PROGRAM OUTLINE

Landscape Horticulturist
LANDSCAPE HORTICULTURIST
PROGRAM OUTLINE

APPROVED BY INDUSTRY
MAY 2013

BASED ON
NOA 2010

Developed by
Industry Training Authority
Province of British Columbia
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<td></td>
<td>Instructor Requirements</td>
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</tbody>
</table>
Section 1

INTRODUCTION

Landscape Horticulturist
Introduction

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.
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.)
- **Garfield Marshall**, BCLNA Representative (Advance Orchard Co. Ltd.)
- **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)
- **Dale Toronitz**, Education Representative (Camosun College)
- **Denis Gour**, Apprentice Representative (Blasig Landscape Design & Construction Ltd.)

Industry Subject Matter Experts retained to assist in the development of Program Outline content:

- **Carol Barnett**
- **PJ Burns**
- **Betty Cunnin**
- **David Davidson**
- **Jeff Foley**
- **Renee Giardini**
- **Denis Gour**
- **Tim Holt**
- **Peter Isaacson**

- **Gary Jones**
- **Anne Kadwell**
- **Ron Marchuk**
- **Bruce McTavish**
- **Michelle Nakano**
- **Dan Regan**
- **Kristine Schlamp**
- **Liz Spring**
Industry Subject Matter Experts retained as outline reviewers:

- Ron Brown, Ron’s Landscaping
- Mike Chesters, Kwantlen Apprentice
- Les Costello, Capilano College
- David Davidson, Kwantlen Polytechnic University
- Egan Davies, Kwantlen Apprentice
- Brian Fisher, BC Hydro
- Bill Hardy, Northwest Landscaping Supply Ltd.
- Stephen Head, BCLNA Education Chair
- Dwayne Holder, College of the Rockies
- Marcus Janzen, BCGGA Education Chair
- John Jouan, BCLNA Landscape Education Chair
- Douglas Justice, UBC Botanical Garden
- Laura-Jean Kelly, G.R. Paine Horticulture Centre, Vancouver Island University
- Yolanda Leung, BCSLA Continuing Education
- Todd Major, Park & Tilford Garden Director
- Bill Manning, BCRPA Region 2
- Bruce McTavish, Kwantlen Polytechnic University
- Glen Minaker, West Vancouver Parks Board
- Tom Mulleder, United Flower Growers
- Tony Puddicombe, TQ, Kwantlen Polytechnic University
- Rae Roer, Parks Council Chair
- Clyde Snobelen, Camosun College
- David Turner, BCRPA Chair Region 2
- Rob Welsh, Capilano College
- Bob Wick, Western Canada Turfgrass Association
- Suzanne Wilkinson, Horticulture Centre of the Pacific

Facilitators:

- 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.

<table>
<thead>
<tr>
<th>Section</th>
<th>Training Providers</th>
<th>Employers/ Sponsors</th>
<th>Apprentices</th>
<th>Challengers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Credentialing Model</strong></td>
<td>Communicate program length and structure, and all pathways to completion</td>
<td>Understand the length and structure of the program</td>
<td>Understand the length and structure of the program, and pathway to completion</td>
<td>Understand challenger pathway to Certificate of Qualification</td>
</tr>
<tr>
<td><strong>OAC</strong></td>
<td>Communicate the competencies the industry has defined as representing the scope of the occupation</td>
<td>Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification</td>
<td>View the competencies they will achieve as a result of program completion</td>
<td>Understand the competencies they must demonstrate in order to challenge the program</td>
</tr>
<tr>
<td><strong>Training Topics and Suggested Time Allocation</strong></td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>Understand the relative weightings of various competencies of the occupation on which assessment is based</td>
</tr>
<tr>
<td><strong>Program Content</strong></td>
<td>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</td>
<td>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</td>
<td>Provides detailed information on program content and performance expectations for demonstrating competency</td>
<td>Allows individuals to check program content areas against their own knowledge and performance expectations against their own skill levels</td>
</tr>
<tr>
<td>Section</td>
<td>Training Providers</td>
<td>Employers/ Sponsors</td>
<td>Apprentices</td>
<td>Challengers</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Training Provider Standards</strong></td>
<td>Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program</td>
<td>Identifies the tools and equipment an apprentice is expected to have access to; those supplied by the training provider and those the student is expected to own</td>
<td>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</td>
<td>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</td>
</tr>
</tbody>
</table>
Section 2

PROGRAM OVERVIEW

Landscape Horticulturist
Program Overview

Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Landscape Horticulturist apprenticeship pathway.

**CROSS-PROGRAM CREDITS**

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program.

**RECOMMENDATION FOR CERTIFICATION**

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

**Apprenticeship - Direct Entry**

- **Landscape Horticulturist Level 4**
  - Technical Training: 180 hours (6 weeks*)
  - Work-Based Training: 6,480 hours total
  - Interprovincial Red Seal Exam

- **Landscape Horticulturist Level 3**
  - Technical Training: 180 hours (6 weeks*)
  - Work-Based Training: Accumulate hours
  - ITA Standardized Written Exam

- **Production Horticulturist Level 3**
  - Technical Training: 240 hours (8 weeks*)
  - Work-Based Training: 4,860 hours total
  - ITA Certificate of Qualification Exam

- **Common Core Level 1 and Level 2**
  - Technical Training: 360 hours (12 weeks*)
  - Work-Based Training: Accumulate hours
  - ITA Standardized Written Exam Level 1 and Level 2

- **Horticulture Technician Foundation**
  - Technical Training: 36 weeks*
  - ITA Standardized Horticulturist Foundation Exam

- **Certified Landscape Horticulturist Technician (CLHT) in Ornamental Maintenance plus one other module within the Certified Landscape Horticulturist Technician certification**
  - Technical Training: None
  - Work-Based Training: 3,240 hours

- **Production Horticulturist Level 1 and Level 2**
  - Technical Training: Level 1 and Level 2
  - Work-Based Training: None

- **Technical Training: None**
  - Technical Training: 1,000 hours

*Suggested duration based on 30-hour week
Challenge Pathway

This graphic provides an overview of the Landscape Horticulturist challenge pathway.

C of Q = Certificate of Qualification

Completion Requirements
Interprovincial Red Seal Exam

Prerequisites
Approved Challenge Application, including:
Trade-Related Work Experience: 9,720 hours

CROSS-PROGRAM CREDITS
Individuals who hold the credentials listed below are entitled to receive the following credits toward WBT for challenging this program

- C of Q Production Horticulturist
  Work Experience: 3,240 hours

- Certified Landscape Horticulturist Technician (CLHT) in Ornamental Maintenance plus one other module within the Certified Landscape Horticulturist Technician certification
  Work Experience: 1,000 hours
Occupation Description: "Landscape Horticulturist" means a person who selects, handles and utilizes trees, shrubs and ornamental plants and turf grass for the design, development and maintenance of public and private landscaping spaces. Prepares soil, plants, cultivates, prunes and irrigates to maintain plant vigor. Controls plant pests utilizing appropriate integrated pest management techniques.

<table>
<thead>
<tr>
<th>USES OCCUPATIONAL SKILLS</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use personal protective equipment (PPE)</td>
<td>Identify fire types and extinguishing methods</td>
<td>Use WHMIS</td>
<td>Recognize work hazards</td>
<td>Demonstrate basic horticultural skills</td>
<td>Identify relevant legislation, regulations and standards</td>
<td></td>
</tr>
<tr>
<td>USES AND MAINTAINS TOOLS AND EQUIPMENT</td>
<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td>B5</td>
<td>B6</td>
</tr>
<tr>
<td>Use and maintain hand tools and power tools</td>
<td>Use and maintain measuring equipment</td>
<td>Operate vehicles and motorized equipment</td>
<td>Maintain vehicles and motorized equipment</td>
<td>Use and maintain equipment attachments</td>
<td>Transport equipment</td>
<td></td>
</tr>
<tr>
<td>ORGANIZES WORK</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
<td>C5</td>
<td>C6</td>
</tr>
<tr>
<td>Perform site assessments</td>
<td>Use documentation and reference material</td>
<td>Maintain records</td>
<td>Comply with policies and regulations</td>
<td>Plan daily tasks</td>
<td>Communicate with others</td>
<td></td>
</tr>
<tr>
<td>Order plants and materials</td>
<td>Transport materials</td>
<td>Organize plants, materials and equipment</td>
<td>Maintain safe work environment</td>
<td>Examine interpersonal and supervisory skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARTICIPATES IN MARKETING AND SALES</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
<td>D4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control inventory</td>
<td>Sell product and services</td>
<td>Maintain customer relations</td>
<td>Prepare estimates for basic landscape installation projects</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Landscape Horticulturist Industry Training Authority 03/14
# Program Overview

## Analyzes and Maintains Plant Health

<table>
<thead>
<tr>
<th>Identify plants and plant requirements</th>
<th>Manage growing conditions</th>
<th>Manage pests and diseases</th>
<th>Describe plant science as it applies to horticulture</th>
<th>Describe physical and biological characteristics of soil and soilless media</th>
<th>Describe chemical characteristics of soil and soilless media</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1 2 3 4</td>
<td>E2 1 2 3 4</td>
<td>E3 1 2 3 4</td>
<td>E4 1</td>
<td>E5 2</td>
<td>E6 2</td>
</tr>
</tbody>
</table>

- Assess landscape sites with respect to soils  

## Performs Pre-Construction Activities

<table>
<thead>
<tr>
<th>Interpret landscape plans</th>
<th>Participate in job planning activities</th>
<th>Prepare site</th>
<th>Examine the principles of garden design and participate in basic landscape design activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 2 3</td>
<td>F2 1 3</td>
<td>F3 1 2 3 4</td>
<td>F4 1</td>
</tr>
</tbody>
</table>

## Installs Softscape

<table>
<thead>
<tr>
<th>Install erosion control materials</th>
<th>Install growing media</th>
<th>Describe installation of interior landscape plants</th>
<th>Install turf from seed</th>
<th>Install exterior landscape plants</th>
<th>Install sod</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 4</td>
<td>G2 4</td>
<td>G3 4</td>
<td>G4 4</td>
<td>G5 4</td>
<td>G6 4</td>
</tr>
</tbody>
</table>

- Install mulch  

## Installs Hardscape

<table>
<thead>
<tr>
<th>Install drainage systems</th>
<th>Install landscape structures</th>
<th>Install walkway, patio, driveway and parking lot materials</th>
<th>Install steps and retaining walls</th>
<th>Install irrigation systems</th>
<th>Install water features</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 3</td>
<td>H2 3</td>
<td>H3 3</td>
<td>H4 3</td>
<td>H5 3</td>
<td>H6 3</td>
</tr>
</tbody>
</table>

- Install low voltage landscape lighting  

03/14

Landscape Horticulturist

Industry Training Authority
## Program Overview

<table>
<thead>
<tr>
<th>MAINTAINS SOFTSCAPE</th>
<th>Maintain growing media</th>
<th>Maintain and schedule maintenance activities for grass/turf</th>
<th>Maintain interior softscape</th>
<th>Maintain exterior softscape</th>
<th>Demonstrate basic pruning of trees, shrubs, groundcovers and vines</th>
<th>Describe cultural management of trees, shrubs, groundcovers and vines</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I1</td>
<td>I2</td>
<td>I3</td>
<td>I4</td>
<td>I5</td>
<td>I6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAINTAINS HARDSCAPE</th>
<th>Maintain drainage system</th>
<th>Maintain walkways, patios, driveways and parking lots</th>
<th>Maintain irrigation systems</th>
<th>Maintain landscape lighting</th>
<th>Maintain water features</th>
<th>Maintain steps and retaining walls</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>J1</td>
<td>J2</td>
<td>J3</td>
<td>J4</td>
<td>J5</td>
<td>J6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Maintain landscape structures

| J7                  | J7                      | J7                                                   | J7                         | J7                        | J7                     | J7                            |
|                     | 3                       | 3                                                    | 3                          | 3                         | 3                      | 3                             |
# Training Topics and Suggested Time Allocation

## Landscape Horticulturist – Level 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Uses</th>
<th>% of Time</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Line A</strong></td>
<td><strong>Uses Occupational Skills</strong></td>
<td>15%</td>
<td>75%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>A1</td>
<td>Use personal protective equipment (PPE)</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>Identify fire types and extinguishing methods</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>Use WHMIS</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>Recognize work hazards</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A5</td>
<td>Demonstrate basic horticultural skills</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td>Identify relevant legislation, regulations and standards</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Line B</strong></td>
<td><strong>Uses and Maintains Tools and Equipment</strong></td>
<td>25%</td>
<td>40%</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td>B1</td>
<td>Use and maintain hand tools and power tools</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>Use and maintain measuring equipment</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>Operate vehicles and motorized equipment</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>B4</td>
<td>Maintain vehicles and motorized equipment</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Line C</strong></td>
<td><strong>Organizes Work</strong></td>
<td>10%</td>
<td>80%</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>C6</td>
<td>Communicate with others</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>C10</td>
<td>Maintain safe work environment</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>C11</td>
<td>Examine interpersonal and supervisory skills</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Line E</strong></td>
<td><strong>Analyzes and Maintains Plant Health</strong></td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>E1</td>
<td>Identify plants and plant requirements</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>E3</td>
<td>Manage pests and diseases</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>E4</td>
<td>Describe plant science as it applies to horticulture</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>E5</td>
<td>Describe physical and biological characteristics of soil and soilless media</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

| Total Percentage for Landscape Horticulturist Level 1 | 100% |
## Training Topics and Suggested Time Allocation

### Landscape Horticulturist – Level 2

<table>
<thead>
<tr>
<th>Line</th>
<th>USES OCCUPATIONAL SKILLS</th>
<th>% of Time</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Use personal protective equipment (PPE)</td>
<td>10%</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>A5</td>
<td>Demonstrate basic horticultural skills</td>
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<tr>
<td>Line</td>
<td>USES AND MAINTAINS TOOLS AND EQUIPMENT</td>
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</tr>
<tr>
<td>B1</td>
<td>Use and maintain hand tools and power tools</td>
<td></td>
<td>✔️</td>
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</tr>
<tr>
<td>B3</td>
<td>Operate vehicles and motorized equipment</td>
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<td>✔️</td>
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<tr>
<td>B4</td>
<td>Maintain vehicles and motorized equipment</td>
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<tr>
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<td>Use and maintain equipment attachments</td>
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<tr>
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<td>20%</td>
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<tr>
<td>C6</td>
<td>Communicate with others</td>
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<td>C9</td>
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<td>C10</td>
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<td>Examine interpersonal and supervisory skills</td>
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<td>100%</td>
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<tr>
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<td>Identify plants and plant requirements</td>
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<td>✔️</td>
<td>✔️</td>
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<tr>
<td>E2</td>
<td>Manage growing conditions</td>
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<td>✔️</td>
<td>✔️</td>
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<td>E3</td>
<td>Manage pests and diseases</td>
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<td>✔️</td>
<td>✔️</td>
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<td>E4</td>
<td>Describe plant science as it applies to horticulture</td>
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<td>✔️</td>
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<td>E6</td>
<td>Describe chemical characteristics of soil and soilless media</td>
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<td>✔️</td>
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Total Percentage for Landscape Horticulturist Level 2: 100%
## Program Overview

### Training Topics and Suggested Time Allocation

#### Landscape Horticulturist – Level 3

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<th>Line</th>
<th>Training Topic</th>
<th>% of Time</th>
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<td>Use and maintain hand tools and power tools</td>
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<td>B6</td>
<td>Transport equipment</td>
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<tr>
<td><strong>Line C</strong></td>
<td>ORGANIZES WORK</td>
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<tr>
<td>C1</td>
<td>Perform site assessments</td>
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<td>C2</td>
<td>Use documentation and reference material</td>
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<tr>
<td>C3</td>
<td>Maintain records</td>
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<tr>
<td>C4</td>
<td>Comply with policies and regulations</td>
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<tr>
<td>C5</td>
<td>Plan daily tasks</td>
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<td>C8</td>
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<tr>
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<td>Control inventory</td>
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<tr>
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<td>40%</td>
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</tr>
<tr>
<td>E1</td>
<td>Identify plants and plant requirements</td>
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<tr>
<td>E3</td>
<td>Manage pests and diseases</td>
<td></td>
<td></td>
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<tr>
<td>E7</td>
<td>Assess landscape sites with respect to soils</td>
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<tr>
<td><strong>Line F</strong></td>
<td>PERFORMS PRE-CONSTRUCTION ACTIVITIES</td>
<td>10%</td>
<td>25%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>F1</td>
<td>Interpret landscape plans</td>
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<tr>
<td>F2</td>
<td>Participate in job planning activities</td>
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<tr>
<td>F3</td>
<td>Prepare site</td>
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<tr>
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<td>INSTALLS HARDSCAPE</td>
<td>30%</td>
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</tr>
<tr>
<td>H1</td>
<td>Install drainage systems</td>
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<td></td>
</tr>
<tr>
<td>H2</td>
<td>Install landscape structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H3</td>
<td>Install walkway, patio, driveway and parking lot materials</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>H4</td>
<td>Install steps and retaining walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H5</td>
<td>Install irrigation systems</td>
<td></td>
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<tr>
<td>H6</td>
<td>Install water features</td>
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<tr>
<td>H7</td>
<td>Install low voltage landscape lighting</td>
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<td><strong>Line I</strong></td>
<td>MAINTAINS SOFTSCAPE</td>
<td>15%</td>
<td>25%</td>
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<tr>
<td>I5</td>
<td>Demonstrate basic pruning of trees, shrubs, groundcovers and vines</td>
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### Program Overview

