

Basic Knowledge Requirements to Become a Master Gardener in Ontario

including Sample questions

February, 2019

Master Gardeners of Ontario Inc.

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

PART A - Introduction

Purpose

The purpose of this document is to define the minimum knowledge required by Master Gardeners in Training (MGiTs) as they complete their certification and become Master Gardeners (MGs).

Expectations

It is not the intent of this document to make sure all Master Gardeners know the same things. There is no need for all Master Gardeners to be identical in terms of what they know about gardening. In fact, this diversity is good for the organization. Master Gardeners across Ontario will have different experience and context because of their local climates and environments. But there is a minimum level of knowledge required for Master Gardeners to perform their roles effectively. It is expected that the questions on an Interim Exam would not be so specific that it could not accommodate this expected variation in the knowledge base of individual MGs. One MG might know roses intimately but only have a passing understanding of clematis while another might know clematis intimately but only have a passing knowledge of roses. In these days of being able to quickly research and ask advice this should be considered a strength of the organization rather than a weakness.

This document defines the level of knowledge required so that MGITs will know what to expect from the Certification Exam and so that those designing and marking the exam will have guidelines on what constitutes fair content. This is not meant as a training manual but as an outline of subjects that MGs should know along with the scope of knowledge for each of these subjects. It is expected that MGs will continually be updating and increasing their knowledge of gardening, but this is the minimum they should know before being released on their own to advise the public under the MGOI banner.

Reference Materials

There are many resources available for the self-directed studier: print, digital, classes (in person), tutorials (online). Some options include, but are not limited to:

- Reference Manual for Ontario Master Gardeners (on MGOI website, www.mgoi.ca)
- Online courses & resources (see the CEU Information tab of the MGOI website for suggestions)
- In person classes at a local educational institution
- In person classes and workshops at local botanical gardens
- Local horticultural conferences
- Internet websites, specifically government and educational (see Resources tab on themgoi.ca website)
- Research on Questions asked at clinics and on hotlines

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

- Print resources
 - Your favourite garden books and books from your local library
 - on perennials, annuals, trees, kitchen garden, lawns, pests, etc
 - Complete Gardener's Dictionary (Barbara W. Ellis)
 - 100 Easy-to-Grow Native Plants for Canadian Gardens (Lorraine Johnson)
 - Botany in a Day – The Patterns Method of Plant Identification (Thomas J. Elpel)
 - How Plants Work: The Science Behind the Amazing Things Plants Do (Linda Chalker-Scott)
 - The New Ontario Gardener (Trevor Cole)
 - The Year-Round Vegetable Gardener: How to Grow Your Own Food 365 Days a Year, No Matter Where You Live (Niki Jabbour)
 - The Organic Gardener's Handbook of Natural Pest and Disease Control: A Complete Guide to Maintaining a Healthy Garden and Yard the Earth-Friendly Way (Rodale Organic Gardening)
 - Bringing Nature Home (Douglas Tallamy)
 - Trees in Canada (John L. Farrar)
 - The Global Forest (Diana Beresford-Kroeger)
 - The Hidden Life of Trees: What They Feel, How They Communicate — Discoveries from A Secret World (Peter Wohlleben,)
 - Planting: a New Perspective (Piet Oudolf & Noel Kingsbury)

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

Tips on How to Study for and Write the Certification Exam

General Information

- Every effort has been made to design a financially accessible and flexible option for Master Gardeners to achieve their educational requirements.
- You have 3 years to complete your education requirements. You are allowed only two attempts at the exam and they must be 6 months apart.
- The exam contains multiple choice questions, short answer questions, True/False questions and matching questions.
- There are 4 versions of the Certification exam. All versions have the same number of questions on a specific topic and the same number of types of questions. The pass rate for each of the exams is similar.
- It takes enormous time and resources to create a new exam. For that reason, the questions on the exam are confidential and shouldn't be shared. This will ensure that everyone has the same chance of success.
- There is no single resource that is recommended for studying as horticulture is a very broad topic. (see suggestions below)
- The exam is open-book, so you are allowed to bring in your own print (on paper) resources.
- Digital resources and the Internet are not allowed.
- The exam room should be in a quiet location so that you can work without being distracted.
- The pass mark is 70% and most people pass - in fact over 90% pass the exam! Having a well thought out study plan and understanding the exam process, will greatly increase your chances of success.

Getting Started

- Work independently if you are a disciplined self-starter.
- Create a study group with other MGITs if you prefer to work on a team; if your group has no one else who is doing the self-study option, ask your coordinator to contact other Master Gardener groups to find members who might be interested in studying with you. It is possible to support each other by email, Skype or other electronic means.
- Check [Master Gardener in Training Modules](#) (online study guides set up by Cochrane Master Gardeners)
- Horticulture is a broad field and it will take time to cover even the basic knowledge requirements.
- Set a schedule with specific topics to be studied within a specific time period. i.e. lawns (week 1), soil (week 2), arboriculture (weeks 3 & 4)
- Multiple choice exams tend to focus on details. If you learn a little bit each day and allow for repeated review, you will build a much more reliable long-term memory.

