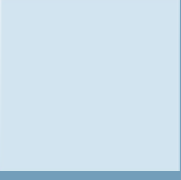


# Horticulture Technician Foundation Program Outline



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# **HORTICULTURE TECHNICIAN FOUNDATION PROGRAM OUTLINE**

**APPROVED BY INDUSTRY  
MAY 2013**

**BASED ON  
NOA 2010**

**Developed by  
Industry Training Authority  
Province of British Columbia**



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**Section 1**

**INTRODUCTION**

**Horticulture Technician Foundation**



## Foreword

This Program Outline describes the Landscape Horticulturist Apprenticeship Program. This program represents the new standard for horticulture apprenticeship training in British Columbia. All tasks identified in the National Occupational Analysis (NOA) have been included, as well as those competencies that apply specifically to Landscape Horticulture in British Columbia.

This document is intended as a guide for the course instructors in the classroom, laboratories and for practical training. Since this is a practical trade it is expected that instructor demonstration and student participation will be integrated into all learning activities.

**Note:** The Achievement Criteria for the practical assessments may be combined at the instructor's discretion and as time permits.

Safe working practices may not be specified in all competencies and learning tasks, however they are an implied part of this training program and should be stressed throughout the apprenticeship training.

This Program Outline also lists the Training Provider Standards which includes:

- Facility Requirements
- Tools and Equipment (for each level of technical training)
- Reference Materials
- Instructor Requirements

### SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.



## Acknowledgements

The Program Outline was prepared with the advice and direction of an industry steering committee convened initially by HortEducationBC (HEBC). Members include:

- *Anne Kadwell*, CEO HortEducationBC
- *Bill Hardy*, HEBC Board Chair (Northwest Landscape Ltd.)
- *Don Fraser*, Past Chair (Northwest Landscape Ltd.)
- *Mary Ann Van Den Berge*, BCLNA Representative (Trice Farms Pond & Garden Centre)
- *Cable Baker*, BCLNA Representative (RCB Garden Service)
- *Bruce McTavish*, BCLNA Representative (Kwantlen Polytechnic University, McTavish Resource & Management Consultants Ltd.)
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- *Ted de Crom*, WCTA Representative (City of Richmond Parks & Recreation Department)
- *Gail Szostek*, GreenSpace Consulting (former HortEducation BC Board Member)
- *Bill Reid*, the Corporation of the District of Powell River, Department of Parks, Recreation and Culture (former HortEducation BC Board Member)
- *Egan Davis*, HortEducationBC Board Member (City of Vancouver)
- *Rob Welsh*, Education Representative (Kwantlen Polytechnic University)
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Industry Subject Matter Experts retained to assist in the development of Program Outline content:

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- J. Jankola & Associates Consulting

The Industry Training Authority would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Landscape Horticulturist occupation.





## How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
<b>Program Credentialing Model</b>	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
<b>OAC</b>	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
<b>Training Topics and Suggested Time Allocation</b>	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
<b>Program Content</b>	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measurable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels



Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
<b>Training Provider Standards</b>	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment



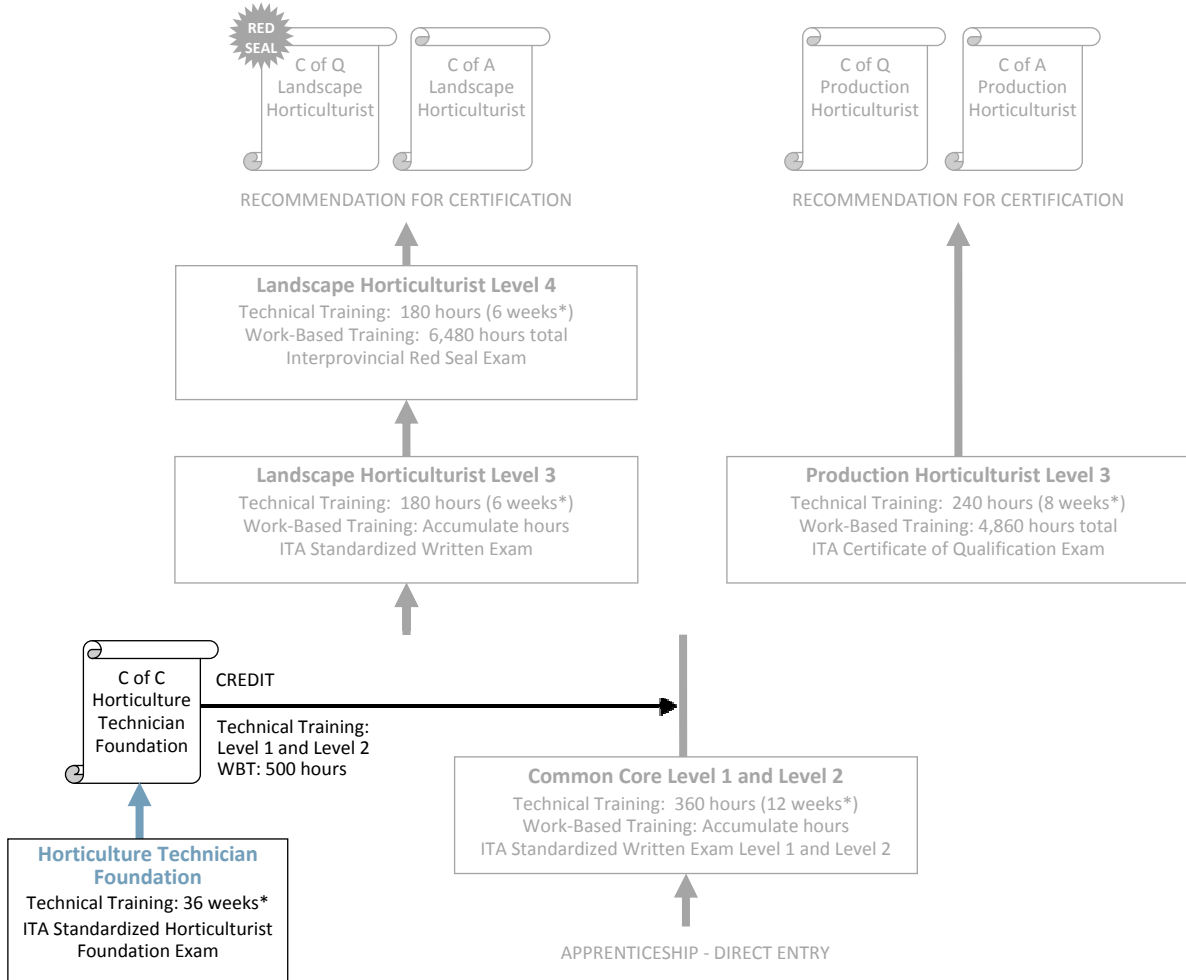
# **Section 2**

## **PROGRAM OVERVIEW**

### **Horticulture Technician Foundation**



# Program Credentialing Model



\*Suggested duration based on 30-hour week

C of Q = Certificate of Qualification  
 C of A = Certificate of Apprenticeship  
 C of C = Certificate of Completion  
 WBT = Work-Based Training



# Occupational Analysis Chart

## Horticulture Technician Foundation

<b>USES OCCUPATIONAL SKILLS</b>  A	Use personal protective equipment (PPE)  A1	Identify fire types and extinguishing methods  A2	Use WHMIS  A3	Recognize work hazards  A4	Demonstrate basic horticultural skills  A5	Identify relevant legislation, regulations and standards  A6
	1   2	1	1	1	1   2	1
<b>USES AND MAINTAINS TOOLS AND EQUIPMENT</b>  B	Use and maintain hand tools and power tools  B1	Use and maintain measuring equipment  B2	Operate vehicles and motorized equipment  B3	Maintain vehicles and motorized equipment  B4	Use and maintain equipment attachments  B5	
	1   2	1	1   2	1   2	2	
<b>ORGANIZES WORK</b>  C	Communicate with others  C6	Organize plants, materials and equipment  C9	Maintain safe work environment  C10	Examine interpersonal and supervisory skills  C11		
	1   2	2	1   2	1   2		
<b>ANALYZES AND MAINTAINS PLANT HEALTH</b>  E	Identify plants and plant requirements  E1	Manage growing conditions  E2	Manage pests and diseases  E3	Describe plant science as it applies to horticulture  E4	Describe physical and biological characteristics of soil and soilless media  E5	Describe chemical characteristics of soil and soilless media  E6
	1   2	2	1   2	1   2	1	2



## Training Topics and Suggested Time Allocation

### Horticulture Technician Foundation – Level 1

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
<b>Line A</b>	<b>USES OCCUPATIONAL SKILLS</b>	<b>15%</b>	<b>75%</b>	<b>25%</b>	<b>100%</b>
A1	Use personal protective equipment (PPE)		✓	✓	
A2	Identify fire types and extinguishing methods		✓	✓	
A3	Use WHMIS		✓		
A4	Recognize work hazards		✓	✓	
A5	Demonstrate basic horticultural skills		✓	✓	
A6	Identify relevant legislation, regulations and standards		✓		
<b>Line B</b>	<b>USES AND MAINTAINS TOOLS AND EQUIPMENT</b>	<b>25%</b>	<b>40%</b>	<b>60%</b>	<b>100%</b>
B1	Use and maintain hand tools and power tools		✓	✓	
B2	Use and maintain measuring equipment		✓	✓	
B3	Operate vehicles and motorized equipment		✓	✓	
B4	Maintain vehicles and motorized equipment		✓	✓	
<b>Line C</b>	<b>ORGANIZES WORK</b>	<b>10%</b>	<b>80%</b>	<b>20%</b>	<b>100%</b>
C6	Communicate with others		✓	✓	
C10	Maintain safe work environment		✓	✓	
C11	Examine interpersonal and supervisory skills		✓	✓	
<b>Line E</b>	<b>ANALYZES AND MAINTAINS PLANT HEALTH</b>	<b>50%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
E1	Identify plants and plant requirements		✓	✓	
E3	Manage pests and diseases		✓	✓	
E4	Describe plant science as it applies to horticulture		✓	✓	
E5	Describe physical and biological characteristics of soil and soilless media		✓	✓	
<b>Total Percentage for Horticulture Technician Foundation Level 1</b>		<b>100%</b>			