<table>
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<td>J1</td>
<td>Maintain drainage systems</td>
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<td>J2</td>
<td>Maintain walkways, patios, driveways and parking lots</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>J3</td>
<td>Maintain irrigation systems</td>
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<tr>
<td>J4</td>
<td>Maintain landscape lighting</td>
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<td>Maintain water features</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>J6</td>
<td>Maintain steps and retaining walls</td>
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<td>✔</td>
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<td>J7</td>
<td>Maintain landscape structures</td>
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100%
## Program Overview

### Training Topics and Suggested Time Allocation

#### Landscape Horticulturist – Level 4

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<td><strong>Line B</strong></td>
<td><strong>USES AND MAINTAINS TOOLS AND EQUIPMENT</strong></td>
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<td>90%</td>
<td>100%</td>
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<tr>
<td>B1</td>
<td>Use and maintain hand tools and power tools</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6</td>
<td>Transport equipment</td>
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</tr>
<tr>
<td><strong>Line C</strong></td>
<td><strong>ORGANIZES WORK</strong></td>
<td>1%</td>
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<td>50%</td>
<td>100%</td>
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<tr>
<td>C7</td>
<td>Order plants and materials</td>
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<tr>
<td><strong>Line D</strong></td>
<td><strong>PARTICIPATES IN MARKETING AND SALES</strong></td>
<td>10%</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
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<tr>
<td>D2</td>
<td>Sell product and services</td>
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<tr>
<td>D3</td>
<td>Maintain customer relations</td>
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<tr>
<td>D4</td>
<td>Prepare estimates for basic landscape installation projects</td>
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<tr>
<td><strong>Line E</strong></td>
<td><strong>ANALYZES AND MAINTAINS PLANT HEALTH</strong></td>
<td>20%</td>
<td>25%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>E1</td>
<td>Identify plants and plant requirements</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>E3</td>
<td>Manage pests and diseases</td>
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<tr>
<td><strong>Line F</strong></td>
<td><strong>PERFORMS PRE-CONSTRUCTION ACTIVITIES</strong></td>
<td>10%</td>
<td>75%</td>
<td>25%</td>
<td>100%</td>
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<tr>
<td>F4</td>
<td>Examine the principles of garden design and participate in basic landscape design activities</td>
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<tr>
<td><strong>Line G</strong></td>
<td><strong>INSTALLS SOFTSCAPE</strong></td>
<td>30%</td>
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<tr>
<td>G1</td>
<td>Install erosion control materials</td>
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<tr>
<td>G2</td>
<td>Install growing media</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>G3</td>
<td>Describe installation of interior landscape plants</td>
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</tr>
<tr>
<td>G4</td>
<td>Install turf from seed</td>
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<tr>
<td>G5</td>
<td>Install exterior landscape plants</td>
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<tr>
<td>G6</td>
<td>Install sod</td>
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<tr>
<td>G7</td>
<td>Install mulch</td>
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<td><strong>Line I</strong></td>
<td><strong>MAINTAINS SOFTSCAPES</strong></td>
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<td>25%</td>
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<tr>
<td>I1</td>
<td>Maintain growing media</td>
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<td>I2</td>
<td>Maintain and schedule maintenance activities for grass/turf</td>
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<tr>
<td>I3</td>
<td>Maintain interior softscape</td>
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<tr>
<td>I4</td>
<td>Maintain exterior softscape</td>
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<tr>
<td>I6</td>
<td>Describe cultural management of trees, shrubs, groundcovers and vines</td>
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<td><strong>Total Percentage for Landscape Horticulturist Level 4</strong></td>
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**03/14**

Landscape Horticulturist

Industry Training Authority
Section 3

PROGRAM CONTENT

Landscape Horticulturist
Level 1

Landscape Horticulturist
**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**

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
</tr>
</thead>
</table>
| 1. Select and use PPE as required for task, tools, equipment, machinery and environment | • Ear protection  
• Eye protection  
• Hand protection  
• Foot protection  
• Safety vests  
• Respiratory protection  
• Fall protection |
| 2. Ensure safe use of PPE | • Inspect  
• Maintain |
| 3. Store PPE to maintain its integrity | • Dry area  
• Protected area |
| 4. Check PPE prior to use | • Operation  
• Condition |
| 5. Check PPE inventory | • Ensuring there is a ready supply |
| 6. Recognize damaged and expired PPE | • Check expiration date  
• Ensure integrity of PPE |
| 7. Check and replace PPE components | • 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

1. Describe conditions necessary to support a fire
   - Air
   - Fuel
   - Heat
   - Chemical chain reaction
   - Weather conditions

2. Describe classes of fires according to the materials being burned
   - Class A
   - Class B
   - Class C
   - Class D
   - Symbols and colours

3. Describe the procedure for using a fire extinguisher
   - Extinguisher selection
   - P.A.S.S.
     - Pull
     - Aim
     - Squeeze
     - Sweep
Objects
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
  o Compressed gas
  o Flammable and combustible material
  o Oxidizing Material
  o Poisonous and Infectious Material
  o Poisonous and Infectious Material that will cause immediate or serious toxic effects
  o Poisonous and Infectious Material that will cause other toxic effects
  o Corrosive material
  o Dangerously reactive material
• WHMIS labels

NOTE: WHMIS certification is mandatory to complete Level One.
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

1. Identify workplace hazards and potential risks
   • Electrical and utility
   • Working at heights
   • Gravitational ("slips, trips and falls")
   • Thermal (heat and cold stress)
   • Motorized equipment/mechanical (pinch point, "struck against", vehicle)
   • Public
   • Behavioural (fatigue, rushing, complacency, stress, substance abuse, ignorance, frustration)
   • Chemical
   • Compressed gas
   • Environmental (insects, plants, weather)
   • Hazardous trees

2. Identify how to mitigate the risks of workplace accidents and injuries
   • Visual assessments
   • Safe work plan
   • Post-job inspection
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
  o Hazards versus risks
- Hand tools used in basic horticulture
  o Refer to Level One B1- Use and maintain hand tools and power tools
- BC Landscape Standard
  o Objectives of the BC Landscape Standard
  o Guide to use
  o Format of the BC Landscape Standard
  o Scope of sections
- Basic horticultural tasks
  o Maintenance
  o Determining maintenance levels
  o Appropriate maintenance procedures
  o Common landscape maintenance tasks and tools
- Operating horticulture power equipment safely and efficiently
  o Refer to Level One B1- Use and maintain hand tools and power tools
- Safe work practices when lifting and bending
- Basic calculations
  o Landscape calculations
  o Calculating quantities: fertilizer application rates
  o 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
# Program Content

## Level 1

**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

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identify applicable federal legislation and regulations</td>
</tr>
<tr>
<td>2.</td>
<td>Identify applicable provincial legislation and regulations</td>
</tr>
<tr>
<td>3.</td>
<td>Identify applicable local regulations</td>
</tr>
<tr>
<td>4.</td>
<td>Examine applicable regulations</td>
</tr>
<tr>
<td>5.</td>
<td>Examine relevant WorkSafeBC procedures</td>
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</tbody>
</table>

### CONTENT

- Where to find standards
- How specific federal requirements apply to horticulture activities
- How specific provincial requirements apply to horticulture activities
- How specific local requirements apply to horticulture activities
- Applying regulations, standards, and procedures to the job
- Applying WorkSafeBC accident and near miss reporting procedures
- Applying accident investigation requirements
Program Content
Level 1

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

1. Select and use appropriate measuring equipment for the task

2. Maintain measuring equipment

CONTENT

• (see the list of Measuring Equipment for Level One, detailed in the Training Provider Standards of this Program Outline)

• Cleaning and disinfecting measuring equipment to ensure proper operation and to prevent transfer of contaminants
• Calibrating measuring equipment such as thermometers, pH meters, levels and EC meters
• Checking and replacing batteries on measuring equipment
• Checking tools for damage, excessive wear and proper operation
• Storing measuring equipment for organization, safety and security

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

1. Identify engine components of motorized equipment engines
   • Differences between a two-stroke, four-stroke, and hybrid four-stroke engines
   • Carburetor
   • Ignition system
   • Starter components
   • Piston
   • Compression

2. Demonstrate personal safety in the workplace
   • Safety procedures
   • Use of PPE

3. Demonstrate safe operating procedures for motorized horticulture equipment such as starting, stopping and adjusting
   • String trimmers
   • Lawnmowers
   • Backpack blowers

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

1. Use hand tools to maintain horticulture equipment
   - Sockets and wrenches
   - Ignition tester
   - Tachometer
   - Torque wrench
   - Feeler gauges

2. Perform and document circle check of vehicles and motorized equipment
   - Lights
   - Plates
   - Brakes

3. Inspect equipment
   - Inspect visually for:
     - Damage and wear
   - Lock-out and tag-out as necessary
   - Inspect equipment to ensure efficient functioning

4. Check position of safety features as applicable
   - Lock-out devices
   - Chutes
   - Trimmer and belt guards
   - Operator presence switches

5. Check and replace fluids according to manufacturers’ specifications
   - Oil
   - Coolant
   - Hydraulic fluids

6. Check and replace components
   - Spark plugs
   - Belts
   - Pull cords

7. Check and adjust air pressure in components
   - Tires
   - Air compressors

8. Check and tighten components
   - Loose connections
   - Loose fittings
LEARNING TASKS

9. Check cutting height and adjust
   - According to client expectations
   - Turf needs

10. Apply preventive maintenance procedures
   - 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
   • Effective communication:
     o Four basic communication skills
       (listening, speaking, reading, writing)
     o Communication process
     o Active listening
     o Non-verbal communication
     o Barriers to communication
     o Preparing for meetings

2. Relay information
   • Relaying information to
     o Co-workers
     o Clients
     o Suppliers
     o Office staff
   • Relaying information in laypersons’ terms to
     o Clients
     o 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
1. Assess site hazards
   • High voltage
   • Motorized equipment
   • Working at heights

2. Identify PPE and safety equipment
   • For task

3. Maintain worksite to avoid injuries to self and others
   • Clean
   • Tidy
**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

| 1. Manage time | • Role of the supervisor |
| 2. Explain stress management | • Ability to effectively manage personal and work time |
| 3. Recognize ethical and social responsibility issues in the work place | • Individual |
|  | • Organizational |
|  | • How organizations can help manage stress |
|  | • Ethical and social consequences of work place practices |
|  | o Personal experience |
|  | o Religious beliefs impact personal ethics |
|  | o Culture affects ethical norms |
|  | o Internal reflection |
|  | o Organizational ethics |
|  | o Legal responsibilities |
|  | o BC Acts |
| 4. Communicate effectively | • Identifying and using verbal and non-verbal communication techniques (review Level One C6 – Communicate with others) |
| 5. Describe conflict management | • Defining conflict |
|  | • Sources of conflict |
|  | • Basic styles for managing conflict |
|  | • Conflict management strategies |
| 6. Examine the concept of power in an organization | • Guidelines of managing interpersonal conflict |
|  | • Recognizing power structure in the organization and how power is applied within the organization |
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

CONTENT
• Life cycle of a plant
• Plant growth patterns
  o Annuals
  o Biennials
  o Perennials
  o Herbaceous perennials
  o Woody perennials
• Deciduous and evergreen plants
  o Deciduous plants
  o Evergreens
  o Broadleaf evergreens
  o Coniferous evergreens
• Climbing plants
  o Stems specialized for climbing
  o Monocarpic plants

2. Employ correct naming and plant identification terminology

CONTENT
• Origin of plant naming systems
  o Common names
  o Nomenclature
  o Binomial system for naming plants
  o Plant taxonomy
  o Writing botanical names

3. Name the plant family for each plant identified

CONTENT
• Plant families
• Plant families commonly found in British Columbia
  o ASTERACEAE – Aster Family
  o CARYOPHYLLACEAE – Pink Family
  o ERICACEAE – Heath Family
  o LAMIACEAE – Mint Family
  o LILIACEAE – Lily Family
  o RANUNCULACEAE – Buttercup Family
  o ROSACEAE – Rose Family
  o SAPINDACEAE – Soapberry 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

- 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

1. Define plant stress
2. Describe conditions that lead to plant stress
3. Categorize plant pest types and broadly associate the symptoms of biotic plant stress with type of plant
4. Describe the life stages of example pests
5. Describe basic arthropod morphology and identify typical examples of arthropod to order

CONTENT
• Causes and symptoms
• Abiotic factors
  o Light temperature
  o Humidity
  o Air
  o Water supply
  o Mechanical damage
  o Nutrition
  o Other common symptoms of abiotic plant stress
• Distinguishing between biotic and abiotic causes of plant stress
• Biotic plant stress
  o Common indicators
• Biotic plant stress factors
  o Common plant insect indicators
  o Common plant disease indicators
• Susceptibility to biotic stress factors (insects and diseases)
• Potential stress-inducing environmental conditions
• Major plant pest types including:
  o Plant feeding pests
  o Plant feeding animals
  o Diseases
  o Weeds
• Damage caused by various pests
• Lifecycle of typical pests
• Disease lifecycles
• Basic arthropod morphology
• Eight orders of insects
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<tr>
<th>LEARNING TASKS</th>
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<tbody>
<tr>
<td>6. Identify the four types of plant-pathogens</td>
<td>• Categories of pathogens:</td>
</tr>
<tr>
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<td>o Fungi</td>
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<td>o Bacteria</td>
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<td>o Viruses</td>
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<td>o Nematodes</td>
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<td>7. Describe the characteristics that make plants weeds</td>
<td>• Defining weeds</td>
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<td></td>
<td>o Competition</td>
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<td>o Common characteristics</td>
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<td>8. Describe established methods for controlling pests (IPM)</td>
<td>• Classification of weeds by life histories</td>
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<td></td>
<td>o Annuals</td>
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<td>o Biennials</td>
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<td>o Herbaceous perennials</td>
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<td>o Woody perennials</td>
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<td>• Integrated Pest Management (IPM)</td>
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<td>• Six steps of IPM</td>
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<td>o Prevention</td>
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<td>o Monitoring</td>
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<td>o Treatments</td>
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<td>o Evaluation</td>
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<td>• Establishing methods for controlling pests</td>
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<td>o Cultural</td>
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<td></td>
<td>o Biological</td>
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<td>o Chemical</td>
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</tbody>
</table>
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

1. Describe the external parts of herbaceous and woody stems

2. Describe the parts of a leaf and variations in shape

3. Describe parts of the flower

4. Identify typical inflorescences

5. Identify typical fruit

6. Describe stages in the life cycle of a flowering plant

7. Describe parts of a seed and seedling

CONTENT

• Plant identification using features of a stem
  o Woody and herbaceous stems

• Parts of a simple leaf
  o Leaf shapes
  o Leaf tips
  o Leaf margins
  o Leaf surfaces
  o Pattern of veins within the leaf blade
  o Simple and compound leaves

• Flower structure
  o Complete and incomplete flowers
  o Perfect vs. imperfect flowers
  o Monoecious vs. dioecious plants
  o Flower symmetry

• Inflorescence types

• Placing fruit types
  o Fleshy fruits
  o Dry fruits

• Dehiscent and indehiscent fruits

• Reproduction

• Monocot seed development
• Dicot seed development
• Dicot seedling development
• Monocot seedling development
<table>
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<th>LEARNING TASKS</th>
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<tbody>
<tr>
<td>8. Identify stem, root, and leaf modifications</td>
<td>Roots</td>
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<td>o Root systems</td>
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<td></td>
<td>o Specialized underground storage structures</td>
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<td>9. Identify plant adaptations to environmental effects</td>
<td>Plant adaptations</td>
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<td>Stem modifications for protection</td>
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<td>Stems specialized for colonizing</td>
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<td>10. Describe basic growth responses to plant hormones</td>
<td>Response to hormones</td>
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<tr>
<td></td>
<td>o Auxins</td>
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<td>o Gibberellins (GA)</td>
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<td>o Cytokinins</td>
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<td>o Ethylene</td>
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<td>o Abscisic acid (ABA)</td>
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</table>
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

