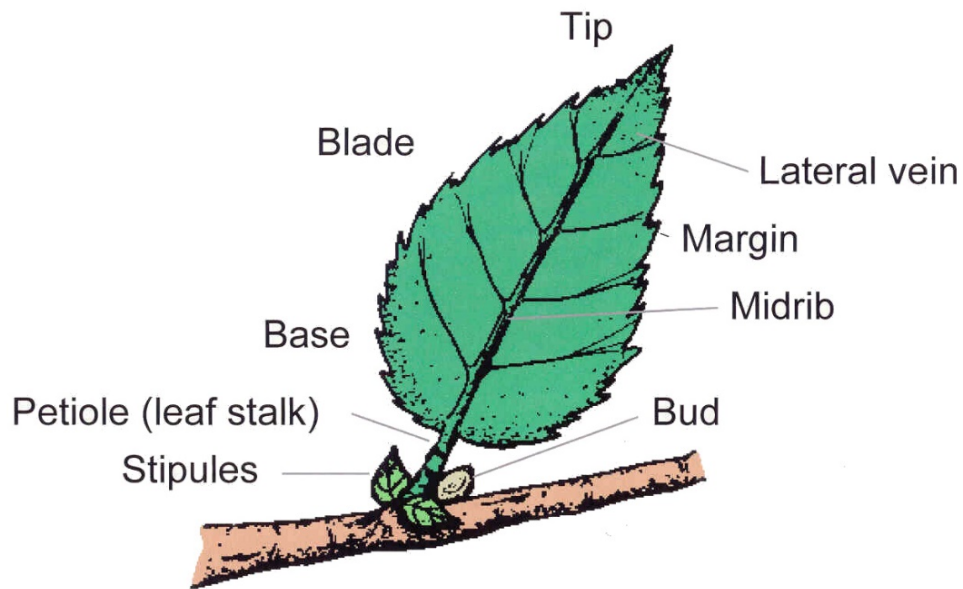




# MASTER GARDENER

COLORADO STATE UNIVERSITY  
EXTENSION



# Botany

## Reference / Supplemental Reading

- **CMG GardenNotes** on Botany available on-line at [www.cmg.colostate.edu](http://www.cmg.colostate.edu)
  - #121 Horticulture Classification
  - #122 Taxonomic Classification
  - #131 Plant Structures: Cells, Tissues, and Structures
  - #132 Plant Structures: Roots
  - #133 Plant Structures: Stems
  - #134 Plant Structures: Leaves
  - #135 Plant Structures: Flowers
  - #136 Plant Structures: Fruit
  - #137 Plant Structures: Seeds
  - #141 Plant Growth: Photosynthesis, Respiration and Transpiration
  - #142 Plant Growth Factors: Light
  - #143 Plant Growth Factors: Temperature
  - #144 Plant Growth Factors: Water
  - #145 Plant Growth Factors: Hormones
  
- **Reference Books**
  - *Botany for Gardeners*. Brian Capon. Timber Press.
  - *Gardener's Latin: A Lexicon*. Bill Neal.
  - *Introduction to Botany*. James Schooley. Delmar Publishers.
  - *Manual of Woody Landscape Plants, Fifth Edition*. Michael A. Dirr. Stipes. 1998.
  - *Hartman's Plant Science, Fourth Edition*. Margaret J. McMahon, Anthon M. Kofranek, and Vincent E. Rubatzky. Prentice Hall.
  - *The Why and How of Home Horticulture*. D.R. Bienz. Freeman. 1993.
  - *Winter Guide to Central Rocky Mountain Shrubs*. Co. Dept. of Natural Resources, Div. of Wildlife. 1976.
  
- **Web-Based References on Plant Taxonomy**
  - *International Plant Name Index* at [www.ipni.org](http://www.ipni.org)
  - *U.S. Department of Agriculture Plant Data Base* at <http://plants.usda.gov>

---

**Basic Botany** curriculum developed by David Whiting (retired), with Joann Jones (retired), Linda McMulkin, Alison O'Connor, and Laurel Potts (retired); Colorado State University Extension.

Photographs and line drawings by Scott Johnson and David Whiting. Revised by Mary Small, CSU Extension

- Colorado Master Gardener Training is made possible, in part, by a grant from the **Colorado Garden Show, Inc.**
- Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating.
- Extension programs are available to all without discrimination.
- No endorsement of products named is intended, nor is criticism implied of products not mentioned.
- Copyright Colorado Master Gardener Program, Colorado State University Extension. All Rights Reserved.

