SKILLED TRADES BC

PROGRAM OUTLINE

Arborist Technician

SKILLED TRADES BC

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SKILLED TRADES BC

ARBORIST TECHNICIAN
PROGRAM OUTLINE

APPROVED BY INDUSTRY
May 2010

Developed By
SkilledTradesBC
Province of British Columbia

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Section 1

INTRODUCTION

Arborist Technician

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 Qs) 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 the 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 recommends 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 Practical Evaluation 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 Arborist Technician 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 Arborist Technician 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 instructor, equipment and material, and facility for training providers. 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 Arborist Technician 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.

Arborist Technician Job Description

An Arborist Technician is a certified tradesperson who is able to provide specific practical elements of tree care, working up to 3 meters from the ground:

- Pruning
- Planting
- Removal

This trade engages in a range of outdoor work activities in varying weather conditions.
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 an Arborist Technician, the tradesperson must be able to:

- Interpret reference materials such as regulations and technical documentation
- Assimilate and apply new knowledge through field work
- Operate hand and power tools
- Operate power equipment (i.e. stump grinder, dump truck, chipper)
- Support workers aloft (i.e. aerial lift truck and climber)
- Identify 30 common tree species and 20 common shrubs and demonstrate basic knowledge of tree biology
- Understand and be able to initiate and support emergency response procedures from the ground
- Recognize his/her own technical limitations
- Use effective written and verbal communication skills

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:

Interest in natural environment and trees, enjoys working outdoors, physically fit, works well in a team environment, ability to remain level headed, problem solving skills, positive response to change, critical thinking skills, situational awareness, ability to predict and plan for safe work practices, and good physical coordination.

Pre-requisites:

- Grade 10 education,
- 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 HortEducationBC. Members include:

- Kyle Banks — Davey Tree Expert Company of Canada
- Mark Brown — District of North Vancouver
- Paul Buikema — Progress Landscaping
- Thor Clausen — Arbortech Tree Services
- Rupert Evans — The Butchart Gardens
- Wes Hawley — Hawleyscape Tree Service Ltd.
- Clifford Hoegler — BC Plant Health Care Inc.
- Anne Kadwell — HortEducationBC
- Kerin Matthews — Mountain Maple
- Pat Perry — 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:

- 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
- Hud Elwood — Branching Out Tree Service
- Rupert Evans — The Buchart Gardens
- Wes Hawley — Hawleyscape Tree Service Ltd.
- Jason Healey — City of Surrey
- Laura Henderson — Davey Tree Expert Company of Canada
- Dylan Jones — Cedar Ridge Tree Care
- Cory Manton — District of Saanich
- Kerin Mathews — Mountain Maple
- Nick Perkins — Davey Tree Expert Company of Canada
- Pat Perry — Davey Tree Expert Company of Canada
- Lars Shearer — Burley Boys Tree Service Ltd.
- Darren Silcox — Bartlett Tree Experts Company of Canada
- Scott Suffron — Davey Tree Expert Company of Canada
- Gail Szostek — District of Maple Ridge
- Alex Thorburn — City of Richmond
- Jason Timmis — Cedar Ridge Tree Care
- Gareth Tudor-Jones — Bartlett Tree Experts Company of Canada
- Blair Veitch — Davey Tree Expert Company of Canada
- Sean Wightman — Burley Boys Tree Service Ltd
- Bill Wilde — Arbor Vitae Tree Consultants

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SkilledTradesBC would like to acknowledge the dedication and hard work of these and other industry representatives in identifying the training requirements of the Arborist Technician 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