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

- At the end of the month, do a quick review and note any areas of concern or uncertainty.
- Use the following resources to identify topics and research information:
 - Parts B, C, D and E of this document were created by the Education Committee to support self-study. They include guidelines, suggested topics, plant lists, pests and diseases, sample questions for practice. Use the sample questions to practice your exam taking skills. (see below)
 - [Reference Manual for Ontario Master Gardeners, 3rd edition](#) (18 chapters with detailed lists of references and resources) **Note - this is a digital resource and is not allowed in that format for the exam.**
- Commercial or government pamphlets and your own favourite garden books are good resources. Create your own resources from the Internet and print them out.
 - Bookmark sections of books with post its or sticky notes
 - Use highlighters to make important information stand out.
 - Create brief notes and summaries on topics to simplify access to information and help you learn.
 - Know the reference material inside and out so that you can quickly refer to a page if you draw a blank on the exam.

Taking the exam - Prep

- Get a good night's rest before the exam.
- Organise your reference materials the night before.
- You may use paper reference material only. Digital resources or the Internet are not allowed.
- Pack a drink (& snack if needed), several pencils, pens.
- Arrive at the exam site early so that you can get everything organized.
- Visit the washroom before entering the room and take a deep breath.
- Have a watch with you to keep track of time.
- Arrange your reference materials in front of you.
- Plan your time and pace yourself. There are 100 questions and 2 ½ hours to take the exam. This means you have about 1.5 minutes per question.

Starting the exam

- Skim over the entire exam before starting to answer questions.
- Go back to the beginning and read the first question. Answer it if you know the answer. If not, move on. Skip over any questions that you would need to verify in one of your source books.
- When you have answered all questions you can readily answer, go back to the beginning and start on the questions you skipped.
- Circle or underline key words to help you focus and narrow down the question's meaning. Look it up if it is a topic in your resources you have bookmarked.

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

- Multiple choice questions:
 - Read all of the choices.
 - Eliminate choices that you know are incorrect by putting an “x” beside them.
 - When deciding between two responses, circle key words, underline and compare wording, reread the question.
 - If you are unable to make a choice and need to spend more time with the question, put a big question mark beside that question, and move on to the next.
- Avoid getting bogged down on one question part of the way through the exam.
- True or False questions: Read the statement carefully. Circle any key words. Check for any missing or incorrect information that would make the statement false. If part of it is false, the whole thing is false.
- Short answer questions: Keep answers brief or in point form.
- Go through the exam again, checking that you have answered all questions. Once again, don't get bogged down on questions that you don't know the answer to but do make an educated guess as a last resort. There is no penalty for incorrect answers.

Post exam

- Give yourself a pat on the back for doing something exceptional!

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

PART B - Guidelines

Basic plant form and function

- MGs should have an understanding of basic plant form and function with enough understanding of the terminology and concepts to allow reading and understanding of scientific information useful in solving practical gardening problems, but not necessarily enough to engage in the research themselves.
- They should have a practical understanding of the basic underlying anatomy, physiology and the environmental factors involved in plant growth, survival, and reproduction.
- They should be familiar with the common growth habits and reproductive strategies that plants employ.

Soils

- MGs need to know enough about soil structure and both biotic and abiotic soil processes so that they can advise on ways to rebuild and maintain healthy soils.
- They need to have a clear and practical understanding of methods of composting, mulching, and soil amending by both organic and chemical methods.
- Practical methods that homeowners can use for assessing and improving soil structure and health should be understood. This should include chemical fertilizers and their alternatives along with an understanding of how to apply them.
- MGs need to understand the concept and importance of pH.

Lawns

- MGs should understand how to maintain a healthy lawn by both chemical and alternative means.
- They should know when it is appropriate to replace or renovate the turf in a lawn and how to go about it.
- They should know about available non-chemical ways of maintaining lawns.
- They should also know how to identify the primary grass species employed, along with their uses. They should know how to identify and control the common weeds, insects and diseases of turf.
- They should also know about alternative ground covers.
- They should understand Integrated Pest Management (IPM) as it applies to lawns.

Plants for indoor use

- MGs should know how to maintain and propagate the commonly used houseplants.

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

- They should know how to identify and control the common pests and diseases of houseplants.

Arboriculture

- MGs should understand how to choose (based on site conditions), plant, prune and otherwise maintain trees in healthy conditions.
- They should be familiar with the common insects, diseases and disorders that affect trees and how to deal with them.
- They should have a clear understanding of how to diagnose tree problems.
- They should understand the differences between evergreen and deciduous trees and shrubs.
- They should be aware of trees native to their area.

Pruning

MGs should be aware of pruning methods for all common shrubs and trees including fruit trees, hedges and perennials.

Fruit, Vegetable and Herb Gardening

MGs should be familiar with the cultural practices of fruits, vegetables and herbs that might be grown in a small garden. This includes vines, shrubs and small fruit trees. MGs should, with the aid of reference material, be able to diagnose and advise on treatment of damage due to pests and diseases.

Plant Identification and Cultural Practices

- MGs should be able to understand the seed propagation process and the importance of food, light and water to grow plants from seeds.
- MGs should understand the value of pinching and deadheading.
- MGs should be able to identify and explain the cultural practices for a majority of the common genera of perennials, shrubs, trees, vines, annuals, fruit trees, and vegetables.
- As a minimum, methods of propagation should be understood in general terms rather than in detail for each plant.
- Although MGs will know a great deal about varieties and cultivars, the specifics will vary with the individual MG and are not included because they can be looked up and the information is too vast for anyone to retain it all. While it is preferred that MGs know both common and scientific names, as a minimum requirement, either will suffice.
- It is difficult to define a common minimum requirement for the plants that an individual MG should know that would be consistent across the province. Of course there would be differences from one growing zone to another, but often MGs have to know about

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

plants that grow outside their zones in order to advise people on the risks of growing them. MGs should understand the environmental requirements of perennials so that they can advise where best to grow them. As a minimum, MGs should be familiar with common plants grown in their areas and their cultural practices. Appendix A contains a list of commonly used genera of perennials, shrubs, and trees grown in Ontario with their scientific and common names. Included also is a guide to pronouncing the scientific names.

