Botany for Gardeners

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What do you need to know?

Plant Morphology

- Plant parts and associated terminology

Plant Taxonomy

- How plants are named
- How to use a taxonomic key

Plant Morphology

Plants parts

Commonly used terminology

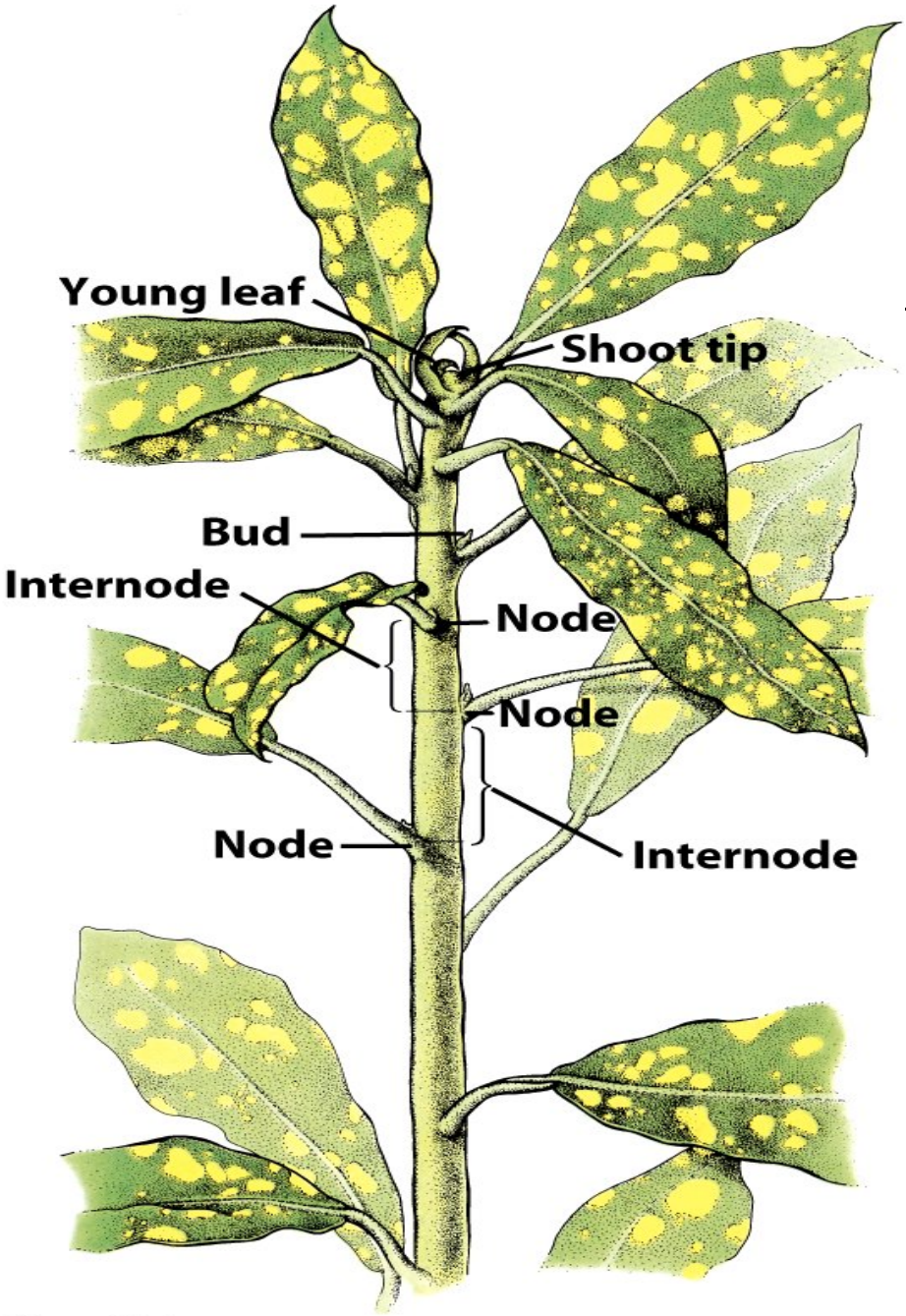


Figure 25-1
Biology of Plants, Seventh Edition

Plant shoot

Organs:

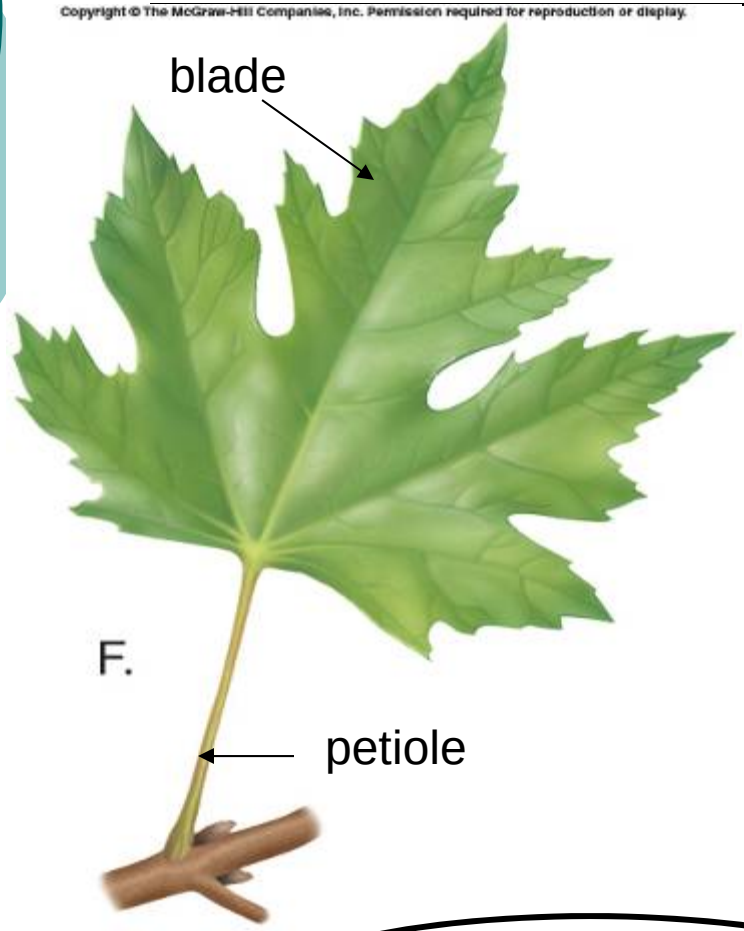
- Leaf
- Flower
- Stem
  - Nodes
  - Buds
    - Terminal
    - Axillary