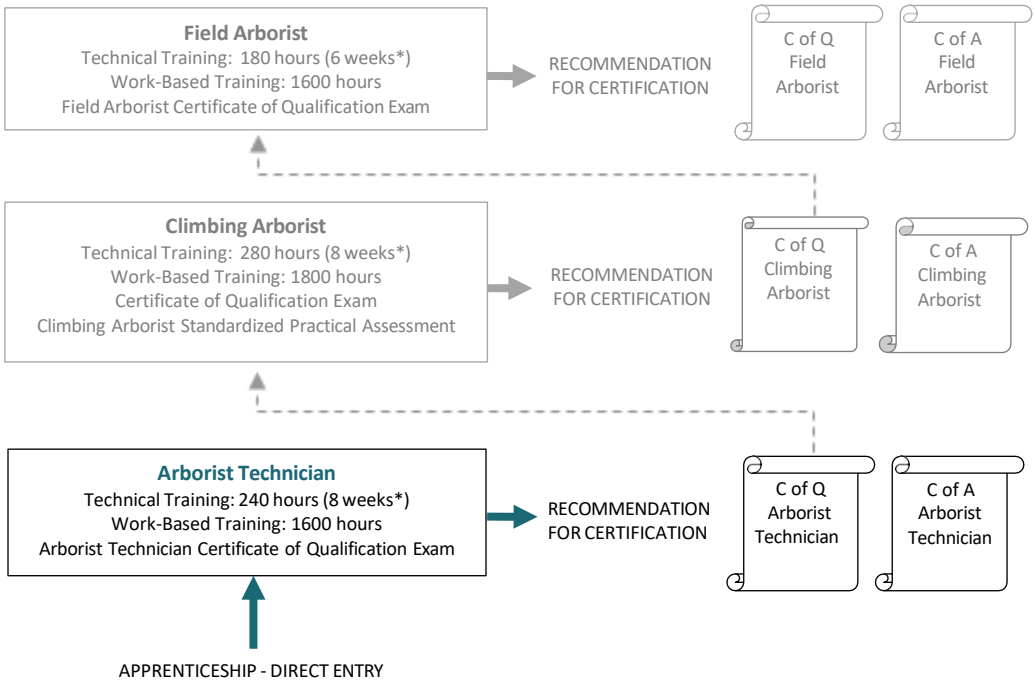
Arborist Technician

Program Credentialing Model

Apprenticeship Pathway

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

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



**Suggested duration based on 30 hour week*

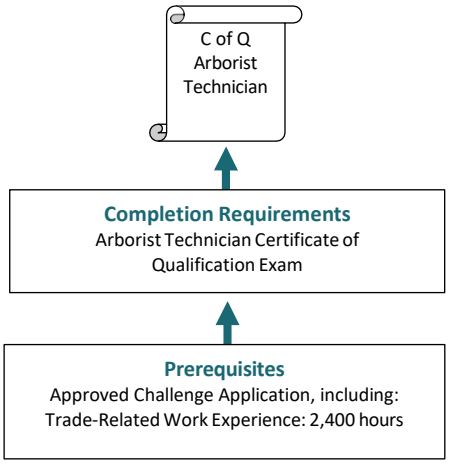
CROSS-PROGRAM CREDITS
Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

None

Challenge Pathway

This graphic provides an overview of the Arborist Technician 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

None

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.

Regulations and Other Occupational Skills A	Identify relevant legislation and regulations A1	Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI) A2	Describe electrical systems and hazards A3	Identify work site hazards and develop and implement safe work plan A4	Apply regulations to the job site A5	Describe workplace leadership and communication A6
	1	1	1	1	2	2
	Write a variety of technical reports A7					
	3					
Power Equipment B	Use chipper in a safe and effective manner B1	Work safely and effectively on ground operations while using an aerial lift truck B2	Operate a single axle non-air brake dump truck B3	Operate a stump grinder B4	Work safely and effectively during aerial operations with aerial lift device B5	
	1	1	1	1	2	
Hand Tools and Small Power Tools C	Use and maintain hand tools C1	Operate a variety of small power tools C2	Use and inspect ladders C3			
	1	1	1			
Tree Work and Management D	Identify common trees in British Columbia D1	Identify common shrubs in British Columbia D2	Describe basic tree biology and its importance to good arboriculture practices D3	Safely prune trees to appropriate Industry standards D4	Safely prune shrubs to appropriate Industry standards D5	Safely plant trees to Industry standards D6
	1	1	1	1	1	1

