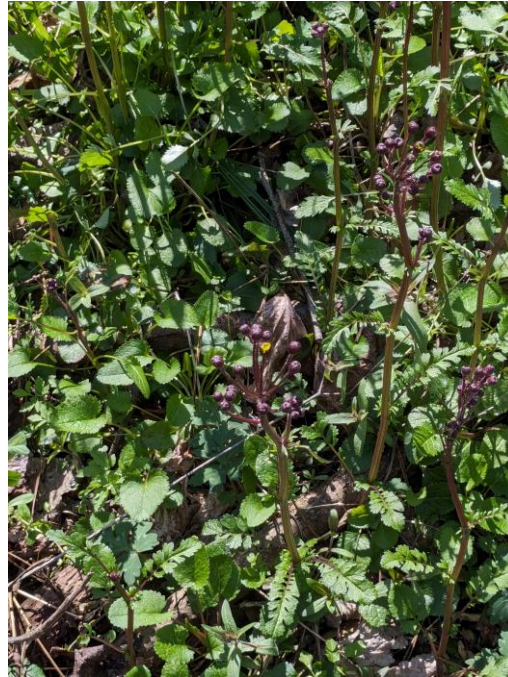
Opposite
(two leaves/node)



Whorled
(three or more
leaves/node)

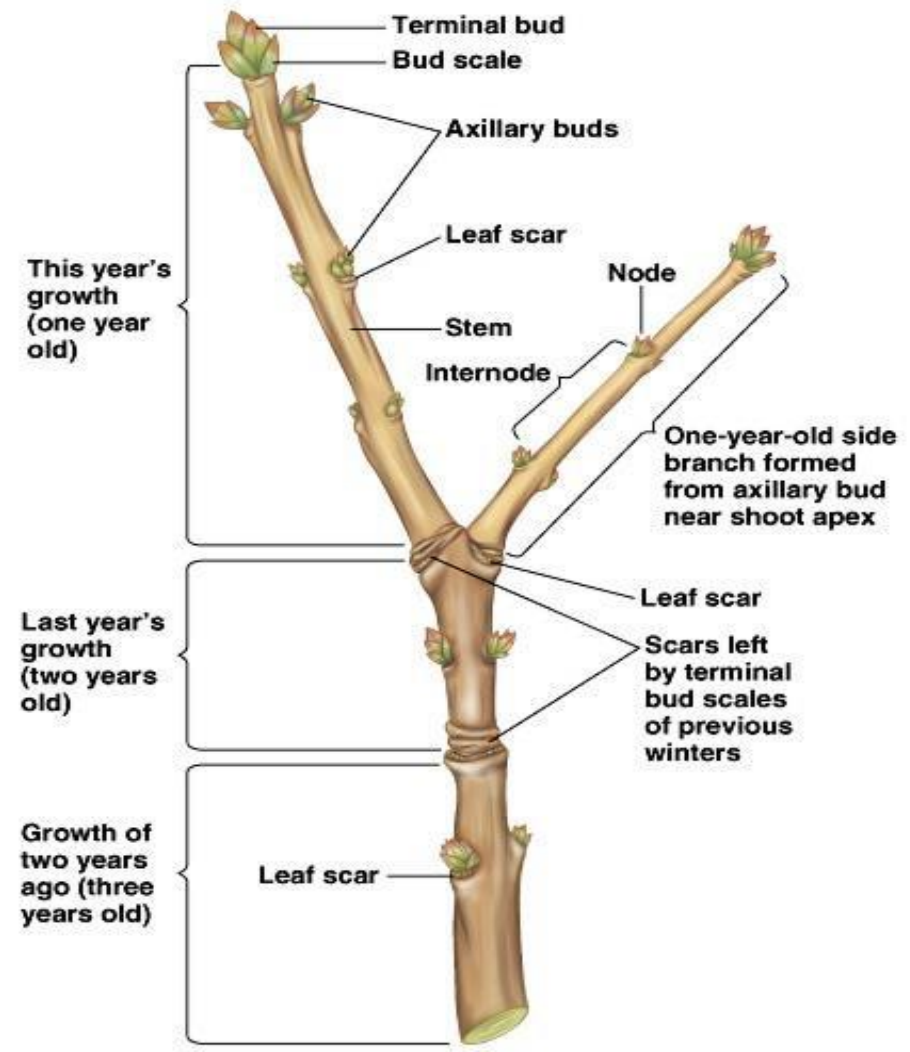


Leaf Arrangement and Venation:

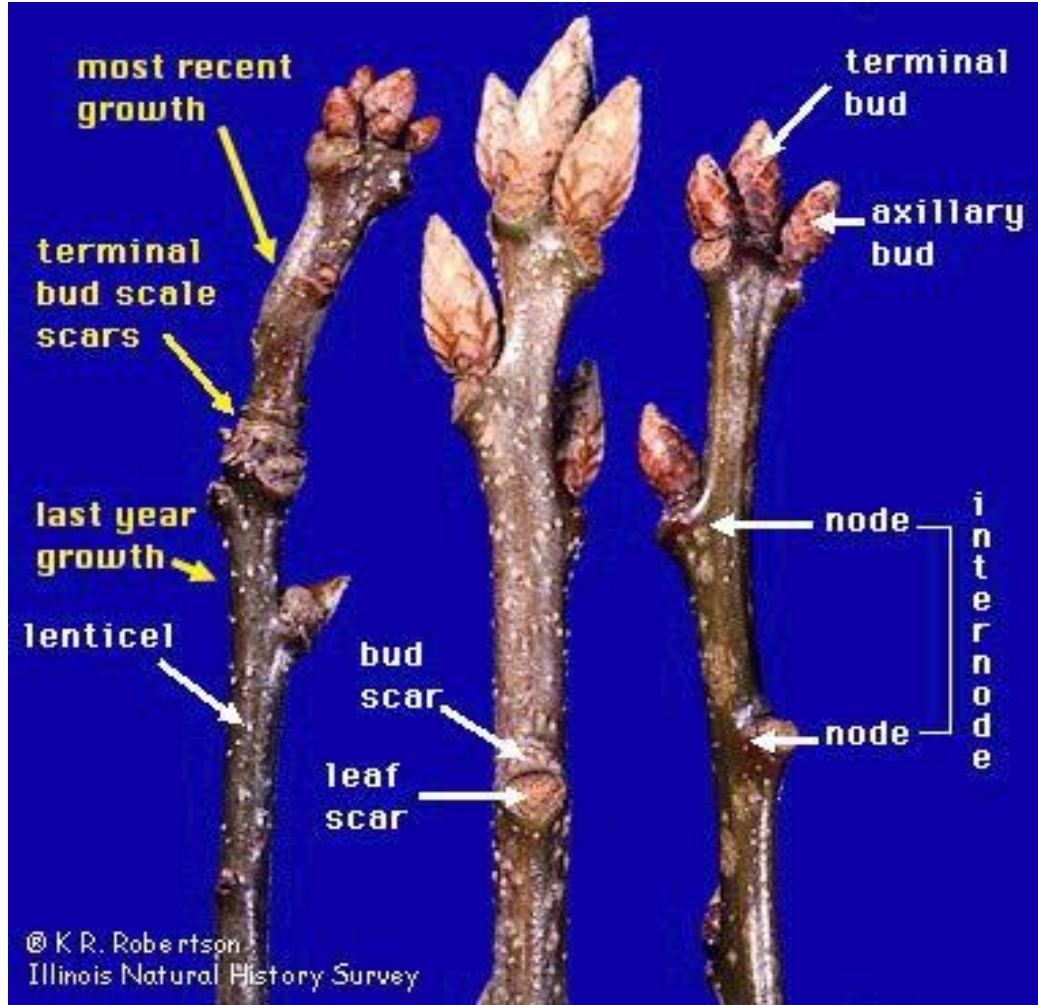


**Polymorphic, Basal, Shade Leaves:
All leaves are not created equally!**

Intro to Twigs: Twig Morphology

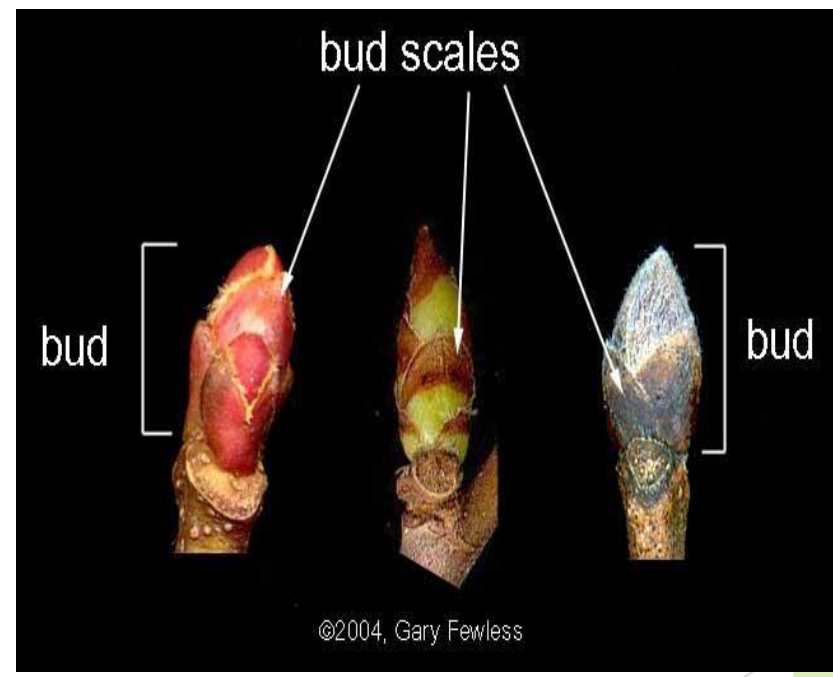
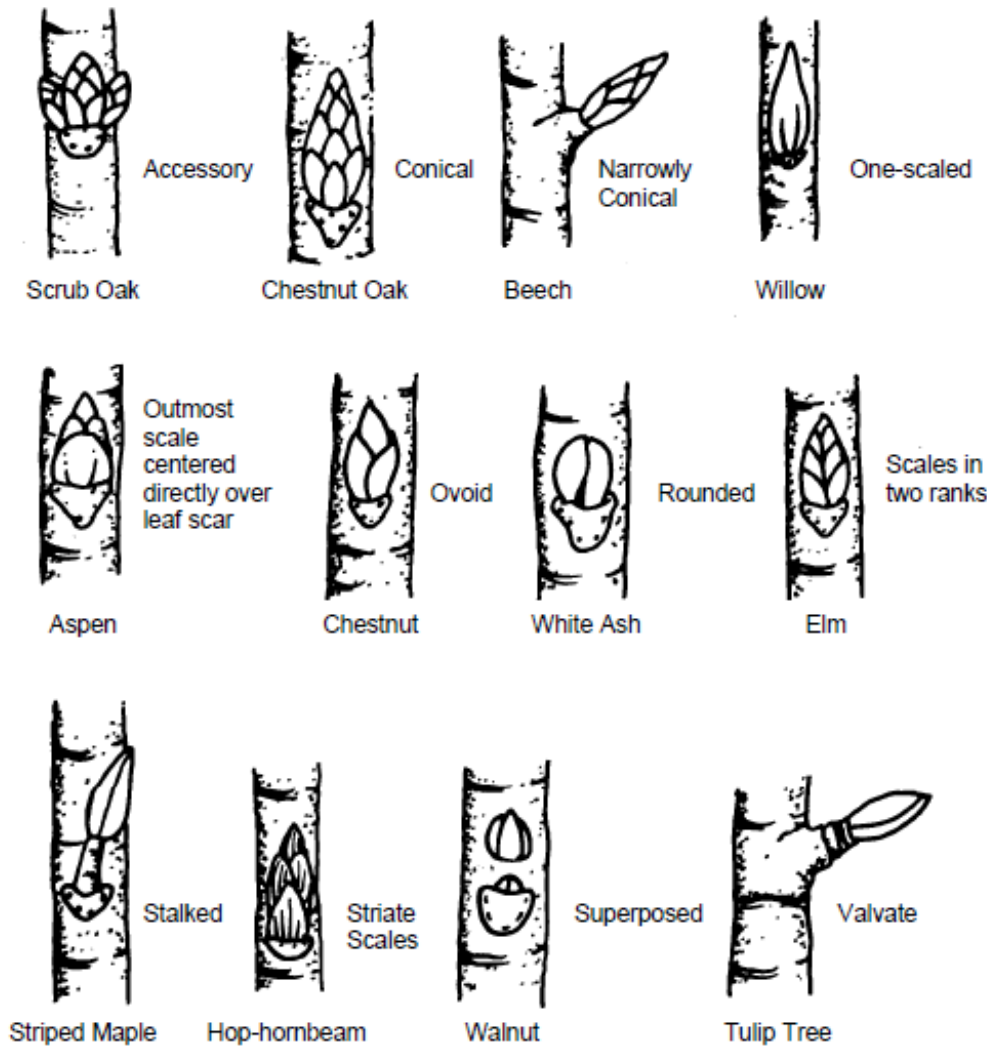