Problem Solving

With the help of reference material, MGs should be able to identify, diagnose and advise on the control of insects, diseases, and disorders affecting plants. Appendix B contains a list of pests and diseases commonly encountered in Ontario.

Cultural and organic methods should be understood as well as chemical ones. Integrated Pest Management (IPM) should be understood in this context. Strategies for diagnosing problems should be understood.

Weeds

MGs should be familiar with the common weed types and their growth habits. MGs should be able to advise on effective strategies for the management and control of weeds. MGs should be knowledgeable about both organic and chemical means of control as well as IPM methods. MGs should also have an understanding of common invasive species and how to deal with them.

Ecological horticulture

MGs should have an understanding of the ecological topics of xeriscaping, plant succession, naturalizing, ecosystem interactions and relationships. MGs should have some knowledge of beneficial organisms, e.g. predators, parasitoids, beneficial nematodes, and competing/antagonist microorganisms. They should be aware of practices that encourage the presence of these beneficial organisms.

Policies and public relations

MGs should know about MGOI policies on dealing with the public and how to research and present horticultural information to the public. They should know the pesticide policy and any other policy that MGOI approves. Although MGs will not be examined specifically for it, they should be aware of MGOI's mission statement:

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

Master Gardeners of Ontario Incorporated develops the knowledge and the leadership skills to enable volunteers to provide balanced, scientific horticultural information to Ontario communities.

Similarly, MGs should be aware that all Coordinators possess a handbook that contains information about the organization such as bylaws, policies, etc. They are encouraged to consult this document for information.

Landscape design

MGs will want to become versed in landscape design but as a minimum they only need to understand very basic design concepts. This should include how to analyze and approach a garden design.

APPENDIX B
 REQUIREMENTS FOR CERTIFICATION EXAM

PART C

Some Perennials, Trees & Shrubs Commonly Grown in Ontario

(These may not necessarily grow in all soil and climate conditions)

| | |
|--------------------------------------|-------------------|
| <i>Matthiola</i> math-ee-OH-lah | Stock |
| <i>Rudbeckia</i> rud-BEK-ee-ah | Black-eyed Susan |
| <i>Cornus</i> KOR-nus | Dogwood |
| <i>Geranium</i> jer-AY-nee-um | Hardy Geranium |
| <i>Iberis</i> eye-BEER-iss | Candytuft |
| <i>Lychnis</i> LIK-nis | Maltese cross |
| <i>Salvia</i> SAL-vee-ah | Salvia |
| <i>Scabiosa</i> skab-ee-OH-sah | Pincushion Flower |
| <i>Sedum</i> SEE-dum | Sedum |
| <i>Saponaria</i> sap-oh-NAR-ee-ah | Soapwort |
| <i>Achillea</i> ah-KILL-lee-ah | Yarrow |
| <i>Aconitum</i> ak-on-EYE-tum | Monkshood |
| <i>Alchemilla</i> al-kem-ILL-ah | Lady's Mantle |
| <i>Anemone</i> ah-NEM-oh-nee | Japanese Anemone |
| <i>Anthemis</i> an-THEME-iss | Marguerite Daisy |
| <i>Aquilegia</i> ak-will-EE-zsah | Columbine |
| <i>Arabis</i> AYR-ah-biss | Wall Rockcress |
| <i>Armeria</i> ar-MARE-ee-ah | Thrift |
| <i>Artemisia</i> ar-tem-EE-zs | Artemisia |
| <i>Aruncus</i> ah-RUN-kus | Goat's Beard |

| | |
|---|----------------|
| <i>Asclepias</i> ah-SKLEE-pee-us | Butterfly Weed |
| <i>Aster</i> ASS-ter | Aster |
| <i>Astilbe</i> ah-STILL-bee | Astilbe |
| <i>Bellis</i> BELL-iss | English Daisy |
| <i>Bergenia</i> ber-GEN-ee-ah | Bergenia |
| <i>Campanula</i> kam-PAN-yew-lah | Bellflower |
| <i>Cerastium</i> sir-ASS-tee-um | Snow-in-summer |
| <i>Chrysanthemum</i> kris-AN-theh-mum | Chrysanthemum |
| <i>Delphinium</i> del-FIN-ee-um | Delphinium |
| <i>Dianthus</i> dy-ANN-thus | Pinks |
| <i>Dicentra</i> dy-SEN-trah | Bleeding Heart |
| <i>Doronicum</i> door-ON-ih-kum | Leopard's bane |
| <i>Echinacea</i> eh-kih-NAY-shah | Coneflower |
| <i>Erica</i> eh-REE-kah | Heather |
| <i>Euphorbia</i> yew-FOR-bee-ah | Euphorbia |
| <i>Filipendula</i> fil-ih-PEND-yew-lah | Meadowsweet |
| <i>Gaillardia</i> gay-LARD-ee-ah | Blanket Flower |
| <i>Geum</i> JEE-um | Geum |
| <i>Gypsophila</i> jip-SOF-ih-lah | Baby's Breath |