	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	Identify common trees in British Columbia D15	Identify common quarantine pests of trees in Canada D16	Develop and implement integrated pest management plans for trees in urban setting D17	Diagnose and treat insects and diseases D18
	2	2	3	3	3	3
	Inspect, assess and identify a variety of risks to trees D19	Inventory trees D20	Preserve and retain trees D21	Examine tree value appraisal D22		
	3	3	3	3		
Falling and Bucking E	Demonstrate safe chain saw use E1	Describe and demonstrate the process of falling E2	Practice falling a tree E3	Manage falling hazards E4	Recognize hazardous weather conditions E5	Recognize dangerous falling practices E6
	1	1	1	1	1	1
	Identify special falling techniques E7	Plan for limbing and bucking E8				
	1	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

ARBORIST TECHNICIAN

Occupation Description: An "Arborist Technician" is a person who undertakes to prune and perform other work on trees from the ground. In their work Arborist Technicians identify plants, select rigging gear, and have knowledge of how to fall, limb and buck trees, assist climbers, chip brush, cut wood and clean-up sites after tree care operations.

Regulations and Other Occupational Skills A	Identify relevant legislation and regulations A1	Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI) A2	Describe electrical systems and hazards A3	Identify work site hazards and develop and implement safe work plan A4		
Power Equipment B	Use a chipper in a safe and effective manner B1	Work safely and effectively on ground operations while using an aerial lift truck B2	Operate a single axle non-air brake dump truck B3	Operate a stump grinder B4		
Hand Tools and Small Power Tools C	Use and maintain hand tools C1	Operate a variety of small power tools C2	Use and inspect ladders C3			
Tree Work and Management D	Identify common trees in British Columbia D1	Identify common shrubs in British Columbia D2	Describe basic tree biology and its importance to good arboriculture practices D3	Safely prune trees to appropriate industry standards D4	Safely prune shrubs to appropriate industry standards D5	Safely plant trees to industry standards D6
Falling and Bucking E	Demonstrate safe chain saw use E1	Describe and demonstrate the process of falling E2	Practice falling a tree E3	Manage falling hazards E4	Recognize hazardous weather conditions E5	Recognize dangerous falling practices E6

	Identify special falling techniques E7	Plan for limbing and bucking E8			
	1	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	
	1	1	1	1	
Climbing G	Select and inspect basic climbing gear G1				
	1				
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	
	1	1	1	1	

Training Topics and Suggested Time Allocation
ARBORIST TECHNICIAN

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	Regulations and Other Occupational Skills	6%	80%	20%	100%
A1	Identify Relevant Legislation and Regulations		✓		
A2	Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI)		✓		
A3	Describe Electrical Systems and Hazards		✓		
A4	Identify Work Site Hazards and Develop and Implement Safe Work Plan		✓	✓	
Line B	Power Equipment	20%	25%	75%	100%
B1	Use a Chipper in a Safe and Effective Manner		✓	✓	
B2	Work Safely and Effectively on Ground Operations While Using an Aerial Lift Truck		✓	✓	
B3	Operate a Single Axle Non-Air Brake Dump Truck		✓	✓	
B4	Operate a Stump Grinder		✓	✓	
Line C	Hand Tools and Small Power Tools	5%	25%	75%	100%
C1	Use and Maintain Hand Tools		✓	✓	
C2	Operate a Variety of Small Power Tools		✓	✓	
C3	Use and Inspect Ladders		✓	✓	
Line D	Tree Work and Management	36%	50%	50%	100%
D1	Identify Common Trees in British Columbia		✓		
D2	Identify Common Shrubs in British Columbia		✓		
D3	Describe Basic Tree Biology and its Importance to Good Arboriculture Practices		✓		
D4	Safely Prune Trees to Appropriate Industry Standards		✓	✓	
D5	Safely Prune Shrubs to Appropriate Industry Standards		✓	✓	
D6	Safely Plant Trees to Industry Standards		✓	✓	
Line E	Falling and Bucking	18%	40%	60%	100%
E1	Demonstrate Safe Chain Saw Use			✓	
E2	Describe and Demonstrate the Process of Falling		✓	✓	
E3	Practice Falling a Tree			✓	
E4	Manage Falling Hazards		✓		
E5	Recognize Hazardous Weather Conditions		✓		
E6	Recognize Dangerous Falling Practices		✓		
E7	Identify Special Falling Techniques		✓		
E8	Plan for Limbing and Bucking		✓		