## Training Topics and Suggested Time Allocation

### Horticulture Technician Foundation – Level 2

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
<b>Line A</b>	<b>USES OCCUPATIONAL SKILLS</b>	<b>10%</b>	<b>25%</b>	<b>75%</b>	<b>100%</b>
A1	Use personal protective equipment (PPE)		✓	✓	
A5	Demonstrate basic horticultural skills		✓	✓	
<b>Line B</b>	<b>USES AND MAINTAINS TOOLS AND EQUIPMENT</b>	<b>20%</b>	<b>40%</b>	<b>60%</b>	<b>100%</b>
B1	Use and maintain hand tools and power tools		✓	✓	
B3	Operate vehicles and motorized equipment		✓	✓	
B4	Maintain vehicles and motorized equipment		✓	✓	
B5	Use and maintain equipment attachments		✓	✓	
<b>Line C</b>	<b>ORGANIZES WORK</b>	<b>20%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
C6	Communicate with others		✓	✓	
C9	Organize plants, materials and equipment		✓	✓	
C10	Maintain safe work environment		✓	✓	
C11	Examine interpersonal and supervisory skills		✓	✓	
<b>Line E</b>	<b>ANALYZES AND MAINTAINS PLANT HEALTH</b>	<b>50%</b>	<b>60%</b>	<b>40%</b>	<b>100%</b>
E1	Identify plants and plant requirements		✓	✓	
E2	Manage growing conditions		✓	✓	
E3	Manage pests and diseases		✓	✓	
E4	Describe plant science as it applies to horticulture		✓	✓	
E6	Describe chemical characteristics of soil and soilless media		✓	✓	
<b>Total Percentage for Horticulture Technician Foundation - Level 2</b>		<b>100%</b>			



# **Section 3**

## **PROGRAM CONTENT**

### **Horticulture Technician Foundation**





# Level 1

## Horticulture Technician Foundation



**Line (GAC):**        **A**    **USES OCCUPATIONAL SKILLS**  
**Competency:**       **A1**   **Use personal protective equipment (PPE)**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe and demonstrate personal safety in the workplace.
- Demonstrate proper use of PPE.

**LEARNING TASKS**

1. Select and use PPE as required for task, tools, equipment, machinery and environment
  
2. Ensure safe use of PPE
  
3. Store PPE to maintain its integrity
  
4. Check PPE prior to use
  
5. Check PPE inventory
  
6. Recognize damaged and expired PPE
  
7. Check and replace PPE components

**CONTENT**

- Ear protection
- Eye protection
- Hand protection
- Foot protection
- Safety vests
- Respiratory protection
- Fall protection
  
- Inspect
- Maintain
  
- Dry area
- Protected area
  
- Operation
- Condition
  
- Ensuring there is a ready supply
  
- Check expiration date
- Ensure integrity of PPE
  
- According to manufacturers' specification
- According to workplace requirements

**Achievement Criteria**

**Performance**    The learner will select PPE for specified tasks.  
**Conditions**     The learner will be given the appropriate PPE commonly used in the trade.  
**Criteria**        The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:  
                       Selected correct PPE required for specified tasks as designated by the instructor



**Line (GAC):**        **A    USES OCCUPATIONAL SKILLS**  
**Competency:**       **A2   Identify fire types and extinguishing methods**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify various types and classes of fires.
- Describe the procedure for using a fire extinguisher.

**LEARNING TASKS**

**CONTENT**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Describe conditions necessary to support a fire</li> <br/> <li>2. Describe classes of fires according to the materials being burned</li> <br/> <li>3. Describe the procedure for using a fire extinguisher</li> </ol> | <ul style="list-style-type: none"> <li>• Air</li> <li>• Fuel</li> <li>• Heat</li> <li>• Chemical chain reaction</li> <li>• Weather conditions</li> <br/> <li>• Class A</li> <li>• Class B</li> <li>• Class C</li> <li>• Class D</li> <li>• Symbols and colours</li> <br/> <li>• Extinguisher selection</li> <li>• P.A.S.S. <ul style="list-style-type: none"> <li>○ Pull</li> <li>○ Aim</li> <li>○ Squeeze</li> <li>○ Sweep</li> </ul> </li> </ul> |
|---|--|



**Line (GAC):**        **A   USES OCCUPATIONAL SKILLS**  
**Competency:**       **A3   Use WHMIS**

### Objectives

To be competent in this area, the individual must be able to:

- Summarize Workplace Hazardous Material Information System (WHMIS).
- Complete the online WHMIS certification.

### LEARNING TASKS

1. Describe WHMIS requirements

### CONTENT

- WHMIS certification
- WHMIS symbols
  - Compressed gas
  - Flammable and combustible material
  - Oxidizing Material
  - Poisonous and Infectious Material
  - Poisonous and Infectious Material that will cause immediate or serious toxic effects
  - Poisonous and Infectious Material that will cause other toxic effects
  - Corrosive material
  - Dangerously reactive material
- WHMIS labels

**NOTE: WHMIS certification is mandatory to complete Level One.**



**Line (GAC):**        **A    USES OCCUPATIONAL SKILLS**  
**Competency:**       **A4   Recognize work hazards**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify workplace hazards.
- Identify how to mitigate the risk of workplace accidents and injuries.

**LEARNING TASKS**

**CONTENT**

- |  |  |
|--|--|
| <p>1. Identify workplace hazards and potential risks</p>                         | <ul style="list-style-type: none"> <li>• Electrical and utility</li> <li>• Working at heights</li> <li>• Gravitational (“slips, trips and falls”)</li> <li>• Thermal (heat and cold stress)</li> <li>• Motorized equipment/mechanical (pinch point, “struck against”, vehicle)</li> <li>• Public</li> <li>• Behavioural (fatigue, rushing, complacency, stress, substance abuse, ignorance, frustration)</li> <li>• Chemical</li> <li>• Compressed gas</li> <li>• Environmental (insects, plants, weather)</li> <li>• Hazardous trees</li> </ul> |
| <p>2. Identify how to mitigate the risks of workplace accidents and injuries</p> | <ul style="list-style-type: none"> <li>• Visual assessments</li> <li>• Safe work plan</li> <li>• Post-job inspection</li> </ul>  |



**Line (GAC):**        **A**    **USES OCCUPATIONAL SKILLS**  
**Competency:**       **A5**   **Demonstrate basic horticultural skills**

**Objectives**

To be competent in this area, the individual must be able to:

- Practice basic skills used in general horticulture.
- Use safe work habits.
- Identify, select, use and maintain appropriate hand tools for the task.
- Practice safe operation of common power equipment.
- Identify levels of landscape maintenance and plant standards stated in the BC Landscape Standard.

**LEARNING TASKS**

1. Demonstrate basic horticultural skills

**CONTENT**

- Range of workplace hazards
  - Hazards versus risks
- Hand tools used in basic horticulture
  - Refer to Level One *B1- Use and maintain hand tools and power tools*
- BC Landscape Standard
  - Objectives of the BC Landscape Standard
  - Guide to use
  - Format of the BC Landscape Standard
  - Scope of sections
- Basic horticultural tasks
  - Maintenance
  - Determining maintenance levels
  - Appropriate maintenance procedures
  - Common landscape maintenance tasks and tools
- Operating horticulture power equipment safely and efficiently
  - Refer to Level One *B1- Use and maintain hand tools and power tools*
- Safe work practices when lifting and bending
- Basic calculations
  - Landscape calculations
  - Calculating quantities: fertilizer application rates
  - Conversions
- Cooperative work methods

**Achievement Criteria**

**Performance** The learner will maintain beds, borders, lawns, nurseries, and containers on campus.

**Conditions** The learner will be given the appropriate materials, equipment and tools.

**Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:

- Performed tasks in a safe manner
- Used tools and equipment safely and correctly
- Performed tasks in a logical sequence



**Line (GAC):**        **A    USES OCCUPATIONAL SKILLS**  
**Competency:**     **A6   Identify relevant legislation, regulations and standards**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe and apply relevant legislation and regulations to activities that impact onsite activities.

**LEARNING TASKS**

**CONTENT**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Identify applicable federal legislation and regulations</li> <li>2. Identify applicable provincial legislation and regulations</li> <li>3. Identify applicable local regulations</li> <li>4. Examine applicable regulations</li> <li>5. Examine relevant WorkSafeBC procedures</li> </ol> | <ul style="list-style-type: none"> <li>• Where to find standards</li> <li>• How specific federal requirements apply to horticulture activities</li> <li>• How specific provincial requirements apply to horticulture activities</li> <li>• How specific local requirements apply to horticulture activities</li> <li>• Applying regulations, standards, and procedures to the job</li> <li>• Applying WorkSafeBC accident and near miss reporting procedures</li> <li>• Applying accident investigation requirements</li> </ul> |
|---|---|





**Line (GAC): B USES AND MAINTAINS TOOLS AND EQUIPMENT**

**Competency: B1 Use and maintain hand tools and power tools**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe safe use and maintenance of hand and power tools.

**LEARNING TASKS**

1. Identify hand and power tools for basic horticultural tasks
  
2. Describe hand tool maintenance
  
3. Describe power tool maintenance

**CONTENT**

- (See the list of *Tools and Equipment* for Level One, detailed in the *Training Provider Standards* of this Program Outline)
  
- Cleaning and disinfecting hand tools to ensure proper operation and to prevent transfer of contaminants
- Lubricating hand tools such as secateurs and shears
- Checking tools regularly for damage, excessive wear and proper operation
- Storing hand tools for organization, safety and security
- Sharpening hand tools such as secateurs, shears and shovels
- Replacing components in tools such as secateurs and loppers due to damage and wear
  
- Lubricating power tools according to manufacturers' specifications
- Adjusting power tools such as chain saws, mowers and power washers
- Checking tools for wear, damage and malfunction
- Following recommended maintenance schedule according to manufacturers' specifications
- Checking fluid levels and air pressure
- Greasing nipples on motorized equipment
- Sharpening and balancing mower blades
- Sharpening tools such as chainsaws and power edgers according to manufacturers' specification
- Disinfecting tools to prevent cross-contamination from site to site
- Storing power tools for organization and security



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B2    Use and maintain measuring equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Safely use and maintain measuring equipment.

**LEARNING TASKS**

**CONTENT**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Select and use appropriate measuring equipment for the task</li> <br/> <li>2. Maintain measuring equipment</li> </ol> | <ul style="list-style-type: none"> <li>• (see the list of <i>Measuring Equipment</i> for Level One, detailed in the <i>Training Provider Standards</i> of this Program Outline)</li> <br/> <li>• Cleaning and disinfecting measuring equipment to ensure proper operation and to prevent transfer of contaminants</li> <li>• Calibrating measuring equipment such as thermometers, pH meters, levels and EC meters</li> <li>• Checking and replacing batteries on measuring equipment</li> <li>• Checking tools for damage, excessive wear and proper operation</li> <li>• Storing measuring equipment for organization, safety and security</li> </ul> |
|---|---|

**Achievement Criteria**

- Performance**    The learner will calibrate measuring equipment.
- Conditions**     The learner will be given thermometers, pH meters, levels and EC meters.
- Criteria**         The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
- Calibrated to manufacturers' specifications



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B3   Operate vehicles and motorized equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify engine designs and functions of motorized equipment.
- Apply safe work practices as related to motorized horticulture equipment.