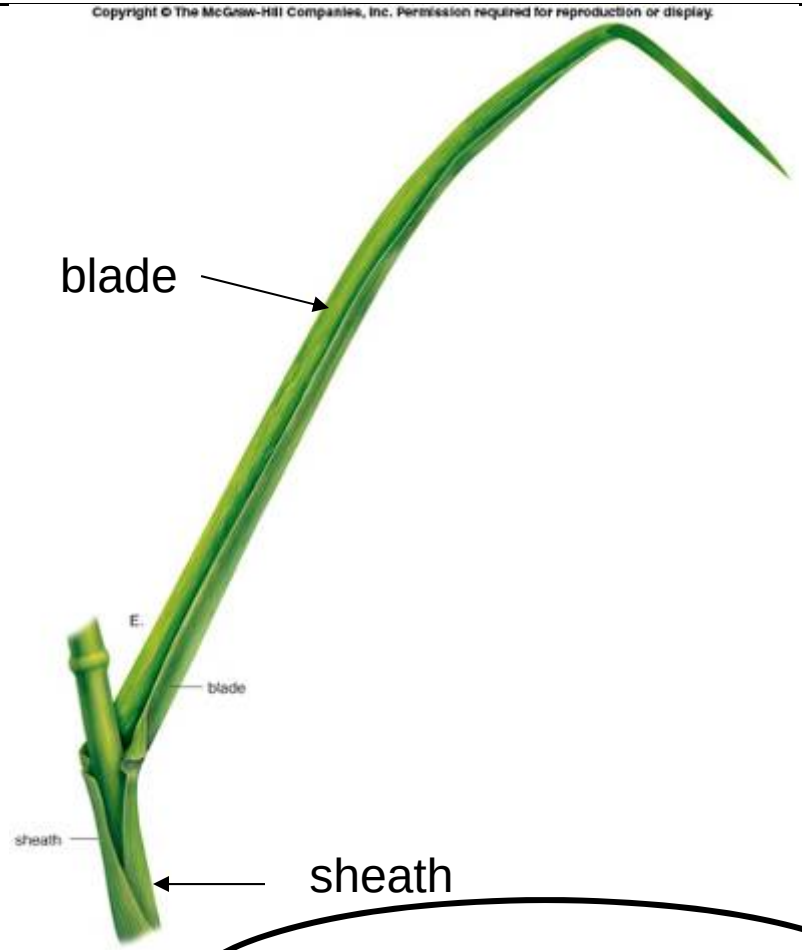
Leaves

- Leaf Types and Leaf Parts

- Terminology:
  - Simple vs Compound
  - Pattern of attachment to stem
  - Venation pattern

Two Basic Leaf Types in Flowering Plants





Broadleaf = eudicot
Netted veins

Grass = monocot
Parallel veins

Simple leaf

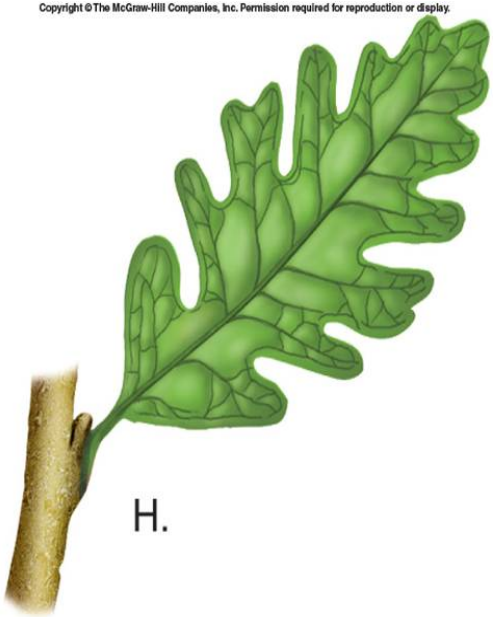
One undivided blade

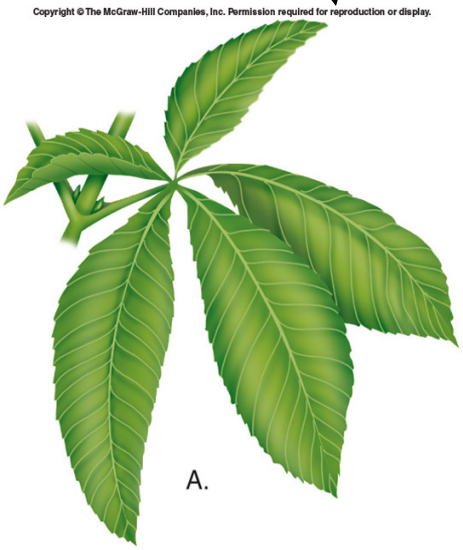
Compound leaf

blade subdivided into leaflets

Palmately compound

Pinnately compound

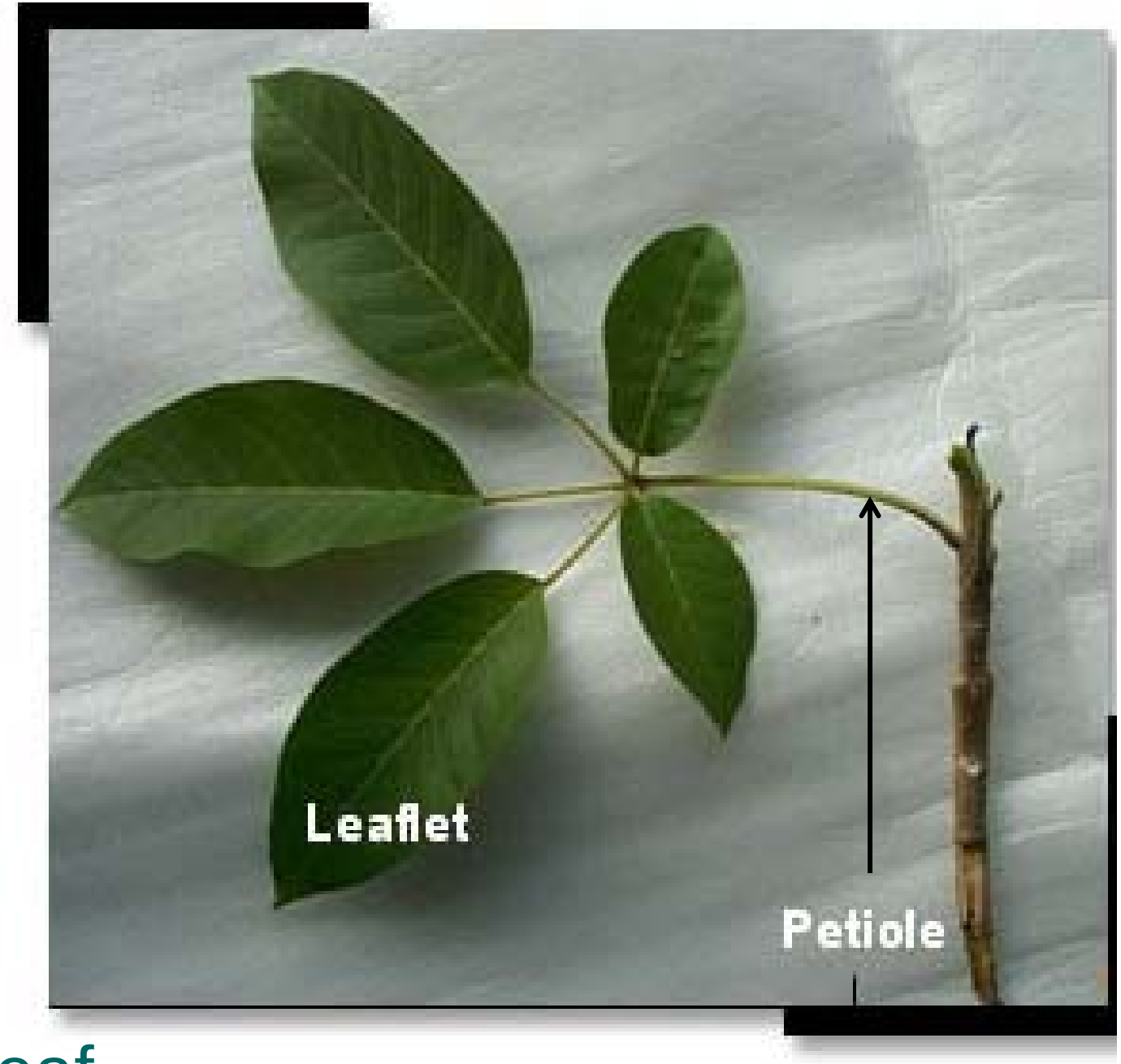




Quiz!!!!!!!!!!!!!!!!!!!!!!!!!!!!

