COLORADO MASTER GARDENER
COLORADO GARDENER CERTIFICATE

Student Training Guide
2020 Edition

Course Syllabus
Reading & Homework List
Class Notes & Homework
Course Syllabus

Course Information
Curriculum is created by a statewide team and coordinated locally to be offered in communities across Colorado. Course content is developed using research- and evidenced-based horticultural information approved by Colorado State University. Course format varies by region and county. All students will take online classes as part of their curriculum, utilizing Colorado State University Online’s platform called, Canvas.

Course Instruction
Your best point of contact for questions and information is your local county staff. Look up your local county staff information at http://extension.colostate.edu/staff-directory/

Course Objective
The purpose of the Colorado Master Gardener and Colorado Gardener Certificate training is to teach interested participants in relevant, evidenced-based horticultural information specific to our regions in Colorado. Colorado Master Gardener Apprentices receive reduced tuition in return for their volunteer service commitment following training.

Colorado Master Gardeners (CMG) are volunteers trained in horticulture by Colorado State University Extension staff. They assist Colorado State University Extension staff in delivering research-based gardening information to foster successful gardening in Colorado communities. The CMG Volunteer's audience is exclusively home gardeners. CMG training provides the knowledge and skills necessary to achieve the goals of CMG volunteers in Colorado counties.

Course Schedule
Contact your local county for a copy of your course schedule as these vary by region and county. All students will have access to online classes offered through CSU Online’s Canvas platform. To gain access to these courses, you’ll need to register using a link provided by your local coordinator. Instructions for registering and links to Canvas are available online in GardenNotes.

Course Materials
GardenNotes is your online textbook and curriculum for this course. There is no hardcopy version or text available. Access GardenNotes online at http://ColoradoMasterGardener.org > Volunteer Resources > GardenNotes.

See the Reading, Homework and Worksheet List for more detailed information by class. The Student Training Guide contains all homework some of which may be optional.

Apprentices are encouraged to print or save a copy of the Colorado Master Gardener Volunteer Handbook – GardenNotes #014.
**Instructional Methods**
Classes generally include lecture and lab portions. Labs may consist of worksheets, guided activities, group discussions or hands on activities.

The Front Range as well as Tri River Area and some Western Slope counties have face-to-face lectures for some classes. While “Distance Ed” counties located across the state view several classes as a live webinar using Zoom technology. Distance Ed counties may also have face-to-face instruction depending on the topic and location. Lab activities in the Distance Ed sites are generally led by the local county coordinator following Zoom classes.

All students will have access to online classes offered through CSU Online’s Canvas platform. To gain access to these courses, you’ll need to register using a link provided by your local coordinator. Instructions for registering and links to Canvas are available online in GardenNotes.

**Course Policies**
Follow your county course schedule for class dates and online class deadlines. Readings should be done before class. Homework should be done following an in-person or online class. Worksheets will be in class.

To complete the course, all trainees must attend 80% of classes. Absences totaling more than 20% of classes will result in being dropped from the program. Additionally, students must complete ALL online classes – this is indicated by completing all pre- and post-tests for each online class. Your score for pre- and post-tests do not affect your grade.

The open-book and open-note, online final exam must be passed with a 70% or better to successfully complete the course. Your county coordinator will give you information on due dates for the exam. It is taken online and is auto-graded.

Apprentices who drop out of the program prior to completing the required 50 hours of volunteer service must pay $15/hour of unmet volunteer service up to $500 to cover the cost for instruction and staff time.

Apprentices should refer to the *Colorado Master Gardener Volunteer Handbook* for additional information and program policies.