**LEARNING TASKS**

**CONTENT**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Identify engine components of motorized equipment engines</li> <br/> <li>2. Demonstrate personal safety in the workplace</li> <br/> <li>3. Demonstrate safe operating procedures for motorized horticulture equipment such as starting, stopping and adjusting</li> </ol> | <ul style="list-style-type: none"> <li>• Differences between a two-stroke, four-stroke, and hybrid four-stroke engines</li> <li>• Carburetor</li> <li>• Ignition system</li> <li>• Starter components</li> <li>• Piston</li> <li>• Compression</li> <br/> <li>• Safety procedures</li> <li>• Use of PPE</li> <br/> <li>• String trimmers</li> <li>• Lawnmowers</li> <li>• Backpack blowers</li> </ul> |
|---|---|

**Achievement Criteria**

- Performance**    The learner will start, stop and adjust power equipment.
- Conditions**     The learner will be given string trimmers, lawnmowers and backpack blowers.
- Criteria**         The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
- Started, stopped and adjusted power equipment to manufacturers' specifications



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B4   Maintain vehicles and motorized equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Maintain motorized equipment.
- Apply safe work practices as related to motorized horticulture equipment.

**LEARNING TASKS**

**CONTENT**

- |  |  |
|--|--|
| 1. Use hand tools to maintain horticulture equipment                     | <ul style="list-style-type: none"> <li>• Sockets and wrenches</li> <li>• Ignition tester</li> <li>• Tachometer</li> <li>• Torque wrench</li> <li>• Feeler gauges</li> </ul>  |
| 2. Perform and document circle check of vehicles and motorized equipment | <ul style="list-style-type: none"> <li>• Lights</li> <li>• Plates</li> <li>• Brakes</li> </ul>   |
| 3. Inspect equipment   | <ul style="list-style-type: none"> <li>• Inspect visually for: <ul style="list-style-type: none"> <li>○ Damage and wear</li> </ul> </li> <li>• Lock-out and tag-out as necessary</li> <li>• Inspect equipment to ensure efficient functioning</li> </ul> |
| 4. Check position of safety features as applicable                       | <ul style="list-style-type: none"> <li>• Lock-out devices</li> <li>• Chutes</li> <li>• Trimmer and belt guards</li> <li>• Operator presence switches</li> </ul>  |
| 5. Check and replace fluids according to manufacturers' specifications   | <ul style="list-style-type: none"> <li>• Oil</li> <li>• Coolant</li> <li>• Hydraulic fluids</li> </ul>   |
| 6. Check and replace components  | <ul style="list-style-type: none"> <li>• Spark plugs</li> <li>• Belts</li> <li>• Pull cords</li> </ul>   |
| 7. Check and adjust air pressure in components                           | <ul style="list-style-type: none"> <li>• Tires</li> <li>• Air compressors</li> </ul>   |
| 8. Check and tighten components  | <ul style="list-style-type: none"> <li>• Loose connections</li> <li>• Loose fittings</li> </ul>  |



## LEARNING TASKS

9. Check cutting height and adjust
  
10. Apply preventive maintenance procedures

## CONTENT

- According to client expectations
- Turf needs
  
- Equipment maintenance
  - Clean fuel
  - Clean air
  - Clean lubricating oil
- Maintenance schedule
- Maintain a lawn mower or edger: Every three months or 50 hours
  - Change engine oil
  - Replace or service air filter
  - Sharpen blade
  - Check spark plug
  - Check and adjust controls and drive mechanisms
  - Lube controls and drive mechanisms
  - Clean cooling fins
  - Tighten bolts
- Maintain a hedge or string trimmer
- Mixing gas and oil

## Achievement Criteria

**Performance** The learner will service motorized equipment (at the instructor's discretion).

**Conditions** The learner will be given any of the motorized equipment listed:

- Lawn mower
- Edger
- Dethatcher
- Rototiller
- String trimmer
- Hedger
- Chainsaw
- Backpack blower
- Aerator

**Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:

- Inspected power equipment to manufacturers' specifications
- Checked position of safety features to manufacturers' specifications
- Checked and replaced fluids according to manufacturers' specifications
- Cleaned and/or replaced air and oil filters to manufacturers' specifications
- Cleaned and/or replaced spark plugs to manufacturers' specifications
- Adjusted carburetor, if required, to manufacturers' specifications



**Line (GAC):**        **C    ORGANIZES WORK**  
**Competency:**     **C6   Communicate with others**

### Objectives

To be competent in this area, the individual must be able to:

- Effectively communicate verbally and in written form.
- Effectively communicate trade related information to various people.

### LEARNING TASKS

1. Use effective verbal and written communication
  
  
  
  
  
  
  
  
  
  
2. Relay information

### CONTENT

- Effective communication:
  - Four basic communication skills (listening, speaking, reading, writing)
  - Communication process
  - Active listening
  - Non-verbal communication
  - Barriers to communication
  - Preparing for meetings
- Relaying information to
  - Co-workers
  - Clients
  - Suppliers
  - Office staff
- Relaying information in laypersons' terms to
  - Clients
  - Public



**Line (GAC):**        **C   ORGANIZES WORK**  
**Competency:**      **C10 Maintain safe work environment**

**Objectives**

To be competent in this area, the individual must be able to:

- Assess site hazards and apply appropriate safety procedures.

**LEARNING TASKS**

**CONTENT**

- |   |   |
|---|---|
| 1. Assess site hazards                                    | <ul style="list-style-type: none"> <li>• High voltage</li> <li>• Motorized equipment</li> <li>• Working at heights</li> </ul> |
| 2. Identify PPE and safety equipment                      | <ul style="list-style-type: none"> <li>• For task</li> </ul>  |
| 3. Maintain worksite to avoid injuries to self and others | <ul style="list-style-type: none"> <li>• Clean</li> <li>• Tidy</li> </ul>   |



**Line (GAC):**        **C   ORGANIZES WORK**  
**Competency:**      **C11 Examine interpersonal and supervisory skills**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the basic interpersonal and supervisory skills based on time stress management, ethics, communication, power and teams.

**LEARNING TASKS**

**CONTENT**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Manage time</li> <br/> <li>2. Explain stress management</li> <br/> <li>3. Recognize ethical and social responsibility issues in the work place</li> <br/> <li>4. Communicate effectively</li> <br/> <li>5. Describe conflict management</li> <br/> <li>6. Examine the concept of power in an organization</li> </ol> | <ul style="list-style-type: none"> <li>• Role of the supervisor</li> <li>• Ability to effectively manage personal and work time</li> <br/> <li>• Individual</li> <li>• Organizational</li> <li>• How organizations can help manage stress</li> <br/> <li>• Ethical and social consequences of work place practices <ul style="list-style-type: none"> <li>○ Personal experience</li> <li>○ Religious beliefs impact personal ethics</li> <li>○ Culture affects ethical norms</li> <li>○ Internal reflection</li> <li>○ Organizational ethics</li> <li>○ Legal responsibilities</li> <li>○ BC Acts</li> </ul> </li> <br/> <li>• Identifying and using verbal and non-verbal communication techniques (review Level One C6 – <i>Communicate with others</i>)</li> <br/> <li>• Defining conflict</li> <li>• Sources of conflict</li> <li>• Basic styles for managing conflict</li> <li>• Conflict management strategies</li> <li>• Guidelines of managing interpersonal conflict</li> <br/> <li>• Recognizing power structure in the organization and how power is applied within the organization</li> </ul> |
|--|--|





**LEARNING TASKS**

7. Describe characteristics of an effective team

**CONTENT**

- Characteristics of a high performing crew/team
- Recognizing ineffective work crews
- Supervisory role



**Line (GAC):** E **ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:** E1 **Identify plants and plant requirements**

### Objectives

To be competent in this area, the individual must be able to:

- Identify a wide range of plants, morphological characteristics, growing requirements, use and availability.

### LEARNING TASKS

1. Recognize a range of plant materials commonly used in commercial horticulture
2. Employ correct naming and plant identification terminology
3. Name the plant family for each plant identified

### CONTENT

- Life cycle of a plant
- Plant growth patterns
  - Annuals
  - Biennials
  - Perennials
  - Herbaceous perennials
  - Woody perennials
- Deciduous and evergreen plants
  - Deciduous plants
  - Evergreens
  - Broadleaf evergreens
  - Coniferous evergreens
- Climbing plants
  - Stems specialized for climbing
  - Monocarpic plants
- Origin of plant naming systems
  - Common names
  - Nomenclature
  - Binomial system for naming plants
  - Plant taxonomy
  - Writing botanical names
- Plant families
- Plant families commonly found in British Columbia
  - ASTERACEAE – Aster Family
  - CARYOPHYLLACEAE – Pink Family
  - ERICACEAE – Heath Family
  - LAMIACEAE – Mint Family
  - LILIACEAE – Lily Family
  - RANUNCULACEAE – Buttercup Family
  - ROSACEAE – Rose Family



## LEARNING TASKS

4. Recognize and describe bud, bark, foliage, flower and fruit characteristics
  
5. Use a dichotomous key for plant identification
  
6. Identify and describe 50 woody and non-woody plants.

## CONTENT

- SAPINDACEAE – Soapberry Family
  - Plant morphology
  - Morphology descriptors for leaves
  - Leaf arrangement
  - Needles
  - Scales and awls
  - Patterns of inflorescence
  - Descriptors for flowers
  - Plant types
  - Descriptors for fruit
  - Woody stems
  
- Limitations of plant keys
- Conifer key
- Deciduous key
  
- Using botanical terms
- According to its cultural and maintenance requirements



**Line (GAC):** E **ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:** E3 **Manage pests and diseases**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify signs and symptoms of living and non-living factors that cause plant stress.