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line F	Rigging	7%	40%	60%	100%
F1	Describe Rigging Concepts Including Selection and Use of Ropes		✓	✓	
F2	Select and Use Knots, Hitches and Slings in Rigging		✓	✓	
F3	Use Various Types of Hardware in Rigging Systems		✓	✓	
F4	Select and Use Friction Control Devices for Rigging		✓	✓	
Line G	Climbing	1%	60%	40%	100%
G1	Select and Inspect Basic Climbing Gear		✓	✓	
Line H	Emergency Response	7%	90%	10%	100%
H1	Evacuate Worker		✓	✓	
H2	Review and Describe First Aid Certification Requirements		✓		
H3	Describe Precautions and Procedures to Prevent and Suppress Fires		✓		
H4	Implement Spill Response		✓		
	Total Percentage for Arborist Technician	100%			

Section 3
PROGRAM CONTENT

Arborist Technician

Arborist Technician

Line (GAC): A REGULATIONS AND OTHER OCCUPATIONAL SKILLS

Competency: A1 Identify Relevant Legislation and Regulations

The Arborist Technician regularly applies their understanding of relevant legislation and regulations to activities that impact their onsite activities.

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

Objectives

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

- Identify and apply regulations for all relevant legislation that impacts their onsite activities, according to the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify applicable federal legislation and regulations	• Where to find regulations and standards • How specific federal requirements apply to arboricultural activities
2. Identify applicable provincial legislation and regulations	• How specific provincial requirements apply to arboricultural activities
3. Identify applicable local regulations	• How specific local requirements apply to arboricultural activities
4. Apply applicable regulations	• Ability to apply regulations, standards, and procedures to the job
5. Apply relevant WorkSafeBC procedures	• WorkSafeBC accident and near miss reporting procedures • Accident investigation requirements

Achievement Criteria

Theoretical evaluation

Given a series of multiple-choice questions on regulations for all relevant legislation that impacts their onsite activities, 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. A case study scenario where the apprentices are required to identify the appropriate and applicable regulations.

Line (GAC): A REGULATIONS AND OTHER OCCUPATIONAL SKILLS

Competency: A2 Explain Musculoskeletal Injury (MSI) and Repetitive Strain Injury (RSI)

An Arborist Technician will regularly perform a variety of job tasks involving repetitive motions and physical exertion. They must be aware of safe working procedures and precautions to avoid Musculoskeletal Injuries (MSI) and Repetitive Strain Injuries (RSI).

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 the signs, symptoms and causes of MSI and RSI, and be able to take the appropriate precautions to prevent these injuries from occurring while on the job.

