SKILLEDTRADESBC

PROGRAM OUTLINE

Climbing Arborist

SKILLED TRADES BC

The latest version of this document is available in PDF format on the SkilledTradesBC website
www.skilledtradesbc.ca

To order printed copies of Program Outlines
or learning resources (where available)
for BC trades contact:

Crown Publications, Queen's Printer
Web: www.crownpub.bc.ca
Email: crownpub@gov.bc.ca
Toll Free 1 800 663-6105

Copyright © 2013 SkilledTradesBC

This publication may not be modified in any way without permission of SkilledTradesBC

SKILLED TRADES BC

CLIMBING ARBORIST

PROGRAM OUTLINE

APPROVED BY INDUSTRY

NOVEMBER 2010

Developed by
SkilledTradesBC
Province of British Columbia

SKILLED TRADES BC

TABLE OF CONTENTS

Section 1

INTRODUCTION

Climbing Arborist

Foreword

The Arboriculture Trade for British Columbia includes three distinct and progressive Apprenticeship Training Programs – Arborist Technician, Climbing Arborist and Field Arborist. The three separate Arboriculture Trade Provincial Certificates of Qualification (C of Q's) have been defined as follows:

Arborist Technician

In this entry level training the apprentice is primarily performing work on the ground or within 3 meters of the ground on ladders. Successful completion of training and assessments will result in Arborist Technician C of Q.

Climbing Arborist

In Climbing Arborist training the focus is on the climbing and technical skills used while working in trees. Successful completion of training and assessments will result in Climbing Arborist C of Q.

Field Arborist

The Field Arborist training covers the skills involved in advanced tree management, including: development of pest management plans, tree and site assessment and office management skills. Successful completion of training and assessments will result in Field Arborist C of Q.

Note 1: *The **Arborist Technician** and the **Climbing Arborist** Apprenticeship Training Programs recommend the apprentice obtain their Level 1 First Aid certification.*

Note 2: *Falling and Bucking is a separate endorsement from the Arboriculture Training Programs. The **Arborist Technician** technical training, as outlined in that program, covers the required knowledge and practical requirements of the **WorkSafeBC Faller Training Standard**.*

Note 3: *To obtain certification as a **Climbing Arborist** the Apprentice must successfully complete the **Climbing Arborist** Standardized Practical Assessment which may only be taken after successful completion of the Apprenticeship Training Program, the SkilledTradesBC written exam, and the required workplace hours.*

This Program Outline details the new **Climbing Arborist** Apprenticeship Training Program for British Columbia.

The Outline is to be used as a guide for all Instructors in classroom, field and work experience components of the **Climbing Arborist** Apprenticeship Training Program. It also provides direction for the written and practical evaluations conducted during the technical training and workplace based training components of the program.

The Outline includes training provider standards for instructors, equipment and materials, and the facility requirements. The Outline is based on an 8 week training delivery program run with 2 Instructors and 20 students per class.

The development team for the **Climbing Arborist** Apprenticeship Training Program has collectively an extensive background in all arboriculture workplaces, including private sector climbing and consulting, municipal/urban tree management, utility arboriculture, and botanical gardens. Organizations and individual subject matter experts involved are listed on the proceeding pages.

Safety

The development team recognized that safety is of paramount importance in the arboriculture industry and that trained arborists are critical in ensuring workplace safety. It is imperative that arborists are aware of circumstances that may lead to injury to themselves, others, and surrounding trees or properties. It is generally recognized that a safety conscious attitude and work practices contribute to a healthy, safe and accident free working environment, and it is the responsibility of the Arborist to ensure the safety culture on the job site. It is imperative that Arborists are very familiar with and apply occupational health and safety rules and best practices as an integrated part of their job functions. As well, it is essential to identify hazards and take necessary measures to protect oneself, coworkers, the public, property, and the environment. The Program Outline provided incorporates safety as a thematic element through all competency areas, to reinforce the need and value of safe work practices in this trade.

Climbing Arborist Job Description

A Climbing Arborist is a certified tradesperson who cares for and maintains trees and other woody shrubs. Climbing Arborists may prune and remove trees at heights. Climbing Arborists must perform their tree-climbing methods in such a manner as to prevent unnecessary damage to the tree. Typical tasks for the Climbing Arborist include:

- Tree Risk Assessments
- Aerial work with lift truck
- Tree climbing and pruning at heights
- Identifying and remediating mechanical injuries, drought damage and other abiotic tree disorders
- Identifying common root and crown disorders.

This trade engages in a range of outdoor work activities in varying weather conditions.

Climbing Arborists work year round; however, longer hours may be required in spring and summer or following storms and other weather emergencies.

Tasks are primarily performed in urban settings, usually in crews of two to six people, using hand and power tools and power equipment. This occupation is physically demanding. Knowledge of safety regulations and required workplace precautions are essential in this occupation.

To perform the work of a Climbing Arborist, the tradesperson must be able to:

- Work safely and effectively at heights
- Ensure regulatory compliance
- Demonstrate knowledge of stem and root crown disorders of woody plants
- Structurally support trees
- Understand and be able to initiate and support aerial rescue procedures
- Use effective written and verbal communication skills
- Conduct site inspections
- Develop and communicate a safe job plan and perform pre-job preparation

These workers may be employed by:

- Government departments dealing with environment, lands, and parks
- Institutions or facilities with extensive grounds (public and private)
- Private firms providing services in tree care and landscape management
- Utilities and private utilities contractors
- Tree nurseries
- Orchards
- Golf courses
- Private estates

General Aptitudes and Skills:

Climbing Arborists must enjoy working outdoors, have an interest in natural environments and trees, be physically fit, have good physical coordination and be comfortable working at heights. They must work well in a team environment and have good problem solving and critical thinking skills. They must have situational awareness, positive response to change, the ability to remain level headed, as well as the ability predict and plan for safe work practices.

Pre-requisites:

- Arborist Technician – Certificate of Qualification
- Ability to obtain driver's license
- Ability to obtain Level One First Aid

SAFETY ADVISORY

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

Acknowledgements

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

- Kyle Banks — Davey Tree Expert Company of Canada
- Paul Buikema — Progress Landscaping
- Mark Brown — District of North Vancouver
- Thor Clausen — Arbortech Tree Services
- Heath Czypionka — City of Vancouver
- Rupert Evans — The Butchart Gardens
- Wes Hawley — Hawleyscape Tree Service Ltd.
- Clifford Hoegler — BC Plant Health Care Inc.
- Anne Kadwell — HortEducation BC
- Kerin Matthews — Mountain Maple
- Pat Perry — Davey Tree Expert Company of Canada
- Aidon Pyne — Davey Tree Expert Company of Canada
- Jason Timmis — Cedar Ridge Tree Care
- Gareth Tudor-Jones — Bartlett Tree Experts Company of Canada
- Noah Violini — Bartlett Tree Experts Company of Canada
- Bill Wilde — Arbor Vitae Tree Consultants

Industry subject matter experts retained to assist in the development of Program Outline content:

- Riel Aldred — Davey Tree Expert Company of Canada
- Craig Bench — Cypress Tree Service
- Mark Brown — District of North Vancouver
- Paul Buikema — Progress Landscaping
- Andrew Caines — City of Surrey
- Thor Clausen — Arbortech Tree Services
- Heath Czypionka — City of Vancouver
- Hud Elwood — Branching Out Tree Service
- Rupert Evans — The Buchart Gardens
- Reid Hardman — BC Plant Health Care
- Kerin Mathews — Mountain Maple
- Cory Manton — District of Saanich
- Dan Marzocco — City of Victoria
- Nick Perkins — Davey Tree Expert Company of Canada
- Pat Perry — Davey Tree Expert Company of Canada
- Aidon Pyne — Davey Tree Expert Company of Canada
- Brent Ritson — District of Saanich
- Ryan Senechal — Bartlett Tree Experts Company of Canada
- Jason Timmis — Cedar Ridge Tree Care
- Gareth Tudor-Jones — Bartlett Tree Experts Company of Canada
- Alex Thorburn — City of Richmond
- Blair Veitch — Davey Tree Expert Company of Canada
- Bill Wilde — Arbor Vitae Tree Consultants
- Russel Wilson — Davey Tree Expert Company of Canada

Funds for the development of this program outline were provided by Service Canada.

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Climbing Arborist occupation.

How to Use this Document

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

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment

Section 2

PROGRAM OVERVIEW

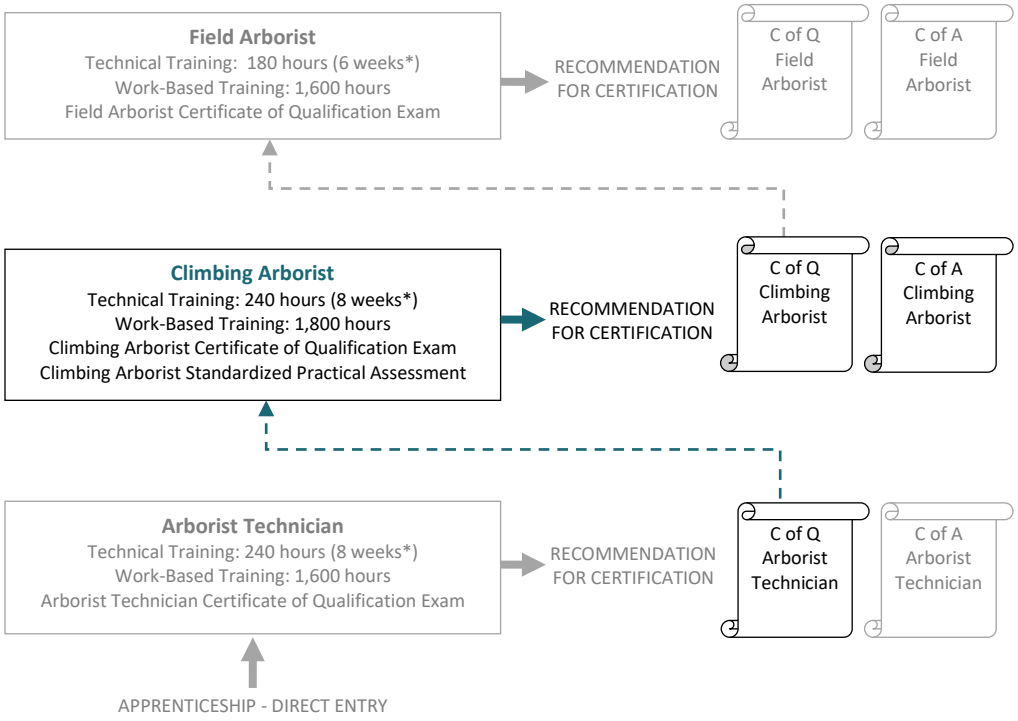
Climbing Arborist

Program Credentialing Model

Apprenticeship Pathway

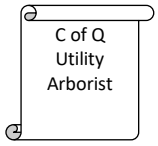
This graphic provides an overview of the Climbing Arborist apprenticeship pathway.

C of Q = Certificate of Qualification
C of A = Certificate of Apprenticeship



**Suggested duration based on 30-hour week*

CROSS-PROGRAM CREDITS
Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

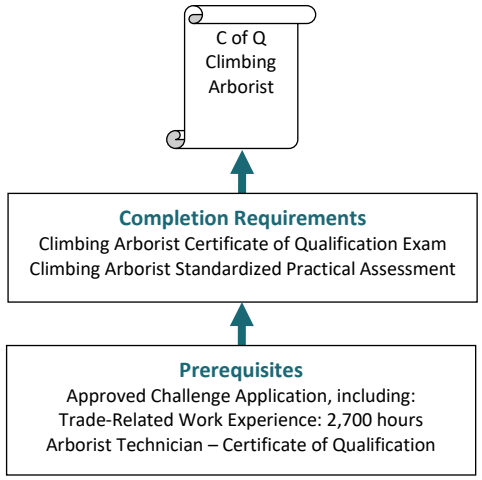


Technical Training: None
Work-Based Training: 800 hours

Challenge Pathway

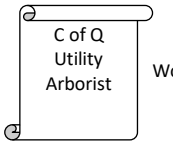
This graphic provides an overview of the Climbing Arborist challenge pathway.

C of Q = Certificate of Qualification



CREDIT FOR PRIOR LEARNING

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



Work Experience: 800 hours

Occupational Analysis Chart

ARBORICULTURE TRADE – ARBORIST TECHNICIAN, CLIMBING ARBORIST & FIELD ARBORIST

Occupation Description: An Arborist is a certified tradesperson working in the Arboriculture trade. Arborists manage and maintain trees and shrubs in the urban forest, focusing on the health and safety of trees and the urban landscape. Typical duties include identifying trees and shrubs; pruning trees and shrubs (both on the ground and aloft); implementing Integrated Pest Management methods; and operating equipment such as chainsaws and chippers.