1. Define soil
   - Soil
   - Soil formation
   - Parent material
   - Biotic – living organisms
   - Topography
   - Time

2. Define soil quality
   - Soil quality and the importance of soil quality, relative to plant growth and environmental sustainability

3. Describe a soil profile
   - Soil profiles
     o LFH horizon
     o A horizon
     o B horizon
     o C horizon

4. Explain the physical properties of soil and soilless medias
   - Texture
   - Structure
   - Density
   - Porosity
   - Soil compaction
   - Soil structure and plant growth
   - Soilless media

5. Describe the behaviour of water in soil
   - Water in soils
   - Soil water holding capacity
   - Available water
   - Water movement through soil
   - Wetting front
   - Hydrolic conductivity of a soil
<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
</tr>
</thead>
</table>
| 6. Examine the key soil biological processes and their effects on plant growth and soil quality | • Water retention and flow in layered soils  
• Water movement in urban soils  
• Managing soils in the urban landscape |
| 7. Explain the role of organic matter in soil | • Biological process in soil  
• Plants  
• Soil animals  
• Other organisms  
• Role of soil organisms in soil quality  
• Promoting beneficial soil organisms |
| 8. Describe composting methods | • 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

Landscape Horticulturist
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. Review personal protective requirements (as per Level One A1 – Use personal protective equipment)
   • Selecting and using PPE as required for task, tools, equipment, machinery and environment
   • Ensuring the safe use of PPE
   • Storing PPE
   • Checking PPE prior to use
   • Checking PPE inventory
   • Recognizing damaged and expired PPE
   • Checking and replacing PPE components

2. Examine chemical handling requirements
   • Goggles
   • Rubber gloves
   • Face shields
   • Chemical protection suits
Program Content  
Level 2

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

1. Perform plant-grading according to the Canadian Standard for Nursery Stock and British Columbia Landscape Standard
   • Assessing and grading plants according to standards for plant:
     • Foliage density
       o Caliper
       o Height
       o Width ratios

2. Identify containers used for growing and shipping ornamental plant material
   • Calculating container volume and comparing results to the standards

3. Describe standards for root ball sizing
   • Calculating root ball sizes for:
     o Containers
     o Field grown stock

4. Prepare balled and burlapped plants
   • Rootballs:
     o Digging
     o Wrapping
     o Tying
   • Safely and efficiently lifting and carrying plant material to avoid physical damage to self and plants
   • Methods of harvesting plant material for field grown stock

5. Securely load plant material
   • Safety
   • Loading
   • Unloading
   • Securing plant material to a truck

6. Prepare plant materials
   • Removal of containers
   • Scarifying root ball
LEARNING TASKS

7. Demonstrate proper planting procedures for bare root stocks

- 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

8. Operate truck and trailer

- 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**

<table>
<thead>
<tr>
<th>Number</th>
<th>Task Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>Identify hand and power tools for basic horticultural tasks for Level Two technical training</td>
</tr>
<tr>
<td>2.</td>
<td>Demonstrate hand tool maintenance</td>
</tr>
<tr>
<td>3.</td>
<td>Demonstrate power tool maintenance</td>
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</tbody>
</table>

**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.
Program Content
Level 2

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

1. Identify horticulture vehicle and motorized equipment engine components and function

   • Differences between gas and diesel engines
   • Carburetor
   • Alternator
   • Radiator
   • Piston
   • Compression

2. Describe and demonstrate personal safety as related to large multiple cylinder equipment

   • Safe lifting and moving techniques
   • Entry onto and exit from machinery using the three point contact
   • Appropriate personal protective equipment
   • Work place hazards and mitigation of the risk of accident and injury
   • General shop safety

3. Describe and demonstrate safe operating procedures for horticulture equipment

   • General points for safe tractor operation
   • Tractor precautions:
     o Starting, speed and slopes
     o Hitch attachments
     o Transfer of tractors and equipment
     o Tractor transfer warnings
   • Operating a skid steer loader and zero turn walk behind machine
   • Power take-off precautions
   • Connecting attachments

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
Program Content
Level 2

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

1. Use hand tools to maintain horticulture equipment
   • Sockets and wrenches
   • Ignition tester
   • Multimeter
   • Battery charger
   • Tire gauge
   • Hydrometer

2. Practice preventive maintenance and troubleshooting procedures
   • Tune up equipment
   • Diagnose work or defective parts

3. Perform and document circle check of vehicles and motorized equipment
   • Lights
   • Plates
   • Brakes

4. Inspect equipment
   • Inspecting visually for:
     ○ Damage and wear
     ○ Lock out and tag out as necessary
   • Inspecting equipment to ensure efficient functioning

5. Check position of safety features
   • Lockout devices
   • Chutes
   • Trimmer and belt guards
   • Rollover protection devices (ROP)
   • Operator presence switches

6. Check and replace fluids according to manufacturers’ specifications
   • Oil
   • Coolant
   • Hydraulic fluids

7. Check and replace components
   • Spark plugs
   • Belts
   • Pull cords
LEARNING TASKS

8. Check and adjust air pressure in components

- Tires
- Air compressors

9. Check and tighten components

- Loose connections
- Loose fittings

10. Check cutting height and adjust components

- According to client expectations
- Turf needs

11. Develop a preventive maintenance plan

- Performing preventive maintenance every 3 months or 50 hours
  - Checking engine oil
  - Changing engine oil
  - Checking air filter
  - Oil-bathing air filter
  - Greasing fittings
  - Checking hydraulic oil
  - Checking tire pressures
  - Testing coolant
  - Checking belts
  - Checking hoses

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-bathing 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
  o Mirroring
  o Repeating back
• Practicing active listening skills
• Reporting discrepancies and seeking direction from supervisor
• Two-way radios
• Computers
• Cell phones
• Communicating with
  o Machine operators
  o Truckers
  o 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
1. Inspect and verify plants and materials
   • Accuracy
   • Quality
   • Quantity

2. Remove and inspect monitoring devices when necessary
   • Temperature recorders
   • Environmental recorders

3. Receive, unload, record and protect materials and products in an organized fashion
   • Plant materials
     o Group/match plants by size and species
     o Place received products in designated areas to maintain product quality
   • Other materials
     o Wood chips
     o Soil
     o Aggregates
     o Store in designated areas to avoid contamination
   • Products
     o Soils
     o Seed
     o Plugs
     o Roots
     o Labels
     o Containers

4. Allocate specified storage areas for equipment and hazardous materials
   • Equipment
   • Hazardous materials

5. Lay out plants on site
   • According to landscape plans
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
   • Avoiding injury to
     o Self
     o Co-workers
     o Others
2. Follow safety procedures when working in high traffic areas
   • Flagging
   • Pylons
   • Signage
3. Handle hazardous materials in accordance with government regulations and WHMIS procedures
   • Disposing
   • Labelling
   • Using PPE
4. Participate in safety meetings and discussion
   • Ensuring that information is recorded and distributed to all team members
5. Report unsafe conditions to supervisor
   • Recognizing
   • Reporting
6. Recognize safety warning signals
   • Back-up signals
   • Back-up alarms
   • Warning lights
7. Contain and dispose of spill contaminants
   • According to regulations
8. Coordinate with other agencies
   • Private and public line locators
   • Emergency response teams
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.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
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</table>
| 1. Describe leadership in the organization | • Definition of leadership  
| | • Role of leaders  
| | • Characteristics of leaders |
| 2. Describe leadership skills | • Motivational theories  
| | • Delegation learning  
| | • Skills needed for effective delegation  
| | • Setting goals for effective delegation and employee commitment  
| | • Team management: coaching and training |
| 3. Describe safety culture | • Role of WorkSafeBC  
| | • Safety culture in the workplace |
| 4. Describe managing a diverse workplace | • Managing diversity  
| | ▪ Characteristics of culture  
| | ▪ Elements of cultural difference  
| | ▪ Cultural orientation  
| | • Legal Requirements  
| | ▪ Canadian Charter of Rights And Freedoms  
| | ▪ Canadian Human Rights Act of 1985  
| | ▪ BC Human Rights Code  
| | • Enforcement of Human Rights |
| 5. Interpret the employment standards | • Impacts of the Employment Standards Act on horticultural operations |
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
   • Natural habitat
     o Alpine plants
     o Woodland understory plants
     o Mediterranean plants
     o Bog plants
     o Native plants
   • Plant use characteristics
     o Bedding plants
     o Cut flowers
     o Trees and shrubs
     o Groundcovers
     o Climbers
   • Characteristics of individual plants and plant groups
   • Plant size
   • Texture
   • Plant form

2. Explain plant hardiness zones
   • Plant hardiness zones
   • Relationship between plant health and hardiness zones

3. Recognize plants suitable for planting in difficult situations
   • Provenance
   • Difficult planting conditions
     o Sunny arid conditions
     o Shade
     o Dry shade
     o Dry soil conditions
     o Wetlands
     o Compacted soils
     o 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
  o Light
  o Wind
  o Heating
  o Ventilation
  o Air conditioning (HVAC) systems
  o Moisture
  o 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
  o Texture
  o Drainage
  o pH
  o Nutrients
  o Contaminants
• Determining air quality that might affect interior and exterior plants
• Taking corrective measures such as
  o Fertilization
  o Liming
  o Adding organics
  o Neutralizing water
  o 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

1. Describe and distinguish between the major plant pest types
   • Weeds as pests
   • Invertebrates as pests
   • Vertebrates as pests
   • Pathogens as pests

2. Describe characteristics that make plants weeds
   • Review what is a weed
   • Weeds as competitors
   • Weed classification
   • Hidden effects of weeds
   • Seeds of weedy plants

3. Describe characteristics that make vertebrates pests
   • Wildlife management
   • Vertebrate plant-feeding pests
     o Birds
     o Deer
     o Rodents

4. Describe characteristics that make invertebrates pests
   • Pest ecology
   • Insect pest success
   • Common invertebrate pests
     o Aphids
     o Leafhoppers
     o Scales
     o Weevils and beetles
     o Caterpillars and moths
     o Lacebugs
     o Sawflies
     o Thrips
     o Mites
     o Fungus gnats
     o Leaf miners
     o Slugs and snails
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

   • Biological control
   • Cultural control
   • General prevention

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

   • 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
CONTENT
1. Describe the internal anatomy of stems, roots, and leaves

• The plant cell
• Cell types, tissues, and their functions
• Primary growth
• Secondary growth

2. Describe plant part anatomy

• Stems
  o Herbaceous stems
  o Woody stems
  o Bark
• Roots
  o Root apical meristems
  o Root cap
  o Epidermis
  o Cortex
  o Endodermis
  o Pericycle
  o Vascular tissue
  o Adventitious roots
  o Secondary growth
• Leaves
  o Anatomy of a leaf

3. Describe the movement of sap through a plant and the effects of environment on the rate of flow

• Water movement
  o Diffusion
  o Osmosis
  o Capillary attraction
  o Active transport

4. Describe the flow of sugars, produced in photosynthesis, through the plant

• Photosynthesis
  o Chlorophyll
  o Translocation for sugars
  o Respiration
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

• 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
  o Photoperiod
  o Tropisms and plant growth
Program Content
Level 2

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.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
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</thead>
</table>
| 1. Describe how soil colloids determine soil chemical properties | • Soil colloids  
• Soil pH and colloidal material  
• Cations and plant roots |
| 2. Behaviour of nutrients in soil | • Mineral nutrients  
• Primary macronutrients  
• Secondary macronutrients  
• Micronutrients |
| 3. Acquisition of nutrients by plants | • Nutrient uptake  
• The nitrogen cycle  
• Root absorption |
| 4. Measure soil reaction (pH) | • Define pH  
• Testing soil for pH |
| 5. Manage soil reaction | • Adjusting the pH of soil  
• Buffering capacity |
| 6. Explain how soil reaction (pH) relates to soil fertility | • Plant growth and pH tolerance  
  o Importance of pH to plant growth  
  o Phosphorus  
  o Pathogens and pH |
| 7. Measure and manage salinity and sodicity | • Salinity in soils  
• Measurement of salinity and sodicity  
• Measurement of electrical conductivity  
• Sodic soils |
| 8. Describe soil salinity and sodicity and impact on soil properties | • Impact of salinity and sodicity on soil physical and chemical characteristics |
LEARNING TASKS

9. Discuss nutrient management

- Nutrient management
  - Slow-release fertilizers
  - Water soluble fertilizers
- Field stock and landscape fertilizer management
- Turf fertilizer management
- Organic fertilizers and amendments
- Inorganic fertilizers

10. Sample soils

- Soil testing
  - Collecting soil samples in field crops and on landscape sites
  - Procedures of soilless media samples
- Limitations of soil nutrient analysis

11. Interpret soil test information

- Interpreting basic soil test results
- Calculate fertilizer application rates

12. Interpret fertilizer label information

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

- Performed sodic and salinity analysis
- Performed pH analysis
- Performed nutrient management analysis
Level 3

Landscape Horticulturist
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 Three technical training
2. Demonstrate hand tool maintenance
3. Demonstrate power tool maintenance

CONTENT
• (see the list of Tools and Equipment for Level Three, 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 MAINTAIN TOOLS AND EQUIPMENT
Competency: B6 Transport equipment

Objectives
To be competent in this area, the individual must be able to:
- Load equipment and attachments safely, according the authorities having jurisdiction.
- Unload equipment and attachments safely, according the authorities having jurisdiction.

LEARNING TASKS

1. Load equipment and attachments
   - Selecting trailer type according to
     - Equipment restrictions
     - Weight restrictions
   - Securing loads according to jurisdictional requirements
     - Including all equipment attachments
   - Tying flags to back end of trailers to indicate extended load according to regulations
   - Placing traffic cones and blocks when loading and unloading trailer

2. Unload equipment and attachments
   - Determine the best location for unloading equipment and attachments
     - Level ground
     - Close to work area
   - Placing traffic cones and blocks when loading and unloading trailer
Line (GAC): C  ORGANIZES WORK
Competency: C1 Perform site assessments

Objectives
To be competent in this area, the individual must be able to:
- Conduct site assessment as per industry standard practices.
- Identify and mark public and private utilities.
- Perform soil analysis and identify existing plants.
- Plan for construction activities.

LEARNING TASKS

1. Assess access points
   - Access points to identify
     - Site restrictions
     - Challenges for work

2. Perform visual inspection
   - Visual inspection of
     - Site
     - Neighbouring properties

3. Identify markings for public and private utilities
   - BC One Call
     - Cable
     - Natural gas
     - Power
     - Telephone

4. Mark locations of private utilities
   - Irrigation lines
   - Drainage systems
   - Landscape lighting components
   - Locate septic components if necessary

5. Perform soil tests
   - Percolation
   - Core sampling
   - Ribbon tests

6. Identify existing plants
   - Health
   - Vigour
   - Maintenance practices

7. Identify construction activity requirements
   - Areas to be marked for excavating and/or protecting
   - Grading and drainage patterns
   - Security requirements
Achievement Criteria

Performance  The learner will identify existing plants and perform soil tests.

Conditions  The learner will be directed to a specified site on campus and provided with the necessary equipment for select soil tests.

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

- Identified existing plants for
  - Health
  - Vigour
  - Maintenance practices
- Performed percolation and ribbon tests on soil
Objectives
To be competent in this area, the individual must be able to:
- Use documentation and reference materials to plan and organize work activities.

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<td>2. Interpret documentation</td>
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<td>• Site locates</td>
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<td>3. Refer to WHMIS for procedures for hazardous</td>
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<td>• Clean up</td>
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<td>4. Use catalogues</td>
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<td>• Comparing products among suppliers</td>
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<td>o Methods of control</td>
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<td>6. Use text books and interpret in-depth information</td>
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<td>• Pests</td>
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<td>• Diseases</td>
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Achievement Criteria

Performance  The learner will use documentation and reference materials to plan and organize work activities.

Conditions  The learner will be given a case study and reference material (to be determined by the instructor).

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

- Selected appropriate research documents to identify
  - Plants
  - Tools
  - Equipment
  - Price comparisons
  - Identification of hazardous materials
- Evaluated the quality of the research documents
Objectives
To be competent in this area, the individual must be able to:
• Read, record, complete, maintain and provide input for records as required on the job.

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<th>LEARNING TASKS</th>
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<td>1. Complete safety records</td>
<td>• Accident reports</td>
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<td>• Safety meeting sheets</td>
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<td>• According to regulations</td>
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<td>2. Complete work records</td>
<td>• Work orders</td>
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<td>4. Provide input</td>
<td>• Safety inspection reports</td>
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<td>• Employee evaluations</td>
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<td>5. Maintain records as required</td>
<td>• Integrated pest management (IPM)</td>
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<td>• Plant health programs</td>
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<td>6. Read and record data</td>
<td>• Test results</td>
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<td>• Monitoring devices</td>
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</tbody>
</table>
Line (GAC): C ORGANIZES WORK
Competency: C4 Comply with policies and regulations

Objectives
To be competent in this area, the individual must be able to:
• Describe and demonstrate knowledge of current policies and regulations that pertain to the horticultural industry and the authorities having jurisdiction.