LEARNING TASKS	CONTENT
1. Define MSI	• A condition where a part of musculoskeletal system is injured over time • A large group of conditions that result from traumatizing the body in either a minute or major way over a period of time; the build up of trauma that causes the disorder • Conditions are often focused on a joint and affect the muscle and bone; however other areas can be strained and their response to that trauma can be an injury
2. Define RSI	• An injury to a part of the body that is caused by overusing or straining that body part • A large group of conditions that result from using the body in a way it is not designed for or capable of comfortably working • These conditions are often focused on a joint and usually affect the muscle, bone, tendon or bursa of the joint; however, other anatomical features and areas can be stressed and their response to that strain can be an injury

3. Identify signs and symptoms of MSI and RSI	• Differ in type and severity from person to person, even though their work tasks may be similar
	• Take weeks, months or years to develop
	• Signs of injury may be present only in later stages when irreversible damage has occurred
	• Signs include:
	  ○ Pain
	  ○ Change in skin colour
	  ○ Numbness or tingling
	  ○ Decreased range of motion
	  ○ Decreased strength
	  ○ Swelling
	  ○ Fatigue

4.	Identify the causes of MSI and RSI	• Repeated small injuries to muscles, tendons, ligaments, nerves, blood vessels and joints • Specific contributing factors present in work tasks and activities • Long unbroken periods of work • Ergonomics or the lack of it • Lack of information leads to neglect by the concerned individuals
5.	Identify contributing factors to MSI and RSI	• Awkward postures • Repetitive motions • Vibrations • Forceful exertions • Pressure points
6.	Identify preventive measures for MSI and RSI	• Ensure proper training has occurred • Know the hazards or factors in the job in regards to MSI and RSI • Knowledge of proper use of equipment and tools provided • Report MSI and RSI hazards to your supervisor and request training to avoid MSI injuries • Be aware of your posture and areas of tension in muscles and joints • Alternate work activities or take short breaks from repetitive or forceful tasks • Move and change position during work task • Be aware of the signs of MSI and RSI and report any symptoms to your supervisor

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the signs, symptoms, causes, and preventive measures for MSI and RSI, 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. Signs and symptoms of MSI and RSI
2. Causes of MSI and RSI
3. Contributing factors to MSI and RSI
4. Preventive measures for MSI and RSI

LINE A: A REGULATIONS AND OTHER OCCUPATIONAL SKILLS

Competency: A3 Describe Electrical Systems and Hazards

An Arborist Technician during a work day may be exposed to electrical hazards. They must be able to identify and avoid the hazards to protect themselves and others.

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

Objectives:

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

- Describe electrical systems and hazards and avoid hazards to protect themselves and others, as per Industry standards and authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify electrical hazards	• Electrical system construction examples • Behaviour of electricity • Electrical hazards (step and touch)
2. Describe electrical hazard abatement techniques for self and others	• Limits of approach • Safe work methods

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions identifying and avoiding hazards to protect themselves and others from risk of injury, 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. Electrical hazards
2. Line identification
3. Maintain limits of approach
4. Electrical step and touch potentials

LINE A: A REGULATIONS AND OTHER OCCUPATIONAL SKILLS

Competency: A4 Identify Work Site Hazards and Develop and Implement a Safe Work Plan

An Arborist Technician must identify work site hazards and participate in the development and implementation of a safe work plan.

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:

- Participate in identifying hazards, establishing a safe work plan and conducting both pre- and post-job inspections, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify job site hazards and potential risks	• Electrical and utility services • Gravitational ("slip, trip and fall") • Overhead ("struck by") • Thermal (heat and cold stress) • Mechanical (pinch point, "struck against", vehicle) • Public • Behavioural (fatigue, rushing, complacency, stress, substance abuse, ignorance, frustration) • Chemical • Compressed gas • Environmental (insects, plants, weather)
2. Participate in a visual tree assessment	• Fungal fruiting bodies • Decay • Structural defects • Cracks • Inclusions • Dead wood • Hangers • Root lifting
3. Examine Hierarchy of Control	• Elimination • Substitution • Contain risk at source • Remove employee from risk • Reduce exposure to risk by safe working systems/practices • Warning signals (audible, visual – i.e. "all clear") • Personal protective equipment • Discipline/Supervision
4. Develop a written safe work plan	• Hierarchy of Controls • Site hazards • Safe work procedures for abatement • Applicable regulations