Block	Competency	Code	Level
Regulations and Other Occupational Skills (A)	Identify relevant legislation and regulations	A1	1
	Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI)	A2	1
	Describe electrical systems and hazards	A3	1
	Identify work site hazards and develop and implement safe work plan	A4	1
	Apply regulations to the job site	A5	2
	Describe workplace leadership and communication	A6	2
	Write a variety of technical reports	A7	3
Power Equipment (B)	Use chipper in a safe and effective manner	B1	1
	Work safely and effectively on ground operations while using an aerial lift truck	B2	1
	Operate a single axle non-air brake dump truck	B3	1
	Operate a stump grinder	B4	1
	Work safely and effectively during aerial operations with aerial lift device	B5	2
Hand Tools and Small Power Tools (C)	Use and maintain hand tools	C1	1
	Operate a variety of small power tools	C2	1
	Use and inspect ladders	C3	1

Tree Work and Management — **D**

Identify common trees in British Columbia — D1	1				
Identify common shrubs in British Columbia — D2	1				
Describe basic tree biology and its importance to good arboriculture practices — D3	1				
Safely prune trees to appropriate Industry standards — D4	1				
Safely prune shrubs to appropriate Industry standards — D5	1				
Safely plant trees to Industry standards — D6	1				
Identify common trees in British Columbia — D7		2			
Identify common stem and root crown diseases in British Columbia — D8		2			
Identify common woody plant pests and diseases in British Columbia — D9		2			
Assess trees on site — D10		2			
Perform appropriate actions to solve abiotic tree disorders — D11		2			
Safely prune trees to appropriate Industry standards — D12		2			
Select trees for site conditions — D13		2			
Structurally support trees — D14		2			
Identify common trees in British Columbia — D15			3		
Identify common quarantine pests of trees in Canada — D16			3		
Develop and implement integrated pest management plans for trees in urban setting — D17			3		
Diagnose and treat insects and diseases — D18			3		
Inspect, assess and identify a variety of risks to trees — D19			3		
Inventory trees — D20			3		
Preserve and retain trees — D21			3		
Examine tree value appraisal — D22			3		

Falling and Bucking — **E**

Demonstrate safe chain saw use — E1	1				
Describe and demonstrate the process of falling — E2	1				
Practice falling a tree — E3	1				
Manage falling hazards — E4	1				
Recognize hazardous weather conditions — E5	1				
Recognize dangerous falling practices — E6	1				
Identify special falling techniques — E7	1				
Plan for limbing and bucking — E8	1				

Rigging F	Describe rigging concepts including selection and use of ropes F1	Select and use knots, hitches and slings in rigging F2	Use various types of hardware in rigging systems F3	Select and use friction control devices for rigging F4	Select and use appropriate rigging techniques F5	Perform cuts for various situations F6
	1	1	1	1	2	2
Climbing G	Select and inspect basic climbing gear G1	Conduct pre-climb assessment G2	Select and inspect climbing gear G3	Climb using various techniques G4	Conduct advanced post-climb job and gear inspection G5	
	1	2	2	2	2	
Emergency Response H	Evacuate worker H1	Review and describe First Aid certification requirements H2	Describe precautions and procedures to prevent and suppress fires H3	Implement spill response H4	Perform aerial rescue H6	
	1	1	1	1	2	
Job Planning and Risk Assessment I	Conduct site inspections. I1	Develop and communicate safe job plan I2	Conduct pre- job preparation I3	Ensure regulatory compliance I4		
	2	2	2	2		
Arboriculture Soil Science J	Examine soil chemistry and biology J1	Examine soil physics and hydrology J2	Develop and implement soil remediation strategies J3			
	3	3	3			

Occupational Analysis Chart

CLIMBING ARBORIST

Occupation Description: A "Climbing Arborist" is a certified tradesperson who cares for and maintains trees and other woody shrubs. Climbing Arborists perform tasks such as tree risk assessments, pruning and removal of trees. In their work they use both climbing and aerial lift devices, rope and rope tools for rigging. They also identify and remediate mechanical injuries, damage, other abiotic tree disorders, and common root and crown disorders.

Regulations and Other Occupational Skills **A**	Apply regulations to the job site A5		Describe workplace leadership and communication A6		
	2		2		
Power Equipment **B**	Work safely and effectively during aerial operations with aerial lift device B5				
	2				
Tree Work And Management **D**	Identify common trees in British Columbia D7	Identify common stem and root crown diseases in British Columbia D8	Identify common woody plant pests and diseases in British Columbia D9	Assess trees on site D10	Perform appropriate actions to solve abiotic tree disorders D11	Safely prune trees to appropriate industry standards D12
	2	2	2	2	2	2
	Select trees for site conditions D13	Structurally support trees D14				
	2	2				

Rigging F	Select and use appropriate rigging techniques F5	Perform cuts for various situations F6			
	2	2			
Climbing G	Conduct pre-climb assessment G2	Select and inspect climbing gear G3	Climb using various techniques G4	Conduct advanced post-climb job and gear inspection G5	
	2	2	2	2	
Emergency Response H	Perform aerial rescue H6				
	2				
Job Planning And Risk Assessment I	Conduct site inspections I1	Develop and communicate safe job plan I2	Conduct pre-job preparation I3	Ensure regulatory compliance I4	
	2	2	2	2	

Training Topics and Suggested Time Allocation

CLIMBING ARBORIST

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	**Regulations and Other Occupational Skills**	**6%**	**100%**	**0%**	**100%**
A5	Apply regulations to the job site		✓		
A6	Describe workplace leadership and communication		✓		
Line B	**Power Equipment**	**8%**	**20%**	**80%**	**100%**
B5	Work safely and effectively during aerial operations with aerial lift device		✓	✓	
Line D	**Tree Work And Management**	**50%**	**40%**	**60%**	**100%**
D7	Identify common trees in British Columbia		✓	✓	
D8	Identify common stem and root crown diseases in British Columbia		✓	✓	
D9	Identify common woody plant pests and diseases in British Columbia		✓	✓	
D10	Assess trees on site		✓		
D11	Perform appropriate actions to solve abiotic tree disorders		✓		
D12	Safely prune trees to appropriate industry standards		✓	✓	
D13	Select trees for site conditions		✓		
D14	Structurally support trees		✓	✓	
Line F	**Rigging**	**11%**	**20%**	**80%**	**100%**
F5	Select and use appropriate rigging techniques		✓	✓	
F6	Perform cuts for various situations		✓	✓	
Line G	**Climbing**	**12%**	**20%**	**80%**	**100%**
G2	Conduct pre-climb assessment		✓	✓	
G3	Select and inspect climbing gear		✓	✓	
G4	Climb using various techniques			✓	
G5	Conduct advanced post-climb job and gear inspection		✓	✓	
Line H	**Emergency Response**	**8%**	**10%**	**90%**	**100%**
H6	Perform aerial rescue		✓	✓	
Line I	**Job Planning and Risk Assessment**	**5%**	**60%**	**40%**	**100%**
I1	Conduct site inspections		✓	✓	
I2	Develop and communicate safe job plan		✓	✓	
I3	Conduct pre-job preparation		✓	✓	
I4	Ensure regulatory compliance				
	Total Percentage for Climbing Arborist	**100%**			

Section 3

PROGRAM CONTENT

Climbing Arborist

Climbing Arborist

Line (GAC): **A** **Regulations and Other Occupational Skills**

Competency: **A5** **Apply regulations to the job site**

The Climbing Arborist must have the competency to know how to apply legislation and regulation to the job site. They need sufficient knowledge of safety regulations and policies to spot potential issues and incidents before they turn into accidents. They need sufficient knowledge of environmental regulations and policies to spot potential environmental issues and incidents before they turn into major problems. A Climbing Arborist must be able to judge when it is appropriate to stop work and/or seek the advice of more senior people.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Apply legislation and regulations to decision making on the job site, according to the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Follow safety regulations	• For self • For others • Meeting safety compliances in job situations • WorkSafeBC BC accident and near miss reporting requirements • Emergency response, clean up and emergency planning
2. Follow environmental regulations	• Typical environmental issues on job sites • Meeting environmental compliances in job situations
3. Obtain permitting and licensing	• Application of regulations, standards, and procedures to the job situation

Achievement Criteria:
Given a series of multiple-choice questions on applying legislation and regulations to the job site, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Theoretical evaluation

Evaluation content to include, but not limited to:

1. Emergency response procedures
2. Environmental regulations that impact job sites
3. Local permitting and licensing issues
4. Risk mitigation

Line (GAC): **A** **REGULATIONS AND OTHER OCCUPATIONAL SKILLS**

Competency: **A6** **Describe workplace leadership and communication**

Climbing Arborists normally have crews working on the job site that they must supervise in an effective manner to ensure site safety and efficient work practices. They interact with a wide variety of people and must be able to communicate effectively. They will often be in a position to train and mentor other Arborists and apprentices.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Describe workplace leadership and communication, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT

1. Describe effective communication	• Effectively communicate to:
	  ○ Crew
	  ○ Sub-trades
	  ○ Clients
	  ○ Neighboring residents
	  ○ Supervisors
	  ○ Regulatory officials

2. Describe conflict resolution	• Understand conflict • Sources of conflict • Conflict management strategies
3. Describe supervisory role	• Typical weekly/daily activities • Delegate work activities and briefing of crews • Leadership strategies, including leading by example, role modeling, etc. • Fair and progressive discipline as required by company policies or regulatory requirements (e.g. safety infractions) • Performance feedback to crew members • Provide reports as needed

4. Describe training strategies	• Training plans • Tailgate/tailboard training • New, young and transferred employees • Coaching and mentoring employees • Performance review and recommendations • Training opportunities

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on workplace leadership and communication, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Effective communication
2. Conflict resolution
3. Supervisory role
4. Training strategies

Line (GAC): B POWER EQUIPMENT

Competency: **B5** **Work safely and effectively during aerial operations with aerial lift device**

Climbing Arborists use an aerial lift truck to access trees to perform a variety of tree care activities. Normally, the Climbing Arborist is working from the bucket of the lift truck; however they may also be the truck operator.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

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

- Work safely at a number of tasks while in the bucket of an aerial lift truck, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Describe hazards including electrical	• Electrical and other common hazards
2. Explain the body harness requirements for operation of a lift truck	• Body harnesses
3. Discuss the maximum weight allowed for each model of lift	• Lift weights and angles
4. Discuss and explain the types of hydraulic controls most commonly found on lift trucks used for arboriculture	• Common controls and their use
5. Discuss the correct way to use the controls for full movement and to "feather" the controls for fine movements	• Control use
6. Explain what obstacles must be watched for while elevating or descending (i.e. - rotating into oncoming trucks or damaging service wires etc.)	• Lifting and descending objects • Importance of clearance distances • Traffic • Electrical hazards
7. Discuss the advantages and disadvantages of 2 man buckets	• 2 man bucket operations, advantages and disadvantages
8. Discuss the advantages of over-center booms and booms with higher reaches	• Boom types, advantages and disadvantages

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on working safely and effectively during aerial operations with an aerial lift truck, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Knowledge of WorkSafeBC work related regulations
2. Knowledge of hazards abatement procedures
3. Knowledge of risks associated with work zones
4. Explain the over-center travel of the lower boom

Performance evaluation

Performance — Given an aerial lift truck, the apprentice should be able to:

1. Perform pre-use inspection
2. Perform a site assessment to identify potential hazards particularly electrical hazards
3. Establish a safe work zone
4. Establish an emergency procedure
5. Communicate verbally and with hand signals
6. Wear appropriate PPE
7. Demonstrate upper then lower boom operation to lift off cradle
8. Demonstrate feathering controls
9. Demonstrate conventional boom travel
10. Demonstrate over-center boom travel compared to conventional boom travel

Conditions — Given an aerial lift truck in an on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D7** **Identify common trees in British Columbia**

A Climbing Arborist has a working knowledge of a variety of different tree species and can identify them using a variety of different methodologies. They use this knowledge to make decisions on a variety of arboriculture tasks, such as pruning, site selection, and disease and pest management.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	4

Objectives

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

- Identify a variety of tree species common to British Columbia, using several different methodologies.

LEARNING TASKS	CONTENT
1. Identify trees during all seasons of the year	• Binomial nomenclature and general tree taxonomy to Family
2. Describe the characteristic parts of trees to help correctly identify them	• Morphological characteristics of a variety of common trees, including buds, leaf scar, stems, bark, inflorescences, leaf arrangement and morphology, growth habit
3. Use of dichotomous keys for field study purposes	• Native conifer and deciduous dichotomous key for native species tree identification

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on a variety of tree species common to British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify trees species common to British Columbia
2. Describe growth habit
3. Describe morphological characteristics
4. Match tree species to site conditions

Performance evaluation

Performance	Given samples of twigs, leaves and or photos, the apprentice will correctly identify 10 native woody plants (at Instructor's discretion and/or as availability dictates).
Conditions	An on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D8** **Identify common stem and root crown diseases in British Columbia**

The Climbing Arborist will occasionally have to identify common stem and root crown diseases in trees. This is an important task as these diseases can increase risk while in the trees, and the Climbing Arborist must make decisions on effective means to remove diseased tree parts.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	3

Objectives

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

- Identify and diagnose common stem and root crown diseases in British Columbia, according to Industry standards.