LEARNING TASKS

1. Review and comply with current governmental and company policies
   • Transportation
   • Pest control
   • Conservation of water
   • Habitat preservation
   • Control of spraying

2. Enforce safety regulations
   • WorkSafeBC requirements
     o PPE usage
     o Usage of tools and equipment
     o Handling and storage of equipment

3. Comply with governmental, company and environmental agencies
   • Department of Fisheries and Oceans (DFO)
   • Canadian Food Inspection Agency (CFIA)
   • Environment Canada
   • Provincial, regional and municipal agencies

4. Contact authorities
   • For information
   • To report incidents and occurrences

5. Contact public and private locators
   • Locate utility lines (BC One Call)
   • Other services

6. Verify personal licensing and certification
   • Up to date
   • Current
Line (GAC): C ORGANIZES WORK
Competency: C5 Plan daily tasks

Objectives
To be competent in this area, the individual must be able to:
• Demonstrate the ability to plan and execute daily tasks.

LEARNING TASKS

1. Organize for daily tasks
   • Labour
   • Materials
   • Equipment

2. Prioritize and sequence tasks
   • Time management
   • Efficient performance

3. Delegate tasks to team members
   • Utilize individual strengths

4. Modify daily tasks according to challenges
   • Site hazards
   • Weather
   • Lack of materials
   • Competing projects

5. Refer to other information to assist in daily planning
   • Historical information
   • Previous plans

Achievement Criteria
Performance The learner will demonstrate the ability to plan and execute daily tasks.
Conditions The learner will be given a case study and related historical information.
Criteria The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria
• Organized daily tasks
• Prioritized and sequenced tasks
• Delegated tasks to team members
• Modified daily tasks according to challenges
Line (GAC): C   ORGANIZES WORK
Competency: C8 Transport materials

Objectives
To be competent in this area, the individual must be able to:
- Plan and prepare for the transportation of materials.
- Load materials according to standard practices.
- Transport materials according to governing requirements, policies and regulations.

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<td>1. Protect plant materials</td>
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<td>• Anti-desiccants</td>
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<td>2. Secure materials</td>
<td>• Approved tie-downs</td>
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<tr>
<td>3. Load/unload materials using tools and equipment</td>
<td>• Dollies</td>
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<td>• Forklifts</td>
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<tr>
<td>4. Load materials to allow for optimal transport</td>
<td>• Sequence</td>
</tr>
<tr>
<td>and unloading</td>
<td>• Direction</td>
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<tr>
<td>5. Check that loose materials are secure and</td>
<td>• Wood chips</td>
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<td>loaded in a manner to prevent spillage</td>
<td>• Soil</td>
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<td></td>
<td>• Aggregates</td>
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<tr>
<td>6. Cover materials according to policies and</td>
<td>• Governmental</td>
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<tr>
<td>regulations</td>
<td>• Company</td>
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<tr>
<td>7. Load and transport materials according to</td>
<td>• Weight restriction regulations</td>
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<tr>
<td>regulations and requirements</td>
<td>• Load distribution requirements</td>
</tr>
<tr>
<td>8. Perform and document circle checks</td>
<td>• Vehicle</td>
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<td></td>
<td>• Towed equipment</td>
</tr>
</tbody>
</table>
Line (GAC): D  PARTICIPATES IN MARKETING AND SALES
Competency: D1  Control inventory

Objectives
To be competent in this area, the individual must be able to:
• Control inventory as per company policies and procedures.

LEARNING TASKS

1. Control inventory

CONTENT
• Varying methodology within each company dependent on the type of work performed
  o Often performed by owner/operator or accounting department
• Identifying and counting inventory
  o Manual
  o Electronic systems
• Maintaining inventory records
• Identifying and sorting materials
• Identifying restock orders
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 plant and plant requirements for 90 woody and non-woody plants.
• Recognize plants suitable for common tropical, floral and interior landscape situations.

LEARNING TASKS

1. Identify plants and plant requirements
   • Review of Level One and Level Two E1 competency
     o Range of plant materials commonly used in commercial horticulture
     o Correct naming and plant identification terminology
     o Plant families
     o Using a dichotomous key for plant identification
     o Plant hardiness zones
     o Plants suitable for planting in difficult situations
     o Identifying weeds and invasive plants
     o Recognizing bud, bark, foliage, flower, and fruit characteristics

2. Recognize plants suitable for common tropical, floral and interior landscape situations
   • Interior landscaping
   • House plants
   • Floral uses such as cut flowers

3. Identify and describe 90 woody and non-woody plants
   • 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:
• Demonstrate the management of insects, disease, weed, mollusc and vertebrate pests in landscapes.
• Develop an IPM program outline.

LEARNING TASKS

1. Examine IPM principles
   • Reviewing/applying IPM principles
     o Prevention
     o Identification
     o Monitoring
     o Thresholds
     o Treatments
     o Evaluation

2. Describe classifications of landscape sites
   • Landscape maintenance
   • Classification of landscape sites
     o Class A
     o Class B
     o Class C
   • Landscape maintenance levels
     o Level 1
     o Level 2
     o Level 3
     o Level 4
     o Level 5
     o Level 6

3. Describe IPM for insects in landscapes
   • Prevention
   • Identification
   • Monitoring
   • Action decisions
   • Treatments
   • Evaluation

4. Describe IPM for diseases in landscapes
   • Prevention
   • Identification
   • Monitoring
   • Action decisions
   • Treatments
## LEARNING TASKS

<table>
<thead>
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<th>CONTENT</th>
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<tbody>
<tr>
<td>5. Describe IPM for weeds in landscapes</td>
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<tr>
<td>6. Describe IPM for other pests in landscapes</td>
</tr>
</tbody>
</table>

## Achievement Criteria

**Performance**
The learner will develop an IPM program outline.

**Conditions**
The learner will be given IPM program outline headings and reference resources.

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

- Scope of the IPM program should have included a significant problem for a landscape, greenhouse, nursery, and be reasonable in complexity for this project (determined by the instructor)
- Site of the IPM program as described in Section 1 of IPM proposal
- Major pests have been selected, and types of damage and control measures listed
- Potential control methods including physical, cultural, chemical, and biological methods have been listed
Line (GAC): E  ANALYZES AND MAINTAINS PLANT HEALTH
Competency: E7  Assess landscape sites with respect to soils

Objectives
To be competent in this area, the individual must be able to:
• Assess landscapes sites with respect to soils.

LEARNING TASKS

1. Assess landscape site soils
   - Soil quality concepts
   - Soil or growing media depth
   - Soil sampling and testing for quality
   - Collecting soil samples for nutrient, chemical, and textural analysis on landscape sites
   - Soil samples for soil layering
   - Environmental conditions
   - Construction impact or change in site conditions

2. Examine soil compaction and drainage
   - Soil layering or horizons
   - Soil compaction
     - Measuring soil compaction
   - Impact of compaction on soil permeability and drainage
   - Impact of soil layers on water movement

3. Examine soil erosion
   - Soil erosion
   - Environmental conditions
   - Construction impact or change in site conditions

4. Examine the impact of fill, cut, and grading on soils and site hydrology
   - Cut and fill projects
     - Impact of fill
     - Impact of cut
   - Other causes of bank failure

5. Examine site grading and slopes
   - Site grading

6. Examine site protection
   - Soil compaction protection
   - Erosion protection
     - Hydroseeding
     - Erosion control mats
     - Silt fencing
LEARNING TASKS

7. Examine site remediation

CONTENT

- Remediation of soil compaction
- Remediation of drainage and soil infiltration issues
  - Subsurface drainage
  - Mounded plant beds
  - Raised plant beds
  - Subsoil sculpturing

8. Examine specialty growing media

CONTENT

- Green roofs
- Container planters
- Athletic fields
Line (GAC): F PERFORMS PRE-CONSTRUCTION ACTIVITIES
Competency: F1 Interpret landscape plans

Objectives
To be competent in this area, the individual must be able to:
- Interpret plans, scales and symbols as they relate to pre-construction activities.
- Interpret project specifications as they relate to pre-construction activities.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
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</thead>
<tbody>
<tr>
<td>1. Interpret specified scale</td>
<td>• Site layout</td>
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<td></td>
<td>• Job planning activities</td>
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<tr>
<td>2. Interpret symbols to determine the scope of work</td>
<td>• Property lines</td>
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<td>• Grades</td>
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<td>• Elevations</td>
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<td>• Hardscape and softscape elements</td>
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<tr>
<td>3. Interpret project specifications</td>
<td>• Planting plan</td>
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<td></td>
<td>• Softscape and hardscape details</td>
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<td>4. Identify stakeholders for future inquiries</td>
<td>• Property owners</td>
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<td></td>
<td>• Designers</td>
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<td></td>
<td>• Engineers</td>
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</tbody>
</table>
Line (GAC): F PERFORMS PRE-CONSTRUCTION ACTIVITIES
Competency: F2 Participate in job planning activities

Objectives
To be competent in this area, the individual must be able to:
• Participate in job planning activities.

LEARNING TASKS
1. Participate in job planning activities

CONTENT
• Identifying labour expertise
• Determining production hours
• Reviewing safety plan to ensure safe completion of the project
• Verifying term of project and determining sequence of job to ensure project is completed according to plan and budget
• Verifying materials and procedures to meet project specifications
• Planning onsite staging
  o Environmental protection
  o Vehicle parking
  o Storage
  o Portable office and toilets
• Locating private and public utilities to ensure safe completion of project
• Identifying and scheduling sub-contractors to fulfill scope of work
• Identifying and scheduling tools, equipment and attachments to ensure availability
Program Content
Level 3

Line (GAC): F PERFORMS PRE-CONSTRUCTION ACTIVITIES
Competency: F3 Prepare site

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

- Plan and prepare the site according to plans and specifications.

LEARNING TASKS

1. Select and use hand tools
   
   CONTENT
   
   - Tools
     - Levels
     - Builder's Level
     - Transits
     - Hammers
     - Others

2. Select and use equipment
   
   CONTENT
   
   - Equipment
     - Skid steers
     - Loaders
     - Excavators
     - Others

3. Identify and communicate discrepancies
   
   CONTENT
   
   - Plans
   - Site conditions

4. Preserve existing hardscape and softscape elements according to plans and specifications
   
   CONTENT
   
   - Elements
     - Trees
     - Decks
     - Others

5. Remove unwanted materials
   
   CONTENT
   
   - Hazards
   - Debris

6. Create access
   
   CONTENT
   
   - Ensure site
     - Efficiency
     - Security

7. Identify markings to avoid personal injury and damage to utilities
   
   CONTENT
   
   - Utility hazards
     - Underground
     - Overhead

8. Locate and cordon off areas to minimize environmental impact
   
   CONTENT
   
   - Environmental considerations
### Learning Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Content</th>
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<tbody>
<tr>
<td>9. Install environmental mitigation mechanism</td>
<td>• Environmental mitigation mechanisms</td>
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<tr>
<td></td>
<td>o Filters</td>
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<td></td>
<td>o Silt fencing</td>
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<td></td>
<td>o Storm sewer guards</td>
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<td></td>
<td>o Others</td>
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<tr>
<td>10. Lay out site</td>
<td>• Marking and staking locations of hardscape and softscape elements to be installed</td>
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<tr>
<td>11. Establish grade to ensure positive drainage</td>
<td>• Plans</td>
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<tr>
<td></td>
<td>• Specifications</td>
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<tr>
<td>12. Strip and stockpile topsoil and cut/fill material</td>
<td>• Establish rough grade according to</td>
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<td></td>
<td>o Plans</td>
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<tr>
<td></td>
<td>o Specifications</td>
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<tr>
<td>13. Excavate growing media and place service conduits to support sub-trade activities</td>
<td>• Sub-trade activities</td>
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<tr>
<td></td>
<td>o Installing drainage systems</td>
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<td></td>
<td>o Installing irrigation systems</td>
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<td></td>
<td>o Laying fibre optics</td>
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<tr>
<td></td>
<td>o Others</td>
</tr>
<tr>
<td>14. Verify site is prepared and ready for the next phase</td>
<td>• According to specifications</td>
</tr>
</tbody>
</table>

### Achievement Criteria

**Performance**
The learner will prepare a site.

**Conditions**
The learner will be given a set of plans, and appropriate tools and equipment.

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

- Selected and used the appropriate hand tools and equipment
- Identified and communicated discrepancies
- Preserved existing hardscape and softscape elements according to plans and specifications
- Identified markings to avoid personal injury and damage to utilities
- Located and cordoned off areas to minimize environmental impact
- Installed environmental mitigation mechanism
- Laid out site
- Verified site was prepared and ready for the next phase
Program Content
Level 3

Line (GAC): H INSTALLS HARDSCAPE
Competency: H1 Install drainage systems

Objectives
To be competent in this area, the individual must be able to:
• Install a drainage system using the correct tools, equipment and materials, as per specifications.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
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</thead>
<tbody>
<tr>
<td>1. Select and use tools</td>
<td>Tools</td>
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<td></td>
<td>o Shovels</td>
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<td>o Picks</td>
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<td></td>
<td>o Wheelbarrows</td>
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<td></td>
<td>o Others</td>
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<tr>
<td>2. Select and use equipment</td>
<td>Equipment</td>
</tr>
<tr>
<td></td>
<td>o Excavators</td>
</tr>
<tr>
<td></td>
<td>o Trenchers</td>
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<tr>
<td></td>
<td>o Skid steers</td>
</tr>
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<td></td>
<td>o Others</td>
</tr>
<tr>
<td>3. Examine drainage terminology and theory</td>
<td>Water and drainage</td>
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<tr>
<td></td>
<td>Hydrolc cycle</td>
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<td></td>
<td>Precipitation</td>
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<td></td>
<td>o Rain</td>
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<td>o Snow</td>
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<tr>
<td></td>
<td>Runoff</td>
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<tr>
<td></td>
<td>o Overland flow</td>
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<td></td>
<td>o Sub-surface flow</td>
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<td></td>
<td>o Saturated overland flow</td>
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<td></td>
<td>Impacts of urbanization runoff</td>
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<td>Horticulture solutions to urban runoff</td>
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<td></td>
<td>Soils</td>
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<tr>
<td></td>
<td>o Soil profile and texture</td>
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<td>o Soil permeability</td>
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<td>o Compaction</td>
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<td></td>
<td>o Perched water tables</td>
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<td></td>
<td>Benefits of good drainage</td>
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<td></td>
<td>o Plant health</td>
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<td>o Root development</td>
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<td></td>
<td>o Nutrient uptake</td>
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<td></td>
<td>o Plant tolerance</td>
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<td></td>
<td>o Pathogenic organisms</td>
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### LEARNING TASKS

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>LEVEL 3</th>
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<tbody>
<tr>
<td>4. Examine surface and substrate drainage system components and function</td>
<td></td>
</tr>
<tr>
<td>• Over drained soils</td>
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<tr>
<td>• General water table changes</td>
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<tr>
<td>• Drainage systems</td>
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<tr>
<td>• Surface drainage system components</td>
<td></td>
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<tr>
<td>o Storm drains</td>
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<td>o Manholes</td>
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<td>o Drain outlets</td>
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<td>o Retention/detention pools</td>
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<tr>
<td>o Rain gardens</td>
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<tr>
<td>• Subsurface drainage system components</td>
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<tr>
<td>o Pipes</td>
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<td>o Pipe envelope fabrics</td>
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<tr>
<td>o Blind inlets</td>
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<tr>
<td>5. Examine drainage system planning and design considerations</td>
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<tr>
<td>• Drainage plan</td>
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<tr>
<td>o Developing a drainage plan</td>
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<tr>
<td>• Drainage system capacity</td>
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<tr>
<td>• Subsurface drainage planning</td>
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<tr>
<td>o Drain depth and spacing</td>
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<td>o Drain diameter</td>
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<td>o Grades for drains</td>
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<tr>
<td>o Installation of sub-surface drains</td>
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<tr>
<td>• Surface drainage planning</td>
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<tr>
<td>o Land grading</td>
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<tr>
<td>• Recommended slopes for various soils and conditions</td>
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<td>• Limiting velocities</td>
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<tr>
<td>• Minimization of soil structural damage during grading operations</td>
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<td>• Open channels, ditches and swales</td>
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<td>6. Prepare for drainage system installation</td>
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<tr>
<td>• Subsurface drainage installation</td>
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<tr>
<td>o Design drawing</td>
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<tr>
<td>o Performing installation</td>
<td></td>
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<tr>
<td>o Critical aspects of all sub-surface drain installation</td>
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<tr>
<td>• Determining site slopes and drainage grades</td>
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<tr>
<td>o Survey instruments</td>
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<tr>
<td>• How to use a log book</td>
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<td>• Booking procedures</td>
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<tr>
<td>• Establishing elevations</td>
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</table>
LEARNING TASKS

7. Install drainage system

CONTENT

- Moving specified drainage system materials into desired location
- Laying out and assembling drainage components
- Verifying drainage system operation
- Backfilling drainage system with specified materials to finish grade
- Verifying installation meets specifications and is ready for next phase

Achievement Criteria 1

Performance The learner will install a sub-surface drainage system (install a drain pipe, filter and fabric, in an excavated trench).