| | |
|--|------------------|
| <i>Hemerocallis</i> hem-er-oh-KAL-iss | Daylily |
| <i>Heuchera</i> HEW-ker-ah | Coral Bells |
| <i>Hosta</i> HOSS-tah | Hosta |
| <i>Iris</i> EYE-riss | Iris |
| <i>Leucanthemum</i> lew-KAN-theh-mum | Shasta Daisy |
| <i>Liatris</i> lee-AT-tris | Blazing Star |
| <i>Ligularia</i> lig-yew-LAR-ee-ah | Ligularia |
| <i>Lobelia</i> lo-BEE-lee-ah | Cardinal Flower |
| <i>Lupinus</i> Lew-PY-nus | Lupine |
| <i>Malva</i> MAL-vah | Mallow |
| <i>Monarda</i> mo-NAR-dah | Bergamot |
| <i>Nepeta</i> NEP-eh-tah | Catmint |
| <i>Paeonia</i> pay-OH-nee-ah | Peony |
| <i>Papaver</i> pa-PAH-ver | Oriental Poppy |
| <i>Penstemon</i> PEN-steh-mon | Beard Tongue |
| <i>Physostegia</i> fy-so-STEE-jhah | False Dragonhead |
| <i>Platycodon</i> plat-ee-KOE-don | Balloon Flower |
| <i>Phlox</i> flox | Phlox |
| <i>Polemonium</i> Pol-ay-MOH-ni-um | Jacob's Ladder |
| <i>Potentilla</i> po-ten-TIL-ah | Potentilla |
| <i>Primula</i> | Primrose |

| | |
|--|----------------------|
| PRIM-yew-lah | |
| <i>Pulmonaria</i> pull-mon-AR-ee-ah | Lungwort |
| <i>Pulsatilla</i> pul-sah-TIL-lah | Pasque Flower |
| <i>Smilacina</i> smeh-la-SEE-nah | False Solomon's Seal |
| <i>Stachys</i> STAK-iss | Lamb's Ears |
| <i>Aurinia</i> or-EE-ni-ah | Basket-of-gold |
| <i>Tanacetum</i> tan-ah-SEE-tum | Tansy |
| <i>Thalictrum</i> thah-LIK-trum | Meadow Rue |
| <i>Tiarella</i> tee-ar-EL-lah | Foamflower |
| <i>Verbascum</i> ver-BASS-kum | Mullein |
| <i>Veronica</i> ver-ON-ih-kah | Speedwell |
| <i>Viola</i> vy-OH-lah | Pansy |
| <i>Yucca</i> YUK-ah | Yucca |
| <i>Clematis</i> KLEM-ah-tis | Clematis |
| <i>Aubretia</i> | False Rockcress |
| <i>Arenaria</i> | Sandwort |
| <i>Vinca</i> VIN-kah | Periwinkle |
| <i>Sempervivum</i> sem-per-VEE-vum | Hens and Chicks |
| <i>Lamium</i> LAY-mee-um | Dead Nettle |
| <i>Thymus</i> TY-mus | Thyme |
| <i>Campsis</i> KAMP-sis | Trumpet Vine |
| <i>Humulus</i> HUME-yew-luss | Hops |

APPENDIX B
 REQUIREMENTS FOR CERTIFICATION EXAM

Shrubs

| | |
|---|---------------------------|
| <i>Amelanchier</i> am-el-AN-keer | Serviceberry |
| <i>Aralia</i> ah-RAY-lee-ah | Aralia, angelica- tree |
| <i>Caragana</i> kare-ah-GAY-nah | Peashrub |
| <i>Chaenomeles</i> ke-NOM-eh-lez | Flowering Quince |
| <i>Clethra</i> KLETH-rah | Summersweet Clethra |
| <i>Corydalis</i> kor-ID-ah-liss | Corydalis |
| <i>Cotinus</i> koe-TY-nus | Smokebush |
| <i>Cotoneaster</i> kah-TONE-ee-ass- ter | Cotoneaster |
| <i>Crataegus</i> | Hawthorn |
| <i>Deutzia</i> De-T-zee-ah | Deutzia |
| <i>Elaeagnus</i> eh-leh-AHG-nus | Russian-olive |
| <i>Euonymus</i> yew-ON-ih-mus | Euonymus |
| <i>Forsythia</i> for-SITH-ee-ah | Forsythia |
| <i>Fothergilla</i> fah-ther-GILL-ah | Fothergilla |
| <i>Hibiscus</i> hy-BIS-kus | Rose-of-Sharon |
| <i>Ilex</i> EYE-leks | Holly |

| | |
|---------------------------------------|----------------|
| <i>Kalmia</i> KAL-mee-ah | Kalmia |
| <i>Kolkwitzia</i> kol-KWIT-zee-ah | Beauty Bush |
| <i>Ligustrum</i> lih-GUS-trum | Privet |
| <i>Perovskia</i> per-OV-skee-ah | Russian Sage |
| <i>Philadelphus</i> fil-ah-DEL-fus | Mock-Orange |
| <i>Physocarpus</i> fy-so-KAR-pus | Ninebark |
| <i>Potentilla</i> Po-ten-TIL-ah | Potentilla |
| <i>Rhus</i> rus | Sumac |
| <i>Sambucus</i> sam-BOO-kus | Elder |
| <i>Sorbaria</i> sor-BAH-ri-ah | False Spirea |
| <i>Spirea</i> spy-REE-ah | Spirea |
| <i>Syringa</i> sy-RIN-gah | Lilac |
| <i>Vaccinium</i> vak-SIN-ee-um | Blueberry |
| <i>Viburnum</i> vy-BURN-um | Wayfaring tree |
| <i>Juniperus</i> joo-NIP-er-us | Juniper |
| <i>Hydrangea</i> hy-DRAIN-jah | Hydrangea |
| <i>Lonicera</i> lon-ISS-er-ah | Honeysuckle |