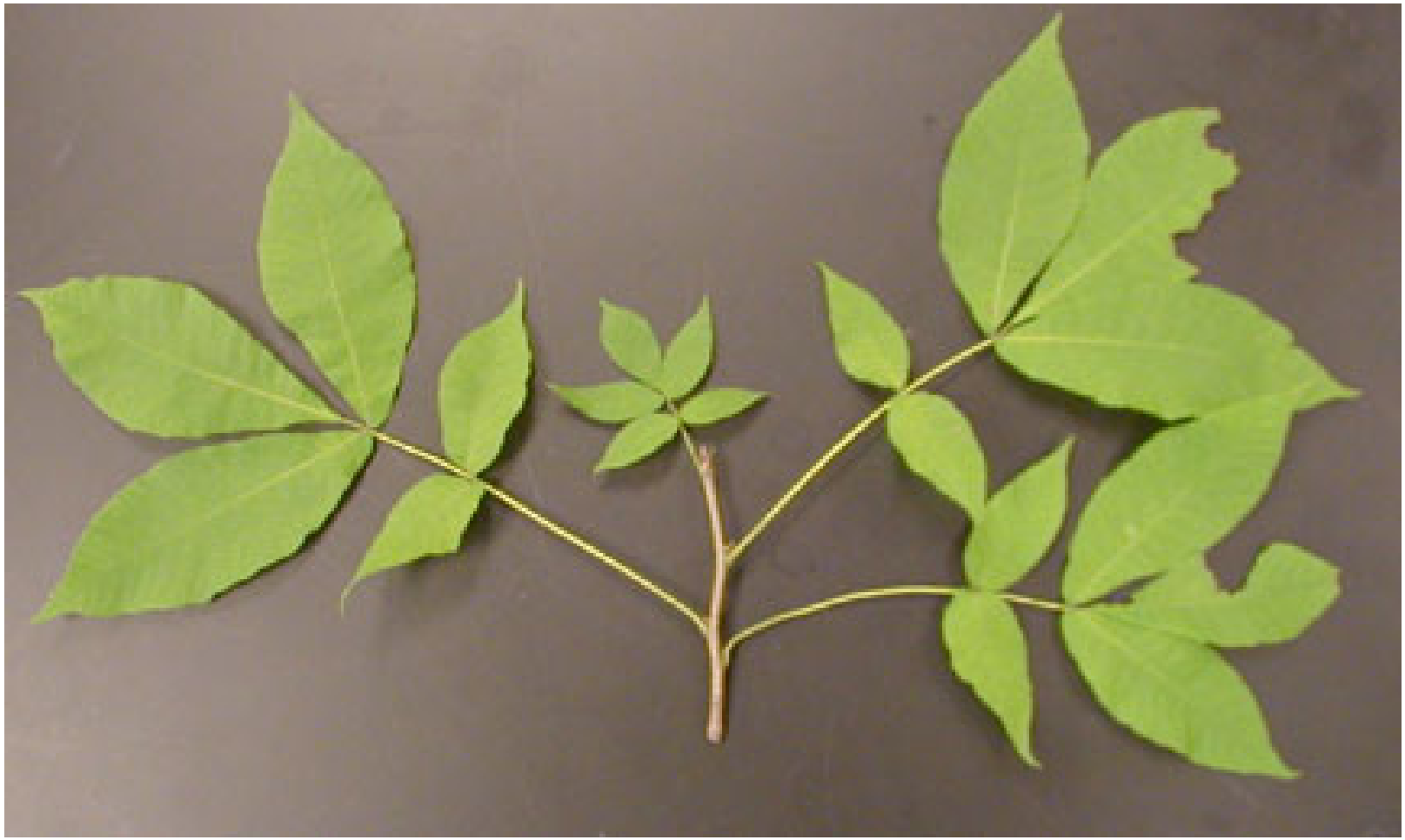
Simple leaf

Simple Leaves



Palmately compound leaf

Pinnately compound leaf

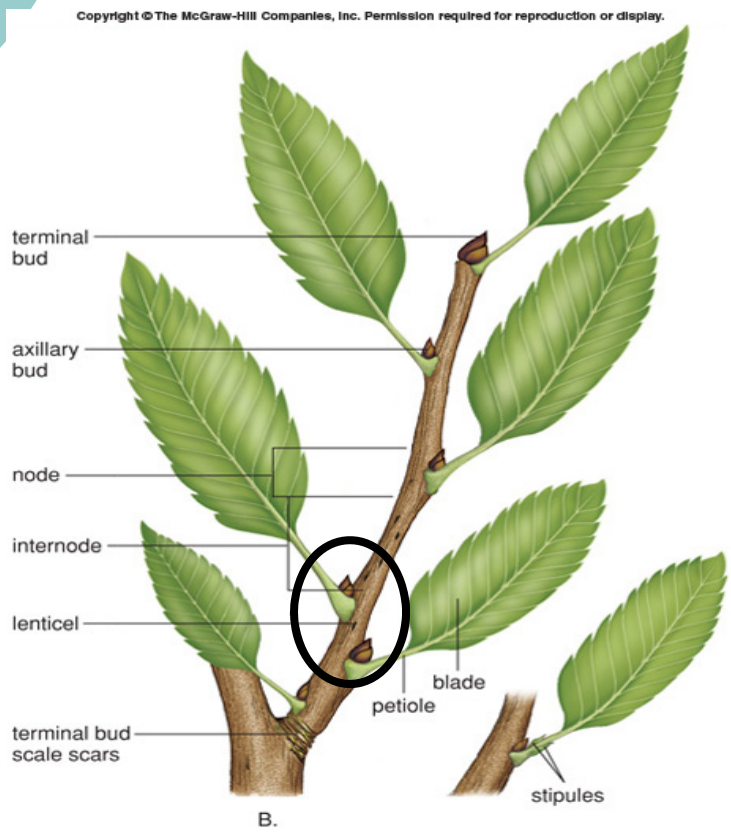


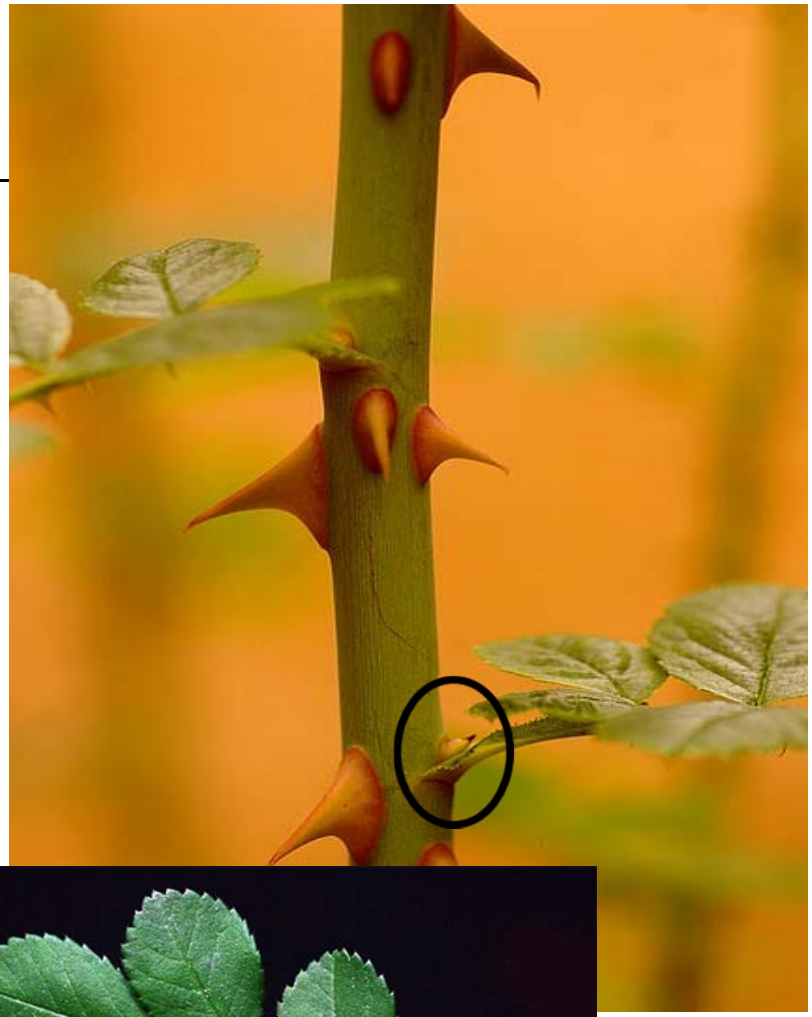
Bipinnately Compound leaf

Key to Simple vs Compound leaves

Look for the

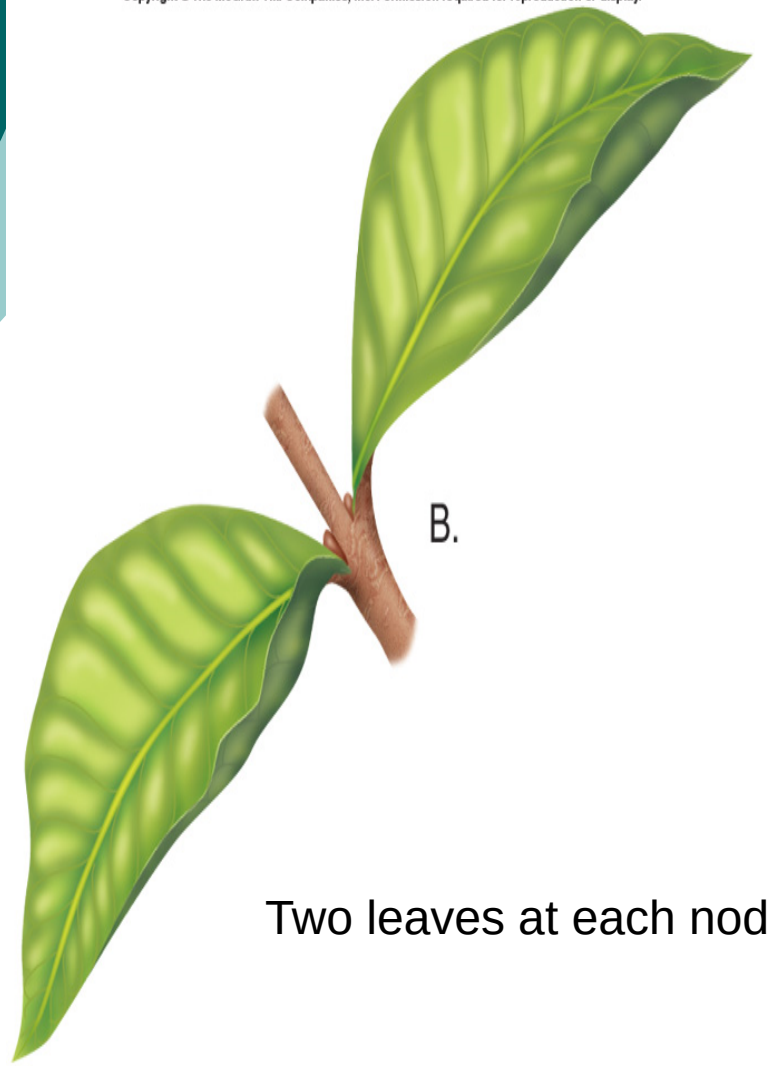