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

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

- Performed all tasks in a safe manner
- Drain installed at proper grade
- Correct size drain and type of rock used
- Drain rock placed to correct depth
- Filter fabric properly installed

Achievement Criteria 2

Performance The learner will use appropriate survey instruments to shoot in grade stakes and develop a grading plan:

- Set up a builder’s level on a tripod
- Shot elevations at intervals given by the instructor
- Recorded elevations in log book

Conditions The learner will be given:

- Builder’s level
- Tripod
- Metric rod
- Metric chain
- Log book
- Grade stakes

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

- Proper set up of equipment
- Accurate measurement of distance intervals
- Accurate measurement of elevations
- Accurate plotting of elevations
- Setup and marked grade stakes
Line (GAC): H INSTALLS HARDSCAPE
Competency: H2 Install landscape structures

Objectives
To be competent in this area, the individual must be able to:
• Install landscape structures using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools
   • Tools
     o Power saws
     o Power drills
     o Hammers
     o Brooms
     o Water and power blowers
     o Others

2. Select and use equipment
   • Equipment
     o Excavators
     o Skid steers and attachments
     o Others

3. Prepare for the installation of landscape structures
   • Laying out and marking construction area
   • Excavating as required
   • Preparing foundation suitable for structure installation

4. Install landscape structures
   • Constructing specified structures
     o Decks
     o Pergolas
     o Gazebos
   • Verifying installation meets specifications and is ready for next phase

5. Cleanup site
   • Cleaning surfaces using tools
   • Repairing damage that has occurred as a result of construction
   • Disposing of and recycling waste materials
Line (GAC): H
Competency: H3 Install walkway, patio, driveway and parking lot materials

Objectives
To be competent in this area, the individual must be able to:
• Install walkway, patio, driveway and parking lot materials using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools
   • Tools
     o Shovels
     o Picks
     o Chisels
     o Diamond saw
     o Wheelbarrows
     o Brooms
     o Power blowers
     o Others

2. Select and use equipment
   • Equipment
     o Excavators
     o Plate compactors
     o Skid steers
     o Others

3. Prepare for installation
   • Laying out and marking construction area
   • Excavating as specified and stabilizing by compaction
   • Storing or removing excavated materials

4. Install walkway, patio, driveway and parking lot materials
   • Sleevning
   • Placing geotextiles as required for base stability
   • Adding aggregate base and compacting in lifts according to specifications
   • Creating or maintaining adequate grade to ensure positive drainage
   • Securing edge restraints as required for finished material
   • Placing bedding materials if required
     o Sand
     o Limestone screening
     o High performance bedding materials
     o Concrete base
LEARNING TASKS

CONTENT

• Screeding bedding materials as required
• Laying materials
  o Flagstones
  o Concrete
  o Aggregates
  o Paving stones
• Other paving types and methods
  o Permeable paving
  o Gravel
  o Stone
• Cleaning surfaces
• Applying joint materials according to manufacturers’ specifications
  o Mortars
  o Sand
  o Polymeric sand
• Cleaning and sealing according to manufacturers’ specifications if required
• Verifying installation meets specifications and is ready for next phase

5. Clean-up site

• Cleaning and repairing damage that has occurred as a result of construction
• Disposing and recycling waste materials

Achievement Criteria

Performance The learner will construct a small patio using interlocking pavers.

Conditions The learner will be given a plan, tools, equipment and materials.

Criteria The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  • Performed tasks safely
  • Installed patio according to plans
Line (GAC): H  INSTALS HARDSCAPE
Competency: H4  Install steps and retaining walls

Objectives
To be competent in this area, the individual must be able to:
• Install steps and retaining walls using the correct tools, equipment and materials, as per specifications.

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<tbody>
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<td>o Diamond saw</td>
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<td>o Stone chisels</td>
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<td>o Wheelbarrows</td>
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<td>o Brooms</td>
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<td>o Power blowers</td>
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<td>o Mechanical sweepers</td>
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<td>o Others</td>
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<td>2. Select and use equipment</td>
<td>• Equipment</td>
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<td>o Excavators</td>
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<td>o Plate compacters</td>
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<td>o Skid steers</td>
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<td>o Others</td>
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<td>3. Perform safe work practices</td>
<td>• PPE</td>
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<td>• Recognizing work hazards</td>
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<td>• Moving materials</td>
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<td>4. Describe standards for environmental protection</td>
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<tr>
<td></td>
<td>• Environmental construction practices</td>
</tr>
<tr>
<td></td>
<td>• Material storage</td>
</tr>
<tr>
<td></td>
<td>• Sourcing appropriate information relative to environmental protection</td>
</tr>
<tr>
<td>5. Describe site preparation and protection of</td>
<td>• Existing plant material</td>
</tr>
<tr>
<td>existing site elements</td>
<td>• Existing hard features</td>
</tr>
<tr>
<td>6. Lay out and stake site from a working drawing</td>
<td>• Laying out site from drawings</td>
</tr>
<tr>
<td></td>
<td>• Horizontal measurements</td>
</tr>
<tr>
<td></td>
<td>• Staking</td>
</tr>
</tbody>
</table>
LEARNING TASKS

7. Locate the position of underground services
   • Gas
   • Electrical
   • Water
   • Sewer
   • Cable
   • Telephone
   • BC One call/Contractor liability and site delay concerns

8. Describe the use of survey and lay out equipment
   • Equipment
     o Builder’s level
     o Carpenter’s level
     o String level
     o Water level
     o Slope
     o Other devices for levelling

9. Describe the properties and use of hard construction materials
   • Materials
     o Wood
     o Segmental retaining wall systems
     o Stone
     o Other wall materials

10. Describe the safe operation of various types of compaction equipment
    • Equipment
      o Vibrator plate tampers
      o Jumping jack tampers
      o Hand tampers

11. Describe the procedures for non-masonry construction of a wall from a variety of materials
    • Materials
      o Wood
      o Segmental retaining wall systems
      o Stone
      o Other wall materials

12. Prepare to install steps and retaining walls
    • Laying out and marking construction area
    • Excavating as specified and stabilizing compaction
    • Storing or removing excavated materials

13. Install steps and retaining walls
    • Placing geotextile materials as required for stability
    • Adding aggregate base and compacting in lifts according to specifications
**LEARNING TASKS**

**CONTENT**

- Placing bedding materials if required
  - Sand
  - Limestone screening
  - Concrete footing
- Screeding bedding materials as required
- Building wall and steps by performing
  - Stacking and assembling courses
  - Using materials such as timber, natural stone and manufactured stone according to specifications
- Placing drainage systems and backfill according to specifications
- Installing adhesives or mortar to secure capstones and treads
- Cleaning surfaces
- Verifying installation meets specifications and is ready for next phase

14. Cleanup site

- Repairing damage that has occurred as a result of construction
- Disposing of and recycling waste materials

**Achievement Criteria**

**Performance**

The learner will construct a small retaining wall with steps.

**Conditions**

The learner will be given a plan, tools, equipment and materials.

**Criteria**

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

- Performed tasks safely
- Installed retaining wall with steps, according to plans
Line (GAC): H INSTALLS HARDSCAPE
Competency: H5 Install irrigation systems

Objectives
To be competent in this area, the individual must be able to:
• Install irrigation systems using the correct tools, equipment and materials, as per specifications.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
</tr>
</thead>
</table>
| 1. Select tools | • Tools  
| | o Pipe cutters  
| | o Crimping tools  
| | o Trenching shovels  
| | o Wheelbarrows  
| | o Others |
| 2. Determine equipment required | • Equipment  
| | o Excavators  
| | o Trenchers  
| | o Skid steers and attachments  
| | o Others |
| 3. Use irrigation terminology | • Gallons per minute (GPM)  
| | • Velocity  
| | • Precipitation rate  
| | • Matched precipitation  
| | • Balance precipitation  
| | • Static pressure  
| | • Dynamic pressure  
| | • Feet of head  
| | • Pounds per square inch (PSI)  
| | • Pressure loss due to friction  
| | • Pipe sizing  
| | • Polyvinyl Chloride (PVC)  
| | • Polyethylene (PE)  
| | • Evapotranspiration (ET)  
| | • Water hammer  
| | • Head to head spacing |
LEARNING TASKS

4. Examine soil, crop and climatic factors that affect irrigation design

   • Soil related terminology
     o Soil texture
     o Saturation point
     o Field capacity
     o Wilting point
     o Available water storage capacity (AWSC)
     o Infiltration rate
     o Slope

   • Measuring soil moisture content
     o Observation of soil and plants
     o Tensiometers
     o Electrical resistance measurements
     o Satellite imaging

   • Summary of relationship of soil to irrigation

   • Crop and climate related terminology
     o Effective crop rooting depth
     o Availability coefficient
     o Maximum soil water deficit
     o Evapotranspiration rate
     o Reference evapotranspiration rate
     o Cop coefficient

   • Calculating maximum irrigation interval and maximum amount applied

5. Examine residential and commercial irrigation components

   • Sprinkler heads
     o Spray heads
     o Rotors
     o Bubblers
     o Quick couplers
     o Low volume emitters

   • Valves
     o Electric remote valves
     o Manual and isolation valves
     o Pressure-regulating valves
     o Backflow preventers
     o Solenoids
     o Valve boxes

   • Controllers
     o Hybrid
     o Electro-mechanical
     o Solid state
LEARNING TASKS

6. Examine installation procedure
   - Trenching vs. pulling pipe
   - Bedding pipe and wiring
   - Backfilling

7. Examine residential and commercial irrigation design
   - Basic water hydraulics
   - Main pressure
     - Pipe friction loss
     - Design flow rate
     - Pipe size
     - Water velocity
     - Surge pressure concerns
   - Design considerations
     - Soil and climate of site
     - Sun and shade problems
     - Plant material
     - Budget
     - Head selection
     - Precipitation rate and infiltration rate
     - Hydro-zones
     - Water meters

8. Examine irrigation components and design principles
   - Valve-in-head vs. block system design
   - Rotor and nozzle selection
   - Head spacing
   - Piping and fittings including swing joints
   - Head levelling

CONTENT

- Multi-programmable
- Wiring and wire connections
- Wireless valves
- Piping and pipe fittings
  - Polyvinyl chloride (PVC) vs. Polyethylene
  - Solvent welding techniques
  - Polyethylene connections including clamps and fusion
  - Pipe repair components
  - Pipe fitting nomenclature
- Micro-irrigation systems
  - Benefits of drip system
  - Components
  - Troubleshooting and maintenance
LEARNING TASKS

CONTENT

• Controller and valve types

Achievement Criteria

Performance  The learner will install a small irrigation system.

Conditions  The learner will be given a set of plans, tools, equipment and materials.

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

  • Performed tasks safely
  • Installed irrigation system according to plans and specifications
  • Pressure tested the system
  • Adjusted sprinkler heads
  • Programmed the timer correctly
Objectives
To be competent in this area, the individual must be able to:
• Install water features using the correct tools, equipment and materials, as per specifications.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select and use tools</td>
<td>• Tools</td>
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<tr>
<td></td>
<td>o Shovels</td>
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<tr>
<td></td>
<td>o Picks</td>
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<tr>
<td></td>
<td>o Chisels</td>
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<tr>
<td></td>
<td>o Wheelbarrows</td>
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<tr>
<td></td>
<td>o Others</td>
</tr>
<tr>
<td>2. Select and use equipment</td>
<td>• Equipment</td>
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<tr>
<td></td>
<td>o Excavators</td>
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<tr>
<td></td>
<td>o Loaders</td>
</tr>
<tr>
<td></td>
<td>o Skid steers</td>
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<tr>
<td></td>
<td>o Others</td>
</tr>
<tr>
<td>3. Prepare to install water features</td>
<td>• Laying out and marking construction area</td>
</tr>
<tr>
<td></td>
<td>• Excavating as required</td>
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<tr>
<td>4. Installing water features</td>
<td>• Placing geotextiles materials according to specifications</td>
</tr>
<tr>
<td></td>
<td>• Placing</td>
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<tr>
<td></td>
<td>o Drains</td>
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<tr>
<td></td>
<td>o Water supply components</td>
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<td></td>
<td>o Filtration systems</td>
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<tr>
<td></td>
<td>o Electrical conduits</td>
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<tr>
<td></td>
<td>• Placing membranes according to specifications</td>
</tr>
<tr>
<td></td>
<td>• Applying adhesives, foams and mortar to secure and seal assembly</td>
</tr>
<tr>
<td></td>
<td>• Completing assembly of</td>
</tr>
<tr>
<td></td>
<td>o Water supply components</td>
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<td></td>
<td>o Filtration systems</td>
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<tr>
<td></td>
<td>o Lighting</td>
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<tr>
<td></td>
<td>• Adding water, running water systems and lighting</td>
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<tr>
<td></td>
<td>• Adjusting water features to ensure optimum performance</td>
</tr>
</tbody>
</table>
LEARNING TASKS

CONTENT

- Adding aggregates and decorative features according to specifications
  - Rocks
  - Garden art
  - Foot bridges
- Verifying and adjusting water flow, sound and aesthetics
- Draining water and cleaning all components
- Refilling water features and adding ecosystem enhancement products as required
  - Beneficial bacteria
  - pH amendments
- Placing aquatic plants as required
- Verifying installation meets specifications

5. Clean-up site

- Repairing any damage that has occurred as a result of construction
- Disposing of and recycling waste materials
Line (GAC): H INSTALLS HARDSCAPE  
Competency: H7 Install low voltage landscape lighting

Objectives
To be competent in this area, the individual must be able to:
- Install low voltage landscape lighting using the correct tools, equipment and materials, as per specifications.

Learning Tasks | Content
--- | ---
1. Select and use tools | • Tools
  - Wire strippers
  - Volt meter
  - Ladders
  - Trenchers
  - Shovels
  - Others
2. Prepare for installation of low voltage landscape lighting | • Digging trenches to required depth
• Storing or removing excavated materials
3. Install low voltage landscape lighting | • Laying out and assembling lighting components according to manufacturers’ specifications and lighting plan
• Verifying operation of the lighting system and checking voltage
• Programming light controller and adjusting fixtures
• Setting lighting for desired effects
4. Cleanup site | • Repairing any damage that has occurred as a result of construction
• Disposing of and recycling waste materials

Achievement Criteria
Performance | The learner will install a small lighting system.
Conditions | The learner will be given a plan, tools, equipment and materials.
Criteria | The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  - Performed tasks safely
  - Installed lighting system according to plans and specifications
Line (GAC): I MAINTAINS SOFTSCAPE
Competency: I5 Demonstrate basic pruning of trees, shrubs, groundcovers and vines

Objectives
To be competent in this area, the individual must be able to:
• Perform basic planting and transplanting techniques.
• Use common arboricultural hand tools to prune trees, shrubs, groundcovers, and vines.

LEARNING TASKS

1. Describe pruning considerations
   • Reasons for pruning trees and shrubs
     o Health and vigour
     o Direct, control, or modify growth
     o Enhancing fruit and flower production
   • Factors affecting the pruning of trees
     o Plant form
     o Function
     o Age
     o Location
     o Timing
     o Pre-pruning treatments
     o Severe pruning
     o Alternatives to pruning
   • Efficiencies while pruning
     o Hand pruning vs. mechanical tools
     o Efficiencies and maintenance standard

2. Review basic plant morphology, anatomy, and physiology with regard to pruning
   • Plant morphology
     o Roots
     o Trunk
     o Crown
     o Branching

3. Demonstrate pruning techniques for young and established trees, shrubs, groundcovers and vines
   • Pruning techniques
     o Pruning cuts
     o Basic steps in pruning trees and shrubs
     o General pruning techniques for canopy cleaning
     o Canopy thinning
     o Canopy raising
     o Canopy reduction
     o Removal
     o Crown balancing
LEARNING TASKS

4. Describe training techniques for young trees
   - Early training for young trees
     - Developing trunk calliper
     - Scaffold spacing
     - Co-dominant stems
     - Root pruning and training

5. Describe timing of pruning ornamentals
   - Plant groups according to growth and flowering habits
   - Other factors that affect pruning time
     - Dormant season
     - Growth response
     - Wind and frost damage
     - Non-dormant pruning
     - Scorch

6. Describe compartmentalization
   - Compartmentalization of decay in trees (CODIT): Resisting decay in trees
   - Callus and wound wood

7. Transplant ornamental woody plants
   - Review transplanting ornamental woody plants
     - Timing: dormant vs. non-dormant transplanting
   - Plant protection during digging and transport
   - Root ball size
   - International Society of Arborists (ISA) caliper guidelines
   - Canadian Nursery Landscape Association (CNLA) Standards for nursery stock
   - Height relationship to calliper by types
   - Planting techniques
     - Site drainage characteristics
     - Planting
     - Air pocket prevention
     - Plant staking
     - Methods of staking
     - One vs. two stakes
     - Guyed staking
     - Duration
     - Materials
LEARNING TASKS

8. Demonstrate safe working practices and operation of common arboricultural equipment and tools

CONTENT

- Safe working practices
  - PPE required
  - Safe working environment
  - Ergonomics
  - Lifting and carrying safety
  - Safely operating power equipment
  - General procedures when operating power equipment

- Maintenance of tools
  - Tool cleaning procedures
  - Pruning equipment
  - Ladders
  - WorkSafeBC

Achievement Criteria

Performance: The learner will demonstrate basic pruning and transplanting techniques.