Revisions July 2016

## Learning Objectives

At the end of this unit, the student will:

- Understand importance of using correct terminology to enhance communications about plants.
- Practice skills needed in diagnosis by carefully examining plants and plant parts for plant identification.
- Correlate plant structure and growth processes with common plant disorders.

## Review Questions

Note: Class time does not permit the instructor to cover all the topics. Please take time to read and review study materials.

Note: This unit covers many horticultural and botanical terms. The objective is to understand that terms are used to communicate and using terms correctly improves communications.

It is not the purpose of this training to memorize terms or definitions. When you come across a term that you don't understand, you can use the glossary in most botany or horticulture textbooks to look up the meaning.

## Classifying Plants

1. Why is it important to understand the concepts of plant taxonomy and classification as a gardener?
2. What is meant by:
  - a. Warm season and cool season plants
  - b. Tender and hardy plants
  - d. Alpine, prairie, woodland, wetland, xeric and native plants
  - e. Herbaceous and woody
  - f. Trees, shrubs, and vines
  - g. Deciduous, evergreen and semi-evergreen
  - h. Broadleaf, narrowleaf and needleleaf
  - i. Annual, summer annual and winter annual
  - j. Biennial
  - k. Perennial, herbaceous perennial, spring ephemerals and woody perennials

3. Why is it important to know the difference between monocots and dicots, especially when it comes to applying herbicides?
4. How can you identify monocots and dicots based on leaf venation, flower parts, and seed cotyledons?
5. Give the protocol for writing scientific names.

## Plant Structures

6. Describe the relationships of cells to tissues to structures to plants.
7. List the three primary functions of roots.
8. Define and identify the following root terms.
  - a. Meristematic zone
  - b. Primary roots
  - d. Lateral roots
  - e. Root tip
  - f. Epidermis
  - g. Root hairs
  - h. Tap root system
  - i. Fibrous root system
  - j. Adventitious roots
9. List the three primary functions of stems.
10. Identify the following parts of a stem:
  - a. Nodes
  - b. Internodes
  - c. Terminal bud
  - d. Lateral bud
  - e. Terminal bud scar
  - f. Leaf scar
  - g. Bundle scar
11. Describe how stem characteristics are used in plant identification.
12. Define the following stem terms:
  - a. Shoot
  - b. Twig
  - c. Branch
  - d. Trunk
  - e. Cane
  - f. Bulb

- g. Corm
- h. Crown
- i. Stolon
- j. Rhizome
- k. Tuber

13. List the two primary functions of leaves.

14. Define and identify the following leaf terms.

- a. Leaf blade
- b. Leaf tip
- c. Leaf base
- d. Mid-vein or midrib
- e. Lateral veins
- f. Leaf stalk or petiole
- g. Stipules
- h. Bud
- i. Pinnate venation
- j. Palmate venation
- k. Parallel venation
- l. Simple leaf
- m. Pinnately compound
- n. Palmately compound
- o. Doubly (bipinnately) compound
- p. Alternate leaf arrangement
- q. Opposite leaf arrangement
- r. Whorled leaf arrangement

15. What is the primary function of flowers?

16. Identify the following parts of a flower:

- a. Sepals
- b. Calyx
- c. Petals
- e. Anthers
- f. Filament
- g. Stamen
- h. Stigma
- i. Style
- j. Ovary
- k. Ovules
- l. Pistil
- m. Floret

17. Define the following flower and plant terms.

- a. Complete flower
- b. Incomplete flower
- c. Perfect flower
- d. Monoecious plant

e. Dioecious plant

18. Describe how flowers are used in plant identification.

19. What is the primary function of fruit?

20. Identify the following parts of a seed:

- a. Seed coat
- b. Endosperm
- c. Cotyledon
- d. Plumule
- e. Radicle

### Plant Growth

21. Define:

- a. Photosynthesis
- b. Respiration
- c. Chloroplasts
- d. Chlorophyll
- e. Transpiration
- f. Stomate

22. Define what is meant by:

- a. Full sun
- b. Filtered shade

23. Define photoperiod.

24. List three factors that influence plant hardiness.

25. What does a hardiness zone map indicate?

26. Define the following terms related to winter injury:

- a. Sunscald
- b. Frost crack
- c. Winter drought

27. How do temperate-zone plants know when to start growing in the spring?

28. List the roles of water in plant growth.

29. Explain how a plant balances shoot growth with root growth.

30. Explain how a plant grows toward the sun.