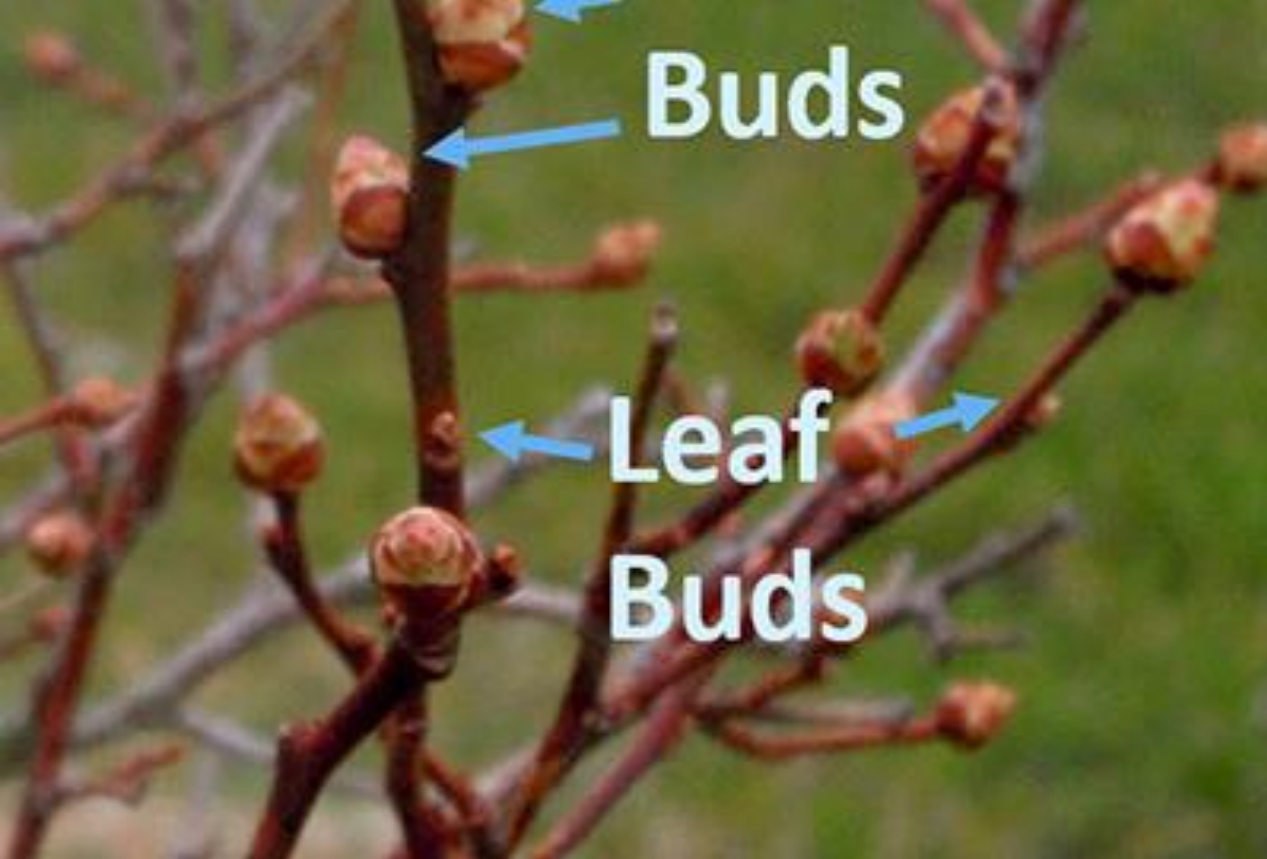
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Twig Morphology

Bud Terminology:





Leaf vs Flower Buds:



Bud Terminology:

- Accessory - An extra bud produced on either side of an axillary bud.
- Adventitious - Used to describe a bud that develops some place other than a stem node. From roots or crown tissue or rhizomes.
- Axillary - When the buds are located in the axil of a leaf.
- Dormant - Non growing buds, where growth is delayed due to winter or dry conditions.
- Flower bud - A stem tip with embryonic flowers. Magnolia, Cherry.
- Lateral - Produced on the sides of the stems instead of at the ends.

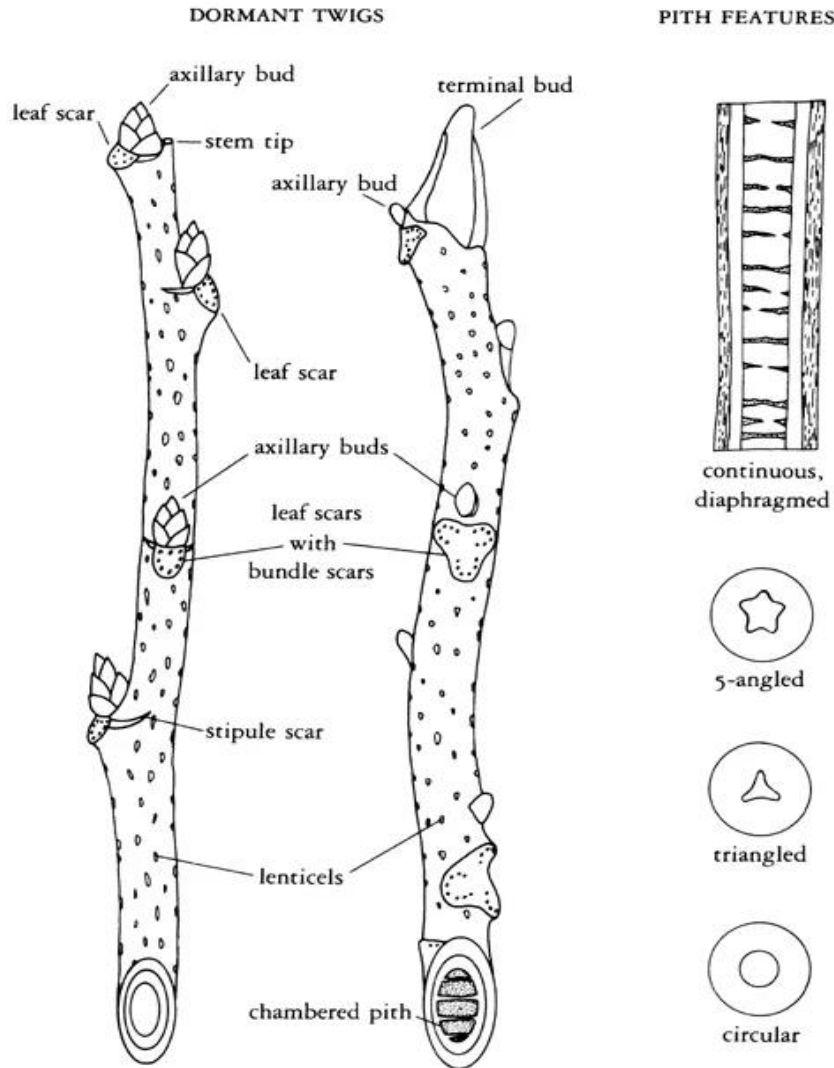


Bud Terminology (cont.):

- Leaf bud - A stem tip containing embryonic leaves.
- Mixed bud - Having both embryonic flowers and leaves.
- Naked - Not covered by a scaly covering.
- Pseudoterminal - Used for lateral buds that take over the function of the terminal buds, Common in persimmon.
- Reproductive - Having embryonic flowers.
- Scaly - Also called 'covered buds' which have bud scales that cover the embryonic flowers and/or leaves.
- Terminal - Buds at the ends of stems.
- Vegetative - Buds of embryonic leaves

Leaf and Bundle Scars plus Pith:

Vegetative Structures



► *Chionanthus virginicus*
(Round Leaf Scar)



Identifying Trees by Bark: Key to winter ID and specie confirmation:



Aspen

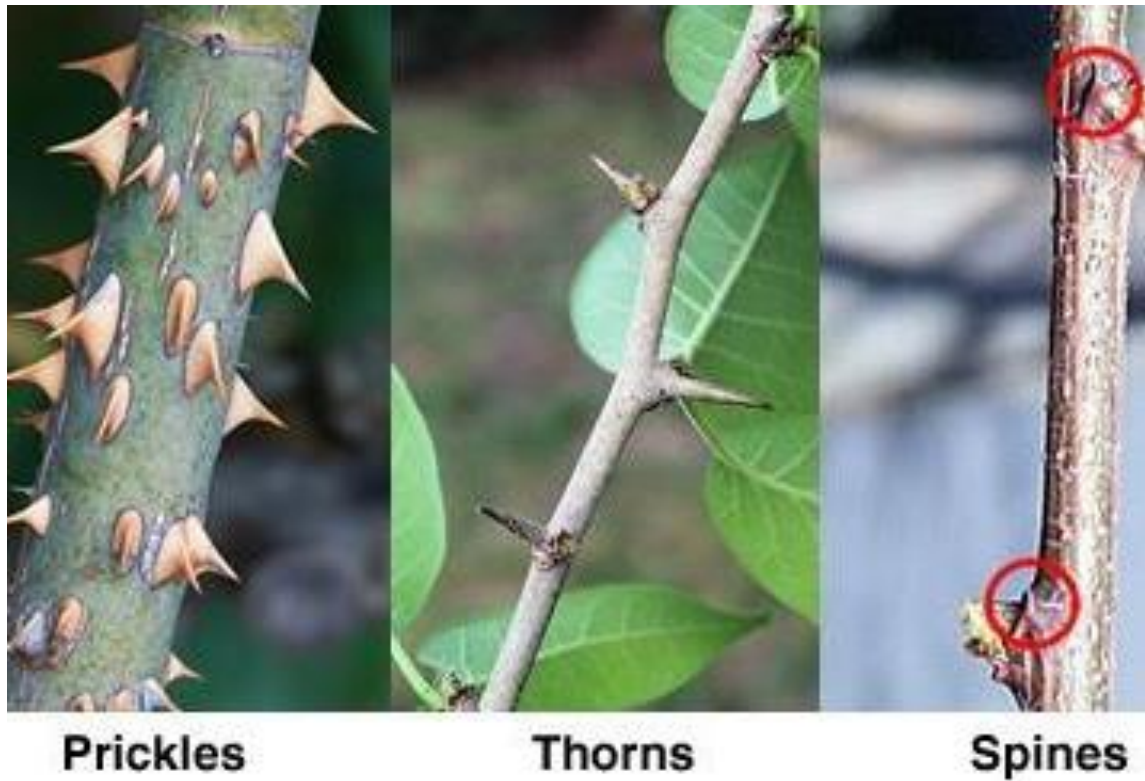


Paper Birch

Bark may look similar so
compare several trees:

**Rough, Smooth, Furrowed, Platy,
exfoliating, patchy, etc.:**

Prickles vs Thorns vs Spines: Often used interchangeably!



- ▶ Spines are from leaf tissue.
- ▶ Thorns are from stem tissue.
- ▶ Prickles are neither and are projections from the plant's skin.

Conifers : Cone-bearing, Subset of Gymnosperms: Pine, Fir, Cedar, Spruce, Larch, Sequoia.

- ▶ Usually evergreen.
- ▶ Fruit is a cone.
- ▶ Needle-like or scale-like leaves.




So many pines.....
Cones, Needle Bundles, Bark are
key for ID purposes.

Needle arrangements and attachment to stem:

- ▶ Fascicle - Pinus
- ▶ Spur Shoots - Larix, Cedrus
- ▶ Sterigmata - Picea
- ▶ Flattened Petiole - Abies

PINE, SPRUCE, AND FIR: HOW DO YOU TELL THEM APART?

PINE	SPRUCE	FIR
 <ul style="list-style-type: none"> Needles attached in clusters of 2, 3, or 5 	 <ul style="list-style-type: none"> Needles attached individually Needles are sharply pointed, square and easy to roll between your fingers Needles are attached to small, stalk-like woody projections that remain when needles shed 	 <ul style="list-style-type: none"> Needles attached individually Needles are softer, flat and cannot be rolled between your fingers

TREE IDENTIFICATION KEY

Tree has needles use.....use CONIFEROUS TREE KEY

Tree has broad leavesuse DECIDUOUS TREE KEY

CONIFEROUS TREE KEY

1. Needles in bundles or groups (2)

1. Needles single or flattened and scaly (3)

2. Needles in clusters of more than 5 needles.....Tamarack (*Larix laricina*)

2. Needles 2 to 5 per bundle: Pine species (see a-c below)

a. Five needles per bundleWhite Pine (*Pinus strobus*)

b. Needles in pairs, 3 to 4 inches long.....Red Pine (*Pinus resinosa*)

c. Needles in pairs, under 2 inches long, bark dark gray..... Jack Pine (*Pinus banksiana*)

3. Needles scaly and flattened (4)

3. Needles single (5)

4. Has cones, scales flat, branches fan-like.....Northern White Cedar (*Thuja occidentalis*)

4. Has berries, may have scaly and prickly needles on same tree, scales rounded..... Eastern Red Cedar (*Juniperus virginiana*)

5. Needles flat (6)

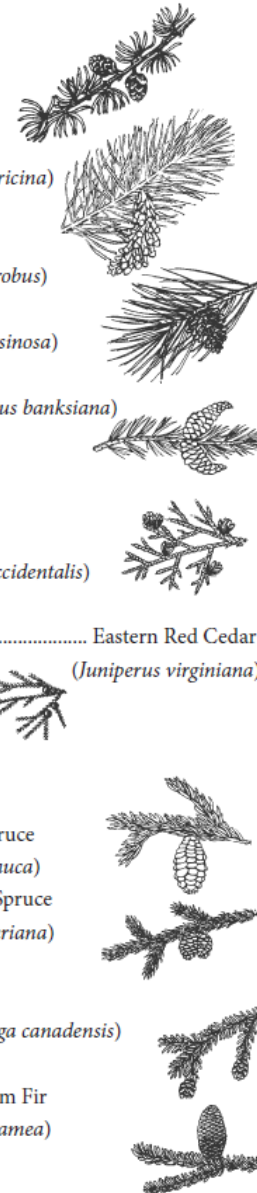
5. Needles square, 4-sided, stiff, sharp: Spruce species (see a-b below)

a. Needles 1/3 to 3/4 inch long, twigs hairless.....White Spruce (*Picea glauca*)

b. Needles 1/3 to 3/4 inch long, twigs have hair, grows in wet areas....Black Spruce (*Picea mariana*)

6. Needles 1/2 inch long with short petiole.....Eastern Hemlock (*Tsuga canadensis*)

6. Needles 3/4 inch to 1 1/4 inches long, no petiole, bubbles in bark.....Balsam Fir (*Abies balsamea*)



Ferns

- ▶ Spore producing plants.
- ▶ Frond Characteristics.
- ▶ Distinguishing Features of Sori and Leaves.