**Course Evaluation**
Your local coordinator will offer course evaluations in-person and/or online to get your feedback.
**Readings, Homework & Worksheets**

>>GARDEN NOTES IS YOUR ONLINE TEXTBOOK FOR THIS COURSE.  
Go to [http://ColoradoMasterGardener.org](http://ColoradoMasterGardener.org) > Volunteer Resources > GardenNotes

<table>
<thead>
<tr>
<th>Topic</th>
<th>GARDEN NOTES Readings</th>
<th>Homework</th>
<th>Worksheets Done in Class</th>
</tr>
</thead>
</table>
| CMG Program Overview  
ONLINE CLASS | #011, #013, #014, #015, #017, #018 | CMG Crossword optional |  |
| Soils, Fertilizers & Amendments | #211-251 | #252 optional  
#253 optional | #252 |
| Botany: How Plants Grow  
ONLINE CLASS | #121,122, 131-137, #141-145 | #155  
#150 in Canvas | #151  
#152 |
| Plant Pathology | #331-332 | #332 optional | #333 |
| IPM & Diagnostics  
ONLINE CLASS | #101, #102 | #105  
IPM Crossword optional | #103 |
| Entomology | #311-313 | #318 optional |  |
| Lawn Care / Turf Management  
ONLINE CLASS | #551-556 | Turf Crossword optional | #571 |
| Weed Management | #351, #352, #353 |  | #356 |
| Science of Planting Trees  
ONLINE CLASS | #631-#636 |  |  |
| Care of Trees  
ONLINE CLASS | #651; #653-659  
#652 is optional |  |  |
<table>
<thead>
<tr>
<th><strong>TOPIC</strong></th>
<th><strong>GARDENNOTES READINGS</strong></th>
<th><strong>HOMEWORK</strong></th>
<th><strong>WORKSHEETS DONE IN CLASS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>#711-724</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pruning</td>
<td>#610-617</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain Gardening</td>
<td>No readings</td>
<td></td>
<td></td>
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<tr>
<td>Water-Wise Landscapes</td>
<td>#410-415</td>
<td></td>
<td></td>
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<tr>
<td>Irrigation Management</td>
<td>#260-268</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Fruit</td>
<td>#760-764</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree Fruit</td>
<td>#770-771</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Class Notes: CMG Introduction

- Review GardenNotes for this class
- Print &/or Save the Colorado Master Gardener Volunteer Handbook (GN#014)
- Complete online course by the date on your course schedule
- Complete CMG Crossword puzzle

----------------------------- NOTES -----------------------------

Module 1: Overview of the CMG Program & CSU

Module 2: Empowering People Through Plants

Module 3: Volunteering as a Colorado Master Gardener

Module 4: The Power of Community

Module 5: Tools & Resources for CMG Volunteers
CMG Program Introduction

Across
5. Resource for CMG volunteers covering program details
8. When to use the title ‘Colorado Master Gardener’
9. Initials of Colorado’s land grant institution
10. Apprentice volunteer hours required
11. Initials of the CMG reporting website
14. Topic that cannot be handled by volunteers
15. Primary purpose of Extension programs
16. Whom to refer legal questions
17. Title of CMG in training/trainee

Down
1. Primary role of CMG
2. CMG volunteer hours required
3. One of the grounds for dismissal
4. Pesticides CMGs can apply while volunteering
6. CSU materials with information on a topic
7. Protects authors and photographers
12. University system founded in 1860s
13. Password-protected website specifically for CMG volunteers
Class Notes: Soils, Fertilizers, Amendments

☐ Review GardenNotes for this class
☐ Attend class
☐ Complete Homework after class

-----------------------------------------  NOTES  -----------------------------------------
Source: USDA Soil Texture Triangle
WEB SOIL SURVEY


2. Click on the green button Start WWS.

3. Under the Area of Interest (AOI) tab, click on Address.

4. Enter Address
   a) Enter your home street address, city, state in the box.
   b) Make sure the Show location marker box is checked
   c) Click on View

5. The Area of Interest Interactive Map will open.
   - With the mouse, draw a box around the general area of the property (marked on the map with a red +). The map will refresh with a closer view

6. Select Area of Interest
   a) Click on the AOI button near the top of the window.
   b) With the mouse drag a box around the property of interest. The map will refresh with a slash filled box of the property of interest.