**LEARNING TASKS**

**CONTENT**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Define plant stress</li> <li>2. Describe conditions that lead to plant stress</li> </ol>                            | <ul style="list-style-type: none"> <li>• Causes and symptoms</li> <li>• Abiotic factors <ul style="list-style-type: none"> <li>○ Light temperature</li> <li>○ Humidity</li> <li>○ Air</li> <li>○ Water supply</li> <li>○ Mechanical damage</li> <li>○ Nutrition</li> <li>○ Other common symptoms of abiotic plant stress</li> </ul> </li> <li>• Distinguishing between biotic and abiotic causes of plant stress</li> <li>• Biotic plant stress <ul style="list-style-type: none"> <li>○ Common indicators</li> </ul> </li> <li>• Biotic plant stress factors <ul style="list-style-type: none"> <li>○ Common plant insect indicators</li> <li>○ Common plant disease indicators</li> </ul> </li> <li>• Susceptibility to biotic stress factors (insects and diseases)</li> <li>• Potential stress-inducing environmental conditions</li> </ul> |
| <ol style="list-style-type: none"> <li>3. Categorize plant pest types and broadly associate the symptoms of biotic plant stress with type of plant</li> </ol> | <ul style="list-style-type: none"> <li>• Major plant pest types including: <ul style="list-style-type: none"> <li>○ Plant feeding pests</li> <li>○ Plant feeding animals</li> <li>○ Diseases</li> <li>○ Weeds</li> </ul> </li> <li>• Damage caused by various pests</li> </ul>  |
| <ol style="list-style-type: none"> <li>4. Describe the life stages of example pests</li> </ol>  | <ul style="list-style-type: none"> <li>• Lifecycle of typical pests</li> <li>• Disease lifecycles</li> </ul>  |
| <ol style="list-style-type: none"> <li>5. Describe basic arthropod morphology and identify typical examples of arthropod to order</li> </ol>                  | <ul style="list-style-type: none"> <li>• Basic arthropod morphology</li> <li>• Eight orders of insects</li> </ul>   |



## LEARNING TASKS

6. Identify the four types of plant-pathogens
  
7. Describe the characteristics that make plants weeds
  
8. Describe established methods for controlling pests (IPM)

## CONTENT

- Categories of pathogens:
  - Fungi
  - Bacteria
  - Viruses
  - Nematodes
  
- Defining weeds
  - Competition
  - Common characteristics
- Classification of weeds by life histories
  - Annuals
  - Biennials
  - Herbaceous perennials
  - Woody perennials
  
- Integrated Pest Management (IPM)
- Six steps of IPM
  - Prevention
  - Identification
  - Monitoring
  - Thresholds
  - Treatments
  - Evaluation
- Establishing methods for controlling pests
  - Cultural
  - Biological
  - Chemical



**Line (GAC):**        **E    ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:**      **E4   Describe plant science as it applies to horticulture**

**Objectives**

To be competent in this area, the individual must be able to:

- Explain plant morphological characteristics, life cycles, and adaptations as they apply to plant identification, plant propagation, arboriculture and turf maintenance.

**LEARNING TASKS**

**CONTENT**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Describe the external parts of herbaceous and woody stems</li> <li>2. Describe the parts of a leaf and variations in shape</li> <li>3. Describe parts of the flower</li> <li>4. Identify typical inflorescences</li> <li>5. Identify typical fruit</li> <li>6. Describe stages in the life cycle of a flowering plant</li> <li>7. Describe parts of a seed and seedling</li> </ol> | <ul style="list-style-type: none"> <li>• Plant identification using features of a stem <ul style="list-style-type: none"> <li>○ Woody and herbaceous stems</li> </ul> </li> <li>• Parts of a simple leaf</li> <li>• Leaf shapes</li> <li>• Leaf tips</li> <li>• Leaf margins</li> <li>• Leaf surfaces</li> <li>• Pattern of veins within the leaf blade</li> <li>• Simple and compound leaves</li> <li>• Flower structure <ul style="list-style-type: none"> <li>○ Complete and incomplete flowers</li> <li>○ Perfect vs. imperfect flowers</li> <li>○ Monoecious vs. dioecious plants</li> <li>○ Flower symmetry</li> </ul> </li> <li>• Inflorescence types</li> <li>• Placing fruit types <ul style="list-style-type: none"> <li>○ Fleshy fruits</li> <li>○ Dry fruits</li> </ul> </li> <li>• Dehiscent and indehiscent fruits</li> <li>• Reproduction</li> <li>• Monocot seed development</li> <li>• Dicot seed development</li> <li>• Dicot seedling development</li> <li>• Monocot seedling development</li> </ul> |
|--|---|



**LEARNING TASKS**

8. Identify stem, root, and leaf modifications
  
9. Identify plant adaptations to environmental effects
  
10. Describe basic growth responses to plant hormones

**CONTENT**

- Roots
  - Root systems
  - Specialized underground storage structures
  
- Plant adaptations
- Stem modifications for protection
- Stems specialized for colonizing
  
- Response to hormones
  - Auxins
  - Gibberellins (GA)
  - Cytokinins
  - Ethylene
  - Abscisic acid (ABA)



**Line (GAC):** E **ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:** E5 **Describe physical and biological characteristics of soil and soilless media**

**Objectives**

To be competent in this area, the individual must be able to:

- Recognize soil and soil management as keys to the successful practice of horticulture.
- Examine soil formation, the physical and biological properties of soils, and soilless media as they relate to use, soil quality, and plant growth.

**LEARNING TASKS**

**CONTENT**

- |  |   |
|--|---|
| 1. Define soil   | <ul style="list-style-type: none"> <li>• Soil</li> <li>• Soil formation</li> <li>• Parent material</li> <li>• Biotic – living organisms</li> <li>• Topography</li> <li>• Time</li> </ul>  |
| 2. Define soil quality   | <ul style="list-style-type: none"> <li>• Soil quality and the importance of soil quality, relative to plant growth and environmental sustainability</li> </ul>  |
| 3. Describe a soil profile                                     | <ul style="list-style-type: none"> <li>• Soil profiles             <ul style="list-style-type: none"> <li>○ LFH horizon</li> <li>○ A horizon</li> <li>○ B horizon</li> <li>○ C horizon</li> </ul> </li> </ul>                                   |
| 4. Explain the physical properties of soil and soilless medias | <ul style="list-style-type: none"> <li>• Texture</li> <li>• Structure</li> <li>• Density</li> <li>• Porosity</li> <li>• Soil compaction</li> <li>• Soil structure and plant growth</li> <li>• Soilless media</li> </ul>                         |
| 5. Describe the behaviour of water in soil                     | <ul style="list-style-type: none"> <li>• Water in soils</li> <li>• Soil water holding capacity</li> <li>• Available water</li> <li>• Water movement through soil</li> <li>• Wetting front</li> <li>• Hydrolic conductivity of a soil</li> </ul> |





## LEARNING TASKS

6. Examine the key soil biological processes and their effects on plant growth and soil quality
  
7. Explain the role of organic matter in soil
  
8. Describe composting methods

## CONTENT

- Water retention and flow in layered soils
- Water movement in urban soils
- Managing soils in the urban landscape
  
- Biological process in soil
- Plants
- Soil animals
- Other organisms
- Role of soil organisms in soil quality
- Promoting beneficial soil organisms
  
- Basic composition of soil organic matter
- Key roles of soil organic matter relative to soil chemical and physical behaviour
  
- Composting processes
- Aerobic vs. anaerobic microorganisms
- Food web of the compost pile
- Use of compost



# Level 2

## Horticulture Technician Foundation



**Line (GAC):**        **A    USES OCCUPATIONAL SKILLS**  
**Competency:**       **A1   Use personal protective equipment (PPE)**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe and demonstrate personal safety in the workplace.
- Demonstrate proper use of PPE.

**LEARNING TASKS**

**CONTENT**

- |  |   |
|--|---|
| <p>1. Review personal protective requirements (as per Level One A1 – <i>Use personal protective equipment</i>)</p> | <ul style="list-style-type: none"> <li>• Selecting and using PPE as required for task, tools, equipment, machinery and environment</li> <li>• Ensuring the safe use of PPE</li> <li>• Storing PPE</li> <li>• Checking PPE prior to use</li> <li>• Checking PPE inventory</li> <li>• Recognizing damaged and expired PPE</li> <li>• Checking and replacing PPE components</li> </ul> |
| <p>2. Examine chemical handling requirements</p>   | <ul style="list-style-type: none"> <li>• Goggles</li> <li>• Rubber gloves</li> <li>• Face shields</li> <li>• Chemical protection suits</li> </ul>   |



**Line (GAC):**        **A**    **USES OCCUPATIONAL SKILLS**  
**Competency:**      **A5**   **Demonstrate basic horticultural skills**

**Objectives**

To be competent in this area, the individual must be able to:

- Assess plant quality.
- Demonstrate plant-handling requirements.

**LEARNING TASKS**

**CONTENT**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Perform plant-grading according to the Canadian Standard for Nursery Stock and British Columbia Landscape Standard</li> <li>2. Identify containers used for growing and shipping ornamental plant material</li> <li>3. Describe standards for root ball sizing</li> <li>4. Prepare balled and burlapped plants</li> <li>5. Securely load plant material</li> <li>6. Prepare plant materials</li> </ol> | <ul style="list-style-type: none"> <li>• Assessing and grading plants according to standards for plant:</li> <li>• Foliage density <ul style="list-style-type: none"> <li>○ Caliper</li> <li>○ Height</li> <li>○ Width ratios</li> </ul> </li> <li>• Calculating container volume and comparing results to the standards</li> <li>• Calculating root ball sizes for: <ul style="list-style-type: none"> <li>○ Containers</li> <li>○ Field grown stock</li> </ul> </li> <li>• Rootballs: <ul style="list-style-type: none"> <li>○ Digging</li> <li>○ Wrapping</li> <li>○ Tying</li> </ul> </li> <li>• Safely and efficiently lifting and carrying plant material to avoid physical damage to self and plants</li> <li>• Methods of harvesting plant material for field grown stock</li> <li>• Safety</li> <li>• Loading</li> <li>• Unloading</li> <li>• Securing plant material to a truck</li> <li>• Removal of containers</li> <li>• Scarifying root ball</li> </ul> |
|--|---|



**LEARNING TASKS**

7. Demonstrate proper planting procedures for bare root stocks
  
8. Operate truck and trailer

**CONTENT**

- Appropriate depth and width of the planting hole
- Placing the plant in hole and back filling with appropriate material
- Appropriate post-planting maintenance requirements
- Appropriate storage of dormant and non-dormant plant material
- Appropriate storage onsite
  
- Safety
- Coupling the truck/tractor and trailer
- Operating either combination in reverse
- Securely parking the vehicle
- Compliance to guidelines established in Certified Horticulture Technician Program (CHT)



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B1    Use and maintain hand tools and power tools**

**Objectives**

To be competent in this area the individual must be able to:

- Demonstrate safe use and maintenance of hand tools.
- Demonstrate safe use and maintenance of power tools.

**LEARNING TASKS**

1. Identify hand and power tools for basic horticultural tasks for Level Two technical training
2. Demonstrate hand tool maintenance
3. Demonstrate power tool maintenance

**CONTENT**

- (see the list of *Tools and Equipment* for Level Two, detailed in the *Training Provider Standards* of this Program Outline)
- Review Level One *B1 - Use and maintain hand tools and power tools.*
- Review Level One *B1 - Use and maintain hand tools and power tools.*



**Line (GAC): B USES AND MAINTAINS TOOLS AND EQUIPMENT**

**Competency: B3 Operate vehicles and motorized equipment**

### Objectives

To be competent in this area, the individual must be able to:

- Examine vehicle and motorized equipment designs and functions.
- Operate and apply safe work practices as related to horticulture task requirements.