LEARNING TASKS	CONTENT
1. Identify common root disease	• Armillaria • Laminated root rot
2. Identify common heart rots	• White butt rot • Hardwood trunk rot (Phellinus Annosus) • Butt rot
3. Identify common sap rot	• Silver leaf disease
4. Identify common canker diseases	• Phomopsis • Cytaspora • Nectria

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on identifying common stem and root diseases in British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify common disease symptoms

Performance evaluation

Performance Diagnose common disease damage to plant material including:

1. Anthracnose
2. Nectria canker
3. Armillaria
4. Verticillium wilt
5. Sudden Oak Death Syndrome (SODS)

Conditions An on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D9** **Identify common woody plant pests and diseases in British Columbia**

The Climbing Arborist will occasionally have to identify common plant pests and diseases in trees. This is an important task as pests and diseases can increase risk while in the trees, and the Climbing Arborist must make decisions on effective means to remove diseased tree parts and deal with pest issues.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	2

Objectives

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

- Identify and diagnose common woody plant pests and diseases in British Columbia, according to Industry standards.

LEARNING TASKS	CONTENT
1. Identify common boring insects of deciduous and conifer species	• Bronze birch borer • Cherry bark tortrix • Pine bark beetles
2. Identify common phytophthora symptoms	• Sudden oak death species • Cupressaceae species
3. Identify common disease symptoms	• Anthracnose • Wilt • Powdery mildew • Fire blight
4. Identify other common insects and their signs	• Aphids • Adelgids • Scales • Leaf miner • Tent caterpillars • Fall webworm • Douglas fir silver spotted tiger moth • Sawfly

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on identifying common woody plant pests and diseases in British Columbia, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify common pests, signs and symptoms
2. Identify common disease symptoms

Performance evaluation

Performance — Diagnose common pest or disease damage to plant material including:

1. Anthracnose
2. Bronze birch borer
3. Aphids
4. Scales
5. Cherry bark tortrix
6. Powdery mildew
7. Pine beetle
8. Tent caterpillar
9. Adelgids
10. Leaf miner

Conditions — An on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D10** **Assess trees on site**

Climbing Arborists occasionally assess trees for common abiotic and biotic tree disorders. This includes assessment of on-site soils and tree structural conditions.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
3	3

Objectives

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

- Assess trees for common abiotic tree disorders, including assessment of soils and tree structural conditions, according to Industry standards.

LEARNING TASKS	CONTENT
1. Identify common abiotic tree disorders including drought, frost injury, winter kill, basal and trunk scars, sunscald and cedar flagging	• Knowledge of common tree morphological characteristics • Conditions and susceptible species for drought, frost injury, basal and trunk scars, sunscald and cedar flagging
2. Visually inspect soil texture and moisture conditions	• Compacted and saturated soil characteristics • Root shear (anchoring) • Soil grading and drainage • Impact on tree growth and health
3. Take soil samples and prepare them to be sent for laboratory analysis	• Field soil texture analysis • Soil sampling techniques
4. Describe soil fertility and its impact on tree growth and health	• Macro and micro nutrients and soil pH and their impact on tree growth and health
5. Visually inspect trees for structural issues	• Common structural issues that are specific to specific tree species, inherent tree failure patterns infrastructure and root interference • Recognition of root damage due to construction, irrigation installation trenching or other activities

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on assessing trees on site, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Common wood decaying fungi in British Columbia
2. Decay and rot in wood
3. Structural problems in trees
4. Root damage
5. Saturated soil
6. Soil nutrients and pH
7. Recognize root damage due to construction, irrigation installation trenching or other activities

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D11** **Perform appropriate actions to solve abiotic tree disorders**

Climbing Arborists occasionally assess options and apply appropriate actions to solve abiotic disorders of trees in a safe and effective manner.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	3

Objectives

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

- Apply basic actions such as pruning, wound tracing and treatments to mitigate abiotic tree disorders, according to Industry standards.

LEARNING TASKS

1. Trace bark wounds
2. Prune to remove damaged parts of the tree

CONTENT

- Wound tracing
- Basic tree anatomy and morphology
- Pruning techniques for removal of dead or damaged parts (ABIOTIC)

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing appropriate actions to solve abiotic tree disorders, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify proper pruning methods to remove damaged wood
2. Identify proper method of tracing wounds

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D12** **Safely prune trees to appropriate industry standards**

A Climbing Arborist regularly prunes a wide variety of trees using appropriate techniques and tools.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Prune a wide variety of trees using appropriate techniques and tools, according to Industry standards.

LEARNING TASKS	CONTENT
1. Safely and effectively utilize appropriate tools	• BC Landscape Standard and ANSI
2. Use proper pruning cuts and principles	• Basic tree anatomy • Various tree pruning cuts • Tree pruning principles
3. Assess tree and site for hazards	• Hazard assessment in and around trees including insects, electrical, objects, terrain

4. Use approved pruning practices for specific outcomes	• Reduce the size of the crown
	  ○ Crown reduction
	• Crown thin trees
	  ○ Crown thinning
	• Crown raise trees
	  ○ Crown raising
	• Shorten limbs
	  ○ Headback or shorten limbs to a lateral
	• Structural prune trees
	  ○ Structural pruning
	• Restoration pruning
	• Rejuvenation pruning
	• Hedge trimming
	  ○ Hedge trimming techniques
	• Fruit production pruning
	  ○ Fruit production pruning techniques
	• Pollarding
	  ○ Pollarding techniques

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on safely pruning trees to appropriate standards, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Basic tree anatomy
2. Tree hazards
3. Identification of various pruning techniques and when they are appropriate to use

Performance evaluation

Performance — The apprentice should be able to:

1. Assess a tree for hazards
2. Safely and correctly perform cleaning, thinning, raising, reducing, and reduction to the canopy

Conditions — An on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D13** **Select trees for site conditions**

A Climbing Arborist will occasionally have to make decisions on the selection of appropriate trees for planting on a variety of sites.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
2	2

Objectives

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

- Select appropriate trees for site conditions and assess the trees prior to installation to ensure they are healthy, according to Industry standards.

LEARNING TASKS	CONTENT
1. Identify and select appropriate trees for the site	• BC Landscape Standard • Common trees of BC and their cultural growth requirements
2. Inspect plants prior to installation to ensure they are healthy and meet standards	• Plant inspection techniques • BC Landscape Standard • Common problems with trees when arriving on a job site

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting trees to site conditions, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Correctly identify tree defects
2. Given a set of landscape plans, identify tree specifications
3. Given two to three site condition scenarios identify the appropriate trees for site

Performance evaluation

Performance The apprentice should be able to:

1. Select appropriate trees for the site
2. Select trees that are healthy and free of defects
3. Prepare site
4. Install trees
5. Support trees

Conditions An on-site situation.

Line (GAC): **D** **TREE WORK AND MANAGEMENT**

Competency: **D14** **Structurally support trees**

A Climbing Arborist selects and installs structural supports in trees to reduce tree failure, reduce tree hazards, improve structure and for tree restoration purposes.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
4	3

Objectives

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

- Select and install structural supports in trees to reduce tree failure, reduce tree hazards, and improve structure for tree restoration purposes, according to Industry standards.

LEARNING TASKS	CONTENT
1. Ascend tree to cabling or bracing point	• Safe tree climbing • Safe aerial lift operation
2. Determine appropriate location in canopy for support	• Tree structure
3. Decide what type of support system to use	• Tree species and the appropriate use of structural support for given species • Static and dynamic support systems and the limitations of each • The climate impact on supports (ice, snow, wind, heavy rain)
4. Determine appropriate tools and materials	• Support materials • Tools used for installation of cabling and bracing
5. Install static support system	• Static support systems
6. Install dynamic support system	• Dynamic support systems
7. Inspect existing structural support systems	• Various structural support systems and their application
8. Inspect for structural issues e.g. wasps nests, cavities, hollows	• Various structural support systems and their application

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on structurally supporting trees, improve structure for tree restoration purposes, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Given a variety of tree species and described scenarios, the apprentice will be able to identify correct support systems
2. Identify appropriate tools for support systems
3. Testing procedures for existing support systems

Performance evaluation

Performance — The apprentice should be able to:

1. Select appropriate system
2. Compile appropriate equipment
3. Safely and effectively install support system

Conditions — An on-site situation.

Line (GAC): **F** **RIGGING**

Competency: **F5** **Select and use appropriate rigging techniques**

Climbing Arborists use rigging techniques to remove large trees or portions of trees in confined locations or when surrounded by obstacles with a low impact focus.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

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

- Use rigging techniques to remove large trees or portions of trees in confined locations or when surrounded by obstacles, with a low impact focus, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Design and use rigging systems in a safe manner	• Shock loading • Limitations of basic rigging system
2. Use of tag (guide) line	• Tag lines
3. Use butt-hitching appropriately	• Butt-hitching
4. Implement natural-crotch rigging	• Crotch rigging
5. Implement false crotch rigging	• False crotch rigging
6. Use butt-tied, tip-tied and balanced rigging techniques in a safe and effective manner	• Application of rigging in practical situations

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and using appropriate rigging techniques, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Describing shock loading
2. Explaining different rigging systems for a variety of situations
3. Dynamic load vectors, angles of incidence, force of mass and impact

Performance evaluation

Performance The apprentice should be able to:

1. Develop a rigging plan for a number of different situations
2. Perform a site assessment
3. Secure a safe work zone
4. Set-up a lift
5. Demonstrate butt-hitching
6. Demonstrate the use of a drift line
7. Demonstrate the use of a controlled speedline
8. Perform butt-tied, tip-tied and balanced rigging techniques
9. Demonstrate the use of a tagline for rigging
10. Demonstrate natural and false crotch rigging techniques
11. Lower the object using a specified rigging technique to the target point

Conditions An on-site rigging situation.

NOTE: The performance evaluations for F5 and F6 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): **F** **RIGGING**

Competency: **F6** **Perform cuts for various situations**

A Climbing Arborist regularly uses a wide variety of cutting techniques and tools to safely remove tree parts.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Safely use various cutting techniques in aerial situations to remove tree parts, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify risk factors to be aware of	• Dangers of cutting above your head • Swing potential • Kickback • Load shifting • Safe work positioning (i.e. not directly underneath the suspended load)
2. Climbing trees with power saws	• Safe ascent and descent • Rope safety • Safe use of chain saw use in aerial situations

3. Cut tree parts with a chain saw while aloft	• Types of cuts:
	  ○ Jump cut
	  ○ Snap cut (Bypass cut)
	  ○ Hinge cut
	  ○ Bore cut
	• Safe use of a variety of hand cutting tools in aerial situations
	• Dynamic load vectors, angles of incidence, force, mass and impact
	• Application and limitations of cutting techniques

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing cuts for various tree parts, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Knowledge of dynamic load vectors, angles of incidence, force, mass and impact
2. Identifying situations that require drop cut
3. Identifying situations that require a snap cut
4. Identifying situations that require a hinge cut
5. Sequencing and explaining the different procedures to make each cut
6. Identifying the potential hazards of each cut
7. Explain the safe procedure for bore cutting
8. Selecting the appropriate face notch angle for specific tree conditions
9. Describing procedures and methods to secure the hinge
10. Developing a safety plan for limb removal

Performance evaluation

Performance The apprentice should be able to:

1. Communicate a safety plan for limb removal
2. Secure the work zone
3. Communicate with hand and voice
4. Climb a tree with chain saw
5. Demonstrate safe chain saw use
6. Safely execute a hinge cut
7. Safely execute a drop cut
8. Safely execute a jump cut
9. Safely execute a snap cut
10. Secure hinge with webbing

Conditions An on-site aerial rigging situation.