Some important features of a fern frond

costa
(midrib
of
pinna)

rachis
(midrib
of
blade)

pinna
(leaflet)

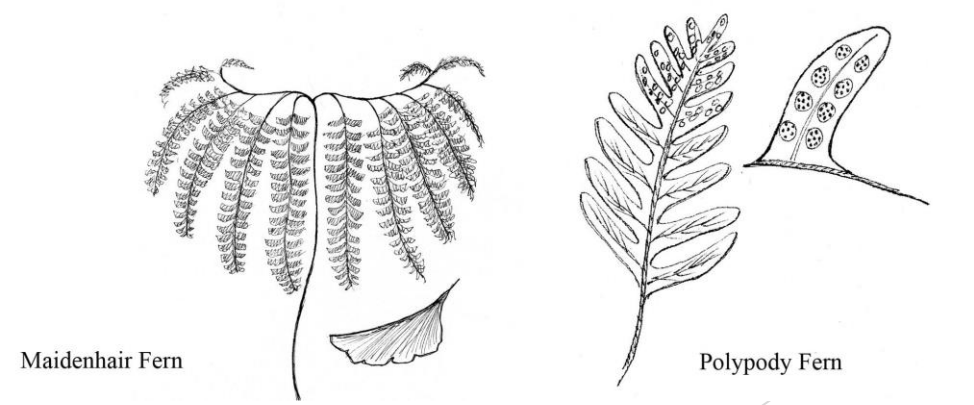
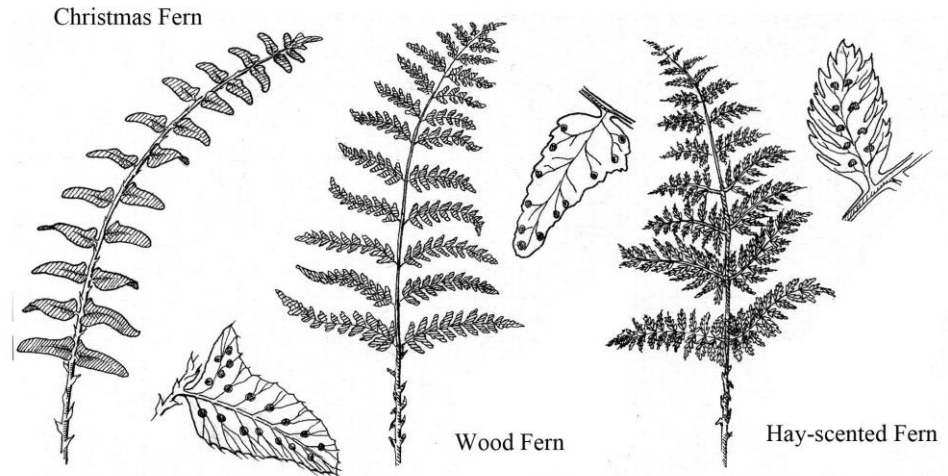
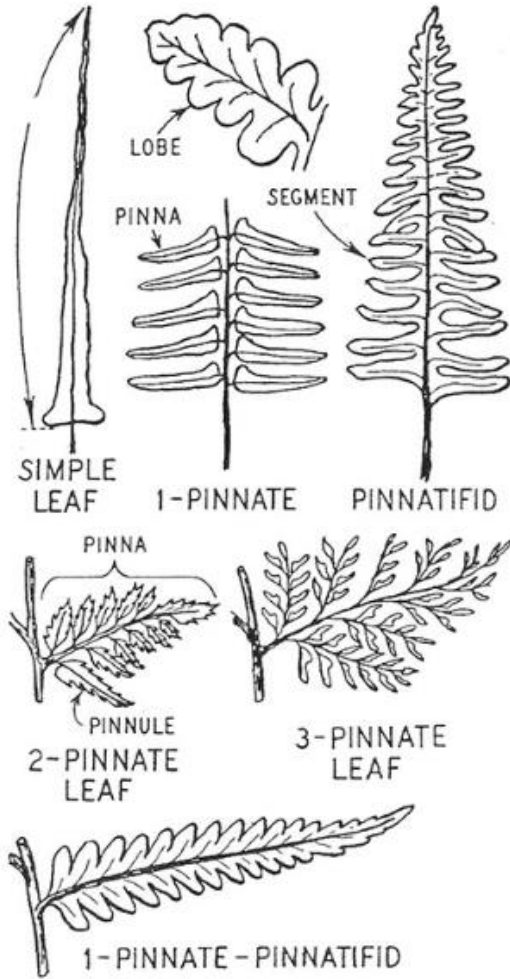
scales

blade
or
lamina

frond

stipe

Fern types and frond structures



Some ferns have separate fruiting fronds:



- ▶ Examples of ferns with fertile fronds:
- ▶ Deer Fern (*Blechnum spicant*)
- ▶ Cinnamon Fern (*Osmundastrum cinnamomeum*)
- ▶ Royal Fern - (*Osmunda regalis*)



