

Botany Chapter 1
Readers Guide

Please use this guide to check your understanding as you read the Botany chapter.

Botany, the study of plants, includes several fields:

- | | |
|----------------|--------------------|
| ___ Morphology | a. classifications |
| ___ Physiology | b. structures |
| ___ Taxonomy | c. environments |
| ___ Ecology | d. growth/changes |

The precise scientific system of naming plants with two Latin terms is known as _____. The first term identifies the _____ and should be capitalized. The second term, or epithet, describes the _____ and is written in lowercase letters. The two terms are either underlined or written in _____. For example, *Kalmia* _____ is the precise term for the plant commonly known as mountain laurel, mountain ivy, or a variety of other common names.

The specific _____ of a sexually propagated plant can be appended to the end of the scientific name. For example, *Buxus microphylla* var. *japonica*. Plants that are vegetatively propagated may be given a cultivar name which is denoted with initial capital letters, not italics, inside single _____ marks. For example: *Cornus florida* _____ is a popular cultivar of dogwoods.

Matching Growth Habits:

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|---------------------------|---|
| ___ Annuals | (a) woody long-lived plants over 15' |
| ___ Biennials | (b) lifespan occurs in one growing season |
| ___ Herbaceous Perennials | (c) plants with trailing stems, possibly coiled tendrils |
| ___ Woody Perennials | (d) long-lived plants with upper growth dying to the ground each winter |
| ___ Trees | (e) long-lived plants with stems remaining in winter |
| ___ Shrubs | (f) plants that grow in first year, reproduce in year 2 |
| ___ Vine | (g) woody long-lived plant with large multiple stems |

Classify as (R) "reproductive" plant structure – OR – (V) "vegetative" plant structure

___ root ___ petiole ___ fruit ___ stem ___ flower ___ axillary bud

ROOTS function to absorb _____ and water from soil, to _____ and support the plant, and to store _____. Some plants use their roots as a means of _____.

The apical _____ zone of a root is where new cells are replicating; the zone of cell

_____ is where cells enlarge; the zone of _____ is where cells begin to

specialize into distinct jobs. Some cells specialize to become outer epidermal root _____ which absorb water and nutrients; some cells specialize into _____ tissue which conducts the movement of water and nutrients.

Matching:

- ___ Taproots (a) numerous small lateral roots; EX: azalea
- ___ Fibrous roots (b) food storage; EX: potatoes, dahlia tubers
- ___ Fleshy roots (c) very long central root; EX: pecan tree
- ___ Aerial roots (d) absorbs water from humid air; EX: orchid

Roots must have fertile soil with nutrients, proper pH, moisture, and _____ to grow well.

Stems have an internal vascular system to transport supplies within the plant. _____ tubes carry water and nutrients upward (and is often known as the inner “sapwood” or the _____ of woody plants) while _____ tubes carry internal plant hormones along with produced foods, downward. In-between is found the _____ tissue of the stem, responsible for thickening stem _____.

Different herbicides are used on different classes of plants, due to different vascular systems. _____ include the grasses, with distinct parallel _____. _____ include woody plants with lateral growth.

A stem _____ is where leaves attach to the stem; there is great cell growth here. Fast-growing plants have large _____ lengths.

Roots also have nodes. _____ (TRUE or FALSE?)

Matching - Stem Types:

- ___ shoot (a) soft stem that dies back to ground
- ___ twig (b) spongy central pith stem that lives 1-2 years
- ___ branch (c) young emergent stem with leaves
- ___ trunk (d) stem older than 1 year with lateral stems
- ___ cane (e) major central stem
- ___ herbaceous stem (f) growing stem less than 1 year in age

Matching - Modified Stems:

- ___ crown (h) short underground stems w/fleshy scale leaves
- ___ runner (i) stem growing along soil surface
- ___ spurs (j) solid underground stem w/ dry not fleshy leaves
- ___ bulb (k) underground stem for food storage
- ___ corm (l) compressed stem w/ very short internodes
- ___ rhizome (m) stubby lateral stem found on fruiting trees
- ___ tuber (n) surface stem forms plantlets at its nodes

A **Bud** is an undeveloped shoot from which new _____ or _____ parts emerge. The terminal bud is found at the _____ of the stem. Lateral (axillary) buds are found at the _____ of the stem.

Flowers attract _____. Fragrance, petals, nectar, and stripes all assist the insects in transferring _____. A successful flower produces a seed which contains a dormant embryo along with stored _____.