7. Soils
   a) Click on the Soil Map tab. This will open a listing of the soil map unit names on the property
   b) Click on the Map Unit Name in blue in the box. This will open the description of the soils.

Note: If the address you entered if not found on the Web Soil Survey, please start over with the address of a friend or relative.
8. **Answer the following questions about one of the soils on the property.**

<table>
<thead>
<tr>
<th>From <strong>Map Unit Setting</strong></th>
<th>Elevation</th>
<th>Mean annual precipitation</th>
<th>Mean annual air temperature</th>
<th>Frost-free period</th>
</tr>
</thead>
<tbody>
<tr>
<td>From <strong>Properties and Qualities</strong></td>
<td>Depth to restrictive feature</td>
<td>Drainage class</td>
<td>Depth of water table</td>
<td>Frequency of flooding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Frequency of ponding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calcium carbonate content</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum salinity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Available water capacity</td>
</tr>
</tbody>
</table>

*From **Typical profile**, give depths of various soil textures.*
ANSWER THE FOLLOWING BASED ON WHAT YOU’VE LEARNED:

1. Properties and challenges with your soil.
   
a. Describe the properties of your soil (or soil you have access to test). What are the good properties supporting plant growth? What are the properties limiting plant growth?

   b. What would you advise a neighbor moving into your neighborhood (same basic soil) about soil management when their yard is a new landscape (nothing currently on the property)?

   c. What would you advise a neighbor (same basic soil) about soil management for an existing landscape with lawns, trees, perennial flower and shrub beds, annual flower and vegetable beds?

2. List eight considerations in selecting an appropriate soil amendment.

3. List eight considerations in selecting an appropriate mulching material.

4. List five considerations in selecting an appropriate fertilizer.
**SOIL TEXTURE BY FEEL LAB**

Identifying the soil samples to coarse (sandy), medium or fine (clayey). Reference: *GardenNotes #214*

<table>
<thead>
<tr>
<th>Soil Sample</th>
<th>Describe the feel:</th>
<th>How long will it ribbon out?</th>
<th>What is the soil texture?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Gritty = sand</td>
<td></td>
<td>o Ribbons &lt;1”,</td>
</tr>
<tr>
<td></td>
<td>o Silk smooth = silt</td>
<td></td>
<td>▪ Feels gritty = coarse texture (sandy soil)</td>
</tr>
<tr>
<td></td>
<td>o Sticky = clay</td>
<td></td>
<td>▪ Not gritty = medium texture (high in silt)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>o Ribbons 1-2 inches</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Feels gritty = medium texture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Not gritty = fine texture</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>o Ribbons &gt;2” = fine texture clayey soil</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your soil (OPTIONAL)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FREE LIME TEST LAB
Using your soil sample(s), do a vinegar test for free lime (calcium carbonate).
Reference: *The Science of GardenNotes* 222

a. Did it fizz (have high calcium carbonate)? Yes No

b. What does this indicate about your soil being prone to iron chlorosis? Can you lower the pH?

OPTIONAL HOMEWORK:
SOIL TEXTURE BY MEASUREMENT LAB

Collect some soil from your home landscape, office or nearby open space. Using the jar method, what is the soil textural class for this sample with the following amounts of sand, silt, and clay?
Reference: *GardenNotes* 214

a. How long do you shake the bottle of soil?

b. When do you measure the sand, silt and clay levels?

<table>
<thead>
<tr>
<th>Sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c. Determine the soil texture for the following sample:

<table>
<thead>
<tr>
<th>Sample</th>
<th>Depth of layer</th>
<th>Percent</th>
<th>Soil Textural Class (from Soil Textural Triangle)</th>
<th>Will this soil behave as a sandy or clayey soil?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample1</td>
<td>Sand 3.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silt 0.5”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay 1.5”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 5.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample2</td>
<td>Sand 3.5”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silt 1”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay 0.5”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 5”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Class Notes: Botany - How Plants Grow

☐ Review GardenNotes for this class
☐ Complete online course by the date on your course schedule
☐ Do Homework and bring to next class

-----------------------------------------  NOTES  -----------------------------------------

Module 1: Classification & Taxonomy

Module 2: Plant Structures
Homework: Botany

Answer the following questions based on content from the online class.