bud at the **node** on the stem





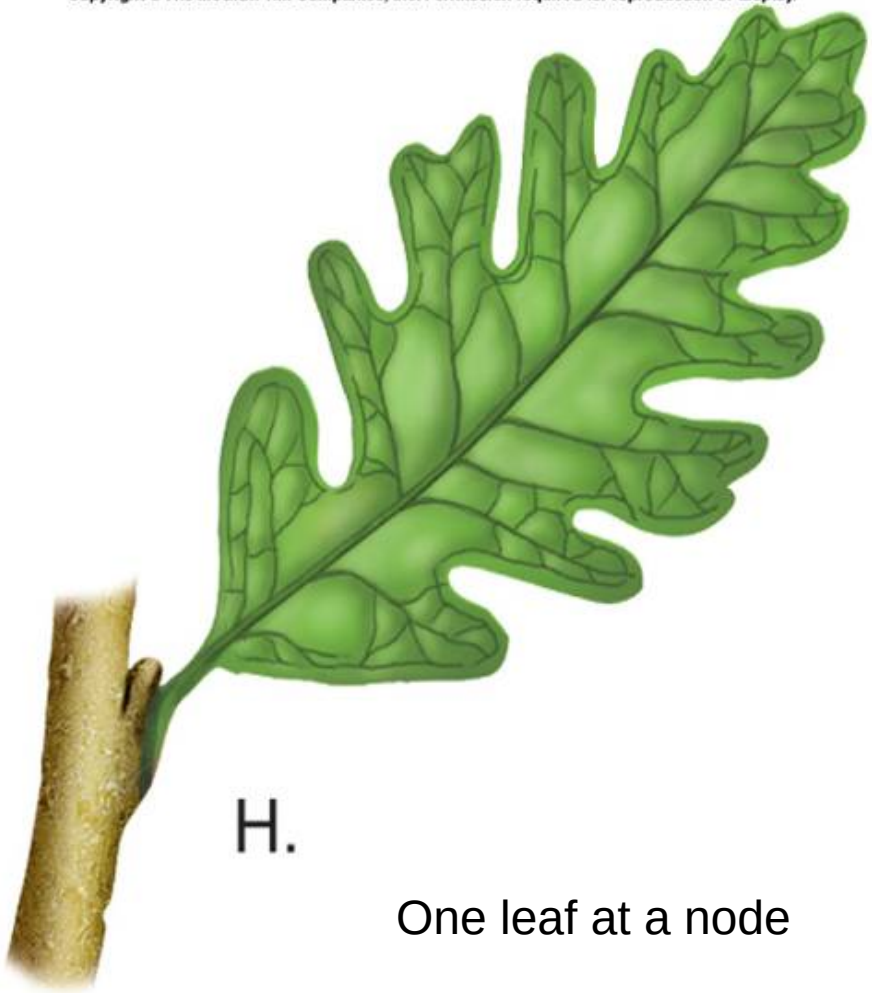
Leaf attachment

Opposite leaf attachment



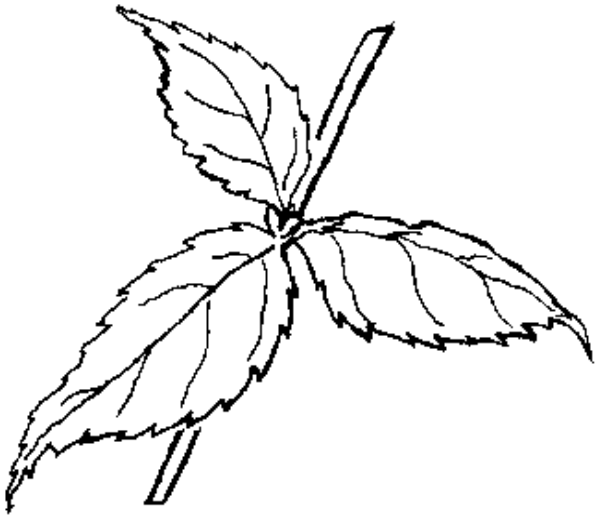
Two leaves at each node

Alternate leaf attachment



One leaf at a node

Whorled leaves

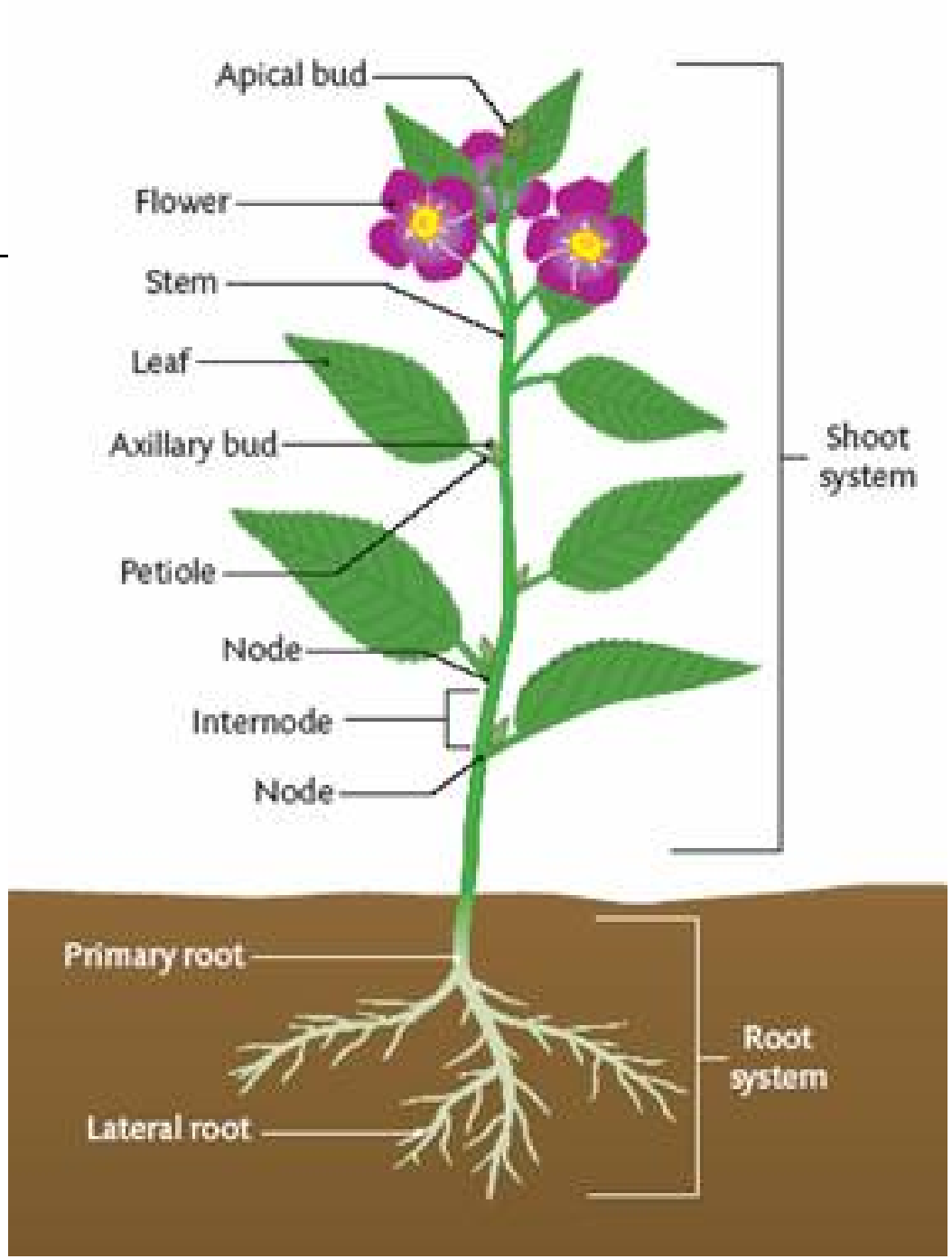


Three or more leaves at one node

