



**MASTER GARDENER**  
COLORADO STATE UNIVERSITY  
EXTENSION

## CMG GardenNotes #120

# Botany

## References and Review Material

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### Reading/Reference Materials

#### CSU GardenNotes

- <https://cmg.extension.colostate.edu/volunteer-information/cmg-gardennotes-class-handouts/>.
- #121, *Horticulture Classification Terms*.
- #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 Physiology: Photosynthesis, Transpiration, and Respiration*.
- #142, *Plant Growth Factors: Light*.
- #143, *Plant Growth Factors: Temperature*.
- #144, *Plant Growth Factors: Water*.
- #145, *Plant Growth Factors: Hormones*.

#### CSU Extension Fact Sheets

- <https://extension.colostate.edu/topic-areas/yard-garden/>.

#### Planttalk Colorado™

- <http://planttalk.org>.
- #2004, *Additional Information: Plant Societies*.
- #2008, *Commonly Used Plant Terms*.

#### Other

- 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>.
- *Botany for Gardeners, Fourth Edition: An Introduction to the Science of Plants*, Brian Capon. Timber Press, 2022. ISBN: 978-1643261430.
- *Gardener's Latin: A Lexicon*, Bill Neal. Algonquin Books, 2003. ISBN: 9781565123847.
- *The Science of Plants*. Tom Michaels. 2022 University of Minnesota Libraries <https://open.umn.edu/opentextbooks/textbooks/1196>.

- *Manual of Woody Landscape Plants*, Sixth edition, Michael A. Dirr. Stipes, 2009.
- *Flora of Colorado*, Jennifer Ackerfield. Second edition. BRIT press, 2022.
- *How Plants Work*, Linda Chalker-Scott. 2015.
- *Alice in the Land of Plants*, Yiannis Manetas. 2012.
- *The Why and How of Home Horticulture*, D.R. Bienz. Freeman, 1993. ISBN: 9780716723530.
- *Plant Form: An Illustrated Guide to Flowering Plant Morphology*, Adrian D. Bell, 2008, Timber Press.

## Learning Objectives

At the end of this training, the student will be able to:

- Understand the 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. 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 do not 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:
  - Warm season and cool season plants.
  - Tender and hardy plants.
  - Alpine, prairie, woodland, wetland, xeric and native plants.
  - Herbaceous and woody.
  - Trees, shrubs, and vines.
  - Deciduous, evergreen, and semi-evergreen.
  - Broadleaf, narrowleaf and needleleaf.
  - Annual, summer annual and winter annual.
  - Biennial.
  - 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 out 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:

- Meristematic zone.
- Primary roots.
- Lateral roots.
- Root tip.
- Epidermis.
- Root hairs.
- Tap root system.
- Fibrous root system.
- Adventitious roots.

9. List the three primary functions of stems.

10. Identify the following parts of a stem:

- Nodes.
- Internodes.
- Terminal bud.
- Lateral bud.
- Terminal bud scar.
- Leaf scar.
- Bundle scar.

11. Describe how stem characteristics are used in plant identification.

12. Define the following stem terms:

- Shoot.
- Twig.
- Branch.
- Trunk.
- Cane.
- Bulb.
- Corm.
- Crown.
- Stolon.
- Rhizome.
- Tuber.

13. List the two primary functions of leaves.

14. Define and identify the following leaf terms:

- Leaf blade.
- Leaf tip.
- Leaf base.
- Mid-vein or midrib.
- Lateral veins.
- Leaf stalk or petiole.
- Stipules.
- Bud.
- Pinnate venation.
- Palmate venation.
- Parallel venation.
- Simple leaf.
- Pinnately compound.
- Palmately compound.
- Doubly (bipinnately) compound.
- Alternate leaf arrangement.
- Opposite leaf arrangement.
- Whorled leaf arrangement.

15. What is the primary function of flowers?

16. Identify the following parts of a flower:

- Sepals.
- Calyx.
- Petals.
- Anthers.
- Filament.
- Stamen.
- Stigma.
- Style.
- Ovary.
- Ovules.
- Pistil.
- Floret.

17. Define the following flower and plant terms:

- Complete flower.
- Incomplete flower.
- Perfect flower.
- Monoecious plant.
- 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:

- Seed coat.
- Endosperm.
- Cotyledon.
- Plumule.
- Radicle.

## Plant Growth

21. Define:

- Photosynthesis.
- Respiration.
- Chloroplasts.
- Chlorophyll.
- Transpiration.
- Stomate.

22. Define what is meant by:

- Full sun.
- 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:

- Sunscald.
- Frost crack.
- 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.