1. Why is it important to use scientific names for plants rather than just common names?

2. Why is it important for you as a Colorado Master Gardener to understand the importance of plant families?

3. Why is winter watering important in Colorado?

4. How can a late spring frost or freeze affect plant growth and development?

5. What resources would you utilize to assist with plant ID?

BONUS QUESTION: A client wants to plant drought-tolerant, deer-resistant perennials in their landscape which has a full sun exposure. They’ve heard about Plant Select and would like to use these if possible. Utilize this website: https://plantsselect.org/?action=plants to find 2-3 plants that might meet their needs. What did you find and what additional information would you need from the client to help them make a right plant, right place decision?
Class Notes: Plant Pathology

☐ Review GardenNotes for this class
☐ Attend class
☐ Do Homework

-----------------------------  NOTES  -----------------------------
1. What 4 components must be present for biotic disease to develop?

2. Another name for the living cause of disease___________________________

3. Another name for the non-living cause of disease________________________

4. List 3 ways to manage powdery mildew on a shrub.

5. A customer brings you a foot-long branch of an aspen tree. The leaves on the branch tips are dark brown and wilted; the branch tip is bent over. Could this be fire blight? Why or why not?


7. How are leaf scorch and winter desiccation similar in terms of how they develop? In symptom expression?

8. A ten-foot row of low growing junipers is planted between the west facing side of a apartment building and a sidewalk. By mid-winter the sidewalk side of the junipers begins to turn completely brown. What symptom supports an abiotic diagnosis? State a possible cause of the juniper symptoms.
Class Notes: IPM & Diagnostics

- Review GardenNotes for this class
- Complete online course by the date on your course schedule
- Do Homework and bring to next class

------------------------------- NOTES -------------------------------

Module 1: Integrated Pest Management
Module 2: The Diagnostic Process

Module 3: Understanding Pesticide Labels
Integrated Pest Management & Diagnostics

Across
2. Siting/locating the plant correctly is an example of this IPM strategy.
6. Symptom name for dead plant tissue.
7. A random pattern of damage usually points to this general disease category.
10. The first step in diagnosis is to __________ the plant.
11. When pests are no longer affected by a pesticide they are said to be this
13. A uniform pattern of damage usually points to this general disease category.

Down
1. A natural botanical pesticide is derived from these.
3. Name of the sign describing slimy droplets.
4. Planting small-throated flowers to attract beneficial insects is an example of this IPM strategy.
5. Checking plants on a regular basis for pests is called this
8. Sunken, usually discolored area on a plant.
9. Type of pesticide absorbed and spread throughout the plant.
12. A multi-prong approach to managing pests (initials)
CMG GardenNotes #105
Homework: IPM & Diagnostics

1. Why is Integrated Pest Management (IPM) the best approach to managing pest problems?

2. Why is it important to discuss tree care issues as they relate to growth phases?

3. What is the first step in the diagnostic process?

4. Why is it important to know what is "normal" for a given plant?
Class Notes: Entomology

☐ Review GardenNotes for this class
☐ Attend class
☐ Do Homework

-----------------------------------------  NOTES  -----------------------------------------
Homework: Entomology

1. How do you know if a creature in your garden is an insect?

2. What makes an insect "beneficial"?

3. Why can aphid populations increase so rapidly?

4. It is July. You have correctly diagnosed a large spider mite infestation on a customer's raspberry plants. What is the most important management strategy you can recommend to the customer?

5. Why do gardeners often report that ladybugs "disappear" shortly after releasing them in the garden?

6. List three factors contributing to pollinator decline.

7. Why is fall garden cleanup valuable to insect pest management? How would you advise a customer who would like to leave the leaves to protect overwintering insects/pollinators?