Let's Practice!!!!!!!!

- Photinia, *Photinia sp.*
- Privet, *Ligustrum sp.*
- Wisteria, *Wisteria sp.*
- Indian Strawberry, *Duchesnea indica*
- Grass

(Plant Root)

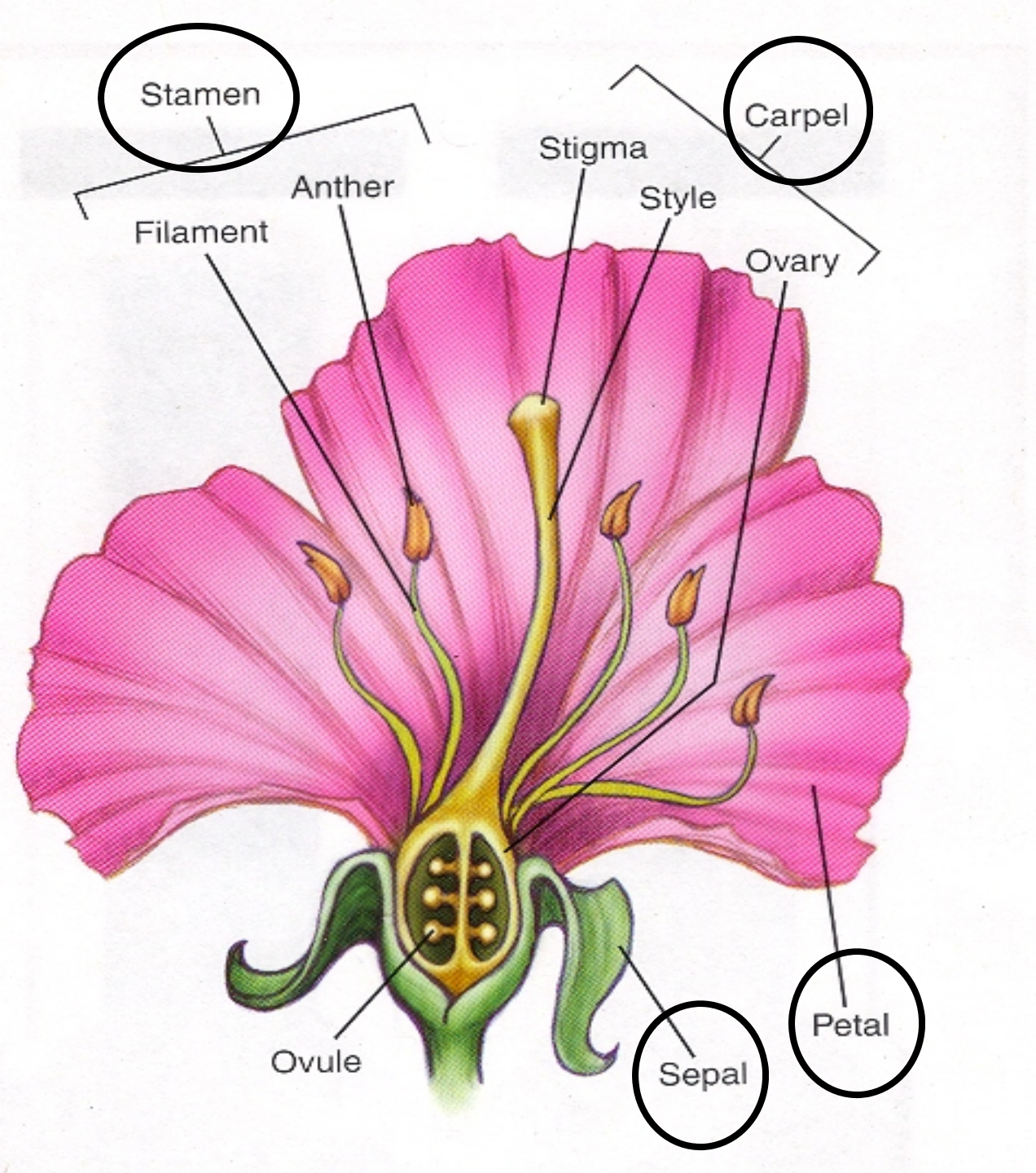

Apical bud
Flower
Stem
Leaf
Axillary bud
Petiole
Node
Internode
Node
Shoot system
Primary root
Lateral root
Root system