NOTE: The performance evaluations for F5 and F6 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): **G** **CLIMBING**

Competency: **G2** **Conduct pre-climb assessment**

Climbing Arborists will regularly assess the work site for a variety of risks. These include site specific ground risks, tree risks, and weather risks. They will also have to formulate risk management plans and communicate them to various on-site employees, sub-trades and others.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Determine and communicate the conditions necessary to climb safely, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Assess the site	• Limits of approach • Road classification • Climbing, climbing tasks, gear, emergency • Response, risk mitigation • Identify obstacles, hazards and targets • WorkSafeBC Regulations, company rules/policies, standards • Risk mitigation strategies
2. Assess the tree	• Tree identification • Structural damage • Biological & physiological signs and symptoms • Purpose and methodology of the climb • Identify obstacles, hazards, and targets • Tree risk assessment
3. Assess the weather	• Plan development for weather conditions
4. Assess PPE	• Determination of appropriate PPE for specific jobs
5. Job plan briefing	• Components of job plan • Formulate and communicate the job plan

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting a pre-climb assessment, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Explaining risk in climbing situations
2. Identify a variety of weather conditions and the risks that they generate
3. Identify site conditions that can generate risk
4. Develop a job plan that mitigates risk relative to ID hazards

Performance evaluation

Performance — The apprentice should be able to:

1. Assess trees for potential risk
2. Assess the site for potential risk
3. Develop a job plan that mitigates risk relative to identified hazards

Conditions — An on-site site situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): **G** **CLIMBING**

Competency: **G3** **Select and inspect climbing gear**

The Climbing Arborist regularly selects the appropriate equipment for climbing and always inspects it for safety prior to entering the tree.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Select the appropriate climbing equipment and inspect it for safety, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Select ropes	• Ropes and their uses • Working load and stretch of various ropes • Inspection criteria when examining ropes • Maintenance
2. Select saddle	• Types of climbing saddles, fasteners, hardware • Inspection criteria when examining gear • Maintenance
3. Select other equipment	• Functions of carabineers, micro-pulleys, ascenders/descenders • Functions of friction savers, throw lines, figure 8's • Inspection criteria when examining gear • Maintenance and storage

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and inspecting climbing equipment, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify a variety of ropes
2. Identify a variety of knots
3. Identify points of attachment, saddles, fasteners, hardware
4. Describe the functions of carabineers, micro-pulleys, ascenders/descenders
5. Describe the functions of friction savers, throw lines, figure 8's
6. Identify defects in rope

Performance evaluation

Performance The apprentice should be able to:
1. Select appropriate ropes for the job
2. Select appropriate gear for the job
3. Identify wear and defects in ropes and equipment

Conditions An on-site site situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): G **CLIMBING**

Competency: G4 **Climb using various techniques**

The Climbing Arborist regularly selects and uses the appropriate climbing techniques for the job.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Select and use the appropriate climbing techniques for the job.
- Demonstrate safe climbing techniques including body thrust and foot locking.

LEARNING TASKS

1. Climb trees using spurless and spur techniques

CONTENT

- Tie in points
- Line installation
- Climbing system advancement
- False crotches
- Advance work positioning lanyard
- Limb walking
- Work positioning redirects
- Controlled movement & descent
- Use spurless techniques
- Use spur technique
- Attach, sharpen and maintain spurs
- Appropriate knots

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on climbing using various techniques, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify a variety of tie points & appropriate knots
2. Identify rope advancement, friction hitch techniques
3. Identify crotching techniques
4. Describe the techniques of line installation, limb walking, work positioning
5. Describe the techniques of redirects, controlled movement and descent
6. Describe spur and spurless techniques
7. Describe spur use and maintenance
8. Identify defects in rope

Performance evaluation

Performance The apprentice should be able to demonstrate:

1. Safe climbing of trees using spurless technique
2. Safe climbing of trees using spur technique
3. Tie points, rope advancement and friction hitches
4. Ability to redirect, control movement and descend
5. Ability to install lines, limb walk, and demonstrate safe work positioning
6. Ability to attach, sharpen and maintain spurs

Conditions An on-site situation, with a variety of trees.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): G CLIMBING

Competency: G5 Conduct advanced post-climb job and gear inspection

After each climb, the Climbing Arborist inspects the job site for any post-climb safety issues such as on site debris; and inspects all equipment to ensure its safety for re-use.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	4

Objectives

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

- Inspect the job site and equipment to ensure its safety for re-use, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Inspect job site after climb	• Post-job hazards, such as hanger • Client concerns re: lawn divots, property damage, debris & clean-up • How to do a post-job walk around to identify hazards • Client communication
2. Inspect equipment after climbing	• Acceptable wear levels • Wear points
3. Store climbing equipment in an appropriate manner	• Correct equipment storage conditions • Wear & tear on all equipment components

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting advanced post-climb job and equipment inspections, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identification of post-job hazards, such as hangers
2. Identify lawn divots, property damage
3. Describe debris & clean-up
4. Recognition of visual signs of gear wear

Performance evaluation

Performance — The apprentice should be able to:

1. Identify types of post-job hazards, such as hangers
2. Identify potential client concerns re: lawn divots, property damage, debris & clean-up
3. Identify acceptable equipment wear levels
4. Demonstrate correct gear storage
5. Demonstrate the ability to communicate effectively with the client

Conditions — A post-climb situation.

NOTE: The performance evaluations for G2, G3, G4 and G5 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): **H** **EMERGENCY RESPONSE**

Competency: **H6** **Perform aerial rescue**

A Climbing Arborist will occasionally have to perform an emergency aerial evacuation procedure for themselves or others in a safe and effective manner. Although this is an occasional activity, the Climbing Arborist's or another's life may depend on their ability to properly respond.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	2

Objectives

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

- Perform an aerial position emergency rescue in a safe and effective manner, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Describe steps to check and perform to ensure no danger to the rescuer before performing an attempt at rescue	• Site and tree hazards
2. Rescue from a spar tree demonstrating the rescue	• SRT rescue and double rope system, bowlines, rescue climbing kit • Ascending on own rope
3. Practice with an unconscious victim and an injured victim who is conscious but cannot climb or rappel down	• Ascending on injured climber's rope • Assess injured person's condition • Determine appropriate action
4. Practice emergency response plan	• Conditions and procedures for emergency assistance
5. Discuss rescue using false crotches	• Single-stem rescue (spar pole)

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on performing an aerial rescue, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Identify operating and safety components of lift-truck
2. Awareness of hazards and approaches to minimizing risk
3. Knowledge of WorkSafeBC regulations and workplace requirements
4. Knowledge of required safety equipment for worksites
5. Knowledge of how a person may require rescue while rappelling and not be easily reached

Performance evaluation

Performance — The apprentice should be able to:

1. Wear appropriate PPE
2. Execute the ERP
3. Safely secure the work zone
4. Assess the situation for hazards
5. Decide if to call for emergency assistance
6. Ascend to rescue
7. Assess the injured person
8. Safely bring the climber down
9. Administer patient care until EMS takes over

Conditions — An aerial situation.

Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**

Competency: I1 **Conduct site inspections**

The Climbing Arborist will often carry out a site inspection as part of the job site risk assessment. They must understand factors and associated risks influencing the safe execution of the job and then use this understanding to develop safe procedures while working on the site.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Identify and understand all factors and associated risks influencing the safe execution of the job, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify tree and site risks	• Assessment procedures for tree risks • Assessment procedures for site risks
2. Identify appropriate methods & techniques for abatement	• Knowledge of tree care methods and techniques
3. Identify equipment needed	• Equipment capabilities and applications • Appropriate equipment for specific jobs
4. Identify workers needed	• Assessment of staff competencies • Verify job qualifications
5. Identify applicable regulation	• Applicable regulations and labour standards

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting site inspections, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Appropriate equipment
2. Staff competencies
3. Risk mitigation
4. Types of risks

Performance evaluation

Performance The apprentice should be able to demonstrate the ability to identify a wide variety of risks and describe how to mitigate the risk.

Conditions An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**

Competency: I2 **Develop and communicate safe job plan**

Climbing Arborists regularly develop safety plans for their job sites and instruct others on how these plans must be implemented.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Develop a safe job plan and communicate it to workers and sub-contractors, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Select techniques to address risk	• Risk mitigation options • Risk analysis
2. Develop procedures to plan and implement and evaluate a job plan	• Appropriate methods and techniques for risk • Mitigation for specific site conditions • Risk exposure
3. Schedule appropriate equipment	• Climbing Arborists' equipment • Scheduling procedures
4. Document the plan	• Risk plan development and documentation
5. Communicate job plan to the crew	• Methods of conducting site meetings • Perform risk analysis • Verbal and written communication techniques

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on developing and communicating safe job plans, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Risk assessment
2. Risk mitigation
3. Scheduling
4. Site meetings
5. Risk plan development

Performance evaluation

Performance	The apprentice should be able to develop and document an appropriate risk management plan for the site and communicate it to all affected parties.
Conditions	An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**

Competency: I3 **Conduct pre-job preparation**

On a regular basis, Climbing Arborists carry out pre-job inspections to ensure that all equipment is safe to use, foreseeable regulations are met and that all required tools and equipment are transported to the job site.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
3	5

Objectives

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

- Select the appropriate resources to undertake a tree care assignment, based on the job estimate and according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Conduct pre-trip inspection	• Pre-trip inspection procedures and decals check • Boom inspection procedure • WorkSafeBC regulations and company safety procedures • Logbooks and vehicle inspection checklists
2. Inspect tools	• Equipment manufacturer (OEM) manual review • Tool inspection procedures
3. Identify resources required	• Tools and attachments for specific jobs
4. Acquire needed resources	• Typical resources needed for climbing jobs

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on conducting pre-job preparation, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Pre-trip inspection procedures
2. Boom inspection
3. Maintenance Log Book(s)
4. Tools and equipment

Performance evaluation

Performance	The apprentice should be able to carry out a pre-job inspection.
Conditions	An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Line (GAC): I **JOB PLANNING AND RISK ASSESSMENT**

Competency: I4 **Ensure regulatory compliance**

It is often the Climbing Arborists' job to ensure that there is on site compliance to all appropriate regulations.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
5	5

Objectives

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

- Ensure that activities at the job site comply with all standards and regulations, according to the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Plan for compliance	• Application of safety compliance to job activities
2. Inspect for compliance	• Application of environmental compliance to job activities
3. Conduct post-job review and follow-up	• Application of permitting and licensing compliance to job activities
4. Prepare reports as needed	• Liability issues/responsibilities • Record keeping requirements • WorkSafeBC accident and near miss reporting procedures • Accident investigation plans • Preparedness and risk mitigation procedures • Emergency response, clean up and emergency procedures • Assessment procedures for job practices to ensure compliance with procedure • Document practices • Write reports • Ability to communicate effectively

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on ensuring regulatory compliance, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Environmental compliance
2. Safety compliance
3. Emergency response procedures
4. Accident investigation
5. Liability issues

Performance evaluation

Performance — The apprentice should be able to:

1. Plan for compliance
2. Inspect for compliance
3. Conduct post-job review and follow-up
4. Prepare reports as needed

Conditions — An on-site situation.

NOTE: The performance evaluations for I1, I2, I3 and I4 have been combined and will be covered off on one Practical Assessment Form within the Instructor Manual.

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

Climbing Arborist Apprenticeship Training Facilities must have a comfortable classroom space and a training area for practical assignments capable of facilitating 2 instructors with 20 students per class, in addition to:

- Internet access
  - Library resources
  - Laboratory facilities for teaching basic tree biology
  - Storage facility for tools and equipment
  - Workshop area for tool maintenance
  - Large secure site for training, operations, demonstrations, and practice including a parking lot for vehicles

REQUIREMENT/GUIDELINES FOR SPECIFIC GENERAL AREA OF COMPETENCIES:

B – Power Equipment

- Large secured site with variable terrain and mature trees conducive to lift truck practice

D – Tree Work and Management

- Access to large range of trees common to the area
- Sites with multiple plant choices of genera, age and condition of trees and shrubs for assessment
- Site locations requiring various tree selections
- Site location suitable for 'mock' or real practice supporting trees; newly planted and mature trees in need of support

F – Rigging

- Large secured site with variable terrain and trees conducive to multiple removals, rigging and cutting practice

G - Climbing

- Large secured site with variable terrain and mature trees conducive to climbing practice

H – Emergency Response

- Variety of trees appropriate to demonstrate aerial rescue

Tools and Equipment

Apprentices must provide their own Personal Protective Equipment and climbing equipment.

PPE to include:

- ANSI approved hard hat or helmet with 4 point chin strap and visor
- Hearing protection (muffs or plugs)
- CSA approved safety glasses
- WorkSafeBC approved (3600 fpm) chainsaw pants or chaps
- CSA approved boots with ankle support
- Leather gloves for rigging
- Rubber gloves for climbing
- Class 2 hi-viz apparel

Climbing equipment to include:

- 12' 8 to 10mm, Prusik cord
- Single eye split tail
- Eye to eye split tail (optional)
- Saddles (ANSI approved Arborist Saddle)
- Approved lanyard and adjuster
- Tree climbing spurs
- Personal first aid kit with pressure bandage
- 2 – Double auto-locking carabiners 23 kN
- Climbing rope 150' x ½" 6000 lbs tensile
- Micro pulley with utility carabiner
- Figure 8 descender

The material and equipment list for the Training Provider is based on a class of 20 apprentices with 2 Instructors. Where applicable, power equipment may be rented for instructional purposes.