Sori



- Fern sorus with immature sporangia

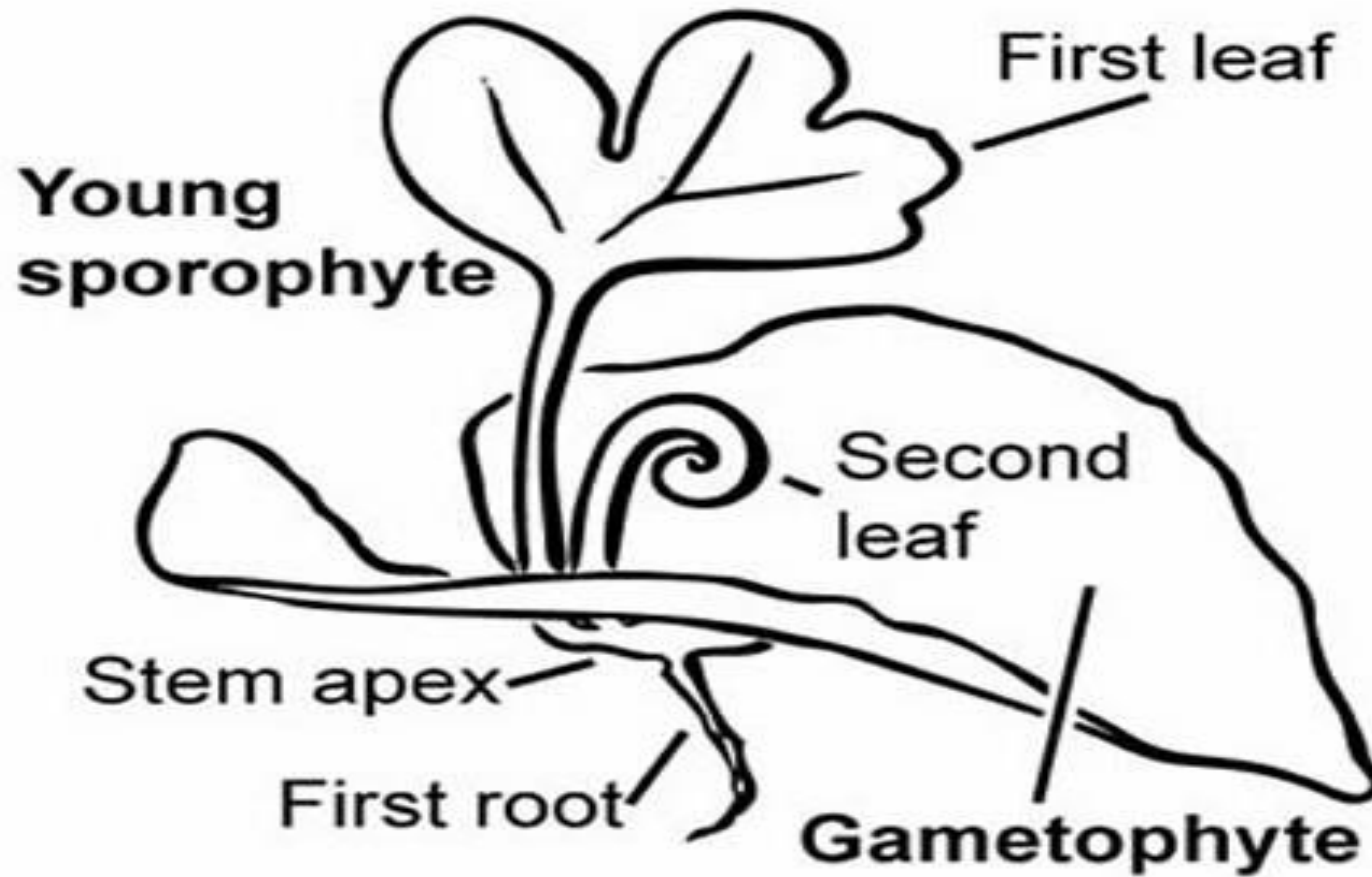
- Circular sori with mature sporangia



- Sori with indusia at different stages of development.

- Linear sori

Fern reproduction from a spore:





Sedges, Rushes, and Grasses:

*“Sedges have
edges,*

*rushes are
round and*

*grasses are hollow
right*

*up from the
ground.”*



Field Key to the Grasses, Sedges and Rushes

1. **Stems solid**, round in cross section, ligule diminutive or absent; leafless or narrow, rounded or grass-like leaf (sometimes leaves are limited to basal leaves or only sheaths on nodes); **flowers parts in 6**, persistent under the fruit; fruit a 3-seeded or many-seeded **capsule****Rushes**

1. Stems solid or hollow, round or triangular in cross-section; leaves more abundant, 2-, or 3-ranked; flowers parts reduced to scales or bracts (lemma or palea); fruit a grain (caryopsis) or achene.

2. Stems mostly **round and hollow**, **nodes** of stems (culms) **solid**; leaves **2-ranked**, sheath of leaf base usually **open**, ligule usually present; flowers in spikelets usually have **2 bracts** (glumes) at base; fruit a **grain** (caryopsis)**Grasses**

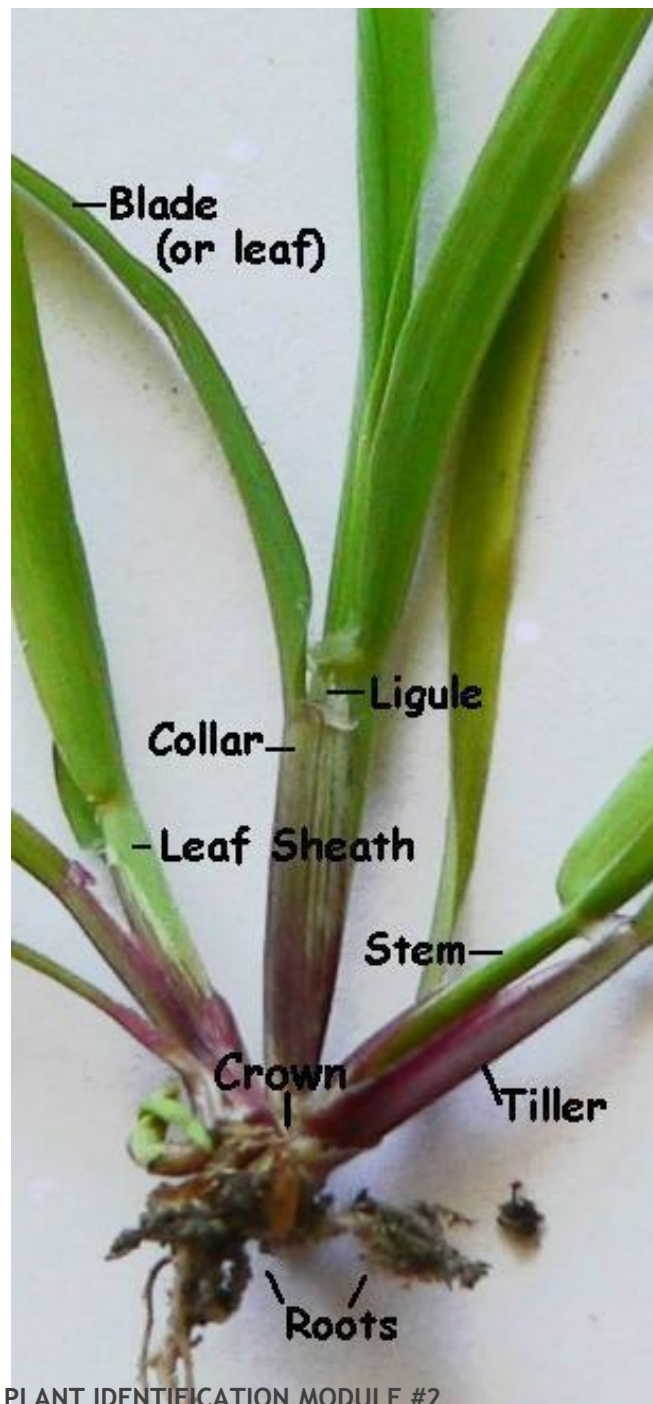
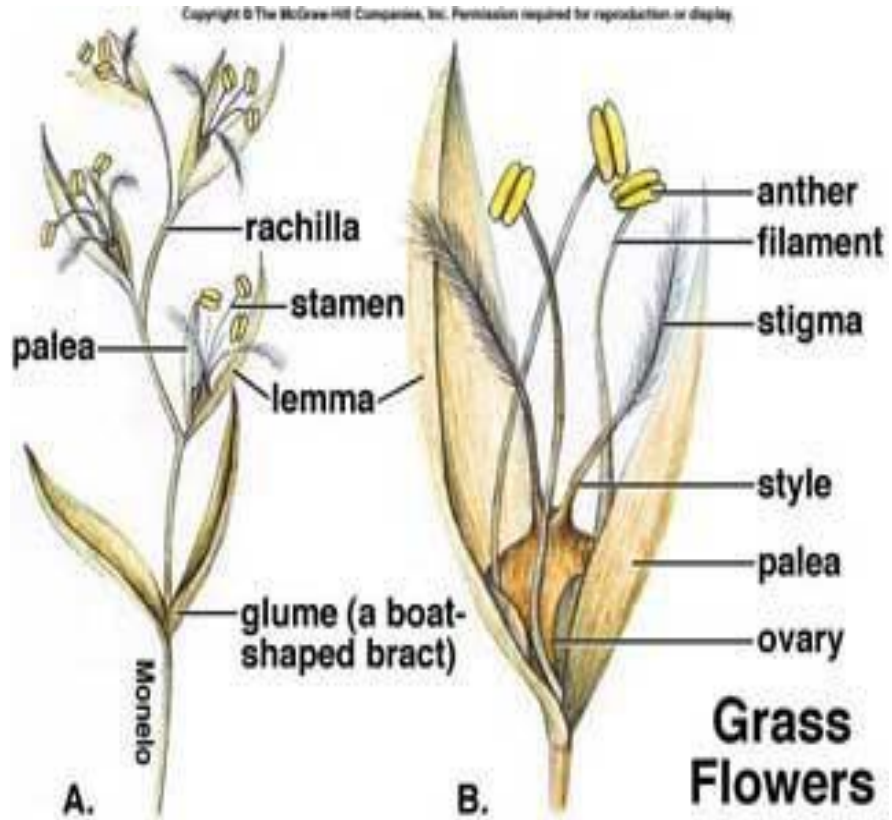
2. Stems mostly **triangular, solid**; leaves **3-ranked**, sheath of leaf base usually **closed**, ligule mostly lacking; flowers subtended by **1 bract**; fruit an **achene****Sedges**