Floral Parts and Terminology

Floral parts

Typical eudicot flower

Floral parts in multiples of 4 or 5

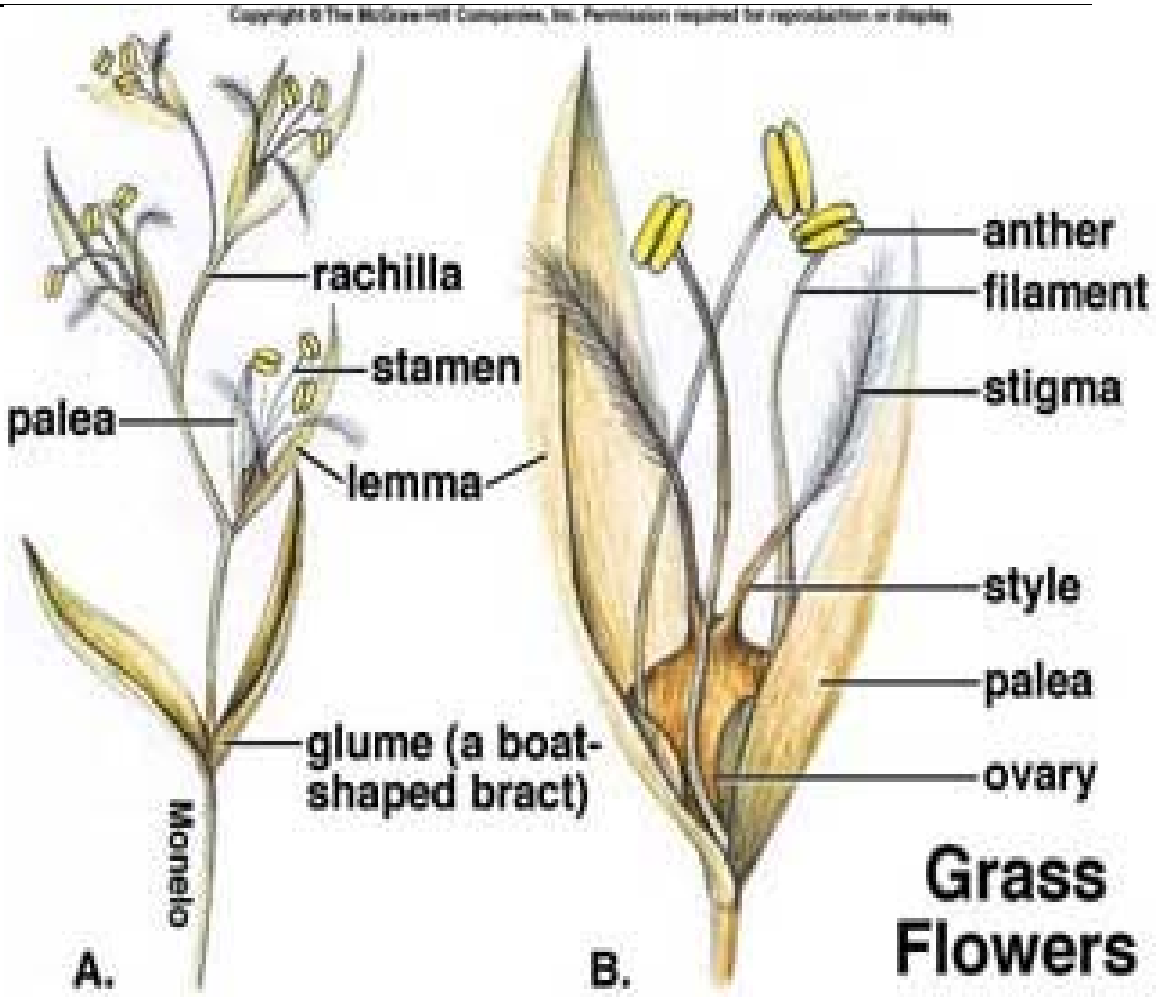


Monocot flower

Floral parts in multiples of 3

Grass Flowers (also monocots)

What seems to be missing?