Conditions: The learner will be given the tools, equipment and materials to perform pruning techniques.

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

- Safely performed tasks
- Pruned trees and shrubs according to industry standards
- Transplanted trees and shrubs according to industry standards
MAINTAINS HARDSCAPE

Competency: J1 Maintain drainage system

Objectives
To be competent in this area, the individual must be able to:
- Describe maintenance requirements for drainage systems.

LEARNING TASKS

1. Describe maintenance requirements for drainage system

CONTENT
- Checking drains to ensure proper operation
- Inspecting and replacing screens to avoid blockage
- Repair and maintenance procedures
  - Ponding
  - Blowouts
  - Washouts
  - Erosion at drain outlet
  - Sediment blockage
  - Root blockage
  - Iron oxide blockage
- Removing debris from drainage system to ensure optimal flow
- Maintaining grades according to original design to allow for adequate flow
- Inspecting performance of drains by flushing drainage systems with water
- Ensuring drain covers are secure
- Winterizing drainage systems
Line (GAC): J MAINTAINS HARDSCAPE
Competency: J2 Maintain walkways, patios, driveways and parking lots

Objectives
To be competent in this area, the individual must be able to:
• Describe maintenance requirements for walkways, patios, driveways and parking lots.

LEARNING TASKS
1. Describe maintenance requirements for walkways, patios, driveways and parking lots

CONTENT
• Visually inspecting structural integrity of hard surfaces for safety and aesthetic reasons
• Removing debris and undesirable growth
• Applying preservatives, stains and sealants on hard surfaces to provide ease of cleaning, longevity and aesthetics
• Repairing wood surface damage
  o Rooting
  o Splintering
  o Cracking
• Topping up jointing sand on interlock surfaces according to manufacturers’ specifications
• Repairing damage to aggregate-based hard surfaces
  o Paving stones
  o Gravel
  o Asphalt
  o Concrete
**Program Content**
**Level 3**

**Line (GAC):** J  MAINTAINS HARDSCAPE

**Competency:** J3  Maintain irrigation systems

**Objectives**
To be competent in this area, the individual must be able to:
- Describe maintenance procedures.
- Describe requirements for irrigation system start-up and maintenance.
- Describe irrigation system auditing and scheduling procedures.

**LEARNING TASKS**

<table>
<thead>
<tr>
<th>1. Describe maintenance procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Head repair and replacement</td>
</tr>
<tr>
<td>• Nozzle damage</td>
</tr>
<tr>
<td>• Pipe repairs</td>
</tr>
<tr>
<td>• Valve electrical problems</td>
</tr>
<tr>
<td>• Waterproof wire connectors</td>
</tr>
<tr>
<td>• Controller programming errors</td>
</tr>
<tr>
<td>• Winterization for cool climates</td>
</tr>
<tr>
<td>• Spring start up procedures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Describe irrigation system auditing and scheduling procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Irrigation system scheduling</td>
</tr>
<tr>
<td>o Irrigation Industry Association of BC worksheets</td>
</tr>
<tr>
<td>o Controller programs</td>
</tr>
<tr>
<td>o Effects on plant health</td>
</tr>
<tr>
<td>o By-law issues</td>
</tr>
<tr>
<td>• Irrigation system auditing</td>
</tr>
<tr>
<td>o Benefits of irrigation system efficiency</td>
</tr>
<tr>
<td>o Lower quarter distribution uniformity</td>
</tr>
<tr>
<td>o Scheduling coefficient</td>
</tr>
<tr>
<td>o Basic auditing kit requirements</td>
</tr>
<tr>
<td>o Procedures to determine sprinkler head pressure on site</td>
</tr>
<tr>
<td>o Practical auditing procedures including head spacing and levelling</td>
</tr>
</tbody>
</table>

**CONTENT**

- Head repair and replacement
- Nozzle damage
- Pipe repairs
- Valve electrical problems
- Waterproof wire connectors
- Controller programming errors
- Winterization for cool climates
- Spring start up procedures

- Irrigation system scheduling
  - Irrigation Industry Association of BC worksheets
  - Controller programs
  - Effects on plant health
  - By-law issues

- Irrigation system auditing
  - Benefits of irrigation system efficiency
  - Lower quarter distribution uniformity
  - Scheduling coefficient
  - Basic auditing kit requirements
  - Procedures to determine sprinkler head pressure on site
  - Practical auditing procedures including head spacing and levelling
LEARNING TASKS

3. Describe irrigation system winterization and spring start-up

CONTENT

- Winterizing a residential/commercial irrigation system
  - Air compressor requirements
  - Safety around compressors
  - Air hose connection to irrigation system
  - Compressor pressure recommendations for safe blow-out
  - Valve consideration for over-wintering including back-flow preventers

- Spring start up procedures
  - Recommended water velocity when re-filling lines
  - Head and nozzle maintenance
  - Pipe repairs
  - Adjusting pressure-regulating valves
  - Controller schedule
Objectives
To be competent in this area, the individual must be able to:
• Describe maintenance requirements for landscape lighting.

LEARNING TASKS
1. Describe maintenance requirements for landscape lighting

CONTENT
• Turning on system to detect defects
• Visually checking light fixtures, fuses and transformers for function and damage, and repairing and replacing as required
• Repairing low-voltage wiring
• Checking and adjusting lighting coverage and positioning
• Cleaning and clearing sensor to ensure optimum operation
• Checking lighting timing and adjusting program according to seasonal requirements
Line (GAC): J MAINTAINS HARDSCAPE
Competency: J5 Maintain water features

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

- Describe maintenance requirements for water features.

LEARNING TASKS
1. Describe maintenance requirements for water features

CONTENT
- Inspecting water features for defects
  - Cracks
  - Leaks
  - Plugged filters
  - Faulty gaskets and seals
- Charging systems to prime pumps and starting up operation for the season
- Setting and re-setting timers according to manufacturers’ specifications
- Cleaning components
  - Filters
  - Screens
  - Nozzles
  - Pumps
- Running systems to ensure functioning according to manufacturers’ specifications
- Inspecting water for conditions
  - Lack of clarity
  - Presence of algae
  - Floating debris
- Testing water for conditions
  - pH levels
  - Presence of bacteria
- Draining and refilling features for seasonal maintenance
- Cleaning basins manually and/or with aquatic cleaning products
- Removing and protecting plants and fish during winter or when cleaning the features if required
- Winterizing by disassembling, covering and draining to avoid damage
- Disconnecting feature components and storing according to manufacturers’ specifications
- Cleaning fountains by draining water and washing features
Line (GAC): J  MAINTAINS HARDSCAPE
Competency: J6  Maintain steps and retaining walls

Objectives
To be competent in this area the individual must be able to:
• Describe maintenance requirements for steps and retaining walls.

LEARNING TASKS
1. Describe maintenance requirements for steps and retaining walls

CONTENT
• Inspecting steps and walls to detect defects that require remediation
• Performing minor repairs
  o Replacing cracked stones
  o Replacing rotting timber
• Cleaning steps and walls using tools and equipment
  o Pressure washers
  o Brooms
• Sealing steps and retaining walls as required
Line (GAC): J MAINTAINS HARDSCAPE
Competency: J7 Maintain landscape structures

Objectives
To be competent in this area, the individual must be able to:
• Describe maintenance requirements for landscape structures.

LEARNING TASKS
1. Describe maintenance requirements for landscape structures

CONTENT
• Inspecting structures for defects
  o Peeling paint
  o Rotting wood
  o Heaving and settling
• Performing minor repairs
  o Replacing rotting and cracked lumber
  o Levelling structures
  o Staining or painting wood structures
• Recognizing hazards of structures and taking appropriate action
Level 4

Landscape Horticulturist
Program Content
Level 4

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

2. Demonstrate hand tool maintenance

3. Demonstrate power tool maintenance

CONTENT

• (see the list of Tools and Equipment for Level Four, 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.
Program Content  
Level 4

Line (GAC): B  USES AND MAINTAINS TOOLS AND EQUIPMENT  
Competency: B6  Transport equipment

Objectives
To be competent in this area, the individual must be able to:
- Load equipment and attachments safely and according to the authorities having jurisdiction.
- Transport equipment and attachments safely and according to the authorities having jurisdiction.
- Unload equipment and attachments safely and according to the authorities having jurisdiction.

<table>
<thead>
<tr>
<th>LEARNING TASKS</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Discuss loading equipment and attachments</td>
<td>Review Level Three B6 - Transport equipment</td>
</tr>
</tbody>
</table>
| 2. Transport equipment and attachments | Determining route from shop to worksite for hauling in advance  
  o Heavy hauling  
  o Weight and height restrictions  
  Following road closure procedures as necessary  
  Complying with licensing requirements for transporting equipment and attachments |
| 3. Discuss unloading equipment and attachments | Review Level Three B6 - Transport equipment |
Line (GAC): C ORGANIZES WORK
Competency: C7 Order plants and materials

Objectives
To be competent in this area the individual must be able to:
• Describe the process for ordering plants and materials.

LEARNING TASKS

1. Identify required materials
   • Types of materials
   • Size
   • Quality
   • Quantity

2. Ensure accuracy of ordering
   • Using botanical nomenclature when ordering plant material

3. Keep records
   • Order number
   • Tracking number
   • Name of supplier

4. Compare prices
   • Budget purposes

5. Determine times and dates
   • Delivery
   • Pick up
Line (GAC): D PARTICIPATES IN MARKETING AND SALES
Competency: D2 Sell product and services

Objectives
To be competent in this area the individual must be able to:
• Describe selling products and services.

LEARNING TASKS
1. Describe selling products and services

<table>
<thead>
<tr>
<th>CONTENT</th>
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<tbody>
<tr>
<td>• Advising and educating clients</td>
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<tr>
<td>o Plants</td>
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<tr>
<td>o Products</td>
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<tr>
<td>o Services</td>
</tr>
<tr>
<td>• Directing customers to seasonal purchases</td>
</tr>
<tr>
<td>• Up-selling additional products and services to clients</td>
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<tr>
<td>• Visually displaying products and services in an attractive way</td>
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<tr>
<td>• Handling payments for products and services</td>
</tr>
<tr>
<td>• Writing invoices, calculating taxes and issue receipts for payment</td>
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<tr>
<td>• Communicating with existing customers to advise of special</td>
</tr>
<tr>
<td>o Products</td>
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<tr>
<td>o Prices</td>
</tr>
<tr>
<td>o Services</td>
</tr>
<tr>
<td>• Distributing advertising material to clients</td>
</tr>
</tbody>
</table>
Line (GAC): D PARTICIPATES IN MARKETING AND SALES
Competency: D3 Maintain customer relations

Objectives
To be competent in this area, the individual must be able to:
• Describe methods of maintaining good customer relations.

LEARNING TASKS
1. Describe methods of maintaining good customer relations

CONTENT
• Addressing client’s concerns with tact and politeness
• Practicing good public relations by acknowledging regular clients
• Maintaining customer record information
  o Address
  o Phone number
  o Email
  o Product preferences
• Providing after-service follow-up
• Distributing product service information to clients
Line (GAC): D PARTICIPATES IN MARKETING AND SALES

Competency: D4 Prepare estimates for basic landscape installation projects

Objectives
To be competent in this area, the individual must be able to:
• Prepare estimates for basic landscape installation projects.

**LEARNING TASKS**

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LEARNING TASKS

4. Calculate additional costs

5. Other consideration in preparing final bid for a landscape project

6. Describe various types of risk management strategies used in the landscape industry

7. Communicate with others to discuss project logistics

CONTENT

- Soil, gravel, other fill materials
- Sod or grass areas
- Planting areas
- Hard landscape materials

- Calculation process
  - Labour and equipment
  - Sub-trades
  - Transportation
  - Safety program
  - Contingencies
  - Surcharges
  - Accommodations

- Other related costs within an estimate
  - Overhead
  - Risk
  - Profit

- Preparing final bid document
- Access to various areas on site
- Final submission date

- Managing risk
  - Customer/public risk
  - Onsite injury

- Types of insurance coverage
  - Commercial property coverage
  - Commercial vehicle policies
  - General liability insurance
  - Other insurance

- Bonding
  - Using of bonds for risk management

- Using Liens in risk management

- Communicating with others
  - Contractors
  - Suppliers
  - Employers

- Logistics
  - Skill requirements
  - Machinery

- Products
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 plant and plant requirements for 90 woody and non-woody plants.
• Recognize plants suitable for common tropical, floral and interior landscape situations.

LEARNING TASKS

1. Identify plant and plant requirements
   • Review of Level One and Level Two E1 competency
     o Range of plant materials commonly used in commercial horticulture
     o Correct naming and plant identification terminology
     o Plant families
     o Using a dichotomous key for plant identification
     o Plant hardiness zones
     o Plants suitable for planting in difficult situations
     o Identifying weeds and invasive plants
     o Recognizing bud, bark, foliage, flower, and fruit characteristics

2. Describe examples of native trees, shrubs, groundcovers, perennials, biennials, and annuals common to the horticulture industry
   • Commercial landscaping
   • Nursery production

3. Describe examples of seasonal crops
   • Common to the ornamental horticulture industry

4. Identify and describe 90 woody and non-woody plants
   • Using botanical terms
   • According to its cultural and maintenance requirements
Program Content
Level 4

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:
• Review basic principles of IPM.
• Discuss social and political implications of pest management in landscapes.
• Describe the impacts of exotic and invasive pests in the landscape.
• Plan an IPM program for a landscape.

LEARNING TASKS

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1. Discuss principles of IPM

2. Discuss the social and political implications of pest management in landscapes

3. Describe exotic pests

4. Examine IPM example – aphid control on urban trees

CONTENT

• Federal pesticide regulations
• Provincial pesticide regulations
• Municipal pesticide regulations
• Considerations in pest management
  • Economic and aesthetic
  • Environmental
  • Social

• Exotic pests
• Invasive plants
• Regulated pests

• Program goal
• Site
• Crop-pest system
• Target pest
• IPM program
  • Pest monitoring
  • Cultural control
  • Biological control
  • Chemical control
  • Evaluation
  • Social consideration
LEARNING TASKS

5. Plan an IPM program for a landscape

CONTENT

- Developing an IPM program
  - Goals
  - Worksite
  - Landscape-pest systems
  - Types of pest damage
  - Costs of control vs. economic/aesthetic losses
  - Thresholds and monitoring
  - Pulling strategies together
  - Calculating risks
  - Evaluating IPM program

- Implementing IPM program
  - Phase I: Monitoring pest population levels
  - Phase II: Modify spray control programs
  - Phase III: Include biological control

Achievement Criteria 1

Performance The learner will develop an IPM program outline.

Conditions The learner will be given:
  - IPM program outline heading (from instructor)
  - Reference materials

Criteria The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  - The scope of the IPM program should have included a significant problem for the landscape, and be reasonable in complexity for this project
  - The site of the IPM program has been adequately described
  - The major pests have been selected, and the types of damage and control measures listed
  - Potential control methods including physical, cultural, chemical and biological methods have been listed

Achievement Criteria 2

Performance The learner will use the IPM proposal prepared in Achievement Criteria 1 and the outline provided by the instructor, to develop an overview of the scope of the report.

Conditions The learner will be given:
  - IPM program outline heading (from instructor)
  - Reference materials

Criteria The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  - The topic has been covered adequately, with enough detail or explanations
  - The dynamic aspects of the program have been made clear
  - The program integrated many control methods in a complementary fashion
- The program had practical significance for the worksite
- The program researched many alternative methods for pest control, identified those which fit into the program and explained why other methods are not to be employed
- The IPM program listed potential risks, with recommended solutions
- Sociological considerations were briefly introduced
- Resource list showed appropriate breadth for the topic, including personnel used as resources, books, Ministry information, etc.
Line (GAC): F PERFORMS PRE-CONSTRUCTION ACTIVITIES
Competency: F4 Examine the principles of garden design and participate in basic landscape design activities

Objectives
To be competent in this area, the individual must be able to:
● Describe the principles of garden design.
● Participate in basic landscape design activities.