APPENDIX B
 REQUIREMENTS FOR CERTIFICATION EXAM

Trees

| | |
|--|--------------------------|
| <i>Acer</i> AY-sir | Maple |
| <i>Aesculus</i> ESS-kew-lus | Horsechestnut |
| <i>Betula</i> BET-ew-lah | Birch |
| <i>Corylus</i> KOR-ih-lus | Hazel |
| <i>Fagus</i> FAH-gus | Beech |
| <i>Fraxinus</i> FRAKS-in-us | Ash |
| <i>Ginkgo</i> GINK-oh | Ginkgo |
| <i>Gleditsia</i> gled-IT-see-ah | Thornless Honeylocust |
| <i>Juglans</i> JOO-glans | Walnut |
| <i>Larix</i> LAIR-iks | Larch |
| <i>Liquidambar</i> lih-kwid-AM-bar | Sweetgum |
| <i>Liriodendron</i> Lir-oh-DEN-dron | Tulip Tree |
| <i>Magnolia</i> mag-NO-lee-ah | Magnolia |

| | |
|----------------------------------|-------------------------|
| <i>Malus</i> MAH-lus | Crabapple |
| <i>Prunus</i> PREW-nus | Cherry, Plum, Almond |
| <i>Quercus</i> KWER-kus | Oak |
| <i>Sorbus</i> SOR-bus | Mountain Ash |
| <i>Styrax</i> STY-rax | Snowbell |
| <i>Tilia</i> TIL-ee-ah | Linden |
| <i>Salix</i> | Weeping Willow |
| <i>Abies</i> A-bee-ez | Fir |
| <i>Chamaecyparis</i> | False Cypress |
| <i>Picea</i> Py-SEE-ah | Spruce |
| <i>Pinus</i> PY-nus | Pine |
| <i>Taxus</i> TAX-us | Yew |
| <i>Thuja</i> THOO-yah | Cedar |
| <i>Thujaopsis</i> Thu-YOP-sis | False Arborvitae |
| <i>Tsuga</i> SOO-gah | Hemlock |

PART D

Some Insects, Pests and Diseases Commonly Encountered in Ontario

(Not all of these are harmful to plants in all circumstances)

INSECTS

Chewing and Boring Insects

COLEOPTERA: beetles and weevils

Bark Beetles, Asian Longhorn Beetle, Emerald Ash Borer, Black Vine Weevil, Strawberry Root Weevil, Lily Leaf Beetle, June Beetles and Chafers, Viburnum Beetles, Asparagus Beetle, Potato Beetle, Squash Vineborer, corn rootworm, cucumber beetles, sap beetles, curculio, Mexican bean beetle, flea beetles, spinach leaf miners, wireworms

DERMAPTERA: earwigs

DIPTERA: flies, gnats, midges, mosquitoes

Apple Maggots, seed corn maggots, root maggots, carrot rust fly

HYMENOPTERA: bees, ants, wasps, sawflies, horntails

Birch Leaf Miner, Rose Sawfly, leafcutter bees,

ISOPTERA: termites

LEPIDOPTERA: butterflies and moths

Tent Caterpillars, Tomato Hornworm, Leaf Rollers, Gypsy Moths, Cutworms, Iris Borers, Spruce Budworm, Fall Web Worms, Peach Tree Borers, Cabbage Worms, Parsleyworm (Swallowtail), Cabbage Loopers, Codling moths

ORTHOPTERA: crickets, praying mantis, grasshoppers

Sucking Insects

HEMIPTERA: stinkbug, plantbug, squash bug, boxelder bug

Spittle Bugs, Hairy Chinch Bugs

HOMOPTERA: scale, mealybugs, whiteflies, aphids, cicadas, leafhoppers

APPENDIX B REQUIREMENTS FOR CERTIFICATION EXAM

THYSANOPTERA: thrips

OTHER PESTS

Slugs and Snails, millipedes, nematodes, sowbugs & pillbugs, Rodents, Deer, Spider Mites (Acarina), Eriophyid mites

DISORDERS caused by abiotic factors

Leaf scorch, walnut injury, Salt injury, Herbicide damage, Winter damage, Nutrient deficiencies, blossom end rot

DISEASES

FUNGI:

Black Spot, Rose Wilt, Damping Off, Dutch Elm Disease, Powdery Mildew, Anthracnose, Verticillium wilt, Fusarium wilt, Hollyhock Rust, Apple Scab, Tar Spot on Maple, Cedar Apple Rust, Snow Mould, Black Knot, Fire Blight, bean rust, corn smut, white mold, Alternaria leaf spot, club root.

BACTERIA:

bacterial black rot, bacterial soft rot, Crown Gall

VIRUSES:

cucumber mosaic virus, rose mosaic

PART E

Sample Questions

NOTE: There are several versions of the Certification Exam, and each one has the same format. There are 100 questions each worth 1 mark.

The exam is made up of:

- multiple choice questions – pick the ONE best answer (such as # 1 on this page)
- T/F questions (such as in #8 on page 18, but each one is separate on the exam)
- matching questions - maximum number of things to be matched is 4 (such as #21 on page 22)
- short answer questions – candidate states answer in own words (such as #14 on page 19)

There are no part marks possible for multiple choice or T/F questions. Our marker gives part marks where deserved for matching and short answer questions

The questions on the exam are not grouped by type – it is a random sequence of multiple choice, T/F, matching and short answer questions.