### LEARNING TASKS

### CONTENT

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Identify horticulture vehicle and motorized equipment engine components and function</li> <br/> <li>2. Describe and demonstrate personal safety as related to large multiple cylinder equipment</li> <br/> <li>3. Describe and demonstrate safe operating procedures for horticulture equipment</li> </ol> | <ul style="list-style-type: none"> <li>• Differences between gas and diesel engines</li> <li>• Carburetor</li> <li>• Alternator</li> <li>• Radiator</li> <li>• Piston</li> <li>• Compression</li> <br/> <li>• Safe lifting and moving techniques</li> <li>• Entry onto and exit from machinery using the three point contact</li> <li>• Appropriate personal protective equipment</li> <li>• Work place hazards and mitigation of the risk of accident and injury</li> <li>• General shop safety</li> <br/> <li>• General points for safe tractor operation</li> <li>• Tractor precautions:               <ul style="list-style-type: none"> <li>○ Starting, speed and slopes</li> <li>○ Hitch attachments</li> <li>○ Transfer of tractors and equipment</li> <li>○ Tractor transfer warnings</li> </ul> </li> <li>• Operating a skid steer loader and zero turn walk behind machine</li> <li>• Power take-off precautions</li> <li>• Connecting attachments</li> </ul> |
|--|---|

### Achievement Criteria

**Performance** The learner will safely operate a vehicle.

**Conditions** The learner will be given a skid steer and specified attachments (e.g., bucket, forks).

**Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:

- Performed a circle check
- Used three point contact when entering and exiting
- Hooked up appropriate attachments
- Started and maneuvered machine and attachments safely



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B4   Maintain vehicles and motorized equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform basic maintenance on larger multiple cylinder engines and equipment as applied to horticulture.
- Apply safe work practices as related to horticulture equipment.

**LEARNING TASKS**

**CONTENT**

<p>1. Use hand tools to maintain horticulture equipment</p>	<ul style="list-style-type: none"> <li>• Sockets and wrenches</li> <li>• Ignition tester</li> <li>• Multimeter</li> <li>• Battery charger</li> <li>• Tire gauge</li> <li>• Hydrometer</li> </ul>
<p>2. Practice preventive maintenance and troubleshooting procedures</p>	<ul style="list-style-type: none"> <li>• Tune up equipment</li> <li>• Diagnose work or defective parts</li> </ul>
<p>3. Perform and document circle check of vehicles and motorized equipment</p>	<ul style="list-style-type: none"> <li>• Lights</li> <li>• Plates</li> <li>• Brakes</li> </ul>
<p>4. Inspect equipment</p>	<ul style="list-style-type: none"> <li>• Inspecting visually for: <ul style="list-style-type: none"> <li>○ Damage and wear</li> <li>○ Lock out and tag out as necessary</li> </ul> </li> <li>• Inspecting equipment to ensure efficient functioning</li> </ul>
<p>5. Check position of safety features</p>	<ul style="list-style-type: none"> <li>• Lockout devices</li> <li>• Chutes</li> <li>• Trimmer and belt guards</li> <li>• Rollover protection devices (ROP)</li> <li>• Operator presence switches</li> </ul>
<p>6. Check and replace fluids according to manufacturers' specifications</p>	<ul style="list-style-type: none"> <li>• Oil</li> <li>• Coolant</li> <li>• Hydraulic fluids</li> </ul>
<p>7. Check and replace components</p>	<ul style="list-style-type: none"> <li>• Spark plugs</li> <li>• Belts</li> <li>• Pull cords</li> </ul>





### LEARNING TASKS

### CONTENT

- |  |  |
|--|--|
| 8. Check and adjust air pressure in components | <ul style="list-style-type: none"> <li>• Tires</li> <li>• Air compressors</li> </ul>   |
| 9. Check and tighten components                | <ul style="list-style-type: none"> <li>• Loose connections</li> <li>• Loose fittings</li> </ul>  |
| 10. Check cutting height and adjust components | <ul style="list-style-type: none"> <li>• According to client expectations</li> <li>• Turf needs</li> </ul>   |
| 11. Develop a preventive maintenance plan      | <ul style="list-style-type: none"> <li>• Performing preventive maintenance every 3 months or 50 hours               <ul style="list-style-type: none"> <li>○ Checking engine oil</li> <li>○ Changing engine oil</li> <li>○ Checking air filter</li> <li>○ Oil-bathing air filter</li> <li>○ Greasing fittings</li> <li>○ Checking hydraulic oil</li> <li>○ Checking tire pressures</li> <li>○ Testing coolant</li> <li>○ Checking belts</li> <li>○ Checking hoses</li> </ul> </li> </ul> |

### Achievement Criteria

**Performance** The learner will practice preventive maintenance on vehicles and motorized equipment.

- Conditions** The learner will be given:
- Skid steer loader
  - Gear tractor
  - 3 - reel turf mower
  - Gas powered utility vehicle (Gator)
  - Electric powered utility vehicle

**Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria and in accordance with manufacturers' specifications:

- Checked engine oil
- Changed engine oil
- Checked air filter
- Oil-bathed air filter
- Greased fittings
- Checked hydraulic oil
- Checked tire pressures
- Tested coolant
- Checked belts
- Checked hoses



**Line (GAC):**        **B    USES AND MAINTAINS TOOLS AND EQUIPMENT**  
**Competency:**      **B5    Use and maintain equipment attachments**

**Objectives**

To be competent in this area, the individual must be able to:

- Safely use equipment attachments for the appropriate task.
- Maintain equipment attachments.

**LEARNING TASKS**

1. Identify, select and use the appropriate equipment attachments for the task
  
2. Maintain equipment attachments

**CONTENT**

- (see the list of *Equipment Attachments* for Level Two, detailed in the *Training Provider Standards* of this Program Outline)
  
- Greasing fittings on equipment such as trailers, aerators and cultivators
- Inspecting attachments for damage and wear and lock-out and tag-out as necessary
- Adjusting attachments for parking, travel and operation
- Checking hydraulic fluids to ensure optimum and safe operation of equipment
- Cleaning and disinfecting attachments such as drop spreaders, sprayers and mowers
- Replacing damaged and worn components such as bushings, blades and tines
- Performing a circle check of equipment attachments to check for items such as lights, plates and brakes
- Checking operation of safety brake pin on trailers

**Achievement Criteria**

**Performance** The learner will inspect and service equipment.

**Conditions** The learner will be given equipment such as trailers, aerators and rototillers.

**Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:

- Greased fittings on equipment
- Inspected attachments for damage and wear and locked-out and tagged-out as necessary
- Adjusted attachments for parking, travel and operation
- Checked hydraulic fluids to ensure optimum and safe operation of equipment
- Cleaned and disinfected attachments such as drop spreaders, sprayers and mowers
- Replaced damaged and worn components such as bushings, blades and tines
- Performed a circle check of equipment attachments to check for items such as lights, plates and brakes
- Checked operation of safety brake pin on trailers



**Line (GAC):**        **C   ORGANIZES WORK**  
**Competency:**      **C6   Communicate with others**

**Objectives**

To be competent in this area, the individual must be able to:

- Effectively communicate trade related information to various people.
- Use a variety of communication techniques such as hand signals, communication equipment, and communication skills.

**LEARNING TASKS**

1. Use communication skills
  
2. Use communication equipment
  
3. Use universal hand signals to communicate visually

**CONTENT**

- Mentoring apprentices
- Ensuring co-workers understand instructions using methods such as
  - Mirroring
  - Repeating back
- Practicing active listening skills
- Reporting discrepancies and seeking direction from supervisor
  
- Two-way radios
- Computers
- Cell phones
  
- Communicating with
  - Machine operators
  - Truckers
  - Crane operators
- WorkSafeBC requirements



**Line (GAC): C ORGANIZES WORK**  
**Competency: C9 Organize plants, materials and equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Inspect and verify plants, materials and equipment.
- Receive, unload, record, protect and store plants, materials and equipment.
- Lay out plants on site.
- Perform final checks of plants, materials and equipment.

**LEARNING TASKS**

**CONTENT**

- |  |  |
|--|--|
| <p>1. Inspect and verify plants and materials</p>  | <ul style="list-style-type: none"> <li>• Accuracy</li> <li>• Quality</li> <li>• Quantity</li> </ul>  |
| <p>2. Remove and inspect monitoring devices when necessary</p>                               | <ul style="list-style-type: none"> <li>• Temperature recorders</li> <li>• Environmental recorders</li> </ul>   |
| <p>3. Receive, unload, record and protect materials and products in an organized fashion</p> | <ul style="list-style-type: none"> <li>• Plant materials               <ul style="list-style-type: none"> <li>○ Group/match plants by size and species</li> <li>○ Place received products in designated areas to maintain product quality</li> </ul> </li> <li>• Other materials               <ul style="list-style-type: none"> <li>○ Wood chips</li> <li>○ Soil</li> <li>○ Aggregates</li> <li>○ Store in designated areas to avoid contamination</li> </ul> </li> <li>• Products               <ul style="list-style-type: none"> <li>○ Soils</li> <li>○ Seed</li> <li>○ Plugs</li> <li>○ Roots</li> <li>○ Labels</li> <li>○ Containers</li> </ul> </li> </ul> |
| <p>4. Allocate specified storage areas for equipment and hazardous materials</p>             | <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Hazardous materials</li> </ul>   |
| <p>5. Lay out plants on site</p>   | <ul style="list-style-type: none"> <li>• According to landscape plans</li> </ul>   |



**LEARNING TASKS**

- 6. Perform final check onsite
  
- 7. Process substandard materials

**CONTENT**

- Required
  - Plants
  - Materials
  - Equipment
  
- Quarantine
- Reject
- Dispose of

**Achievement Criteria**

- Performance** The learner will organize plant materials and equipment onsite.
- Conditions** The learner will be given the appropriate plants, materials and equipment to handle a range of ornamental plant material.
- Criteria** The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
- Sourced and selected plants
  - Laid out plants according to landscape plans
  - Performed final check
  - Processed substandard materials



**Line (GAC):**        **C   ORGANIZES WORK**  
**Competency:**      **C10 Maintain safe work environment**

**Objectives**

To be competent in this area, the individual must be able to:

- Assess site hazards and follow specified safety procedures.