Floral Terminology: Complete flower

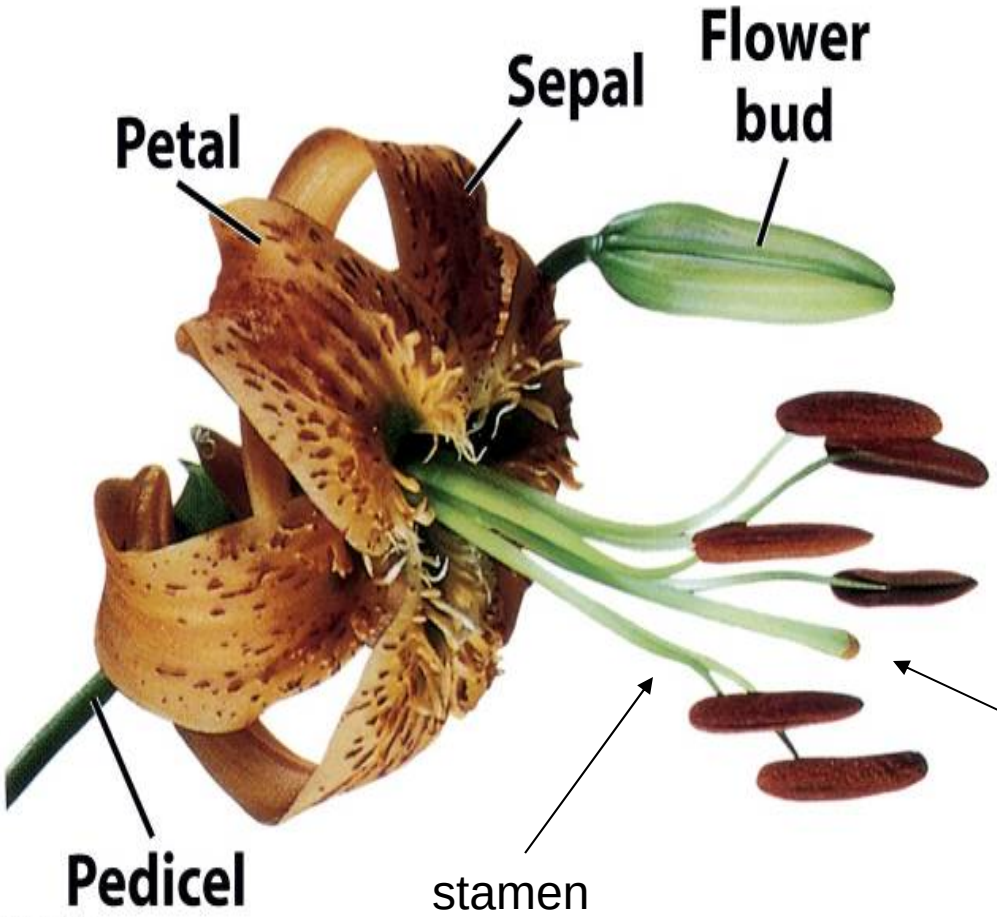


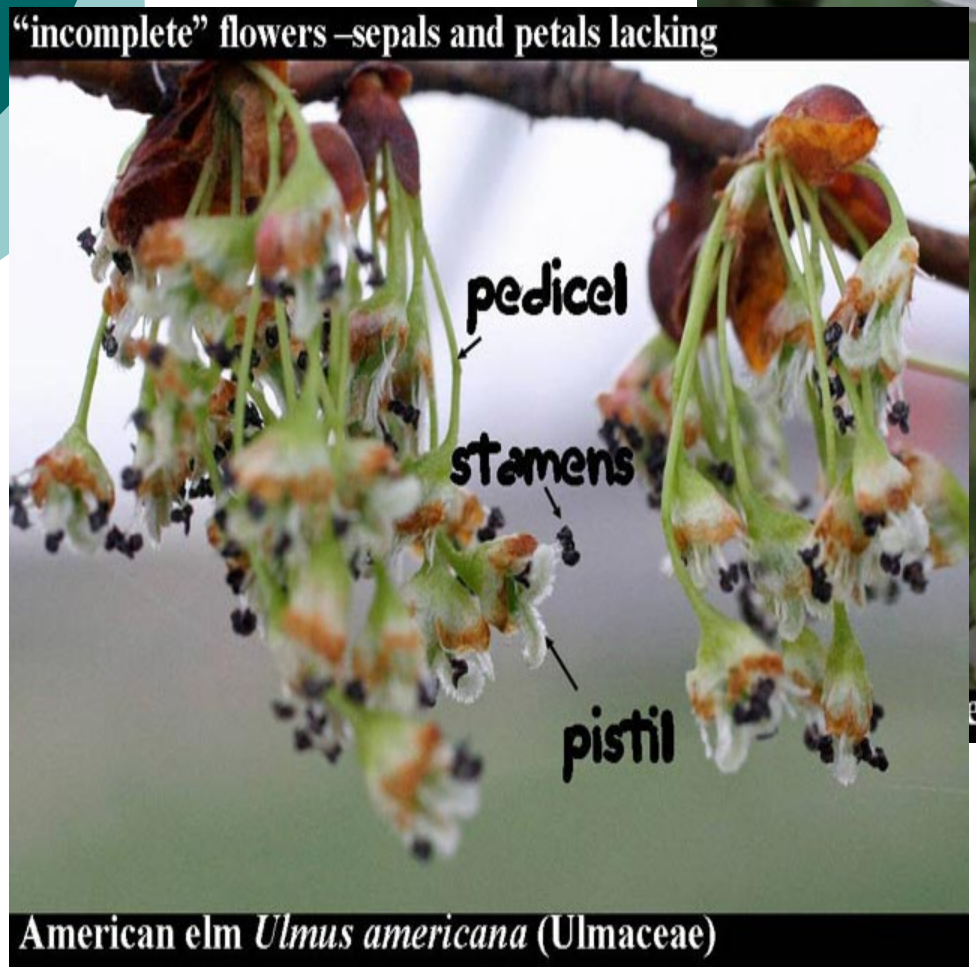
Figure 19-6a
Biology of Plants, Seventh Edition

All four floral parts are present

Incomplete flower = Parts missing

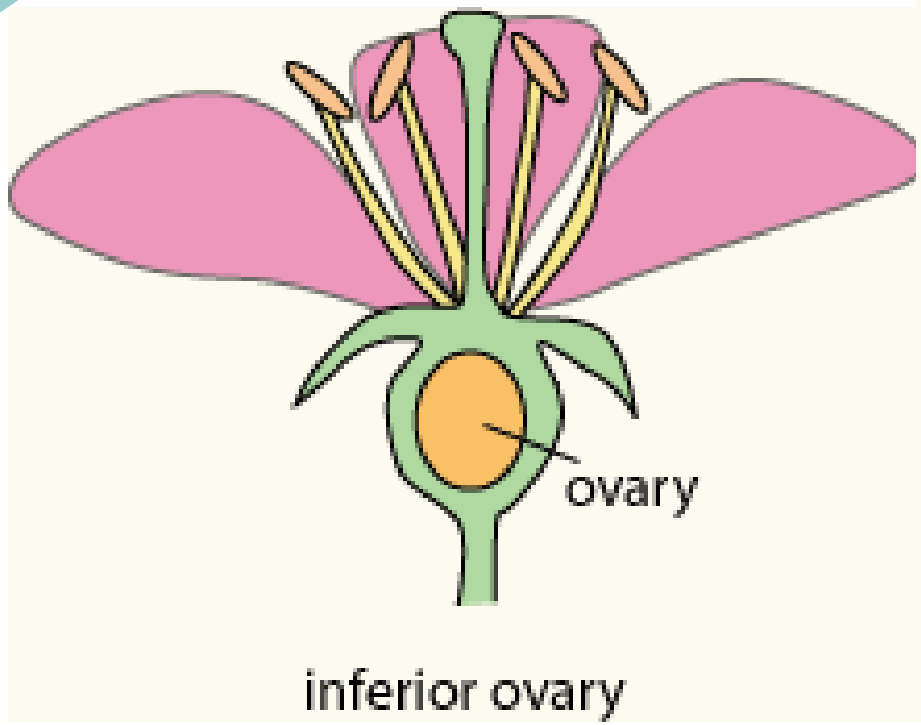
Imperfect (incomplete) flowers

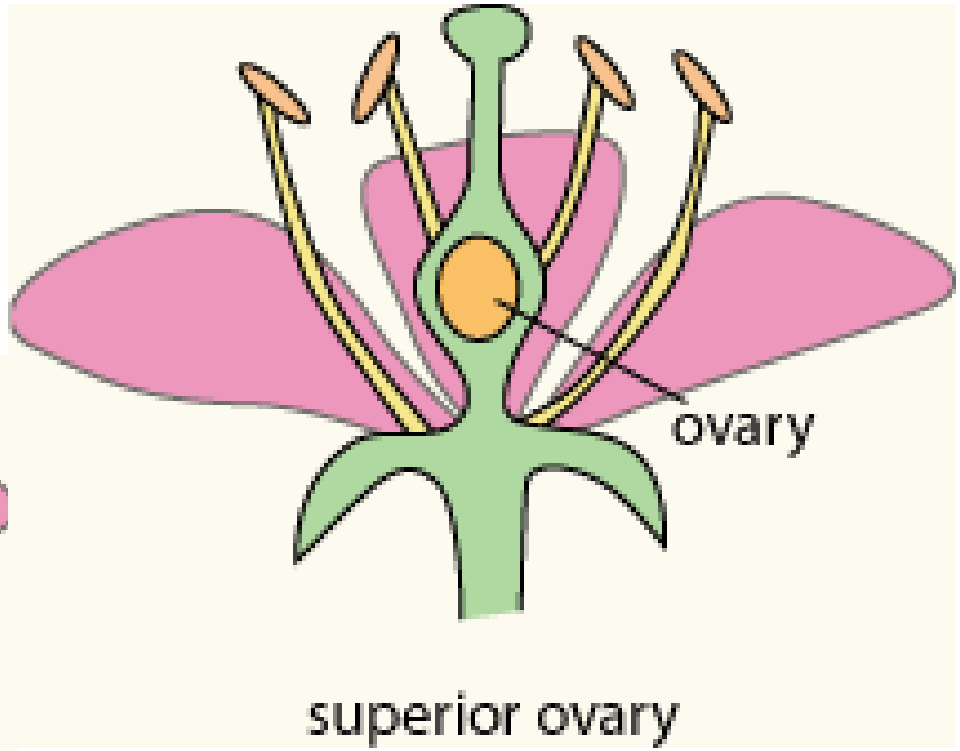
Perfect (incomplete) flower



Radial or Bilateral Symmetry

Inferior or Superior Ovary





Let's practice!