1. The pH of soil is
 - (a) acidic below 7, neutral at 7, alkaline above 7
 - (b) alkaline below 7, neutral at 7, acidic above 7
 - (c) not affected by acid rain or snow
 - (d) only matters in zones warm enough to grow rhododendrons and azaleas

2. You wish to apply nitrogen at a rate of 1.5 kg per 100 M². The fertilizer that you have contains 15% nitrogen. How many kg of this fertilizer would be required to achieve the desired rate on 250 M²?

3. Which of these practices will NOT lessen thatch problems?
 - (a) correcting soil surface drainage
 - (b) light, frequent topdressing of compost worked in with a rake
 - (c) increasing the irrigation of the lawn
 - (d) mechanical dethatching with a rake

4. If one wants to stop using bonemeal, a replacement would be
 - (a) green manure crops of nitrogen-fixing legumes
 - (b) rock phosphate or colloidal phosphate
 - (c) muriate of potash
 - (d) sulphur-coated urea

5. Besides N, P, K, fertilizers contain valuable micronutrients including:
 - (a) perlite, vermiculite and sphagnum
 - (b) boron, manganese and iron
 - (c) strontium, chromate and cadmium
 - (d) zinc, hydrogen and colloids

6. There is a soccer field with good grass, on a rich clay soil, and used by very many

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

teams all summer. It needs levelling. Should it be rolled? Any comments?

7. Containers and planters on balconies often use perlite and vermiculite
 - (a) to reduce the effect of wind
 - (b) to provide buffering capacity for the fertilizers
 - (c) to improve soil porosity and lighten the weight
 - (d) to modify the winter microclimate, especially on high balconies

8. True or False?
 - T F Dandelions are tap-rooted noxious weeds
 - T F Grass that goes brown in summer is dead and must be reseeded
 - T F Weed grasses spread by tillers, rhizomes and stolons; proper lawn grasses only by seeding
 - T F Perennial ryegrass performs well in competition with weed grasses and broadleaved weeds
 - T F If turf has endophytic fungi, it's a problem
 - T F Perennial ryegrass is valuable on dry areas and easily eroded slopes
 - T F White clover is beneficial to lawn grass because its roots add Potassium to the soil
 - T F Under most conditions Kentucky Blue grass will have deeper roots if mowed at 5cm than at 2.5cm

9. Perennials suitable for some balcony and planter locations include
 - (a) *Potentilla*, cranberry cotoneaster, and *Daphne*
 - (b) marigolds, *Petunia* and *Portulaca*
 - (c) morning glory, *Salvia* and violas
 - (d) *Saponaria*, *Dianthus*, *Artemisia* and *Sedum* species

10. Trees and shrubs for large patio planters in Zone 5 should
 - (a) have a layer of coarse rock at the bottom to hold more water
 - (b) get extra fertilizer in late autumn
 - (c) be chosen to be hardy in Zone 3 or 4 if possible
 - (d) be chosen to be hardy in Zone 5b and 6a if possible

11. For naturalizing in the garden, which of these bulbs will not reliably spread and

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

flower? (There may be more than one answer)

- (a) *Scilla*
- (b) *Gladiola*
- (c) daffodil
- (d) species tulips(eg. *Tulipa tarda*)
- (e) regular tulips
- (f) aconite

12. A gardener wants to know what could cause his houseplants to have sticky honeydew on them
- (a) aphid
 - (b) mealybugs
 - (c) whitefly
 - (d) all of the above
13. *Dracena marginata* and *Ficus benjamina* are effective in removing these indoor air pollutants:
- (a) cadmium, arsenic and chromate
 - (b) benzene, trichloroethylene and formaldehyde
 - (c) copper, molybdenum and zinc
14. My indoor plants have been getting their regular water and fertilizer, but since about Christmas their leaves are yellowing, browning and falling off. What is the probable cause? Explain.
15. My most sheltered spot to try to grow rhododendrons, azaleas and heather is right up against the wall of my house. There is space and there is good soil. What do you think?
16. I fertilize my vegetables all summer and they do well but I was told to stop fertilizing trees and roses by July. Why?
17. What is one disadvantage of leaving stakes too long on a newly-planted tree?

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

18. Match the following botanical names with the common names. Fill in the correct letter from the second list into the space on the first list.

_____ *Acer rubrum*
_____ *Larix laricina*
_____ *Juniperus virginiana*
_____ *Prunus virginiana*
_____ *Betula papyrifera*
_____ *Salix pentandra*
_____ *Picea pungens var glauca*
_____ *Gleditsia triacanthos*
_____ *Tilia americana*
_____ *Fraxinus pennsylvanica*
_____ *Vinca minor*
_____ *Metasequoia glyptostroboides*

- (a) Eastern red cedar
- (b) False spirea
- (c) Red maple
- (d) Basswood
- (e) Periwinkle
- (f) Crimson King maple
- (g) Tamarack
- (h) Dawn Redwood
- (i) Blue Colorado spruce
- (j) Canoe or paper birch
- (k) honeylocust
- (l) Chokecherry
- (m) Black locust
- (n) willow
- (o) Green ash

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

19. Match the following plants with their notable characteristics. Fill in the space in the first list with the correct letter from the second list.