Major Structural Differences



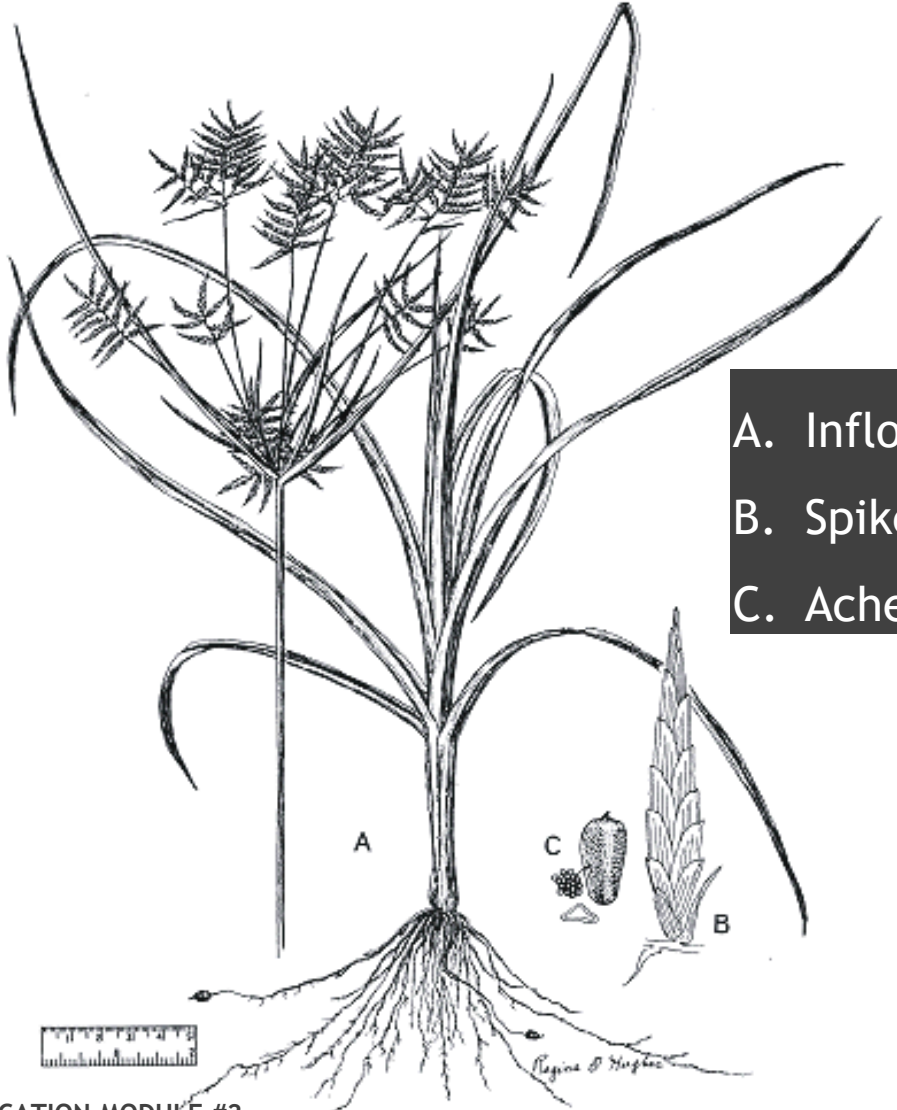
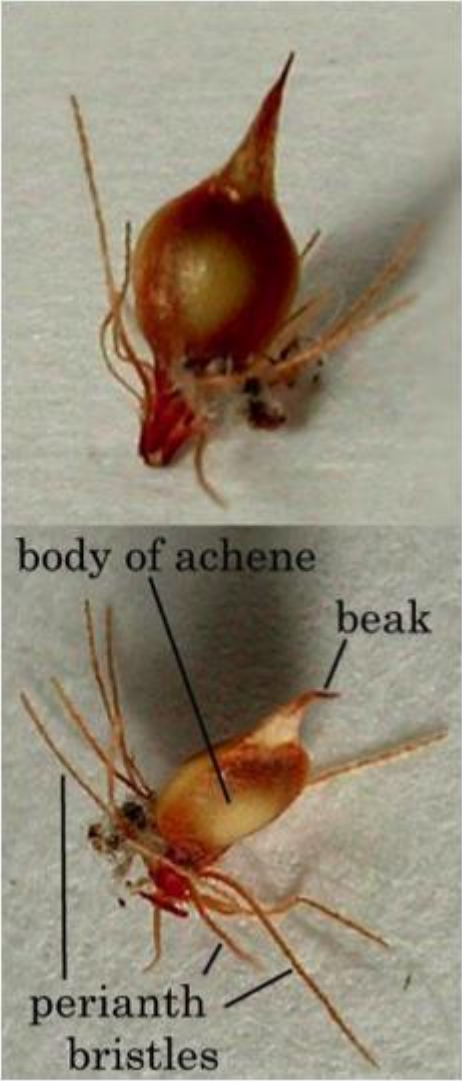
Character	Grasses	Sedges	Rushes
Stem or culm	Usually hollow, cylindrical or flattened	Filled with pith, rarely hollow, usually 3-sided	Filled with sponge-like pith, cylindrical
Nodes	Conspicuous (Jointed)	Indistinct	Indistinct
Leaf arrangement	Distichous in 2 vertical rows or ranks	Tristichous in 3 vertical rows or ranks	Tristichous in 3 vertical rows or ranks
Leaf sheath	Usually split, closed in a few species	Usually closed	Open or closed
Ligule	Present, rarely absent	Absent or weakly developed	Absent or weakly developed
Fruit	Grain	Achene	Capsule

Grass Structure:





Sedges



- A. Inflorescence
- B. Spikelet
- C. Achene

Common Sedge Genera



Eleocharis



Scirpus



Cyperus



Rhynchospora



Carex

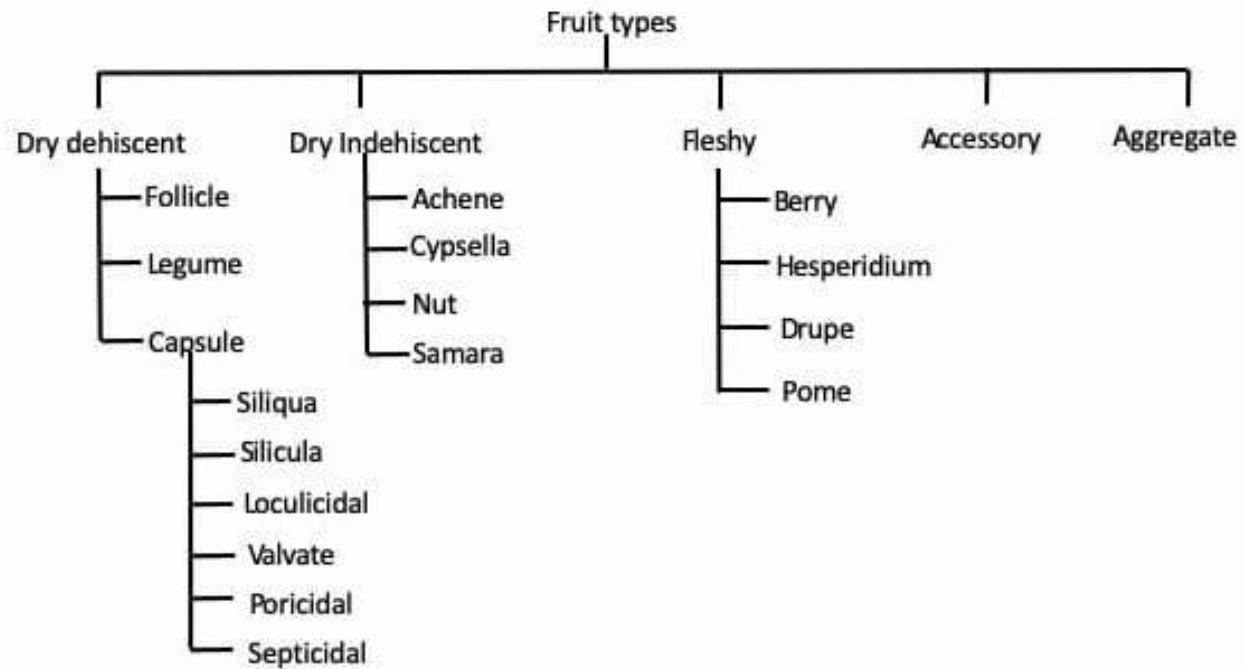
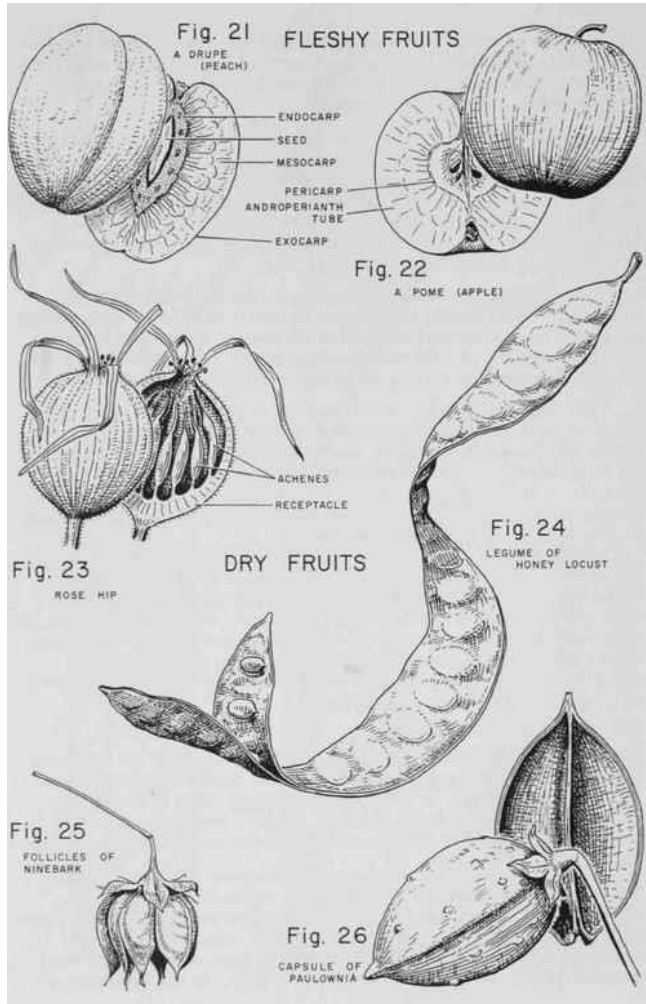


Rushes - Are Round!

Rush Structure: Fruit - Perianth



Fruits:



Hints:

- ▶ Leaf Form, Arrangement, Opposite, Alternate or Whorled. (Look at more than 1 and compare different plants leaves).
- ▶ Pines - Looks at number of needles in a bundle.
- ▶ Oaks - White Oak Group has Lobes and Red Oak Group has Points on Leaves. Look at Acorn Cap and Number in a Group.
- ▶ Winter ID - Bark, Twig Form and Color, Leaf and Bundle Scars.
- ▶ Fruit Types - Cone, Berry, Etc.



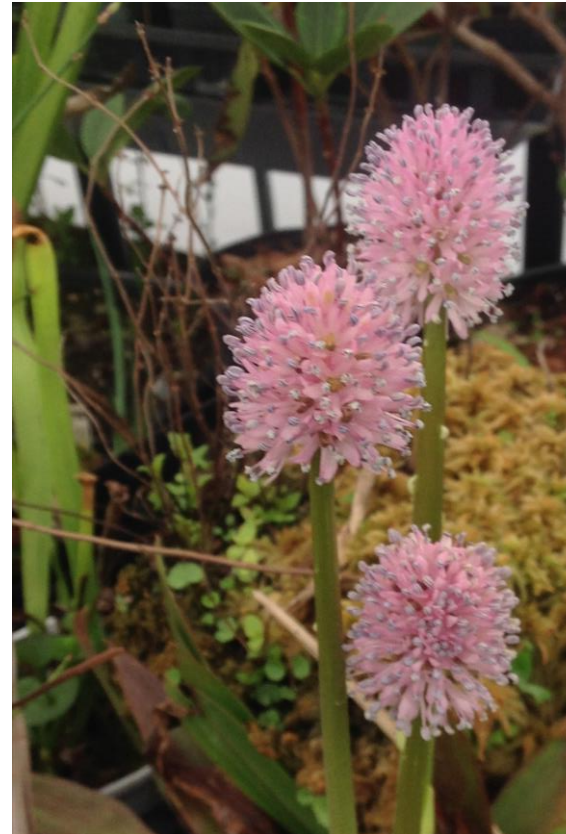
- ▶ Observe - not only plant parts but location, form, size etc.
- ▶ Take photos and or samples
- ▶ Fruit is key for many grass/sedge species ID
- ▶ Find your favorite key(s) and get familiar with its method
- ▶ Oaks like to interbreed
- ▶ Note that you may have a form/variety
No one can know every plant!
- ▶ Practice, practice, practice

Hints to Plant ID (cont.)



ntic / Module #2

Don't blame
me!
Blame the
plants!





This completes Module #2 of an “Introduction to Plant Identification”

- ▶ This series has been taped and will be available to serve as a refresher or for those unable to attend the “live” web course.
- ▶ Thank you for joining us for today’s training session, Module #2, an “Introduction to Plant Identification”