Power Equipment

1 – Over-center truck mounted aerial lift
2 – Non-air brakes single axle dump trucks

Hand and Small Power Tools

4 – Climbing chain saws
4 – Saw lanyards
4 – Mid size bucking chain saws
8 – Chain saw tool kits
10 – Wedges
10 – Hand saws
2 – Sounding mallet
2 – Shovel
1 – Mini mattock
2 – Pocket knife
2 – Increment bore
2 – Hammer
2 – Wood chisel
2 – Pole saw / pruner
4 – Bypass pruner
1 – Dolly
1 – Drill and drill bits
2 – Adjustable wrenches
1 – Hacksaw with extra blades
2 – Wire cutters
2 – Locking pliers
1 – Bolt cutters
2 – Gaff gauge

Rigging and Climbing Gear

2 – Fall arrest harnesses and lanyard
6 – 10' loopies (1/2" or 5/8")
2 – 12' whoopies (1/2" or 5/8")
4 – Spider legs
4 – Eye-and-eye split tails
4 – One eye slings (2 x 18', 2 x 12')
2 – 10 ton Arborist rigging blocks
4 – Pulleys
4 – CMI pulley
2 – Micro pulleys
12 – Steel double auto locking carabiners
1 – Mechanical advantage kit
2 – Port-a-wraps (large steel)
1– Hobbs or GRCS rigging device
2 – 36" steel ring friction saver
2 – Adjustable friction saver
1 – Static Bracing System and associated hardware
1 – Dynamic Bracing Systems and associated hardware
1 – Petzl Rad system

Materials

Barrier/caution tape
16 – Traffic cones
3 – Gasoline cans
8 – 150 ft lengths 1/2 inch rigging lines
4 – 150 ft lengths 5/8 inch rigging lines
Samples of various rope construction types, materials and condition
2 – Climbing lines 150 feet
4 – Throw lines 200 feet
4 – Throw bags 8 oz to 14 oz
1 – Pair binoculars8 – Hand lens (10x min)
2 – Microscopes and applicable slides
Plant models (samples of twigs, leaves, driftwood)
Soil
2 – Spill kits
1 – Rescue dummy
Printed copies of all applicable regulations for student reference in the classroom
Trees and/or sections as required
Mixed gas and bar oil as required
Dichotomous keys for student reference
Camera
Litmus paper
Stakes as required
Tree staking straps as required
2 – Tree guying anchors
2 – Tree stands
Checklist / job plan
Log Books
Boom inspection sheets
Manufacturer's manuals
Vehicle inspection sheets
Case studies / scenario
Job site checklists

Reference Materials

Required Resources for Apprentices:

- *Arborist Technician Apprenticeship Training Program – Apprentice Manual*
- *Climbing Arborist Apprenticeship Training Program – Apprentice Manual*
- *American National Standard for Arboricultural Operations – Pruning Standard*, ANSI A-300 – 2001
- *American National Standard for Arboricultural Operations – Safety Requirements,* ANSI Z133.1-2006
- *Arborist Equipment: A Guide to the Tools and Equipment of Tree Maintenance and Removal*. Blair, Donald F. 2nd Ed. ISA Publication
- *BC Landscape Standard*, 7th Ed, BCLNA, 2008
- *InfoFlips – BC Faller Training Standard*, WorkSafeBC
- *Safe Work Practices for Utility Arborists (Tree care work near power lines),* WorkSafeBC (2005)
- *The Art and Science of Practical Rigging*, ISA Publication, 2001
- *Tree Climbers Companion*. Jepson, J. 2nd Ed. Beaver Tree Publications
- *Trees in Canada*, John Farrar, Fitzhenry & Whiteside Publishing, 1995

Required Resources for Instructors:

- *Arborist Technician Apprenticeship Training Program – Apprentice Manual*
- *Climbing Arborist Apprenticeship Training Program – Apprentice Manual*
- *BC Faller Training Standard*, WorkSafeBC

Recommended Resources:

- *A New Tree Biology Dictionary*, Alex L. Shigo, Shigo and Trees, Associates, 1986
- *An Illustrated Guide to Pruning, 2nd edition,* Edward F. Gilman, Delmar, 2002
- *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 4th edition,* Harris, Clark and Matheny, Prentice Hall, 2004
- *Arborists' Certification Study Guide,* ISA Publication
- *Arborists' Knots for Climbing and Rigging*, ISA Publication, 2006
- *Basic Training for Tree Climbers*, ISA Publication
- *Chain Saw Safety and Field Maintenance,* Kevin K. Eckert, ISA
- *Common Tree Diseases of British Columbia,* Eric Allen, Duncan Morrison and Gordon Wallis, Natural Resources Canada, Canadian Forest Service, 1996
- *Evaluating Tree Defects, Field Guide*, Ed Hayes, 2nd edition
- *Hardy Trees and Shrubs: An Illustrated Encyclopedia*, Dirr, Michael, Timber Press, 2009
- *Manual of Woody Landscape Plants*, *9th edition*, Michael A. Dirr, Stipes Publishing Co., 2009
- *Native Trees of BC*. Halter, Reese & NJ Turner, Crown Publication, 2003
- *Taylor's Guide to Trees,* Houghton Mifflin, 1988
- *The Tree Climbers Knots,* Lingens, D.
- *Tree Climbers' Guide*. Lilly, S. 3rd Ed. ISA Publication
- *Western Trees,* George A. Petrides / Olivia Petrides, Houghton Mifflin, 1992

Additional Audio/Visual Resources:

- *Aerial Rescues*, National Arborist Association
- *Bucket Truck Rescue*, BC.Hydro
- *The Path of Least Resistance*, WorkSafeBC

Website Resources:

- A Tree Story
  http://www.youtube.com/watch?v=5-_GUggGMmM&feature=player_embedded#!
- Arboriculture Canada Training
  http://www.arborcanada.com/
- Arbor Rigging Operations
  http://www.arbormaster.com/uploads/ArborMaster%20Articles/Arborist%20Rigging%20Operations.pdf
- BC Forest Safety Council
  http://www.bcforestsafe.org/training/faller_certification/resources.html
- BC Faller Training Standard, *InfoFlips*
  Part one
  https://www.worksafebc.com/en/resources/health-safety/books-guides/bc-faller-training-standard/part-1?lang=en
  Part Two
  https://www.worksafebc.com/en/resources/health-safety/books-guides/bc-faller-training-standard/part-2?lang=en
- BC Hydro
  https://www.bchydro.com/safety-outages/worker-training/safety-resources.html
- British Columbia IPM Regulations
  http://www.bclaws.ca/civix/document/id/complete/statreg/604_2004
- BC One Call
  http://www.bconecall.bc.ca
- BC Provincial Emergency Program
  http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery
- BC Ministry of Environment
- http://www.env.gov.bc.ca/wld/
- British Columbia Motor Vehicle Act and Other Statutes and Regulations
  http://www.bclaws.ca/civix/document/id/complete/statreg/96318_00
- British Columbia Outdoor Wilderness Guide –The Trees of British Columbia
  http://bcadventure.com/adventure/wilderness/forest/
- British Columbia Workers Compensation Act
  http://www.bclaws.ca/Recon/document/freeside/--%20w%20--/workers%20compensation%20act%20rsbc%201996%20c.%20492/00_act/96492_00.htm
- CSA Standards
  http://www.csa.ca/cm/ca/en/standards
- Canadian Environmental Protection Act
  http://www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=2140D763-1
- Canadian Food Inspection Agency
  http://www.inspection.gc.ca/eng/1297964599443/1297965645317
- Commercial Vehicle Safety and Enforcement (CVSE)
  http://www.th.gov.bc.ca/cvse/
- E-Flora – Electronic Atlas of Plants of British Columbia
  http://ibis.geog.ubc.ca/biodiversity/eflora/
- Environment Canada, Acts, Regulations and Agreements
  http://www.ec.gc.ca/default.asp?lang=En&n=48d356c1-1

- Environment Canada, Acts
  http://www.ec.gc.ca/default.asp?lang=En&n=E826924C-1
- Fisheries Act
  http://laws-lois.justice.gc.ca/eng/acts/F-14/
- Insurance Corporation of BC
  http://www.icbc.com
- Links to the British Columbia Motor Vehicle Act and other statutes and regulations
  http://www.icbc.com/about%20ICBC/company_info/corporate_governance/statutes-regulations
- Ministry of Forest and Range – Tree Book: Learning the Trees of British Columbia
  http://www.for.gov.bc.ca/hfd/library/documents/treebook/
- Ministry of Transportation and Infrastructure, *Traffic Control Manual for Work on Roadways*
  http://www.th.gov.bc.ca/publications/eng_publications/TCM/Traffic_Control_Manual.htm
- OHS Standards
  http://www2.worksafebc.com/Publications/OHSRegulation/Home.asp
- Product Instruction Guide – Miller by Sperian
  http://www.millerfallprotection.com/pdfs/ProdInspecGuide.pdf
- Provincial Regulations
  http://www.bclaws.ca/
- Rigging Knots
  http://www.arbormaster.com/Rigging%20Knots.pdf
- Spill Reporting Amendments
  http://www.bclaws.ca/Recon/document/ID/freeside/46_263_90
- TDG
  https://www.tc.gc.ca/eng/tdg/clear-menu-497.htm
- Traffic Control Manual for Work on Roadways
  http://www.th.gov.bc.ca/publications/eng_publications/TCM/Traffic_Control_Manual.htm
- Tree Care Industry Association (TCIA)
  http://tcia.org/
- Wildlife Act
  http://www.bclaws.ca/Recon/document/ID/freeside/00_96488_01
- WorkSafeBC
  http://www.worksafebc.com
- WorkSafeBC First Aid Certification
  http://www2.worksafebc.com/topics/firstaid/home.asp
- WorkSafeBC OHS Guidelines
  http://www2.worksafebc.com/publications/OHSRegulation/Home.asp
- WorkSafeBC Guidelines Part 19 Electrical Safety
  http://www2.worksafebc.com/publications/OHSRegulation/Part19.asp
  http://www2.worksafebc.com/Publications/OHSRegulation/Part19.asp?ReportID=18571

- WorksSafeBC OHS Guidelines, Forestry Operations and Similar Activites
  https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-26
- WorkSafeBC, *Working Safely Around Electricity*
  http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/electricity.pdf

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:

- Climbing Arborist – Certificate of Qualification

Work Experience

A minimum of 5 years trade experience in at least 75% of the General Areas of Competency.

Instructional Experience and Education

It is preferred that the instructor also possesses one of the following:

- Provincial Instructor's Diploma Program Certificate or be registered in the Program
- Bachelors or Masters degree in Education

Instructor(s) for Specific General Areas of Competency

A – Regulations and Other Occupational Skills

- Diploma in business or equivalent
- A minimum of 5 years practical supervisory experience

B – Power Equipment

- A minimum of 5 years trade experience – operation of power equipment including stump grinder
- A minimum of 5 years lift truck operations, with proven safe work record
- Class one drivers' license

D – Tree Work and Management

- A minimum of 5 years experience
- ISA Certified Tree Risk Assessor

F – Rigging

- A minimum of 5 years trade experience

G – Climbing

- A minimum of 5 years experience
- ISA Certified Tree Worker/Climber Specialist preferred

I – Job Planning and Risk Assessment

- A minimum of 5 years practical climbing experience
- ISA Certified Tree Worker/Climber Specialist
- Broad knowledge of safety issues

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.