_____ Sea buckthorn
_____ Native osier dogwood
_____ Mountain ash
_____ *Forsythia*
_____ Mock orange
_____ Russian olive
_____ *Hydrangea*
_____ Japanese tree lilac
_____ Littleleaf linden
_____ *Gingko biloba*
_____ Peking cotoneaster

- (a) Deciduous conifer
- (b) Attractive silver leaves
- (c) Old favourite grown for its fragrant white blooms
- (d) Small yellow or creamy flowers in June
- (e) Twigs have four corky wings
- (f) Excellent as trimmed hedge
- (g) Blood red twigs in winter
- (h) Reddish berries for birds
- (i) Lenticular bark, like cherry
- (j) Lovely flowers when the buds are not killed above the snow line
- (k) Very resistant to salt spray and tolerates sandy or poor soil
- (l) Narrow columnar tree

20. Match the description to the houseplant pests. Fill in the space in each of the first list with the correct letter from the second list.

_____ aphids
_____ two-spotted spider mites
_____ scale
_____ whiteflies

- (a) four-winged, look like tiny moths
- (b) hard shelled, on the stems
- (c) carriers of virus
- (d) clog soil pores

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

21. Match the plant with its method of propagation. Fill in the space in each of the first list with the correct letter from the second list.

_____mints
_____mosses
_____poplar
_____yew

- (a) aril
- (b) catkins
- (c) raceme
- (d) stolons
- (e) spores
- (f) rhizomes
- (g) panicles

22. Match the plant with the risk. Fill in the space in each of the first list with the correct letter from the second list.

_____Foxglove flowers
_____Rhubarb leaves
_____Fruit pits & seeds
_____Poinsettia bracts
_____green potatoes
_____Dieffenbachia

- (a) not as dangerous as reputed
- (b) solanins
- (c) oxalates
- (d) cyanide
- (e) digitalis
- (f) alkaloid

23. It is important that a landscaping plan be:

- (a) permanent.
- (b) to scale.
- (c) coloured to show the value of perennial beds.
- (d) legally registered with the appropriate municipality.

24. A low and soggy patch in a yard

- (a) is a good place for moisture-lovers like ferns and turtlehead.
- (b) must have tile drainage installed or high raised beds.
- (c) is the result of a permeable subsoil layer.
- (d) is the perfect place for a concrete pool.

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

25. Contour planting on slopes
- (a) improves succession planting.
 - (b) works well with intercropping.
 - (c) helps prevent soil erosion.
 - (d) helps with pollination of corn crops.
26. Write the best answer from the second list into the blanks in the first list.
- _____cutworms
_____onion maggots
_____potato beetles
_____sap beetles
- (a) overwinter in damaged produce not cleaned up last season
 - (b) no cultural or chemical control
 - (c) can be deterred by plantings of marigold or tansy
 - (d) can be trapped with baits
 - (e) visible eggs under the leaves, crush or destroy
 - (f) in soil near the decapitated seedling
27. Which is the best choice to colonize and thus fill a bare spot in a city lot?
- (a) 'Bristol Ruby' *Weigela*
 - (b) Preston lilac
 - (c) Flowering almond, especially if grafted as a standard
 - (d) Snowberry
28. *Miscanthus sinensis* is an ornamental grass that makes a grand statement in the garden. What kind of maintenance does it require to look its best?
29. The Canadian Plant hardiness Zone Map
- (a) is based on a variety of climate factors in addition to minimum winter temperature.
 - (b) is based on the same principles as the USDA Zone Map so all you have to do is add one to the USDA Zone to get the Canadian zone.
 - (c) is controlled by Canadian Laws requiring accuracy on the tagging of shrubs and trees.
 - (d) indicates that the "a" part of any zone is warmer than the "b" part.

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

30. Shearing the tips of branches evenly
- (a) is the best method of shrub rejuvenation.
 - (b) helps a tree recover from loss of roots during transplanting.
 - (c) alleviates the production of chloroplasts in deciduous evergreens.
 - (d) for hedge conifers such as cedar and yew, should be done early in the growing season and if necessary again before midsummer.
31. In pruning Mugho pines we usually have better results if
- (a) we shorten the candles while they are still green and soft.
 - (b) we wait until the new growth is properly hardened off.
 - (c) we use good anvil pruners.
 - (d) we look for the branch collar ring.
32. Flowering shrubs should be pruned by
- (a) careful pruning of all branches into an even tidy shape.
 - (b) removing old branches at 45 cm height to avoid damaging the rootstock.
 - (c) keeping all the established inner branches intact and only removing the suckers around them.
 - (d) removing some older growth annually and letting some new growth come along to replace it.
33. The branch ring or collar area
- (a) should be sprayed with tree paint immediately after being cut.
 - (b) should be sprayed, but after having 24 hours to callus over.
 - (c) contains cells which callus rapidly and naturally; if left intact and left alone, the tree can resist disease infection because of this.
 - (d) should be preserved to help epicormic buds form.
34. Most tree roots are in the top one metre of soil, therefore
- (a) the subsoil conditions only matter for tap-rooted trees like oaks.
 - (b) there is little to worry about if the subsoil below one metre is impervious.
 - (c) that soil matters, but the subsoil should also be broken up to allow air, water and roots to penetrate.
 - (d) water percolation rates matter only in summer droughts.
35. Which of the following is most dangerous to a tree:
- (a) if its heartwood contains no living cells?
 - (b) if its sapwood conducts water and nutrients from its roots?
 - (c) If its cambium layer is damaged by rabbits and lawnmowers?
 - (d) If its phloem cells become part of its bark?