- Hand lens practice
- Alstroemeria, *Alstroemeria*
- Begonia, *Begonia*
- Petunia, *Petunia*
- Trumpet creeper, *Campsis radicans*
- Honeysuckle, *Lonicera japonica*

Plant Taxonomy

- How plants are named
- How to use a taxonomic key

How plants are named

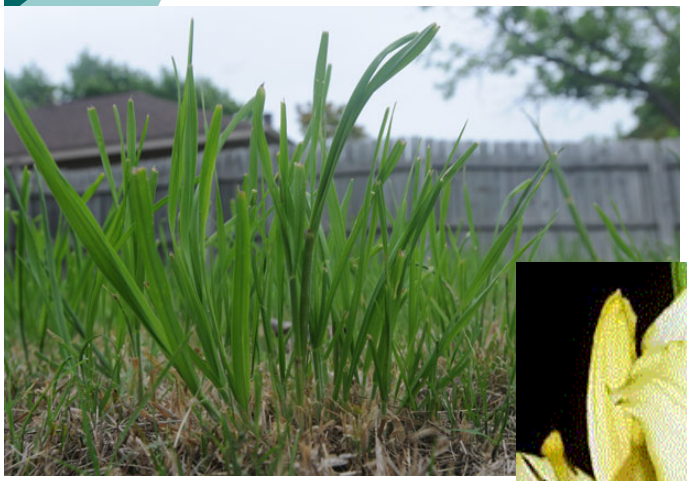
Before we begin:

- Why bother with scientific names for plants?
- You know more than you think!

Why bother?
How is the word “grass” used?

Group of plants within monocots

Common name for all monocots



Why bother?

Number of common names

- 45 English
- 11 French
- 75 Dutch
- 106 German

Common name used for more than one plant

- *Plantago major*
- *Plantago lanceolata*

English plantain

You know more……

Part of scientific name is sometimes used for common name

Forsythia spp.
Multiple species and hybrids

Kalanchoe blossfeldiana
Additional species

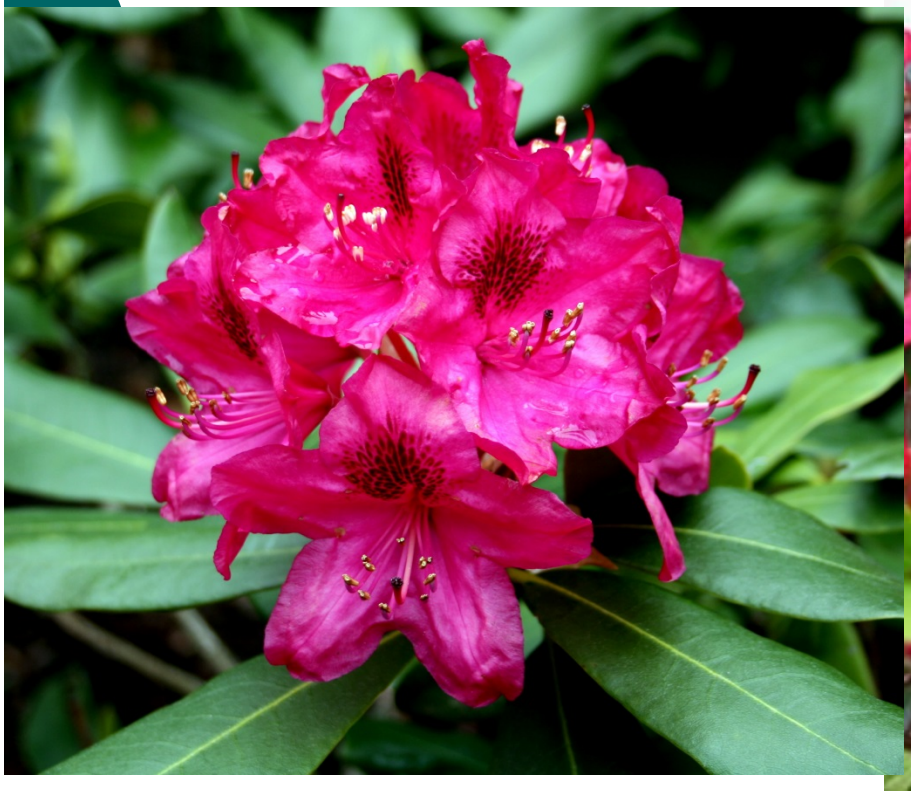
You know more……

Common name *similar* to part of scientific name

Rosa sp.

Lilium sp.

You know more…..



Rhododendron sp. rhododendron

Rhododendron sp. azalea

So what does knowing the genus tell you about these plants?

How plants are named

- Europeans started using “latin” names – common language of the educated
- First word – generic form of plant
- *Nepeta floribus interrupte spicatus pedunculatis* (catnip)

Father of Taxonomy Carl Linnaeus

National Library of Medicine

- Swedish 18th century botanist

- Set out to classify all known plants and animals
- Reduced latin name to two words (binomial nomenclature)
  - (limit phrase to 12 words)
  - Allow shorthand designation for phrase
    - *Nepeta cataria L.*

Genus and species = scientific name

Species =
specific
epithet

Magnolia grandiflora =
Southern
magnolia

Only two words? Not always

Glycine max L. Merrill var. Forest

Glycine (Genus)

max (specific epithet)

L. (Linnaeus)

Merrill (botanist who moved soybean to *Glycine*)

var. Forest (Forest variety)

Linnaeus also

Enhanced hierarchical system of nomenclature (added some groups – taxa)

kingdom

phylum

class

order

family

Scientific name = *genus* *species*

Taxa used by gardeners

kingdom

phylum

class

order

family

genus

species

Plant Families

- Groups of related genera
- All end in -aceae

- Fabaceae (bean or pea family)

Scientific name	Common name
Faba sativa	fava bean
Pisum sativum	garden pea
Cercis canadensis	redbud

Taxa used by gardeners

kingdom

phylum

class

order

family

genus

species

Plant Phyla (singular = phylum)

End in –ophyta

Monilophyta	ferns and allies
Coniferophyta	conifers (pines and relatives)
Anthophyta	flowering plants (monocots and eudicots)

Plant Taxonomic Keys

Used to identify a plant

- What is a taxonomic key?
- How do I use a taxonomic key?

1a Leaves evergreen—some of last year's leaves present.....2

1b Leaves not evergreen—all or at least most of them falling in autumn (deciduous).....7

2a Leaves needlelike or scalelike.....3

2b Leaves broad, not needlelike or scalelike..4

3a Leaves needlelike, from 2 to 18 inches long, in bundles of 2 to 5; seeds borne in a woody cone. **Pines** (*Pinus*).....Pages 20-23

3b Leaves scalelike, uncommonly short-needlelike to about 1 inch long but not in bundles; seeds borne in a small, fleshy, grayish or bluish, berry-like cone. **Cedar**, **Juniper** (*Juniperus*).....Pages 25-26

Taxonomic Keys

- Dichotomous
- Follow like a flow chart

Tips for using keys

- Always read both choices
- Do Not Guess
  - Look up terms
  - Measure features when possible
- Observe multiple specimens if possible

Tips for using keys

- If the choice is not clear, try both. (one at a time☺)
- Read the description of the plant to confirm your choice.
- FYI - The ultimate check is to compare your specimen with a "Type Specimen"

LET’S HAVE SOME FUN WITH A KEY!

Trees for Identification

- Willow Oak, *Quercus phellos*
- Southern Red Oak, *Quercus falcata*
- Sycamore, *Plantanus occidentalis*
- Sugar Maple, *Acer saccharum*
- Flowering dogwood, *Cornus florida*
- Pecan, *Carya illinoinensis*
- Bald cypress, *Taxodium distichum*
- Loblolly pine, *Pinus taeda*
- White Ash, *Fraxinus americana*