**LEARNING TASKS**

**CONTENT**

1. Coordinate task with other workers	<ul style="list-style-type: none"> <li>• Avoiding injury to <ul style="list-style-type: none"> <li>○ Self</li> <li>○ Co-workers</li> <li>○ Others</li> </ul> </li> </ul>
2. Follow safety procedures when working in high traffic areas	<ul style="list-style-type: none"> <li>• Flagging</li> <li>• Pylons</li> <li>• Signage</li> </ul>
3. Handle hazardous materials in accordance with government regulations and WHMIS procedures	<ul style="list-style-type: none"> <li>• Disposing</li> <li>• Labelling</li> <li>• Using PPE</li> </ul>
4. Participate in safety meetings and discussion	<ul style="list-style-type: none"> <li>• Ensuring that information is recorded and distributed to all team members</li> </ul>
5. Report unsafe conditions to supervisor	<ul style="list-style-type: none"> <li>• Recognizing</li> <li>• Reporting</li> </ul>
6. Recognize safety warning signals	<ul style="list-style-type: none"> <li>• Back-up signals</li> <li>• Back-up alarms</li> <li>• Warning lights</li> </ul>
7. Contain and dispose of spill contaminants	<ul style="list-style-type: none"> <li>• According to regulations</li> </ul>
8. Coordinate with other agencies	<ul style="list-style-type: none"> <li>• Private and public line locators</li> <li>• Emergency response teams</li> </ul>



**Line (GAC):**        **C   ORGANIZES WORK**  
**Competency:**      **C11 Examine interpersonal and supervisory skills**

**Objectives**

To be competent in this area, the individual must be able to:

- Demonstrate supervisory skills based on leadership, motivation, and delegation.
- Describe safety management and managing in a diverse workplace.

**LEARNING TASKS**

**CONTENT**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Describe leadership in the organization</li> <br/> <li>2. Describe leadership skills</li> <br/> <li>3. Describe safety culture</li> <br/> <li>4. Describe managing a diverse workplace</li> <br/> <li>5. Interpret the employment standards</li> </ol> | <ul style="list-style-type: none"> <li>• Definition of leadership</li> <li>• Role of leaders</li> <li>• Characteristics of leaders</li> <br/> <li>• Motivational theories</li> <li>• Delegation learning</li> <li>• Skills needed for effective delegation</li> <li>• Setting goals for effective delegation and employee commitment</li> <li>• Team management: coaching and training</li> <br/> <li>• Role of WorkSafeBC</li> <li>• Safety culture in the workplace</li> <br/> <li>• Managing diversity <ul style="list-style-type: none"> <li>○ Characteristics of culture</li> <li>○ Elements of cultural difference</li> <li>○ Cultural orientation</li> </ul> </li> <li>• Legal Requirements <ul style="list-style-type: none"> <li>○ Canadian Charter of Rights And Freedoms</li> <li>○ Canadian Human Rights Act of 1985</li> <li>○ BC Human Rights Code</li> </ul> </li> <li>• Enforcement of Human Rights</li> <br/> <li>• Impacts of the Employment Standards Act on horticultural operations</li> </ul> |
|--|---|





**Line (GAC):** E ANALYZES AND MAINTAINS PLANT HEALTH  
**Competency:** E1 Identify plants and plant requirements

### Objectives

To be competent in this area, the individual must be able to:

- Identify plants used in all segments of horticulture.
- Identify plants suitable for planting in difficult situations.

### LEARNING TASKS

1. Recognize a range of plant materials commonly used in commercial horticulture
2. Explain plant hardiness zones
3. Recognize plants suitable for planting in difficult situations

### CONTENT

- Natural habitat
  - Alpine plants
  - Woodland understory plants
  - Mediterranean plants
  - Bog plants
  - Native plants
- Plant use characteristics
  - Bedding plants
  - Cut flowers
  - Trees and shrubs
  - Groundcovers
  - Climbers
- Characteristics of individual plants and plant groups
- Plant size
- Texture
- Plant form
- Plant hardiness zones
- Relationship between plant health and hardiness zones
- Provenance
- Difficult planting conditions
  - Sunny arid conditions
  - Shade
  - Dry shade
  - Dry soil conditions
  - Wetlands
  - Compacted soils
  - Slopes



### LEARNING TASKS

4. Identify weeds and invasive plants
  
5. Recognize and describe bud, bark, foliage, flower, and fruit characteristics
  
  
  
  
  
  
  
  
  
  
6. Identify and describe 75 woody and non-woody plants

### CONTENT

- Introduction of aliens
- Characteristics of invasive and weed plants
  
- Bud characteristics such as
  - Morphology
  - Type (vegetative or flower)
  - Arrangement
- Bark characteristics such as
  - Furrowed
  - Smooth
  - Plate-like
  - Others
- Describing leaves using botanical terminology and distinguishing a range of inflorescence type and fruit to aid in plant identification
  
- Using botanical terms
- According to its cultural and maintenance requirements



**Line (GAC):** E **ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:** E2 **Manage growing conditions**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe managing a variety of growing conditions.

**LEARNING TASKS**

1. Describe managing growing conditions as applicable to interior and exterior horticulture operations

**CONTENT**

- Determining exposure to conditions such as
  - Light
  - Wind
  - Heating
  - Ventilation
  - Air conditioning (HVAC) systems
  - Moisture
  - Reflective heat load based on location
- Using light meters for measuring light level for interior plants
- Collecting growing media samples using core samplers
- Checking growing media samples manually or by lab analysis for
  - Texture
  - Drainage
  - pH
  - Nutrients
  - Contaminants
- Determining air quality that might affect interior and exterior plants
- Taking corrective measures such as
  - Fertilization
  - Liming
  - Adding organics
  - Neutralizing water
  - Correcting drainage



**Line (GAC):** E **ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:** E3 **Manage pests and diseases**

**Objectives**

To be competent in this area, the individual must be able to:

- Examine biological characteristics of weeds, plant feeders and pathogens.
- List control strategies.

**LEARNING TASKS**

**CONTENT**

- |   |  |
|---|--|
| <p>1. Describe and distinguish between the major plant pest types</p> | <ul style="list-style-type: none"> <li>• Weeds as pests</li> <li>• Invertebrates as pests</li> <li>• Vertebrates as pests</li> <li>• Pathogens as pests</li> </ul>   |
| <p>2. Describe characteristics that make plants weeds</p>             | <ul style="list-style-type: none"> <li>• Review what is a weed</li> <li>• Weeds as competitors</li> <li>• Weed classification</li> <li>• Hidden effects of weeds</li> <li>• Seeds of weedy plants</li> </ul>   |
| <p>3. Describe characteristics that make vertebrates pests</p>        | <ul style="list-style-type: none"> <li>• Wildlife management</li> <li>• Vertebrate plant-feeding pests               <ul style="list-style-type: none"> <li>○ Birds</li> <li>○ Deer</li> <li>○ Rodents</li> </ul> </li> </ul>  |
| <p>4. Describe characteristics that make invertebrates pests</p>      | <ul style="list-style-type: none"> <li>• Pest ecology</li> <li>• Insect pest success</li> <li>• Common invertebrate pests               <ul style="list-style-type: none"> <li>○ Aphids</li> <li>○ Leafhoppers</li> <li>○ Scales</li> <li>○ Weevils and beetles</li> <li>○ Caterpillars and moths</li> <li>○ Lacebugs</li> <li>○ Sawflies</li> <li>○ Thrips</li> <li>○ Mites</li> <li>○ Fungus gnats</li> <li>○ Leaf miners</li> <li>○ Slugs and snails</li> </ul> </li> </ul> |



## LEARNING TASKS

5. Describe the characteristics that make pathogens pests
  
6. Describe the principles of cultural control methods as applied to horticultural plant pests
  
7. Describe the principles of biological control methods as applied to horticultural plant pests
  
8. Describe the principles of chemical control methods as applied to horticultural plant pests
  
9. Describe the integrated strategies and tactics for control of viruses
  
10. Describe integrated strategies and tactics for the control of bacteria

## CONTENT

- Pathogen success
- The disease triangle
- The disease cycle
- Common diseases
  - Diseases caused by bacteria
  - Fungal diseases
  - Diseases caused by nematodes
  - Diseases caused by viruses
  
- Cultural methods of controlling weeds
  - Organic mulches
  - Non-organic mulches
  - Weed control in established plantings
- Cultural control of plant feeding pests
- Cultural control of pathogens
  
- Biological control of weeds
- Biological control of plant-feeding pests
- Beneficial organisms
- Biological agents
- Biological control of pathogens
  
- Chemical control of plant pests
  - Pesticides
- Chemical control of weeds
  - Herbicides
- Chemical control of plant feeding pests
  - Horticultural oil
  - Botanicals
  - Inorganics
  - Insecticidal soaps
  - Synthetic pesticides (organic)
  
- Integrated control strategies for common plant viral diseases
- Methods for the exclusion and eradication of plant pest vectors
- Management of virus-infected plants
  
- Biological control
- Cultural control method



**LEARNING TASKS**

11. Describe integrated strategies and tactics for the control of fungi
  
12. Describe the integrated strategies and tactics for the control of plant-feeding pests

**CONTENT**

- Biological control
- Cultural control
- General prevention
  
- Biological control
- Cultural control
- Plant-feeding pests
- Invertebrates
- Nematodes (invertebrates)
- Arthropod plant feeding pest (invertebrates)
- Vertebrate plant feeding pests and control



**Line (GAC):**        **E    ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:**      **E4   Describe plant science as it applies to horticulture**

**Objectives**

To be competent in this area, the individual must be able to:

- Examine the internal anatomy of stems, roots and leaves as they relate to photosynthesis, respiration, and transpiration.

**LEARNING TASKS**

1. Describe the internal anatomy of stems, roots, and leaves
  
2. Describe plant part anatomy
  
3. Describe the movement of sap through a plant and the effects of environment on the rate of flow
  
4. Describe the flow of sugars, produced in photosynthesis, through the plant

**CONTENT**

- The plant cell
- Cell types, tissues, and their functions
- Primary growth
- Secondary growth
  
- Stems
  - Herbaceous stems
  - Woody stems
  - Bark
- Roots
  - Root apical meristems
  - Root cap
  - Epidermis
  - Cortex
  - Endodermis
  - Pericycle
  - Vascular tissue
  - Adventitious roots
  - Secondary growth
- Leaves
  - Anatomy of a leaf
  
- Water movement
  - Diffusion
  - Osmosis
  - Capillary attraction
  - Active transport
  
- Photosynthesis
  - Chlorophyll
  - Translocation for sugars
  - Respiration

**LEARNING TASKS**

5. Explain the influence of temperature, water availability, and light on the rates of photosynthesis and respiration
  
6. Describe the growth response to external stimuli

**CONTENT**

- Influence of environmental factors
- Effect of light, carbon dioxide availability, water, and nutrient availability on the rate of photosynthesis
- Environmental effects on the plant growth
- Effect of temperature on plant development
- Effect of water stress on plant growth
  
- Photoperiod and flower production
  - Photoperiod
  - Tropisms and plant growth





**Line (GAC):**        **E    ANALYZES AND MAINTAINS PLANT HEALTH**  
**Competency:**       **E6   Describe chemical characteristics of soil and soilless media**

**Objectives**

To be competent in this area, the individual must be able to:

- Examine soil and soil management in horticulture.
- Examine the chemical properties of soil and soilless media (soil reaction, soil salinity, soil fertility).
- Sample soils.