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

36. A gardener in Zone 6 planted a Blue Princess holly, in good soil, in a protected site with adequate moisture, five years ago. It looks lovely and produces lots of blossoms but no berries. What is the problem?
37. Which tree is not hardy in Zone 4 and farther north?
- (a) Balsam fir
 - (b) Northern catalpa
 - (c) *Hydrangea arborescens*
 - (d) Schubert chokecherry
38. What are the disadvantages of each of these? Is any one of them of any value or use? Comments, please.
- (a) Siberian elms
 - (b) Willows
 - (c) Silver maple
 - (d) Poplars
39. A crabapple tree had lovely flowers a few weeks ago but now its leaves are spotty and falling off. What should be done?
- (a) Make sure all the leaves are gathered in autumn.
 - (b) Gather and destroy all the fallen leaves as they come; spray with sulphur.
 - (c) Spray with the safe biocontrol Bt (*Bacillus thuringiensis*).
 - (d) Check for cedar-apple rust galls on nearby cedars, destroy them.
40. What chemical is safe for a cottager to use on the weeds in his lake? What do you recommend?
41. You are short of time to get your weeding done. Some rows should get priority and some you put off. Circle the ones you could put off.
- (a) onions
 - (b) summer squash
 - (c) asparagus
 - (d) winter squash

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

42. Crop rotation in the home garden
- (a) requires the study of plant families and a bit of planning.
 - (b) is better done on a three or four year plan than a two year plan.
 - (c) may be of more value long term for good soil than for disease and insect control.
 - (d) all of the above
43. For all of these vegetable families, list three examples of each:
e.g. Amaryllis (*Liliaceae*) -- chives, onions, garlic
- (a) Mustard (*Brassicaceae/Cruciferae*)

 - (b) Gourd (*Cucurbitaceae*)

 - (c) Pea (*Fabaceae/Leguminosae*)

 - (d) Nightshade (*Solanaceae*)

44. Too much of this fertilizer can reduce the flowering and fruiting of plants:
- (a) Nitrogen
 - (b) Potassium
 - (c) Phosphorous
45. My potatoes had terrible scab last year. What can I do to prevent it?
- (a) Organic gardeners can solve the problem with trap crops and with plants that attract beneficial insects.
 - (b) Use a diazinon treatment, following the instructions carefully.
 - (c) Avoid fresh manure, wood ash, lime; amend the soil for lower pH; move to different plot if possible.
 - (d) Keep the plants properly hilled up while the tubers are forming.

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

46. Which plants do NOT need protection from frost on cold spring nights?
- (a) Tomatoes
 - (b) Peppers
 - (c) Eggplants
 - (d) Carrots
 - (e) Cucumber
 - (f) Pumpkin
 - (g) Beets
 - (h) Parsnips
47. What would you recommend be done about black spot in a rose garden?
48. My summer phlox has white-grey fuzz on the leaves. What should I do?
49. A gardener has very misshapen roots on most of his carrots. What is the pertinent remedial practice for next year?
- (a) more careful fertilizer and watering
 - (b) companion planting, crop rotation, and mulching
 - (c) digging the soil more deeply, tilth improvement, and keeping the rows away from pathways.
 - (d) checking for soil-borne nematodes
50. Which of these statements is NOT true of dwarf fruit trees?
- (a) dwarf trees have smaller fruit.
 - (b) dwarf trees are influenced by the roots to which they are grafted.
 - (c) dwarf trees are not as drought resistant or wind-firm as standard trees.
 - (d) dwarf trees are easier to spray, prune and harvest.
51. In small gardens, fruits such as raspberries, currants and strawberries are more rewarding than big fruit trees because:
- (a) they grow in areas of poor drainage.
 - (b) they grow in poor or sandy soil, or in shade.
 - (c) they give good crops and often within a year or two of planting.
 - (d) they don't need as much care as fruit trees.
52. Is there any fruit that can be grown in very damp ground?

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

53. Enter the correct letter from the second list into the blanks on the first list

- _____ *Mycorrhiza*
- _____ lenticels
- _____ honeydew
- _____ Leaf galls
- _____ Leaf scorch
- _____ water sprouts
- _____ bract
- _____ Blossom-end rot
- _____ Thrips
- _____ Fireblight
- _____ allelopathy
- _____ auxins
- _____ lignin

- (e) unsightly but seldom life-threatening
- (f) leaf-like or petal-like
- (g) nodules on the roots of legumes
- (h) beneficial fungi which help roots absorb certain nutrients
- (j) cause ugly witches brooms
- (k) divisions of a compound leaf
- (l) supports the growth of sooty mould
- (m) could be confused with winter injury or scab infection
- (n) water stress, calcium deficiency
- (o) releasing toxins to eliminate competing plants
- (p) extra-vigorous growth after too severe pruning
- (q) silver streaks, speckles, on leaves
- (r) small grey hard scales on bark
- (s) responsible for apical dominance
- (t) contributes to the woody cell structure
- (u) can look like bacterial or fungal disease, very crisp and dry feeling
- (v) small elliptical pores of the bark

APPENDIX B
REQUIREMENTS FOR CERTIFICATION EXAM

54. Match the name of the flower with a characteristic.

_____ Virginia Bluebell

_____ *Delphinium*

_____ *Begonia*

_____ *Hosta*

_____ Daylily

_____ Coral Bells

_____ Lambs' Ears

_____ *Nicotiana*

_____ Yarrow

_____ Pansies

_____ *Clematis*

_____ *Campanula*

_____ *Monarda*

- (a) keep the roots cool
- (b) leaves that children love
- (c) spring ephemeral, disappears
- (d) thrives in hot dry places
- (e) needs good soil and staking
- (f) roots are tuberous or fibrous
- (g) is a Geranium
- (h) needs no staking
- (i) susceptible to slug damage
- (j) flowers open at night