8. You are working in your county Master Gardener helpdesk. A customer calls about her two-year old crabapple tree. There are “a lot” of holes in the leaves and she wants to know what could be chewing on them. She can’t find any insects. How will you answer this question?
Class Notes: Lawn Care

☐ Review GardenNotes for this class
☐ Complete online course by the date on your course schedule
☐ Do Turf Crossword and bring to next class

-----------------------------------------  NOTES  -----------------------------------------

Module 1: Turf Introduction

Module 2: Species Selection

Module 3: Turf & Weedy Grass Identification

Module 4: Mowing
Class Notes: Lawn Care

Module 5: Fertilization

Module 6: Irrigation & Watering

Module 7: Soil & Thatch

Module 8: Pest Problems
CMG Turf Management Crossword Puzzle

Across
5. A management practice used to relieve soil compaction in lawns
8. This fertilizer nutrient makes grass darker green - and it grows faster
11. This type of irrigation head applies a large amount of water over a short time period
12. There are 2 types of this lawn care implement: the rotary- or the reel-type
14. You should leave these on your lawn when you mow lawns
15. This type of weed can grow back every year WITHOUT producing any seed
16. You are more likely to "stripe" a lawn using this type of fertilizer spreader

Down
1. Used for grass ID - the arrangement of the youngest leaf in the grass shoot (rolled or folded)
2. This is a layer of organic matter that can form in Kentucky bluegrass lawns
3. This is a disease of over-watered lawns
4. This insect-like pest can kill lawns in late winter/early spring (dry conditions)
6. This native grass can be planted in Colorado home lawns
7. This is a pesticide used to control WEEDS
9. This wild animal can cause dead spots in lawns (from constant, close feeding and urine injury)
10. These white larvae of beetles feed on turfgrass roots
13. When this nutrient is deficient, turf can become chlorotic (yellow)
Class Notes: Weed Management

- Review GardenNotes for this class
- Attend class

-----------------------------------------  Notes  -----------------------------------------
Class Notes: Planting Trees

- Review GardenNotes for this class
- Complete online course by the date on your course schedule.

-----------------------------------------  NOTES  -----------------------------------------

Module 1: Overview & References

Module 2: Why Trees Fail

Module 3: Tree Selection & Types of Nursery Stock

Module 4: Determine the Depth of the Planting Hole

Module 5: Dig a Saucer Shaped Hole
Module 6: Set the Tree in Place

Module 7: Backfill

Module 8: Staking

Module 9: Water, Final Grade & Mulch

Module 10: Post-Planting Care of New Trees
Class Notes: Care of Trees

- Review GardenNotes for this class
- Complete online course by the date on your course schedule

-----------------------------------------  NOTES  -----------------------------------------

Module 1: Overview & References

Module 2: Tree Size

Module 3: Mulch

Module 4: Staking

Module 5: Watering Trees
Module 6: Tree Care During Drought

Module 7: Tree Wrap

Module 8: Trees & Turf

Module 9: Herbicide Use Around Trees

Module 10: Iron Chlorosis

Module 11: Fertilization & Review
Class Notes: Vegetables

☐ Review GardenNotes for this class
☐ Attend class

-----------------------------------------  NOTES  -----------------------------------------
Class Notes: Mountain Gardening

☐ Review GardenNotes for this class
☐ Attend Class, if offered in your region

-----------------------------------------  NOTES  -----------------------------------------
Class Notes: Pruning

☐ Review GardenNotes for this class
☐ Attend class (or optionally watch online at CMG Online if not offered)
Class Notes: Small Fruits

- Review GardenNotes for this class
- Attend Class (or optionally watch at CMG Online if not offered)
Class Notes: Tree Fruits

☐ Review GardenNotes for this class
☐ Attend class (or optionally watch online at CMG Online if not offered)
Class Notes: Water-Wise Landscapes

- Review GardenNotes for this class
- Attend Class (or optionally watch online at CMG Online if not offered)

-----------------------------------------  Notes  -----------------------------------------
Class Notes: Irrigation

☐ Review GardenNotes for this class
☐ Attend class (or optionally watch online at CMG Online if not offered)