Appendices

Appendix A

Glossary

ARBORICULTURE TRADE GLOSSARY

3-strand rope – type of rope construction in which three strands are twisted together
7-strand rope, common-grade cable – type of cable, often used to cable trees
12-strand rope – braided rope construction used for climbing and rigging lines; the 12-strand construction is not easily spliceable
16-strand rope – braided rope construction with a cover and a core
abiotic disorders – plant problems caused by non-living agents
abscissic acid – plant growth substance that triggers leaf or fruit drop
abscission – leaf or fruit drop
abscission zone – area at the base of the petiole where cellular breakdown leads to leaf drop
absorbing roots – fine, fibrous roots that take up water and minerals; most of them are within the top 12 inches (30 centimeters) of soil
absorption – taking up
access line – a second climbing line hung in a tree as a means of reaching a victim in an emergency
access route – means of entering and leaving a property during a construction operation
acclimation – process by which plants and other living organisms adapt physiologically to a climate or environment different than their own
acuminate – leaf shape having an apex the sides of which are gradually concave and taper to a point
acute – disorder or disease that occurs suddenly or over a short period of time
adaptability – genetic ability of plants and other living organisms to adjust or accommodate to different environments
adpressed – in close, tight proximity
adventitious bud – bud that arises from a place other than a leaf axil
aeration – provisions of air to the soil to alleviate compaction and improve its structure
aeration system – the set of holes or trenches created in a tree's root area to improve oxygen availability to the roots
aerial device – truck with booms and bucket used to place a worker in proximity of to a tree's crown
aerial rescue – method used to bring an injured worker down from a tree or aerial lift device
aesthetic – artistic or pleasing characteristics
aggregate – close cluster or mix
air excavator – device that blows air at high force; used to remove soil from the root of trees
allelochemicals – naturally produced substances in plants that serve as part of the plant's defense against pests and that may have effects on the growth and development of other plants
allelopathy – chemical effect or inhibition of the growth or development of plants introduced by another plant
alternate – having leaves situated one at each node and alternating positions on the stem; this arrangement means the leaves are not across from each other
amon-eye nut – specialized nut used in cabling trees; has a large eye for attachment of the cable
anatomy – study of the structure and composition (of plants)
angiosperm – plants with seeds borne in an ovary; consisting of two big groups, moncotyledons and dycotyledons
anion – an ion that carries a negative charge
annual rings – see *growth* rings
ANSI A300 standards – industry-developed standards for the practice for tree care; acronym for American National Standards Institute
ANSI Z133.1 – safety standards for tree care operations
anthocyanins – red, purple, or blue pigments; responsible for those colours in some parts of trees and other plants
antigibberellin – plant growth regulator that inhibits the action to the plant hormone gibberellin
antitranspirant – substance sprayed on plants to reduce water loss through the foliage
apical – having to do with the tip
apical bud – terminal bud on a stem
apical dominance – condition in which the terminal bud inhibits the growth and development of lateral buds on the same stem
apical meristems – the growing points at the tips of shoots
appropriate response process (ARP) – method of systematically assessing plant health and client needs to determine which course of action, if any, is recommended
approved – acceptable to federal, state, provincial, or local enforcement authorities
arboriculture – the study of trees and other plants
arborist block – heavy-duty pulley with two attachment points and extended cheek plates; used in rigging operations
artificial respiration – forcing air into the lungs of a person who has stopped breathing
auxin – plant hormone or substance that promotes or regulates the growth and development of plants; it is produced at sites where cells are dividing, primarily in the shoot tips
available water – the water remaining in the soil after gravitational water has drained and before the wilting point has been reached

axial transport – movement of water, minerals, or photosynthate longitudinally within a tree
axillary bud – bud in the axil of a leaf; lateral bud
back cut – cut made on opposite side of a log toward the notch cut or face cut
backfill – soil (and amendments) put back into the hole when planting a tree
balance – in rigging, a technique used to lower a limb without allowing either end to drop
balled and burlapped (B & B) – having the root system and soil wrapped in burlap for moving and planting a tree or other plant
barber chair – dangerous condition created when a tree or branch splits vertically up from the back cut
bare root – tree or other plant taken from the nursery with exposed root system, without soil
bark – protective covering over branches and stem that arises from the cork cambium
bark tracing – cutting away torn or injured bark to leave a smooth edge
barrier – fences or other means used to establish a protection zone around trees on construction sites
belay – securing a climber's rope using wraps around a cleat, carabiner, or other device
bend – type of knot used to join two rope ends together
bend ratio – ratio of the diameter of a branch, sheave, or other device to the rope that is wrapped on it
bight – a curve or arc in the active part of a rope between the working end and the standing part
biodegradable – capable of decaying and being absorbed by the environment
biological control – method of controlling plant pests through the use of natural predators, parasites, or pathogens
biotic – pertaining to a living organism
biotic disorders – disorders caused by a living agent
bipinnate – double pinnate; see *pinnate*
blade – the expanded body of a leaf
Blake's hitch – a climber's friction knot sometimes used in place of the tautline hitch or Prusik knot
blight – any disease, regardless of the casual agent, that kills young, plant-growing tissues
block – a pulley used in rigging
body thrust – method of ascending a tree using a rope
bollard – a post on which wraps can be taken with a rope
boom – long, moveable arm of a bucket truck
botanicals – pesticides that are made from plants
bowline – looped knot used to attach items to a rope
bowline on a bight – knot that can be used as a makeshift saddle in an emergency situation
box cable system - tree cabling system that forms closed polygons; used to join together more than three branches
bracing – installation of metal rods through weak portions of a tree for added support
bracing rod – metal rod used to support weak sections or crotches of a tree
branch bark ridge – top area of a tree's crotch where the growth and development of the two adjoining limbs push the bark into a ridge
branch collar – area where a branch joins another branch or trunk created by the overlapping xylem tissues
branch protection zone – tissues inside the trunk or parent branch at the base of a subordinate branch that protect against the spread of decay
branch union – point where a branch originates from the trunk or another branch; crotch
breaking strength – The load rating at which a device will fail. Some manufacturer's of rope or hardware supply an Average Breaking Strength (ABS) for their products, which is the average load at which the rope or device fails. Others will provide a Maximum Breaking Strength (MBS). Keep in mind that factors such as shock loading will exert many times the weight of the load in force on the product.
Example: *Braid 1/2" Rope has an average breaking strength of 10,400 lb.*
broadcast fertilization – application of fertilizer over the soil surface
bud – small lateral or terminal protuberance on the stem of a plant that may develop into a flower or shoot; undeveloped flower or shoot
buffering capacity – ability of a soil to maintain its pH
bulk density – mass of soil per unit volume; often used as a measure of compaction
butt-hitching – method of lowering pieces when the rigging point is below the work
butt-tying – tying off a limb at the butt end of for rigging
buttress roots – roots at the base of the trunk; trunk flare
CPR – cardiopulmonary resuscitation
CSA – Canadian Standards Association
cable aid – device used to tighten lags and to aid in cable installation
cable clamp – a double-bolted, U-shaped clamp used to secure tree cables
cable grip – device used to attach extra-high-strength cable to lag hooks or eye bolts
cabling – installation of hardware in a tree to help support weak branches or crotches
cambium – layer(s) of meristematic cells that give rise to the phloem and xylem and allow for diameter increase in a tree
canker – localized diseased area, often shrunken and discoloured, on stems or branches
carabiner – oblong metal ring used in climbing and rigging that is opened and closed by means of a spring-loaded gate
carbohydrate – compound, combining carbon and water, produced by plants during photosynthesis
cardiopulmonary resuscitation – procedure used to force air into the lungs and to force blood circulation in a person who has suffered cardiac arrest
carotenoid – a yellow, orange, or red pigment responsible for those colours in some parts of trees and other plants

cation – a positively charged ion
cation exchange capacity (CEC) – ability of a soil to adsorb and hold cations
cavity – an open wound or hollow within a tree, usually associated with decay
cell – smallest unit of an organism that is capable of self-reproduction
cellulose – complex carbohydrate found in cellular walls of the majority of plants, algae, and certain fungi
central leader – the main stem of a tree, particularly an excurrent specimen
chaps – a form of leg protection; worn when operating chain saws
chlorophyll – green pigment of plants, found in chloroplasts; it captures the energy of the sun and is essential in photosynthesis
chloroplast – specialized organelle found in some cells; the site of photosynthesis
chlorosis – whitish or yellowish discolouration caused by lack of chlorophyll; often used in referring to a plant's foliage
chronic – disorder or disease occurring over a long period of time
class – taxonomic group below the division level but above the order level
climbing hitch – knot used as the primary friction knot (tie-in knot) in climbing
climbing line – a rope that meets specifications for use in tree climbing
climbing saddle – a harness designed for climbing trees
climbing spurs – sharp devices that can be strapped to a climber's lower legs to assist in climbing poles or trees being removed
clone – asexually produced organisms that are genetically identical
clove hitch – knot used to secure an object to a rope
CODIT – Compartmentalization Of Decay In Trees
codominant branches/codominant stems – forked branches of nearly the same size in diameter and lacking a normal branch union
come-along – portable cable winch used to draw two things closer together
command and response system – a system of vocal communication convention used in tree care operations
compaction – compression of soil resulting in the loss of macropores
companion cell – parenchyma cells associated with sieve tube members
compartmentalization – natural process of defense in trees by which they wall off decay in the wood; see *CODIT*
complete fertilizer – fertilizer that contains nitrogen, phosphorus, and potassium
complex – a combination of factors that contribute to the stress or decline of a tree
compound leaf – a leaf with two or more leaflets
compounding of forces at the suspension point – This term refers to the fact that if a load is suspended from a rope running over a suspension point (limb of a tree, pulley, etc.), then an equal amount of force must be applied to the other end of the rope to keep the load from moving. This means that the suspension point carries *double* the weight of the load on one end of the rope
conduction – carrying water or nutrients
conifer – a cone-bearing tree or other plant that has its seeds in a structure called a cone
conk – the fruiting body of a fungus, often associated with decay
contact insecticides – materials that cause injury or death to an insect after coming in contact with the pest
container grown – tree or other plant that has been grown in a container
containerized – plant available from the nursery with its root mass in a container
controlled-release fertilizer – slow-release or slowly soluble form of fertilizer
conventional notch – 45-degree notch with a horizontal bottom cut; used in felling trees
cordate – heart-shaped
cork cambium – meristematic tissue from which cork and bark develop to the outside
cracks – defects in trees that, if severe, may pose a risk of tree or branch failure
crenate – leaf margin with rounded teeth
cross section – section cut perpendicular to the axis of longitudinal growth
crown – the above ground portion of a tree
crown cleaning – removal of watersprouts and dead, dying, diseased, crossing, and hazardous branches from a tree
crown reduction - method of reducing the height or spread of a tree by performing appropriate pruning cuts
crown restoration – method of restoring the natural growth habit of a tree that has been topped or damaged in any other way
crown rot – disease or decay at the base of a tree or root flare
cultivar – a cultivated variety of a plant
cultural control – method of controlling plant pests by providing a growing environment favourable to the host plant and/or unfavourable to the pest
cuticle – waxy layer outside the epidermis of a leaf
cytokinin – plant hormone involved in cell division
D-rings – D-shaped metal rings on a climber's saddle used to attach ropes and snaps
dead-end grips – cable termination devices that must be used with extra-high-strength cable
dead-end hardware – cabling, bracing, or guying hardware that is terminated by screwing into the tree
deadwooding – removal of dead and dying limbs from a tree
decay – decomposition of woody tissues by fungi or bacteria
deciduous – tree or other plant that loses its leaves sometime during the year and leafless generally during the cold season
decurrent – rounded or spreading growth habit of the crown of a tree

deficiency – lack or insufficient quantity of a required element
defoliation – loss of leaves from a tree or other plant by biological or mechanical means
dehiscent – opening spontaneously at maturity to release seeds
dentate – having marginal teeth that are perpendicular to the leaf margin
desiccation – total drying out
design criteria – aspects of the site and required functions to be served by the plant that must be considered in plant selection
design factor – factor by which the tensile strength of a rope or piece of hardware is reduced to arrive at the working-load limit for a given application
dicot – see *dicotyledon*
dicotyledon – plant with two cotyledons in its embryo
dieback – condition in which the ends of the branches are dying
differentiation – process in the development of cells in which they become specialized for various functions
diffuse porous – pattern of wood development in which the vessels are distributed evenly throughout the annual ring
dioecious – plant with unisexual flowers with each sex confined to separate plants
direct cable system – simple tree cabling system to join two branches
direct contact – when any part of the body touches an electrical conductor
division – taxonomic division below kingdom level but above class level
dormant – state of reduced physiological activity in the organs of a plant
double braid – rope construction that consists of a braided rope within a braided rope
double crotch – climbing technique consisting of tying into two places in a tree
double serrate – toothed margin of a leaf with smaller teeth within
downy mildew – white fungal growth emerging from water-soaked tissue, usually on the underside of the leaf
drill-hole method – applying fertilizer by drilling holes in the soil occupied by the roots or surrounding them
drip irrigation – method of watering in which water evaporation and runoff are minimized
drip line – perimeter of the area under a tree delineated by the crown
drop-crotch pruning – method of reducing the height of a tree; see *reduction*
drop cut – branch-removal technique consisting of an undercut and a top cut farther out on the branch
drop zone – area where cut branches or wood sections will be dropped from a tree
drum lace – method of tying a balled-and-burlapped tree root ball for moving
dynamic loading – forces created by a moving load; load that changes with time
electrical conductor – body or medium that allows the passage of electricity; while working on trees, generally this will be any overhead or underground electrical device, including communication cables and power lines that have electricity or the potential to have it
emergency response – predetermined set of processes by which emergency situations are assessed and handled
entire – leaf margin without teeth
epicormic – arising from latent or adventitious buds
epidermis – outer tissue of leave, stems, roots, flowers, and seeds
epinasty – distortion of growth
espalier – specialized technique of pruning and training plants to grow within a plane
essential elements – the 17 minerals essential to the growth and development of trees
ethylene gas – naturally occurring plant growth substance that triggers fruit ripening
evapotranspiration (ET) – moisture lost by evaporation of the soil's water and transpiration of the plant
evergreen – tree or plant that keeps its needles or leaves year round; this means for more than one growing season
excurrent – tree growth habit with pyramidal crown and central leader
exfoliating – peeling off in shreds or layers
extra-high-strength cable – type of cable used in supporting trees; stronger but less flexible than standard wrapped cable
exudation – oozing out
eye bolt – a drop-forged, closed-eye bolt installed in trees attach cable
eye splice – technique used to attach common-grade cable to eye bolts or lags
eyesplice – termination in a rope forming an eye and made by splicing the rope back upon itself
face cut – a notch cut used in felling trees or limbs
fall protection – equipment and techniques designed to ensure a climber will not fall from a tree
false crotch – device installed in a tree to set ropes during climbing or rigging when there is not a suitable natural crotch available
family – the taxonomic division under the order level and above the genus level
fermentation – incomplete path of respiration in the absence of sufficient oxygen
fertilizer – substance added to a plant or the surrounding soil to supplement the supply of essential elements
fertilizer analysis – the percentage of nitrogen, phosphorus, and potassium in a fertilizer
fertilizer burn – injury to plants resulting from excess fertilizer salts in the surrounding soil
fiber – elongated, tapering, thick-walled cell that provides strength
field capacity – the point at which soil becomes saturated and cannot absorb any more water.
figure-8 descender – metal device used in rigging
figure-8 knot – safety knot or stopper tied in the climbing knot