LEARNING TASKS

1. Examine influential historical and cultural landscape styles
   • Formal vs. informal
   • Historical and cultural influences
   • Contemporary styles

2. Examine sustainable approaches of design and contemporary gardens
   • Xeriscaping
   • Rain garden approach
   • Green roofs
   • Maintenance considerations
   • Use of native plants in the landscape
   • Role of the International Gardens Festivals

3. Describe the elements and principles of design
   • Using the elements and principles of design
     o Simplicity and variety
     o Balance
     o Interconnection
     o Similarity

4. Describe the design elements of line, form, and texture
   • Visual elements of design
     • Line
     • Symmetrical balance
     • Asymmetrical balance
     • Sequence
     • Rhythm
     • Proportion
     • Emphasis

5. Describe the principles of design: unity, balance, sequence, rhythm and proportion
   • Visual principles of design
     • Unity
     • Repetition
     • Split complementary colour scheme
     • Monochromatic colour schemes
     • Analogous colour schemes
## LEARNING TASKS

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### 6. Describe the design process including research and preparation phase

- Creativity and the design process
- Project research and preparation
  - Client consultation
  - Presenting the portfolio
  - Available services and fees
  - Proposal for design services
- Site study: Site plan and analysis
  - Gathering data
  - Making the site measurements
  - Recording measurements for the site plan
  - Site analysis
  - Design program

### 7. Examine the functions of the site and development of plan

- The purpose of functional diagrams
- Outdoor use areas
- The concept of outside rooms
- Recreation space
- Outdoor work or service area

### 8. Examine preliminary design

- Form composition
- Functional contributions of plants in the landscape
- Selecting the right plant for the right place on the site
- Plant availability
- Suitable exposure
  - Macroclimate
  - Microclimate
  - Soil conditions
LEARNING TASKS

9. Describe the master plan and construction drawings

10. Describe maintenance and evaluation

11. Participate in basic landscape design activities

CONTENT

- Plant characteristics
- Cultural requirements and site suitability: growth and maintenance
- Plant spacing

- Structures
  - Fences and walls
  - Overhead structures
  - Walkways, paths and driveways
  - Structures: Materials and maintenance

- Master plan and working drawings
  - Master plan
  - Construction documentation
  - Layout plan
  - Grading plan
  - Planting plan
  - Irrigation plan
  - Lighting plan
  - Construction detail drawings

- Maintenance
- Evaluation

- Selecting tools
  - Builder’s level/transit
  - GPS
  - Measuring wheels
  - Others

- Measuring and inventorying existing site conditions to provide information to the design team

- Providing detail support to design team for construction plan

- Using design principles to apply creative interpretation of the landscape plan

Achievement Criteria

Performance
The learner will create a design for a garden bed.

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

Criteria
The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
- Produced a design for a garden bed incorporating the principles of texture, colour, form, and scale
Line (GAC): G    INSTALLS SOFTSCAPE
Competency: G1 Install erosion control materials

Objectives
To be competent in this area, the individual must be able to:
• Install erosion control materials using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS
1. Select and use tools
   • Tools
     o Shovels
     o Post pounders
     o Knives
     o Others

2. Select and use equipment
   • Equipment
     o Augers
     o Trenchers
     o Loaders
     o Others

3. Install erosion control material
   • Moving specified erosion control material into desired location
   • Laying out and applying erosion control material
   • Securing placement of erosion control material to ensure performance
   • Verifying that erosion control installation meets specifications and is ready for next phase

Achievement Criteria
Performance  The learner will install erosion control material.
Conditions   The learner will be given appropriate tools and equipment.
Criteria     The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
              • Performed all tasks in a safe manner
              • Selected and used appropriate tools and equipment
              • Installed erosion materials as specified
Program Content  
Level 4

Line (GAC): G INSTALLS SOFTSCAPE
Competency: G2 Install growing media

Objectives
To be competent in this area, the individual must be able to:
• Install growing media using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools

   • Tools
     o Shovels
     o Picks
     o Rakes
     o Wheelbarrows
     o Others

2. Select and use equipment

   • Equipment
     o Skid steers
     o Loaders
     o Excavators
     o Others

3. Install growing media

   • Verifying drainage systems are effective and functioning
   • Scarifying sub-soil with mechanical and manual tools and equipment
   • Moving growing media into desired location
   • Adding growing media in lifts and irrigate as specified
   • Adding and incorporating amendments
     o Fertilizers
     o Composts
     o Peat moss
   • Verifying degree of growing media compaction
   • Grading growing media by mechanical and manual raking to grading-elevation
   • Verifying growing media depth and elevation meeting specifications and are ready for next phase
Program Content  
Level 4

Line (GAC): G INSTALLS SOFTSCAPE
Competency: G3 Describe installation of interior landscape plants

Objectives
To be competent in this area, the individual must be able to:
• Describe installation requirements for interior landscape plants.

LEARNING TASKS

1. Select tools
   • Tools
     o Tree dollies
     o Shovels
     o Rakes
     o Others

2. Select equipment
   • Equipment
     o Skid steers
     o Tree gantries
     o Others

3. Describe preparation of plant materials
   • Foliar washing
   • Scarifying root ball
   • Managing nutrient balance

4. Describe installation of interior landscape plants
   • Monitoring plant health throughout installation process
   • Moving plant materials to desired location
   • Laying out plant materials according to plan
   • Planting interior landscape plants according to specifications
   • Pruning plants as required
   • Verifying moisture content of growing media to ensure adequate irrigation
   • Verifying plant installation meets specifications and is ready for next phase
   • Protecting interior furnishings and surfaces
Line (GAC): G  INSTALLS SOFTSCAPE
Competency: G4  Install turf from seed

Objectives
To be competent in this area, the individual must be able to:
• Install turf from seed using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools

   • Tools
     o Rollers
     o Landscape rakes
     o Seed spreaders
     o Others

2. Select and use equipment

   • Equipment
     o Hydro-seeders
     o Seed drills
     o Tractors and attachments
     o Others

3. Describe turfgrass functions and standards for quality

   • Functions of lawns
     o Recreational use
     o Aesthetic use
     o Environmental function
   • Turf quality
     o Visual turf quality
     o Functional turf quality

4. Describe turfgrass nutrition and application technology

   • Nutrition and soil amendments
     o Roles of nitrogen, phosphorous and potassium
   • Selection of fertilizer products
     o Coated fertilizers
     o Synthetic organic sources/natural organic sources
   • Fertilizer calculations
     o Cost of nutrient/product and cost of nutrient/site
     o Application technology
     o Calibration of drop rotary spreaders
LEARNING TASKS

5. Describe turf grass and water use

- Water use
  - Water use characteristics in common turfgrass
  - Turfgrass with drought resistance ranking
- Symptoms of water stress
- Irrigation monitoring strategies

6. Describe turfgrass selection and identification

- Basic turfgrass physiology
  - Photosynthesis
  - Respiration
  - Growth
  - Storage
- Common turfgrass species
  - Turfgrass morphology
  - Introduction key
  - Perennial ryegrass
  - Annual ryegrass
  - Annual bluegrass
  - Kentucky bluegrass
  - Fine fescues
  - Creeping bentgrass
  - Colonial bentgrass
  - Turf mixtures and blends
  - Using a seed key
- Seed quality
  - The national turfgrass evaluation program
  - Certified and common seed
  - Seeds Act
  - Seed germination
  - Seed purity
  - Calculating pure live seed (PLS)

7. Install turf grass seed

- Verifying seed selection meets specifications
- Calculating and verifying seed distribution will result in uniform turf visual inspection and correct as required
- Verifying seedbed is prepared to specifications
- Using landscape rollers to ensure seed is in direct contact with growing media
Achievement Criteria

Performance: The learner will install turf grass from seed.

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

Criteria: The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  - Selected and used appropriate tools and equipment
  - Installed seed according to specifications
Line (GAC): G INSTALLS SOFTSCAPE
Competency: G5 Install exterior landscape plants

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

• Install exterior landscape plants using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools
   - Tools
     o Tree dollies
     o Shovels
     o Rakes
     o Others

2. Select and use equipment
   - Equipment
     o Tree spade
     o Boom trucks
     o Skid steers and attachments
     o Others

3. Prepare plant materials
   - Removal of containers
   - Scarifying root ball
   - Managing nutrient balance

4. Install exterior landscape plants
   - Monitoring plant health throughout installation process
   - Moving plant materials to desired location
   - Laying out plant materials as per plan
   - Planting, staking and guying plant materials as specified
   - Pruning plant materials as required
   - Verifying moisture content of growing media to ensure adequate irrigation
   - Verifying plant installation meets specifications and ready for next phase
Program Content
Level 4

Achievement Criteria

Performance  The learner will install exterior landscape plants.
Conditions  The learner will be given appropriate materials, tools and equipment.
Criteria  The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  • Performed all tasks in a safe manner
  • Selected and used appropriate tools and equipment
  • Monitored plant health throughout installation process
  • Moved plant materials to desired location
  • Laid out plant materials as per plan
  • Planted, staked and guyed plant materials as specified
  • Pruned plant materials as required
  • Verified moisture content of growing media to ensure adequate irrigation
  • Verified plant installation meets specifications and ready for next phase
Line (GAC): G INSTALLS SOFTSCAPE
Competency: G6 Install sod

Objectives
To be competent in this area, the individual must be able to:
• Install sod using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools
   - Tools
     • Rollers
     • Landscape rakes
     • Sod knives
     • Others

2. Select and use equipment
   - Equipment
     • Rollers
     • Tractors and attachments
     • Others

3. Install sod
   - Verifying area to be sodded is prepared according to specifications
     • Grading
     • Landscape standards
     • Calculate material requirements
   - Verifying selected sod meets specifications
   - Laying sod to prepared area according to specifications
     • Securing sod using stakes as required
     • Using landscape rollers to ensure sod is in direct contact with growing media
   - Monitoring sod regularly to ensure irrigation meets established requirements

Achievement Criteria

Performance The learner will install sod.

Conditions The learner will be given plans, tools, equipment and materials.

Criteria The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
• Verified area to be sodded is prepared according to specifications
• Verified selected sod meets specifications
• Laid sod to prepared area according to specifications
• Monitored sod regularly to ensure irrigation met established requirements
Line (GAC): G  INSTALLS SOFTSCAPE
Competency: G7  Install mulch

Objectives
To be competent in this area, the individual must be able to:
• Install mulch using the correct tools, equipment and materials, as per specifications.

LEARNING TASKS

1. Select and use tools
   • Tools
     o Wheelbarrows
     o Landscape rakes
     o Pitchforks
     o Others

2. Select and use equipment
   • Equipment
     o Skid steers
     o Blower trucks
     o Loaders
     o Others

3. Install mulch
   • Verifying area to be mulched is prepared according to specifications
   • Verifying mulch materials meet specifications
     o Wood
     o Aggregates
     o Composts
   • Applying mulch according to specifications
   • Verifying mulch installation meets specifications

Achievement Criteria
Performance
The learner will install mulch.

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

Criteria
The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
• Performed all tasks in a safe manner
• Selected and used appropriate tools and equipment
• Verified area to be mulched was prepared according to specifications
• Verified mulch materials meet specifications
• Applied mulch according to specifications
### Line (GAC):

**I** MAINTAINS SOFTSCAPE

**Competency:** I1 Maintain growing media

### Objectives

To be competent in this area, the individual must be able to:
- Discuss inspections, assessments, and cultivation of growing media.
- Discuss collecting soil and water samples for lab testing.
- Discuss interpretation of lab testing results and amendments to growing media.

### LEARNING TASKS

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</table>
| **1. Discuss visually inspecting growing media and plants** | • Signs of and symptoms of health  
  • Determining needs of growing media and plants |
| **2. Discuss assessing growing media composition for conditions** | • Texture  
  • Moisture levels  
  • Porosity  
  • Tools  
    o Probes  
    o Ribbon tests |
| **3. Discuss cultivating growing media** | • Tools  
  o Garden fork  
  o Cultivator  
  o Hoe  
  o Others  
  • Reasons for cultivating growing media  
    o Aeration  
    o Weed control  
    o Maintenance of growing media structure |
| **4. Discuss collecting and interpreting soil and water samples** | • Sending samples to the lab to determine  
  o Fertility levels  
  o Deficiency levels  
  • Interpreting lab results  
  • Determining growing media amendments as required |
| **5. Discuss amending growing media** | • Maintaining optimum growing conditions |
Line (GAC): I MAINTAINS SOFTSCAPE
Competency: I2 Maintain and schedule maintenance for grass/turf

Objectives
To be competent in this area, the individual must be able to:
• Maintain and schedule maintenance for grass/turf according to specifications.

LEARNING TASKS

1. Describe turfgrass cultivation

   • Cultivation
   • Aeration
   • Aeration equipment
   • When to aerate
   • Topdressing
   • Thatch removal (de-thatching)
   • Power raking equipment

2. Describe maintenance scheduling for residential lawns

   • Mowing frequency and height of cut
   • Length of maintenance season
   • Maintenance and fertilization
   • Soil quality and testing
   • Secondary operations of maintenance (mechanical maintenance/cultivation)
     o Thatch control
     o Alleviating soil compaction by aerating
     o Topdressing (organic/aggregate)

3. Describe maintenance scheduling for commercial and posts turf sites

   • Mowing
   • Fertilization
   • Cultural management
LEARNING TASKS

4. Describe trouble shooting turf problems

CONTENT

• Visual inspection
  o Colour
  o Thinning
  o Grades
  o Drainage

• Performing growing media analysis to determine substrate conditions

• Species selection
  o Growth habit consideration
  o Site exposure conditions
  o Wear and tolerance

• Managing non-irrigated sites

• Construction and grow-in challenges
  o Poor quality materials
  o Irrigation and drainage repairs
  o Poor turfgrass quality after grow-in

• Maintenance and cultivation concerns
  o Budget constraints
  o Client demands
  o Timing of operations
  o Specific wear sites on the turfgrass

• Sports turf and golf turf problems
  o Divot repair
  o Patching small damaged areas
  o Poor mowing quality
  o Sand based root zone concerns

• Mowing quality concerns
  o Sharpening and adjusting cutting units
  o Mower sanitation

• Water management
  o Timing of irrigation
  o Poor irrigation coverage
  o Traffic on water stressed turfgrass
  o Overwatering and saturate soil

• Renovation and repair

5. Describe turfgrass pest management

CONTENT

• Pest management
  o Abiotic pests
  o Biotic pests
**LEARNING TASKS**

6. Describe turfgrass propagation methods

**CONTENT**

- Seeding
  - Seedbed preparation
  - Amendments
  - Seeding
- Overseeding
  - Equipment
- Sodding
  - Sodding vs. seeding
  - Site preparation
  - Sod laying techniques
  - Sod quality
- Hydroseeding
  - Site preparation
  - Application equipment
- Minimum depth of growing media for turf installation
- Soil quality concerns
- Post planting care
  - Establishment

**Achievement Criteria**

Performance  The learner will create a maintenance plan for grass/turf.

Conditions  The learner will be provided with a site.

Criteria  The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
  - Assessed the site
  - Identified problems
  - Created a maintenance plan
Line (GAC): I MAINTAINS SOFTSCAPE
Competency: I3 Maintain interior softscape

Objectives
To be competent in this area, the individual must be able to:
• Identify interior softscape plants and their needs.
• Maintain interior softscape plants as required.

LEARNING TASKS

1. Identify interior plants and their needs
   - Water
   - Light
   - Nutrients

2. Identify pests and diseases
   - Types
   - Causes

3. Discuss performing visual inspection
   - Determining plant health

4. Describe irrigating and fertilizing plants
   - According to plant needs
     - Manual
     - Automated methods

5. Describe cleaning foliage and containers
   - Aesthetics
   - Plant health

6. Describe pruning plants
   - For reasons such as
     - Dead, disease, damage and interfering (D,D,D,I)
     - Plant health growth control
     - Aesthetics

7. Discuss transplanting plants
   - For reasons such as
     - Growth control
     - Relocation of plants
     - Prevention of root girdling

8. Describe dividing plants
   - For reasons such as
     - Reducing plant size
     - Propagating and improving aesthetic value and vigor

9. Describe mulching interior beds and containers
   - For reasons such as
     - Moisture retention
LEARNING TASKS

10. Describe performing seasonal plant rotation

11. Describe protecting furnishings and surfaces

CONTENT

- Weed suppression
- Growing media temperature moderation
- Aesthetics

- For reasons such as
  - Health
  - Aesthetics

- Barricades
- Tape
- Surface applications
Program Content
Level 4

Line (GAC): I MAINTAINS SOFTSCAPE

Competency: I4 Maintain exterior softscape

Objectives
To be competent in this area, the individual must be able to:
• Identify exterior softscape plants and their needs.
• Maintain exterior softscape plants as required.