Matching:

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|--------------|---|
| ___ anther | (a) male stalk to extend pollen outward |
| ___ filament | (b) female stalk to extend organs upward |
| ___ stigma | (c) contains male pollen grains |
| ___ styles | (d) uppermost female structure collects pollen grains |
| ___ ovary | (e) leafy base supporting the petals |
| ___ sepal | (f) here the fertilized egg will become the seeds |
| ___ stamen | (g) bowling pin-shaped female organs of flower |
| ___ pistil | (h) the male reproductive parts of a flower |

Complete flowers have all the _____ flower parts. Dioecious plants, like hollies, need a male plant in the vicinity of the _____-producing females.

Indeterminate flower clusters bloom _____ the axis. Determinate flowers bloom _____ the axis.

The photoperiod trigger for flowering is actually due to the length of uninterrupted _____. Many spring and fall flowering plants form flowers when the _____ exceeds the trigger duration. Many summer flowering plants (and vegetables) form flowers once the _____ length exceeds the trigger duration.

Leaves are a flattened surface that absorbs sunlight for the production of plant _____. The tough protective cell layer covering top and bottom of the leaf is the _____, and sometimes it has hairs. The Waxy _____ prevents water loss and invasion by _____-causing organisms, as well as toxins like pesticides; it _____ as _____ intensifies. Underneath the leaf are _____ cells that open & close the stomata to control passage of water, _____, and CO₂. If the weather is hot and dry these leaf openings are _____. The leaf interior mesophyll layer is where _____ occurs. Leaves use _____, water, and CO₂ to produce plant _____, starches, stored energy, as well as oils and its other needed substances. The green pigment in plant leaves is _____, which is necessary for photosynthesis. Most photosynthesis occurs when temperatures are between _____ and _____ degrees Fahrenheit. The availability of water as well as the duration, quantity and quality of _____ affects photosynthesis. Fluorescent lights have proper wavelength (color) to positively impact plant growth, but regular incandescent lights often emit excess _____ output with negative effects on plants.

The opposite of photosynthesis is _____ when plants “burn” their stores. Turgor or firmness of a plant is due to its _____ content. Transpiration is the loss of about _____% of its water through the stomata. Excess transpiration results in _____. Leaves droop, stomata close, and photosynthesis and growth both slow.

Temperatures affect flowering and _____ set, and can break bud _____.

Matching Leaf Identification:

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|------------------------|--|
| _____ linear blade | (a) the widest leaf area is near the stem |
| _____ elliptical blade | (b) heart shaped leaf |
| _____ cordate blade | (c) narrow long leaf |
| _____ ovate blade | (d) the widest leaf area is at the middle |
| _____ lanceolate blade | (e) leaf tip tapers to point |
| _____ petiole | (f) the bottom edge of the leaf, at stem |
| _____ leaf apex | (g) emerges from node as short stem-like structure, to hold leaf |
| _____ axil | (h) the angle between the main stem and the leaf stem |
| _____ leaf base | (i) outermost tip of a leaf blade |
| _____ serrated margin | (j) wavy leaf edge |
| _____ sinuate margin | (k) small sharp teeth along edge that point up to apex |
| _____ incised margin | (l) very deep sharp cuts along leaf edge |
| _____ dentate margin | (m) rounded bumpy edge |
| _____ crenate margin | (n) large serrated cuts at edge, with teeth pointing out |

Multi-leaved, _____ leaves can sometimes be difficult to distinguish from a lateral stem which is holding several leaf blades. If in doubt, look for the presence of the leaf axillary _____. Everything past it is considered the leaf arrangement, not a stem.

Matching Compound Leaf Arrangements:

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|-----------------|---|
| _____ pinnate | (a) leaves fan out from single point of petiole |
| _____ palmate | (b) leaves appear along both sides of the petiole |
| _____ alternate | (c) 3 or more leaves emerging from node |
| _____ opposite | (d) leaves emerge on both sides of petiole, at same point |
| _____ whorled | (e) leaves emerge on both sides of petiole, step-like |

Parallel veins of a leaf have side by side veins, without a central mid-rib, and are in the _____ family group. Net-like veins are resistant to _____ and are found in the _____ family group.

Matching leaf descriptive terms:

- | | |
|-----------------|---|
| _____ tendrils | (a) soft, fleshy, juicy leaf tendrils |
| _____ succulent | (b) curling leaf structures for support |
| _____ downy | (c) soft short hairs on leaf |
| _____ hispid | (d) protective leaves enclosing buds |
| _____ scales | (e) first leaves to emerge from seed |
| _____ bracts | (f) showy leaves, may resemble flower |
| _____ cotyledon | (g) bristles/prickles on leaf |

Plant **hormones** move through the plant, affecting its _____. *Auxin* promotes growth, and _____ formation. Pinching a plant back blocks _____ flow. *Gibberellin* affects elongation, seed _____ and flowering. *Ethylene* boosts fruit _____.