first aid – emergency care or treatment of the injuries or illnesses of a person to stabilize his or her condition before medical help is available
foliage – the leaves of a plant
foliar analysis – laboratory analysis of the mineral content of foliage
foliar application – application of fertilizer or other substance by direct spray on the foliage
footlocking – method of climbing a rope by wrapping the rope around one's feet
friction device – device used to take wraps in a load line; provides friction for controlled lowering
friction hitch – any of several friction knots used in climbing trees or rigging
fronds – large, divided leaves, as in palms
fruiting bodies – the reproductive structures of fungi, the presence of which may indicate decay in a tree
fungicides – chemical compounds that are toxic to fungi
gall – swelling of plant tissues; frequently caused by insects, nematodes, fungi, or bacteria
genus – a group of species having similar fundamental traits; botanical classification under the family level and above the species level
geotropism – plant growth produced as a response to the force of gravity; it can be positive as in the roots, or negative as in the trunk
gibberellin – a plant growth substance involved in cell elongation
girdling – inhibition of the flow of water and nutrients in a tree by choking vascular elements
girdling root – root that grows around a portion of the trunk of a tree, causing inhibition of the flow of water and nutrients by choking the vascular elements
glaucescent – having a somewhat glaucous appearance or nature; becoming glaucous
glaucous – covered with a grayish, bluish, or whitish waxy coating or bloom that is easily rubbed off: glaucous leaves
gravitational water – water that drains from the soil's larger macropores under the force of gravity
ground rod – 10-foot (3-meter) metal rod used in grounding a lightning protection system
grounded – electrically connected to the earth
growth rate – speed at which something grows
growth rings – rings of annual xylem visible in a cross section of the trunk of some trees
guard cells – pair of cells that regulate the opening and closing of a stomate due to a change in water content
gummosis – exudation of sap or gum, often in response to disease or insect damage
guying – securing a tree, if needed, with ropes or cables fastened to anchors in the ground or another tree
gymnosperm – plant with seeds exposed
half hitch – simple wrap of a rope used to secure a line temporarily
hardened off – acclimated to the cold or to a new environment
hardiness – ability of a plant to survive low temperatures
hazard assessment – process by which the risk potential or a tree is determined
heading back – topping; cutting limbs back to buds, stubs, or lateral branches not large enough to assume apical dominance
heartwood – inner, nonfunctional xylem tissues that provide structural resistance to the trunk
hinge – a strip of wood fibers created between the notch and the back cut that help control direction in tree felling
hinge cut – sequence of cuts used to control the direction of a limb being removed
hitch – a knot made when a rope is secured around an object or its own standing part
hollowed braid – rope construction characterized by a braided rope with no core
honeydew – substance secreted by certain insects when feeding upon plants
horizon – layer of soil within the soil profile
horticultural oils – highly refined petroleum oils used to smother insects and disrupt their membranes
Humboldt notch – a felling notch that is horizontal on the top and angled on the bottom
IPM – see *Integrated Pest Management*
identification key – aid used to help identify plants
imbricate – where one tepal is outside all others, one is inside all others, and the others are outside on one margin and inside on the other
implant – device, capsule, or pellet that can be inserted into a tree to treat disorders
included bark – bark that becomes embedded in a crotch between branch and trunk or between codominant stems and causes a weak structure
increment borer – device used to take core samples from trees for the purpose of determining age or detecting problems
indirect contact – touching any conductive object that is in contact with an electrical conductor
infectious – capable of being spread from plant to plant
infiltration – downward entry of water into the soil
infiltration rate – speed at which water soaks into the soil
inorganic fertilizer – mineral fertilizer, not coming from plant or animal
insect growth regulators – substances, naturally occurring in insects, that affect growth and development
insecticidal soaps – mild salts of fatty acid that disrupt insect life process
insecticides – substances that are toxic to insects
Integrated Pest Management (IPM) – method of controlling plant pests combining biological, cultural, and chemical controls
internodal – between two nodes on a stem
internode – the region of the stem between two successive nodes
interveinal tissue – leaf tissue between the veins or vascular bundles
introduced species – plant species that are not native to a region

involucre – a series of bracts beneath or around a flower or flower cluster. The cupule, the cuplike structure holding an oak acorn, is a modified, woody involucre
ion – one atom or group of atoms with a positive or negative charge
job briefing – brief meeting of a tree crew at the start of every job to communicate the work plan, responsibilities and requirements, and any potential hazards
jump cut – branch-removal technique consisting of an undercut and a top cut closer in on the branch
kerf – slit or cut in a log made by a saw
kernmantle – rope manufactured to have a core and woven sheath
key – plant identification tool used to determine a plant species
kickback – sudden backward or upward thrust of a chain saw
kickback quadrant – upper quadrant of the tip of a chain saw bar
kingdom – the primary division in taxonomy, separating plants from animals
lag eye – lag-threaded cable anchor with a closed eye
lag hook/J-hook – J-shaped bolt used to attach cables to trees
lag-threaded rod – steel bracing rod used to screw into pre-drilled hole to provide added support to a tree
landing zone – predetermined area where parts will be brought down in a rigging operation
landscape function – the environmental, aesthetic, or architectural functions that a plant can have
lanyard – a short rope equipped with snaps or carabiners; work-positioning lanyards are used for temporarily securing a climber in one place
larva – immature life stage of an insect
lateral – secondary or subordinate branch
lateral bud – vegetative bud on the side of a stem
lateral root – side-branching root that grows horizontally
leach/leaching – tendency for elements to wash down through the soil
leader – the primary terminal shoot or trunk of a tree
leaf apex – tip of the leaf blade
leaf base – bottom part of the leaf blade
leaf blotch – irregularly shaped areas of disease on plant foliage
leaf margin – outer edge of the leaf blade
leaf scar – scar left on the twig after a leaf falls
leaf spot – patches of disease or other damage on plant foliage
leaflet – separate part of a compound leaf blade
leg protection – chaps or other protective clothing worn over the legs when operating a chain saw
lenticel – opening in the bark that permits the exchange of gases
liability – something for which one is responsible; legal responsibility
lignin – substance that impregnates certain cell walls
lion tailing – poor pruning practice in which limbs are thinned from the inside of the crown to a clump of terminal foliage
liquid injection – method of injecting liquid forms of fertilizer into the surrounding soil of a tree
load line – rope used to lower a tree branch or segment that has been cut
lobe – projecting segment of a leaf blade
lowering device – instrument attached to the base of a tree in rigging; used to take wraps with the load lines
machine-threaded rod – steel rod used in cabling and bracing; must be terminated with washers and nuts
macronutrient – any of the essential elements required by plants in relatively large quantities
macropore – larger spaces between soil particles that are usually air-filled
main conductor – primary conductor cable of a lightning protection system; standard down conductor
mature height – the maximum height that a plant can reach if the conditions of the planting site are favourable
meristem – undifferentiated tissue in which active cell division takes place
microinjection – method used to introduce chemicals directly into the xylem of trees
micronutrient – any of the essential elements required by plants in relatively small quantities
micropore – space between soil particles that is relatively small and likely to be water filled
micropulley – small pulley used by tree climbers
minimum irrigation – the practice of minimal irrigation through the use of drought-tolerant plants and watering only when necessary due to reduced rainfall
mismatch cut – cut type used in branch removal in which offset, overlapping cuts allow the section to be manually broken off; snap cut
mitigation – process of reducing damages or risk
monitoring – keeping a close watch; performing regular checks or inspections
monocot – see *monocotyledon*
monocotyledon – a plant whose embryo has one seed leaf (cotyledon)
monoecious – a plant with both sexes on the same plant
morphology – study of the form and structure of living organisms; in this case, of plants
mortality spiral – sequence of events causing the decline, and eventually death, of a tree
mycorrhizae – a symbiotic naturally attaches itself to fine feeder roots and grows its own roots, hyphae which mine the soil for minerals and water to bring into the feeder roots
native species – indigenous to a region
natural crotch – Natural Crotch is the term used for the crotches in trees where branches meet the trunk. These can be useful places to install a climbing or rigging line, though both the rope and tree will experience more abrasion and wear, in comparison to a False Crotch.

Example: *5/8" rope is a good natural crotch rigging line because of its ability to stand up to increased abrasion.*

naturalize species – a non-native species that has become established in a region

necrosis – localized death of a tissue in a living organism

needle – slender conifer leaf

negligence – failure to exercise due care

nematode – microscopic roundworm; some feed on plant tissues and may cause disease

node – slightly enlarged portion of a stem where leaves and buds arise

nomenclature – scientific naming system for living, organisms; scientific names are written in Latin, the genus first (starting with capital letter), followed by the species (always with lowercase letter)

notch – a wedge cut into a log or tree for felling

nutrient cycling – movement of mineral nutrients within an ecosystem as organic matter decomposes and is recycled in plants

oblique – lop-sided, one side larger than the other

obtuse – rounded, approaching semi-circular

Occupational Safety and Health Act (OSHA) – in the United States, the legislative act dealing with health and safety in the work place; administered by the Occupational Safety Administration; Occupational Health and Safety Administration (OHSA) in Canada

oedema (edema) – watery swelling in plant tissue

oils – highly refined petroleum oils used to smother insects and disrupt their membranes

open-face notch – wedge-shaped cut (commonly about 70 degrees) used in felling or removing tree sections

opposite – opposite leaf arrangement; leaves situated two at each node, across from each other on the stem

order – taxonomic division below class level but above family level

organic fertilizer – fertilizer derived from plants or animals

organic layer – layer of organic matter at the soil's surface

osmosis – diffusion of water through a semi-permeable membrane from a region of higher water potential to a region of lower water potential

outriggers – projecting structures on boom trucks

pH – a measure of acidity or alkalinity of a medium

palmate – radiating in a fanlike manner; type of compound leaf

parasite – organism living in or on another organism from which it derives nourishment

parenchyma cells – thin-walled, living cells essential in photosynthesis

parent material – soil bedrock material from which the soil's profile develops

pathogen – casual agent of disease

perched water table – accumulation of water in an upper soil layer

percolation – movement of water through the soil

permanent branches – branches that will be left in place, often forming the initial scaffold framework of a tree

permanent wilting point – point at which a plant cannot pull any more water from the soil

personal protective equipment (PPE) – personal safety gear such as hard hats, safety glasses, and hearing protection

pest resistance – in plants, the tendency to withstand, or not to get, certain pest problems

pesticides – chemicals used to kill unwanted organisms such as weeds, insects, or fungi

pest resurgence – increase in the population of a pest following a reduction in the population of natural predators or parasites of that pest

petiole – the stalk of a leaflet

phenols – naturally produced organic alcohols with acidic properties; one of several chemical defense compounds in trees

pheromone – chemical substance produced by insects that serves as a stimulus to other insects of the same species

phloem – plant vascular tissue that conducts photosynthates; situated to the inside of the bark

photoperiod – length of daylight required for certain developmental processes and growth of a plant

photosynthate – general term for the products of photosynthesis

photosynthesis – the process in green plants (and in some bacteria) by which light energy is used to form organic compounds from water and carbon dioxide

phototropism – influence of light on the direction of plant growth

phylum – primary taxonomic division within a kingdom; the plural is phyla

physiological disorder – in plants, a disorder not caused by an insect, pathogen, or injury

physiology – the study of the life function (of a plant)

phytotoxic – a term used to describe a compound that is poisonous to plants

pigment – substance that appears coloured due to the absorption of certain light wavelengths

pinnate – compound leaf with leaflets along each side of a common axis

pioneer tree – is of the pioneer species which colonize previously uncolonized land, usually leading to ecological succession. They are the first organisms to start the chain of events leading to a livable biosphere or ecosystem. Since uncolonized land may have thin, poor quality soils with few nutrients, pioneer species are often hearty plants with adaptations such as long roots, root nodes containing nitrogen-fixing bacteria, and leaves that employ transpiration. They will die and break down after some time, making new soil for secondary succession, and nutrients.