LEARNING TASKS

1. Identify exterior plant and their needs
   - Water
   - Light
   - Nutrients

2. Identify pests and diseases
   - Types
   - Causes

3. Perform visual inspection
   - Determine plant health

4. Describe irrigating and fertilizing plants
   - According to plant needs
     o Manually
     o Automate methods

5. Describe cultivating growing media
   - Tools
     o Garden fork
     o Cultivator
     o Others
   - For reasons such as
     o Aeration
     o Weed control
     o Maintenance of growing media structures

6. Describe pruning plants
   - For reasons such as
     o Dead, disease, damage and interfering (D,D,D,I)
     o Plant health growth control
     o Aesthetics

7. Describe transplanting plants
   - For reasons such as
     o Growth control
     o Relocation of plants
     o Prevention of root girdling
### LEARNING TASKS

<table>
<thead>
<tr>
<th>Task</th>
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<tr>
<td>8. Describe dividing plants</td>
<td>- For reasons such as</td>
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<td>o Reducing plant size</td>
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<td>o Propagate and improve aesthetic value and vigor</td>
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<td>9. Describe performing seasonal planting and removal of plants</td>
<td>- Annuals</td>
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<td>- Biennials</td>
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<td>10. Describe applying seasonal protection or hardening-off practices to ensure plant survival through winter</td>
<td>- Select media</td>
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<td>- Ground cover</td>
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<td>12. Describe mulching beds and containers</td>
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<td>o Growing media temperature moderation</td>
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<td>o Aesthetics</td>
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<td>13. Describe edging beds</td>
<td>- For reasons such as</td>
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<td>o Bed definition</td>
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<td>14. Describe site cleanup</td>
<td>- Litter pickup</td>
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<td></td>
<td>- Removing excess clippings</td>
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<td>- Clean sidewalks</td>
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<td>15. Describe repairing or removing staking and guying materials to prevent plant damage</td>
<td>- As required</td>
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<td></td>
<td>- Materials</td>
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</tbody>
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### Achievement Criteria

**Performance**  
The learner will create a maintenance plan for an exterior softscape.

**Conditions**  
The learner will be provided with a site.

**Criteria**  
The learner will score a passing grade of 70% or better on a rating sheet according to the following criteria:
- Assessed the site
- Identified problems
- Created a maintenance plan
Line (GAC): I MAINTAINS SOFTSCAPE
Competency: I6 Describe cultural management of trees, shrubs, groundcovers and vines

Objectives
To be competent in this area, the individual must be able to:
- Discuss the cultural management of woody plants in the landscape.
- Examine techniques used to diagnose common problems in ornamental plants in the landscape.
- Discuss tree preservation, winter protection, and hazard abatement practices for woody ornamental plants.

LEARNING TASKS

1. Identify the value of trees in the landscape
   ▪ Environmental and social functions of trees
   ▪ Energy conservation, pollution abatement, and storm control properties of plants in the landscape
   ▪ Economic value of trees in landscape sites

2. Examine the land development process and the impacts of construction on woody plants
   ▪ Impacts on surrounding plant growth from
     o Planning
     o Design
     o Grading and construction
     o Maintenance on trees

3. Explain the goals of tree preservation
   ▪ How the long-term health and survival of trees is dependent upon the patterns of tree growth and development, and preventing injury

4. Recognize plant problems
   ▪ Identifying patterns of common damage to ornamental plant material and developing a diagnostic checklist for plants
   ▪ Common tools used by arborists to diagnose plant problems

5. Identify hazard trees
   ▪ What constitutes a hazard tree
   ▪ Factors contributing to tree failure
     o Structural defects
     o Plant species
     o Size
     o Age
     o Site conditions
   ▪ How past maintenance practices can impact the development of disorders leading to decline
LEARNING TASKS

6. Describe landscape maintenance practices that prevent disorder, disease, and decline of woody plant material

CONTENT

- Performing landscape functions on woody plants in the landscape
  - Edging
  - Fertilizing
  - Mulching
  - Irrigating
  - Weeding
  - Pruning
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
- 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 Two

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 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
  - 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
LEVEL THREE

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 Three

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
  - 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 live ‘in situ’ plant material for pruning
- Access to plant material for planting and staking
- Landscape plans and specifications
- Access to installation site
- Access to installation supplies (for hardscapes)
- Access to appropriate site for installations and maintenance of irrigation and drainage
- Range of landscape design periodicals
LEVEL FOUR

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 Four

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
  - pH meters
  - Soil sampling equipment
Program Content
Section 4

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 live ‘in situ’ plant material for pruning
- Access to plant material for planting and staking
- Landscape plans and specifications
- Range of landscape design periodicals
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
- 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
Shop Equipment

Motorized Equipment

- 3-reel turf mower
- Backhoe
- Baggers for leafs
- Blowers (backpack, hand held, push, earthauger)
- 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

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
LEVEL THREE

Shop Equipment

Motorized Equipment

- Bale breaker
- 3-reel turf mower
- Backhoe
- Bagger for leaves
- Blowers (backpack, hand held, push, earth auger)
- Brush cutter
- Chipper
- Clearing saw
- Conveyor belt
- Edgers
- Electric powered utility vehicle
- Elevated work platforms
- Excavator
- De-thatcher
- Flat filler
- Fork lift
- Front-end loader
- Gas powered utility vehicle (Gator)
- Generators
- Guillotine
- Hedge trimmer (extension, long reach)
- Lawn/weed trimmers (gas & electric)
- Man lift
- Mortar mixer
- Plate compactor
- Plate tamper
- Pot filler
- Powered rollers
- Pressure washer
- Pumps
- Ram compactor (jumping jack)
- Riding mowers/mulchers
- Skid-steer loader
- Sod cutter
- Soil screener
- Spider
- Steam jenny
- Sterilizers
- String trimmer
- Tractors
- Trencher (irrigation)
- 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
• Circular saw
• Compressor
• Concrete saw (dry, wet)
• Demolition hammer (electric)
• Demolition hammer (pneumatic)
• Electric drill
• Fertilizer injector
• Grinder
• Hammer drill
• Heat gun
• Mitre/chop saw
• Mortar/cement mixer
• Mower/mulcher
• Powder-actuated tools
• Power auger
• Power cultivator (rototiller)
• Power sprayer
• Powered wheel barrow
• Reciprocating saw
• Sabre saw
• Table saw
• Torch
• Trencher
• Vacuum (wet/dry, leaf)
• Walk-behind aerator
• Wet saw

Standard Hand Tools

• Axes
• Backpack sprayer
• Boxcutters
• Brick carriers
• Brick splitter
• Brooms
• Builder’s level
• Bulb planters
• Cart
• Chains
• Chisels
• Clay pick
• Clearing axes
• Core samplers (probe)
• Crimpers
• Crowbars
• Cultivator (manual)
• De-thatching rake
• Dolly
• Files
• Flags
• Garden forks
• Grease guns
• Hammers (hand, sledge)
• Hand plane
• Handsaws (cross cut, back, pruning, sod)
• Hand tamper
• Handheld watering equipment
• Ladders (step, extension, orchard)
• Landscape rakes
• Loppers
• Mallet
• Microscope
• Paving stone cart
• Paving stone cutter
• Paving stone extractor
• Picks
• Pick axes
• Pitch forks
• Pipe cutters
• Pliers (various types)
• Plumb line
Program Content
Section 4

• Pole pruners
• Pole saw
• Post hole auger
• Post maul
• Post pounder
• Pruning shears
• Pry bar
• Punch
• Rakes (various types)
• Scaffolding
• Screeding bars
• Screwdrivers (various types)
• Seed/fertilizer spreader
• Sharpening tools
• Shovels (coal, clam, scoop/barn, spade, garden)
• Side cutters
• Sod lifter
• 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
• Barometer
• Compaction measuring device
• Flow meter
• Gas meter
• GPS
• Hydrometer
• Hygrometer
• Laser distance measure
• Levels (line, hand, zip laser)

Student Equipment (supplied by school)

Required - PPE and Safety Equipment

• Chaps/ballistic pants
• Cones
• Chemical protection suits
• Ear protection
• Eye protection (glasses, shields)
• Eyewash kit
• Face shields
• Fall protection (harness)
• Fire extinguisher
• First Aid kits
• Flares
• Goggles
• Hard hat
• Lanyard
• Particle masks
• Reflective shirts, jackets
Program Content
Section 4

- Respirators
- Rubber gloves
- Safety vests
- Spill kit
- Traffic cones

Recommended - Office Equipment
- Camera
- Communication devices
- Computers
- Drafting scale 1-100
- Laminator
- Printer
- Thermal printer

Student Tools (supplied by student)

Required
- CSA-approved steel-toed footwear

Recommended
- Calculator
- Hand lens (10x)
- Work gloves
- Rainwear
Shop Equipment

Motorized Equipment

- 3-reel turf mower
- Bale breaker
- Backhoe
- Baggers for leaves
- Bed edger
- Blender (power)
- Blowers (backpack, hand held, push, earth auger)
- Brush cutter
- Chipper
- Clearing saw
- Conveyor belt
- Edgers
- Electric powered utility vehicle
- Elevated work platforms
- Excavator
- De-thatcher
- Flat filler
- Fork lift
- Front end loader
- Gas powered utility vehicle (Gator)
- Generators
- Guillotine
- Hedge trimmer (extension, long reach)
- Hydro-seeding equipment
- Lawn/weed trimmers (gas & electric)
- Man lift
- Mortar mixer
- Peat shredder
- Plate compactor
- Plate tamper
- Pot filler
- Power dethatcher
- Power rake
- Powered rollers
- Pressure washer
- Pumps
- Ram compactor (jumping jack)
- Riding mowers/mulchers
- Shredder
- Skid-steer loader
- Sod cutter
- Soil screener
- Spider
- Steam jenny
- Sterilizers
- String trimmer
- Tractors
- Trencher (irrigation)
- 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

- Air seeder
- Chainsaw
- Circular saw
- Compressor
- Concrete saw (dry, wet)
- Demolition hammer (electric)
- Demolition hammer (pneumatic)
- Electric drill
- Fertilizer injector
- Grinder
- Hammer drill
- Lawn roller
- Mitre/chop saw
- Mortar/cement mixer
- Mower/mulcher
- Powder-actuated tools
- Power auger
- Power cultivator (rototiller)
- Power seeder/power spreader
- Power soil screener
- Power sprayer
- Powered wheel barrow
- Reciprocating saw
- Roller
- Sabre saw
- Table saw
- Transplant table
- Tree spade
- Torch
- Trencher
- Vacuum (wet/dry, leaf)
- Walk-behind aerator
- Wet saw

Standard Hand Tools

- Axes
- Backpack sprayer
- Boxcutters
- Brick carriers
- Brick splitter
- Brooms
- Builder’s level
- Bulb planters
- Cart
- Chains
- Chisels
- Clay pick
- Clearing axes
- Colour wheel
- Core samplers (probe)
- Crimpers
- Crowbars
- Cultivator (manual)
- De-thatching rake
- Dolly
- Files
- Flags
- Garden forks
- Grease guns
- Hammers (hand, sledge)
- Hand plane
- Handsaws (cross cut, back, pruning, sod)
- Hand tamper
- Handheld watering equipment
- Ladders (step, extension, orchard)
Program Content

Section 4

Landscape Horticulturist  Industry Training Authority  03/14

• Landscape rakes
• Loppers
• Mallet
• Microscope
• Paving stone cart
• Paving stone cutter
• Paving stone extractor
• Picks
• Pickaxes
• Pitch forks
• Pipe cutters
• Pliers (various types)
• Plumb line
• Pole pruners
• Pole saw
• Post hole auger
• Post maul
• Post pounder
• Pruning shears
• Pry bar
• Punch
• Rakes (various types)
• Scaffolding
• Screeing bars
• Screwdrivers (various types)
• Seed/fertilizer spreader
• Sharpening tools
• Shovels (coal, clam, scoop/barn, spade, garden)
• Side cutters
• Sod lifter
• 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
• Barometer
• Compaction measuring device
• Flow meter
• Gas meter
• GPS
• Hydrometer
• Hygrometer
• Laser distance measure
• Levels (line, hand, zip laser)
• Light meter
• Measuring wheel
• Planimeter
• pH meter
• Scale ruler
• Tape measure
• Thermometer
• Tire pressure meter
• Water meter
Student Equipment (supplied by school)

*Required - PPE and Safety Equipment*
- Chaps/ballistic pants
- Cones
- Chemical protection suits
- Ear protection
- Eye protection (glasses, shields)
- Eyewash 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
- Drafting scale 1-100
- Laminator
- Printer
- Thermal printer

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

- 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

- 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

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, www.kwantlen.ca/horticulture/ https://plantdatabase.kwantlen.ca
- 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, www.kwantlen.ca/horticulture/ https://plantdatabase.kwantlen.ca
- WorkSafeBC Website (http://www.worksafebc.com/)
- Equipment Manufacturers Websites (Internet)

Suggested Texts

- Pacific Northwest; Plant Disease Management Handbook - 2008. Extension Services of Oregon State University, Washington State University, and the University of Idaho
• 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.

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 THREE

Required Reference Materials

• Kwantlen University College School of Horticulture Plant identification Database, [www.kwantlen.ca/horticulture/](http://www.kwantlen.ca/horticulture/)
  [https://plantdatabase.kwantlen.ca](https://plantdatabase.kwantlen.ca)


• British Columbia Landscape Standard - Latest edition. BCLNA/BCSLA, Surrey B.C.


• Irrigation System Design Binder - Hunter Industries. San Marcos, CA.

• A Guide to Troubleshooting Automatic Sprinkler Systems - The Toro Company. Riverside, CA.


• Principles of Exterior Drainage - NDS, Inc. Lindsay, CA.


Recommended Resources

• Protecting Nature's Balance: IPM in B.C. - U.B.C. Access. (Video)

Suggested Texts

• IPM Training Manual for Landscape Gardeners - Daar Sheila, Helga Olkowski and William Oldowski. 1992. The Bio-Integral Resource Centre (BIRC), Berkley, CA

• IPM for Floriculture and Nurseries - Latest edition. Dreistadt, Steve (editor) University of California, Oakland CA Publication 3402


• Knowing and Recognizing the Biology of Glasshouse Pests and Their Natural Enemies - Latest edition. Malais, M.H. and Ravensberg, W.J. Koppert

• Biological Systems - Reed Business Information, Doetinchem, Netherlands


Program Content
Section 4

- Drip Irrigation: For Every Landscape and All Climates - Kourik, Robert. 1992. Metamorphic Press, Santa Rosa, CA

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 FOUR

Required Reference Materials

- Kwantlen University College School of Horticulture Plant identification Database, www.kwantlen.ca/horticulture/
  https://plantdatabase.kwantlen.ca

Recommended Resources

- The Turf Line News - Western Canada Turfgrass Association, BC.
- Protecting Nature’s Balance: IPM in B.C. - U.B.C. Access. (Video)

Suggested Texts

- IPM for Floriculture and Nurseries - Latest edition. Dreistadt, Steve (editor) University of California, Oakland CA Publication 3402
- Knowing and Recognizing - Latest edition. Malais, M.H. and Ravensberg, W.J. Koppert
- Biological Systems - Reed Business Information, Doetinchem, Netherlands

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.
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 journeyperson

• 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.
LEVEL THREE

**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, Botany, Agronomy, Plant Biology, Forestry, or Crop 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.

**Subject Matter: Soil Science**
- Subject matter competence as demonstrated by a Baccalaureate Degree in Soil Science Horticulture, Agronomy, Forestry, or Crop Science.

**Subject Matter: Plant Maintenance**
- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma or Baccalaureate Degree in Horticulture, Botany, Agronomy, Plant Biology, Forestry, or Crop Science. Five years relevant industry experience.

**Subject Matter: Install and Maintain Hardscapes**
- 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 or Turf Certificate. Two years relevant industry experience.

LEVEL FOUR

**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, Botany, Agronomy, Plant Biology, Forestry, or Crop 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.

**Subject Matter: Install and Maintain Softscape**
- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma combined with International Society of Arboriculture – Arborist Certification.

**Subject Matter: Estimate Landscape Projects**
- Subject matter competence as demonstrated by a Horticulture Trades Qualification/Apprentice Certificate or Horticulture Diploma, Certified Landscape Professional, or five years industry experience as an estimator. Two years relevant industry experience.

**Subject Matter: Install and Maintain Softscape**
- 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 or Turf Certificate. Two years relevant industry experience.
Subject Matter: Principles of Landscape Design

- Subject matter competence as demonstrated by a Horticulture Diploma (Landscape Design) or Certified Landscape Designer designation.