**LEARNING TASKS**

**CONTENT**

<ol style="list-style-type: none"> <li>1. Describe how soil colloids determine soil chemical properties</li> <li>2. Behaviour of nutrients in soil</li> <li>3. Acquisition of nutrients by plants</li> <li>4. Measure soil reaction (pH)</li> <li>5. Manage soil reaction</li> <li>6. Explain how soil reaction (pH) relates to soil fertility</li> <li>7. Measure and manage salinity and sodicity</li> <li>8. Describe soil salinity and sodicity and impact on soil properties</li> </ol>	<ul style="list-style-type: none"> <li>• Soil colloids</li> <li>• Soil pH and colloidal material</li> <li>• Cations and plant roots</li> <li>• Mineral nutrients</li> <li>• Primary macronutrients</li> <li>• Secondary macronutrients</li> <li>• Micronutrients</li> <li>• Nutrient uptake</li> <li>• The nitrogen cycle</li> <li>• Root absorption</li> <li>• Define pH</li> <li>• Testing soil for pH</li> <li>• Adjusting the pH of soil</li> <li>• Buffering capacity</li> <li>• Plant growth and pH tolerance <ul style="list-style-type: none"> <li>○ Importance of pH to plant growth</li> <li>○ Phosphorus</li> <li>○ Pathogens and pH</li> </ul> </li> <li>• Salinity in soils</li> <li>• Measurement of salinity and sodicity</li> <li>• Measurement of electrical conductivity</li> <li>• Sodic soils</li> <li>• Impact of salinity and sodicity on soil physical and chemical characteristics</li> </ul>
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### LEARNING TASKS

9. Discuss nutrient management
  
10. Sample soils
  
11. Interpret soil test information
  
12. Interpret fertilizer label information

### CONTENT

- Nutrient management
  - Slow-release fertilizers
  - Water soluble fertilizers
- Field stock and landscape fertilizer management
- Turf fertilizer management
- Organic fertilizers and amendments
- Inorganic fertilizers
  
- Soil testing
  - Collecting soil samples in field crops and on landscape sites
  - Procedures of soilless media samples
- Limitations of soil nutrient analysis
  
- Interpreting basic soil test results
- Calculate fertilizer application rates
  
- Classifications of fertilizers
- Fertilizer labeling

### Achievement Criteria

Performance	The apprentice will examine soil samples and identify chemical properties.
Conditions	The learner will be given soil samples and testing equipment.
Criteria	<p>The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:</p> <ul style="list-style-type: none"> <li>• Performed sodic and salinity analysis</li> <li>• Performed pH analysis</li> <li>• Performed nutrient management analysis</li> </ul>



# Section 4

## TRAINING PROVIDER STANDARDS



# Facility Requirements

## LEVEL ONE

### Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
- White marking board with pens and eraser (optional: flipchart in similar size)
- Projection screen or projection area at front of classroom
- Overhead projector and a multi-media (data) projector

### Shop Area

- Access to a service bay – approximately 600 square feet
- Access to a site for equipment operation – minimum 1 acre
- Access to all tools and equipment as listed for Level One

### Lab Requirements

- Botany or Science teaching lab outfitted with compound and dissecting microscopes - approximately 600 square feet
  - Access to live 'in situ' plant material as well as herbaria, and visual samples (slides, photographic databases, etc.)
  - Microscope slides of showing root, stem and leaf anatomy (monocot and dicot)
  - Microscope slides showing woody stem growth
  - Hand lens (10X)
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator and microwave
  - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator, drying oven and microwave
  - Nested sieves, shakers, scales
  - Hydrometers and sedimentation cylinders
  - Munsell colour books



### **Student Facilities**

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

### **Instructor's Office Space**

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

### **Other**

- Access to botanical gardens



## LEVEL TWO

### Classroom Area

- Approximately 900 square feet
- Comfortable seating and tables suitable for training, teaching, lecturing and drafting
- Compliance with all local and national fire code and occupational safety requirements
- Lighting controls to allow easy visibility of projection screen while also allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature regulation to ensure comfortable room temperature
- In-room ventilation sufficient to control training room temperature
- Acoustics in the room must allow audibility of the instructor
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  - Hand lens (10X)
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator and microwave
  - Collection of arthropods, disease organisms, and examples of plant stress
- Soil Science or Chemistry teaching lab - approximately 600 square feet
  - Glassware, lamps, stir plate (with heating capacity)
  - Refrigerator, drying oven and microwave
  - Nested sieves, shakers, scales
  - Hydrometers and sedimentation cylinders
  - Munsell colour books
  - pH meters
  - Soil sampling equipment

**Student Facilities**

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

**Instructor's Office Space**

- Suitable space and office furniture necessary for instructor to prepare lessons and secure file records

**Other**

- Access to a botanical garden
- Access to container nursery stock
- Access to field-grown stock/plant material that can be prepared for transplanting
- Trailer and tractor nursery equipment
- Access to large tree transplanting equipment
- Nursery hand carts and tree dollies
- Multiple nursery stock containers



# Tools and Equipment

## LEVEL ONE

### Shop Equipment

#### *Motorized Equipment*

- Baggers for leafs
- Blowers (backpack, hand held, push, earth auger)
- Dethatcher
- Edgers
- Hedge trimmer (extension, long reach)
- Lawn/weed trimmers (gas & electric)
- Pressure washer
- Soil screener
- String trimmer
- Sterilizers

### Shop (Facility) Tools

#### *Standard Power Tools*

- Chainsaw
- Grinder
- Pole chainsaw
- Pallet Jack
- Power cultivator (rototiller)
- Vacuum (wet/dry, leaf)
- Walk-behind aerator

#### *Standard Hand Tools*

- Brooms
- Cultivator (manual)
- De-thatching rake
- Garden forks
- Grease guns
- Handheld watering equipment
- Landscape rakes
- Loppers
- Mallet
- Microscope
- Pickaxes
- Picks
- Pitch forks
- Pliers (various types)
- Pruning shears
- Rakes (various types)
- Screwdrivers (various types)
- Seed/fertilizer spreader
- Sharpening tools
- Shovels (coal, clam, scoop/barn, spade, garden)
- Spades (various types)
- String line
- Tarps
- Trowels
- Weed digger
- Wheelbarrow
- Wrenches





## Specialty (Facility) Tools

### *Measuring Equipment*

- EC meters Levels
- Hydrometer
- Levels
- pH meter
- Scales
- Sedimentation cylinder
- Tape measure
- Thermometers
- Tire pressure meter

## Student Equipment (supplied by school)

### *Required - PPE and Safety Equipment*

- Ear protection
- Eye protection (glasses, shields)
- Eye wash kit
- Fall protection (harness)
- Fire extinguisher
- First Aid kits
- Flares
- Hardhat
- Lanyard
- Particle masks
- Reflective shirts, jackets
- Respirators
- Safety vests
- Spill kit
- Traffic cones

## Office Equipment

### *Recommended*

- Camera
- Communication devices
- Computers

## Student Tools (supplied by student)

### *Required*

- CSA-approved steel-toed footwear
- Calculator
- Hand lens (10x)
- Secateurs

### *Recommended*

- Work gloves
- Rainwear



## LEVEL TWO

### Shop Equipment

#### *Motorized Equipment*

- 3-reel turf mower
- Backhoe
- Baggers for leafs
- Blowers (backpack, hand held, push, earhauger)
- Brush cutter
- Clearing saw
- Edgers
- Electric powered utility vehicle
- Elevated work platforms
- Excavator
- De-thatcher
- Flat filler
- Fork lift
- Front end loader
- Gas powered utility vehicle (Gator)
- Hedge trimmer (extension, long reach)
- Lawn/weed trimmers (gas & electric)
- Pot filler
- Powered rollers
- Pressure washer
- Pumps
- Ram compactor (jumping jack)
- Riding mowers/mulchers
- Skid steer loader
- Soil screener
- Sterilizers
- String trimmer
- Tractors
- Trucks
- Turf and tree sprayer

#### *Required – Attachments*

- Bucket
- Forks
- Trailer
- Spray equipment

#### *Recommended – Attachments*

- Aerator
- Auger/post hole digger
- Blade
- Cultivator
- Discer
- Harrow
- Leaf vacuum
- Overseeder
- Plough
- Power sweeper
- Rototiller
- Snow blower
- Soil profiler
- Top dresser
- Tow behind de-thatcher
- Tow behind thatcher
- Tree spade
- U-blade
- Vacuum



## Shop (Facility) Tools

### *Standard Power Tools*

- Chainsaw
- Electric drill
- Fertilizer injector
- Grinder
- Hammer drill
- Mower/mulcher
- Power cultivator (rototiller)
- Power sprayer
- Vacuum (wet/dry, leaf)
- Walk-behind aerator

### *Standard Hand Tools*

- Axes
- Backpack sprayer
- Boxcutters
- Brick carriers
- Brick splitter
- Brooms
- Bulb planters
- Cart
- Chains
- Chisels
- Clearing axes
- Core samplers (probe)
- Crimpers
- Crowbars
- Cultivator (manual)
- De-thatching rake
- Dolly
- Files
- Flags
- Garden forks
- Grease guns
- Hammers (hand, sledge)
- Hand tamper
- Handheld watering equipment
- Landscape rakes
- Loppers
- Mallet
- Microscope
- Pickaxes
- Picks
- Pitch forks
- Pliers (various types)
- Pry bar
- Punch
- Rakes (various types)
- Screwdrivers (various types)
- Seed/fertilizer spreader
- Sharpening tools
- Shovels (coal, clam, scoop/barn, spade, garden)
- Side cutters
- Soil screener
- Spades (various types)
- String line
- Tap and die
- Tape measure
- Tarps
- Tie-downs (straps, chains)
- Tree cart
- Trowels
- Water key
- Weed digger
- Wheelbarrow
- Wheel chocks
- Wrenches



## Specialty (Facility) Tools

### *Measuring Equipment*

- Anemometer
- EC meter
- Hydrometer
- Hygrometer
- Levels (line, hand, zip laser)
- Light meter
- pH meter
- Tape measure
- Thermometer
- Tire pressure meter