plant growth regulator – a compound, effective in small quantities, that affects the growth and development of plants

plant growth substance – a naturally produced compound, effective in small quantities, that affects the growth and development of plants; see *plant hormone*
Plant Health Care (PHC) – a holistic and comprehensive program to manage the health, structure, and appearance of plants in the landscape
plant hormone – substance produced by a plant that affects physiological processes such as growth; see *plant growth substance*
planting specifications – detailed plans and statements of particular procedures and standards for planting
pole pruner – long-handled tool used to make small pruning cuts that cannot be reached with hand tools
pole saw – long-handled tool with a pruning saw on the end
pollarding – a specialty pruning technique used on large-maturing trees that results in the development of callus at the cut ends of the branches
positive-locking – unable to be opened unintentionally; locks automatically and requires two or more motions before opening
powdery mildew – white or grayish fungal growth on the surface of stems or foliage
preformed tree grip – device used to attach extra-high-strength cable to lag hooks or eye bolts
prescription fertilization – philosophy of basing fertilization recommendations on plant needs
pruning – cutting away unwanted parts of a plant
Prusik hitch – type of multi-wrapped friction hitch used in climbing and rigging; used to attach the Prusik loop to the climbing line when footlocking
Prusik loop – loop of rope, smaller in diameter than the climbing line, used for the secured footlock method of ascending a rope
radial aeration – means of aerating the soil in the root zone of a tree by removing and replacing soil in a spokelike pattern
radial transport – movement of substances in a tree perpendicular to the longitude axis of the tree
radial trenching – method of improving aeration in the root zone of a tree; radial aeration
raising – removing lower limbs from a tree to provide clearance
ray – tissues that extend radially across the xylem and phloem of a tree
reaction wood – wood formed in leaning or crooked stems, or on lower or upper sides of branches
reaction zone – a natural boundary formed by a tree to separate wood infected by disease organisms from healthy wood; important in the process of compartmentalization
reactive forces – the forces generated in operating a chain saw
redirect rigging – changing the path of a rigging line to modify the forces or the direction of limb removal
reduction – pruning to decrease the height and/or spread of a branch or crown
rescue kit – climbing gear and emergency equipment that should be set out on every job site so that it is available in an emergency situation
rescue pulley – light-duty pulley used in rigging operations
resistance – in plants, the tendency to withstand, or not to get, certain diseases
resistance varieties – plants that are tolerant of, or not susceptible to, certain disease or pest problems
resource allocation – distribution and use of photosynthate for various plant functions and processes
respiration – process by which carbohydrates are converted into energy by using oxygen
restoration – pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged
rhizosphere – immediate environment of roots where biological activity is high
rigging – method of using ropes and hardware to remove large limbs or take down trees
rigging line – rope used in rigging operations; usually the load-bearing line
rigging point – the place in a tree (natural or false crotch) that the load line passes through to control limb removal in rigging operations
ring porous – pattern of wood development in which the large-diameter vessels are concentrated in the earlywood
risk assessment – process of determining the level of risk posed by a tree or group of trees on a property
risk management – process of assessing and controlling risk in tree management
root ball – containment of roots and soil of a tree or other plant
root crown – the upper-most portion of the root system where the major roots join together at the base of the stem or the trunk
root hair – modified epidermal cells of a root that aid in the absorption of water and minerals
root pruning – in transplanting, the process of pre-digging a root ball to increase the density of root development within the final ball
rope sling – a section of rope, usually with at least one eyesplice, used to secure equipment or tree sections in rigging operations
running bowline – knot often used to tie off limbs for removal
rust – disease caused by a certain group of fungi and characterized by reddish brown spots
sanitation – practice of removing dead or diseased plant parts to reduce the spread of disease
sapwood – outer wood that actively transports water and minerals
scabbard – sheath for a pruning saw
scaffold branches – the permanent or structural branches of a tree
scale – one of a group of insects that attach themselves to plant parts and suck the sap
scorch – browning and shrivelling of foliage, especially at the leaf margin
screw link – connecting device with a threaded closure mechanism; used in rigging operations

secondary nutrients – nutrients required in moderate amounts by plants
secondary pest outbreak – increase in secondary pest population following a reduction in the population of natural predators or parasites
secured footlock – method of ascending a rope in which the climber is secured against a fall
serrate – sawtooth margin of a leaf with the teeth pointed forward
shackle – a U-shaped fitting with a pin run through it; clevis
shakes – separation of the growth rings in wood
shall – the word that designates a mandatory requirement in the ANSI standards
sheave – the inner fitting within a block over which the rope runs
ship auger – type of drill bit used to drill holes in trees for cable installation
shock-loading – the dynamic load placed on a rope or rigging apparatus when a moving log is stopped
should – the word that designates an advisory recommendation in the ANSO standards
sieve cells – long, slender phloem cells in gymnosperms
sieve tube elements – specialized phloem cells involved in photosynthate transport
sign – the physical evidence of a casual agent
simple leaf – a single, one-part leaf; not composed of leaflets
sink – a plant part that uses more energy than it produces
sinker roots – downward-growing roots that take up water and minerals; most are in the top 12 inches (30 centimeters) of soil
sinus – space between two lobes of a leaf
site analysis – determination of the conditions, environment, and needs of a planting site
site considerations – the factors that must be taken into account when assessing a planting site to select plant species
skeletonized – leaves that have had the tissue removed from between veins by insects
sling – device used in rigging to secure equipment or pieces being rigged
slowly soluble fertilizer – a fertilizer that has some particles coated to delay the dissolving of the minerals
snap – connecting device used by tree climbers primarily for connecting the climbing line to the saddle
snap cut – cut type used in branch removal in which offset, overlapping cuts allow the section to be manually broken off; mismatch cut
soil amendment – material added to soil to improve its physical or chemical properties
soil analysis – analysis of soil to determine pH, mineral composition, structure, and other characteristics
soil auger – device for removing cores of soil for inspecting or testing
soil compaction – compression of the soil resulting in reduction of the total pore space, especially the macropores
soil profile – vertical section through a soil, through all of the horizons
soil structure – the arrangement of soil particles
soil texture – the relative fineness or coarseness of a soil due to a particle size
source – plant part that produces carbohydrates; mature leaves are sources
species – a group of organisms composed of individuals of the same genus name that can reproduce among themselves and have similar offspring
specific epithet – the classification name that follows the genus name in scientific nomenclature
specifications – detailed plans and statements of particular procedures and standards
speed lining – a method of lowering tree segments past obstacles below
speedline – rigging line strung in such a way as to slide tree segments to the ground
splits – open cracks or fissures in tree trunks or branches
split-tail – tree climbing system in which the climbing hitch is formed with a separate, short length of rope
square knot – a knot used to tie together two ropes of equal diameter
staking – supporting a newly planted tree with stakes
standard down conductor – length of copper cable used in lightning protection systems on trees
standing part – the inactive part of a rope, as opposed to the working end
stippling – speckled or dotted areas on foliage
stomata – small pores between two guard cells on leaves and other green plant parts thorough which gases are exchanged
stopper knot – knot tied in the end of line to keep the tail from passing through the climbing hitch
stress – factor that negatively affects the health of a tree
structural defects – flaws, decay, or other faults in the trunk, branches, or root collar or a tree, which may lead to failure
structural pruning – pruning to establish a strong branch scaffold system
stunting – growth reduction of organisms, in this case, plants
subordinate – pruning to reduce the size and growth of a branch in relation to other branches or leaders
subsurface application – placement of fertilizer below the soil surface
sucker – shoot arising from the roots
surface application – placement of fertilizer or other material on the soil surface
symbiosis – a mutually beneficial association of two different types of living organisms
symbiotic – a mutually beneficial association
symbiotic relationship – association between two organisms that is mutually beneficial
symptom – a plant's reaction to a disorder
systemic – substance that moves throughout and is absorbed by the entire organism, in this case, by the roots, leaves, or both

tagline – rope used to control the swing and direction of drop of a limb being removed
tannins – organic substances produced by trees; believed to be involved in the tree's chemical defense processes
tap root – central, vertical root that grows right below the trunk and is often choked off by the development of other roots
taper – the change in diameter over the length of trunks and branches
target – person, object, or structure that could be injured or damaged in the event of tree or branch failure
tautline hitch – type of climbing hitch used by climbers to tie in
taxonomy – science that studies the description, denomination, and classification of living organisms, based on their similarities and differences
temporary branches – branches left in place when training young trees; such branches will be removed later
tensile strength – the breaking strength of a rope under load
tensiometer – instrument used to measure soil moisture
terminal bud – the bud on the end of a twig or shoot
terracing – method used to lower the soil grade in stages
thimble – device used in cabling to form the loop in the cable
thinning – selective removal of unwanted branches and limbs to provide light or air penetration through the tree or to lighten the weight of the remaining branches
threaded rod – metal rod used for support bracing of trees
thresholds – pest population levels requiring action
through-hardware – anchors or braces that pass completely through a trunk or branch and are secured with washers and nuts
throwing ball – device used to set a rope in a tree
throwing knot – a series of loops and wraps tied in a rope to form a weight for throwing
throwline – device consisting of a small weight attached to a thin, lightweight cord; used to set climbing ropes in trees
tie in – to secure a climber's rope in a tree with a tautline hitch
timber hitch – knot consisting of a series of wraps on a rope; used to secure the rope to a limb or tree
tip tying – tying a rope on the tip (brush) end of a limb or tree
topping – cutting back a tree to buds, stubs, or lateral not large enough to assume apical dominance
torts – wrongful acts, other breach of contract, for which civil action may be taken
tracheid – elongated, tapering xylem cell, adapted for support
translocated – movement of sugars in the phloem
transpiration – water vapour loss through the stomata of leaves
transplant shock – stress following transplant in which growth is reduced and the tree may wilt or drop foliage
transplanting – moving a plant to a new location
tree island – soil or landscape surrounding a tree, such as within a paved area
tree spade – mechanical device used to dig and move trees
tree well – wall constructed around a tree when the soil grade is raised to maintain the original soil level and provide oxygen to the root zone
tree wrap – material used to wrap the trunks of newly planted trees
trenching – digging to install utilities; of concern due to root damage
triangular cable system – tree cabling that forms a triangular shape
tropism – growth movement or variation of a plant as a response to an external stimulus such as light or gravity
tunneling – alternate means to trenching for installation of underground utilities
turgid – fully hydrated to a normal state of distension
undercut – a cut on the underside of a limb to be removed to prevent unwanted tearing as the limb falls
utility pruning – pruning around or near utility facilities with the object of maintaining safe and reliable utility service
variety – subdivision of a species having a distinct difference, and breeding true to that difference
vascular discolouration – darkening of the vascular tissues of woody plants in response to disease
vascular tissue – tissue that conducts water or nutrients
vector – organism that transmits a pathogen
venation – arrangement of veins
vertical mulching – filling vertical drilled holes in the soil with materials such as gravel, perlite, peat, or sand
vessels – stacked, tubelike, water-conducting cells in the xylem
vigor – overall health; capacity to grow and resist stress
vista pruning – selective pruning to allow a view from a predetermined point
vitality – overall health; a plant's ability to deal effectively with stress
water-holding capacity – ability of a soil to hold moisture
water-insoluble nitrogen (WIN) – nitrogen fertilizer in a form that is not soluble in water
water shoot – a secondary, upright shoot arising from the trunk, branches or roots of a plant
watersprout – an upright, adventitious shoot arising from the trunk or branches of a plant; although incorrect, it is also called a sucker
webbing sling – length of sewn webbing, often formed into a loop, used as an attachment in rigging
whorled – leaves arranged in a circle around a point on the stem
wilt – loss of turgidity and subsequent drooping of leaves
wire basket – type of metal basket used to support the root ball of balled-and-burlapped plants

witch's broom – plant disorder in which large number of accessory shoots develop
work plan – predetermined, orderly means for job completion
working end – the part of a rope terminated for use
working-load limit (WLL) – tensile strength divided by design factor; load limit for a rope or piece of equipment
work-positioning lanyard – rope or strap designed to aid in climbing and tree work; secondary means of attachment
wound dressing – compound applied to tree wounds or cuts, if necessary
xylem – main water- and mineral-conducting tissue in trees and other plants; provides structural support and becomes wood after lignifying