## Student Equipment (supplied by school)

### *Required - PPE and Safety Equipment*

- Cones
- Chemical protection suits
- Ear protection
- Eye protection (glasses, shields)
- Eye wash kit
- Face shields
- Fall protection (harness)
- Fire extinguisher
- First Aid kits
- Flares
- Goggles
- Hard hat
- Lanyard
- Particle masks
- Reflective shirts, jackets
- Respirators
- Rubber gloves
- Safety vests
- Spill kit
- Traffic cones

### *Recommended - Office Equipment*

- Camera
- Communication devices
- Computers

## Student Tools (supplied by student)

### *Required*

- CSA-approved steel-toed footwear

### *Recommended*

- Calculator
- Hand lens (10x)
- Work gloves
- Rainwear



## Reference Materials

### LEVEL ONE

#### Required Reference Materials

- Kwantlen University College School of Horticulture Plant identification Database, [www.kwantlen.ca/horticulture/](http://www.kwantlen.ca/horticulture/)  
<https://plantdatabase.kpu.ca/>
- Botany for Gardeners - Latest edition. Capon, Brian. Timber Press, Portland, OR.
- Soil Science and Management - Latest edition. Plaster J. Edward. Thomson/Delmar Learning, Clifton Park, NY
- British Columbia Landscape Standard - Latest edition. BC Landscape and Nursery Association and the British Columbia Association of Landscape Architects, Surrey, BC
- Identify Plants and Describe Their Use – Module 1, HEBC 2012
- Communication and Organizational Skills – Module 1, HEBC 2012
- Equipment Maintenance and Safety – Module 1, HEBC 2012
- Plant Science for Horticulture – Module 1, HEBC 2012
- Plant Stress – Signs and Symptoms, HEBC 2012
- Soil and Soilless Media – Physical and Biological Characteristics – Module 1, HEBC 2012
- Horticultural Skills – Module 1, HEBC 2012

#### Recommended Resources

- Integrated Pest Management Manual for Landscape Pests in British Columbia. Gilkeson, Linda A. 2000. Pollution and Remediation Branch, Victoria, BC.
- WorkSafeBC Website (<http://www.worksafebc.com/>)
- Equipment Manufacturers Websites (Internet)

**Suggested Texts**

- Abiotic Disorders of Landscape Plants : A Diagnostic Guide - Costello, Laurence Raleigh. 2003. University of California, Agriculture and Natural Resources, Oakland, CA
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC
- B.C. Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria BC
- Ball Identification Guide to Greenhouse Pests and Beneficials - Gill, Stanton. 1998. Ball Publishing, Batavia, Ill.
- Field Guide to Noxious and Other Selected Weeds of British Columbia - Cranston, Roy. 2002. Ministry of Agriculture, Food and Fisheries; Ministry of Forests, Victoria, BC (Also available online at <http://www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm> )
- Pacific Northwest; Plant Disease Management Handbook - 2000. Extension Services of Oregon State University, Washington State University, and the University of Idaho
- Soil Management Handbook for the Lower Fraser Valley - Bertrand, R.A., G.A. Hughes-Games, and D.C. Nikkel. 1991. Ministry of Agriculture, Fisheries & Food, Abbotsford, B.C.
- Western Fertilizer Handbook - Soil Improvement Committee, California Fertilizer Association. Latest edition (Horticulture ed.) Interstate Publishing Inc., Danville, Illinois
- Groundskeepers Safety Guide - Latest edition. Canadian Centre for Occupational Health and Safety, Hamilton, ON.
- Outdoor Power Equipment, Latest Edition, Webster, Jay, Nelson. Canada, Scarborough ON

**NOTE:**

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.



## LEVEL TWO

### Required Reference Materials

- Kwantlen University College School of Horticulture Plant identification Database, <http://www.kpu.ca/hort>  
<https://plantdatabase.kpu.ca/>
- Botany for Gardeners - Capon, Brian. Latest edition. Timber Press, Portland, OR.
- Integrated pest management manual for landscape pests in British Columbia - Gilkeson, Linda A. 2000. Pollution and Remediation Branch, Victoria, BC.
- Soil Science and Management - Latest edition. Plaster J. Edward. Thomson/Delmar Learning, Clifton Park, NY
- British Columbia Landscape Standard - Latest edition. BC Landscape and Nursery Association, BC Society of Landscape Architects, BC
- Canadian Standards for Nursery Stock - Latest edition. Canadian Nursery and Landscape Association
- Identify Plants and Describe Their Use – Module 2, HEBC 2012
- Leadership and Organizational Skills – Module 2, HEBC 2012
- Equipment Maintenance and Safety – Module 2, HEBC 2012
- Plant Science for Horticulture – Module 2, HEBC 2012
- Plant Stress – Causes and Controls – Module 2, HEBC 2012
- Soils and Soilless Media – Chemical Characteristics – Module 2, HEBC 2012
- Horticultural Skills – Plant Quality and Handling – Module 2, HEBC 2012

### Recommended Resources

- Kwantlen University College School of Horticulture Plant identification Database, <http://www.kpu.ca/hort>  
<https://plantdatabase.kpu.ca/>
- Field Guide to Noxious and Other Selected Weeds of British Columbia - Cranston, Roy. 2002. Ministry of Agriculture, Food and Fisheries; Ministry of Forests, Victoria, BC (Also available online at <http://www.agf.gov.bc.ca/cropprot/weedguid/weedguid.htm>)
- WorkSafeBC Website (<http://www.worksafebc.com/>)
- Equipment Manufacturers Websites (Internet)

### Suggested Texts

- B.C. Nursery and Landscape Pest Management and Production Guide - Latest edition. B.C. Ministry of Environment, Lands, and Parks. Latest Edition, Crown Publications, Victoria BC
- Home and Garden Pest Management Guide for British Columbia - B.C. Ministry of Agriculture Fisheries and Food Latest edition. Crown Publications, Victoria, BC
- Abiotic disorders of landscape plants: a diagnostic guide - Costello, Laurence Raleigh. 2003. University of California, Agriculture and Natural Resources, Oakland, CA
- Ball Identification Guide to Greenhouse Pests and Beneficials - Gill, Stanton. 1998. Ball Publishing, Batavia, Ill.
- Pacific Northwest; Plant Disease Management Handbook - 2008. Extension Services of Oregon State University, Washington State University, and the University of Idaho



- Handbook for Pesticide Applicators and Pesticide Dispensers - Latest edition. Provincial Ministry of Environment, BC
- Western Fertilizer Handbook - Soil Improvement Committee, California Fertilizer Association. Latest edition. (Horticulture Ed.) Interstate Publishing Inc., Danville, Illinois
- Soil Fertility Manual - Latest edition. Potash & Phosphate Institute and the Foundation for Agronomic Research. Province of British Columbia Ministry of Skills, Training and Labour and the Centre for Curriculum and Professional Development, Norcross, GA
- Considerations for their use - Ministry of Education, Skills and Training and the Ministry of Labour and the Centre for Curriculum and Professional Development. 1995. BC.
- Outdoor Power Equipment, Latest Edition, Webster, Jay, Nelson. Canada, Scarborough ON





# Instructor Requirements

## Occupation Qualification

The instructor must possess:

- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma
- Teaching competence as demonstrated by successful completion of Provincial Instructor Diploma (PIDP) or equivalent or regular faculty status at an institution which has a defined faculty review process (as specified by institutional policy) or contract faculty who have at least completed the Instructional Skills Workshop (PIDP 3102) or equivalent.

## Work Experience

- Instructors with the Landscape Horticulture C of Q must have a minimum 2 years experience working in the industry as a journey person
- Or credentials for related subject matter competence

## ***ADDITIONAL CREDENTIALS AND EXPERIENCE RECOMMENDED FOR SPECIFIC SUBJECT MATTER***

### LEVEL ONE

#### **Subject Matter: Plant Identification and Use**

Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture and 2 years of plant identification experience.

#### **Subject Matter: Communication and Supervision**

Subject matter competence as demonstrated by a Business Diploma with Human Resource or Organizational Behaviour specialty or Baccalaureate Degree in with a minor in Business or Certified Landscape Professional.

Two years supervisory or management experience in a private or public organization.

#### **Subject Matter: Equipment Operation and Maintenance**

Subject matter competence as demonstrated by an Outdoor Power Equipment Trades Qualification/Apprentice Certificate.

5 years of relevant industry experience.

#### **Subject Matter: Plant Science**

Subject matter competence as demonstrated by a Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Forestry with a minimum of 5 years of experience in plant science.

#### **Subject Matter: Analyze and Maintain Plant Health**

Subject matter competence as demonstrated by a Horticulture Diploma or Baccalaureate Degree in Horticulture, Agronomy, Forestry, Crop Science, or Pest Management and/or a Diploma in Agriculture or Forestry with a minimum of 5 years of experience in analyzing and maintaining plant health.

**Subject Matter: Physical and Biological Characteristics of Soil and Soilless Media**

Subject matter competence as demonstrated by a Baccalaureate Degree in Soil Science Horticulture, Agronomy, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Pest Management with a minimum of 5 years of experience in analyzing physical and biological characteristics of soil and soilless media.

**Subject Matter: Practical Horticultural Skills**

Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture and 2 years of practical landscape or nursery experience

**LEVEL TWO****Subject Matter: Plant Identification and Use**

Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture and 2 years of plant identification experience.

**Subject Matter: Communication and Supervision**

Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in with a minor in Business or Certified Landscape Professional. Two years of relevant industry experience.

**Subject Matter: Equipment Operation and Maintenance**

Subject matter competence as demonstrated by an Outdoor Power Equipment Trades Qualification/Apprentice Certificate or equivalent within Horticulture training or education, with a minimum of 2 years of relevant industry experience.

**Subject Matter: Plant Science**

Subject matter competence as demonstrated by a Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Forestry with a minimum 5 years of experience in plant science.

**Subject Matter: Analyze and Maintain Plant Health**

Subject matter competence as demonstrated by a Horticulture Diploma or Baccalaureate Degree in Horticulture, Agronomy, Forestry, Crop Science, or Pest Management and/or a Diploma in Agriculture or Forestry with a minimum of 5 years of experience in analyzing and maintaining plant health.

**Subject Matter: Chemical Characteristics of Soil and Soilless Media**

Subject matter competence as demonstrated by a Baccalaureate Degree in Soil Science Horticulture, Agronomy, Forestry, or Crop Science and/or a Diploma in Horticulture, Agriculture or Pest Management with a minimum of 5 years of experience in analyzing physical and biological characteristics of soil and soilless media.

**Subject Matter: Practical Horticultural Skills**

Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture and 2 years of practical landscape or nursery experience.