5.	Implement the safe work plan	• PPE • Signs, cones, flagging tape, barricades • Tools and equipment relative to tasks
6.	Participate in a post-job inspection	• Post-job hazards such as hangers • Property damage • Clean-up • Man check (head count)

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on identifying hazards, establishing a safe work plan and conducting both pre- and post-job 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. Knowledge of hazards types
2. Knowledge of Hierarchy of Controls
3. Knowledge of visual tree assessment
4. Knowledge of applicable regulations
5. Knowledge of safe work plan requirements (documentation and implementation)
6. Knowledge of post-job inspection requirements

Performance evaluation

Performance — The apprentice should be able to:

1. Wear appropriate PPE
2. Participate in a pre-job site-hazard inspection and
3. Participate in a visual tree assessment
4. Develop a safe work plan
5. Implement a safe work plan
6. Participate in a post-job inspection

Conditions — Given a typical work-site situation.

LINE B: B POWER EQUIPMENT

Competency: B1 Use a Chipper in a Safe and Effective Manner

An Arborist Technician regularly uses a chipper in a safe and efficient manner. Chippers are used to chip tree debris into smaller pieces for transporting away from the work site.

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

Objectives:

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

- Use a chipper in a safe and efficient manner, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Identify and use a variety of safety devices and features	• Critical safety features and devices
2. Operate brush chipper according to owner's manual	• Maintenance requirements
3. Use personal protective equipment	• Appropriate PPE for working with chippers as per industry standards and/or WorksafeBC regulations
4. Safely feed wood debris into chipper	• Safe work procedures as they apply to chippers
5. Perform basic maintenance on a brush chipper	• Basic maintenance requirements on a chipper
6. Apply lockout/tag out procedures to maintenance	• Lockout/tag out procedures
7. Establish safe work site	• Safe work plan

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe operation of a chipper, 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 diagram, identify and describe component parts including safety shut off, start-up and operation parts of a common sized chipper
2. The apprentice will have knowledge of work related regulations and bylaws related to chipper operations, including transportation regulations
3. Identify maintenance procedures
4. Identify lock-out procedures
5. Identify personal protection equipment
6. Explain the procedures for safe chipper operation
7. Explain the procedures for clearing a jammed chute
8. Explain the procedures for chipper shut down
9. Establish criteria to set up a safe work site
10. Identify potential hazards

Performance evaluation

Performance The apprentice should be able to:

1. Wear appropriate PPE for chipper operations
2. Attach and detach from tow vehicle (i.e. parking)
3. Set-up safe work area
4. Inspect equipment before operations, as per operator's manual
5. Demonstrate working knowledge of safety features during operations
6. Position chipper chute
7. Stage brush
8. Perform start-up operations
9. Demonstrate engaging and disengaging the clutch
10. Safely feed chipper
11. Maintain a safe work site
12. Perform shut down operations
13. Prepare chipper for transport

Conditions Given a chipper.

LINE B: B POWER EQUIPMENT

Competency: B2 Work Safely and Effectively On Ground Operations While Using an Aerial Lift Truck

Arborists use an aerial lift truck to access trees to perform a variety of tree care activities. Normally the arborist is working from the bucket of the lift truck; however, they may also be the truck operator. An Arborist Technician will often be the ground operator of the aerial lift truck but will not be working from the bucket of the truck.

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:

- Safely carry out ground operations with an aerial lift truck to access trees to perform a variety of tree care activities, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Assess tree and lift placement	• Aerial lift positioning and set up
2. Assess workplace for hazards	• Safe and efficient access methods • Assess site for hazards and obstacles
3. Identify and use safety devices and features	• Safety devices on aerial lift trucks
4. Safely carry out ground operations according to owner's manual	• Operation of ground components of aerial lift activity
5. Use appropriate PPE	• PPE for aerial lift operations

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on safely carrying out ground operations with an aerial lift truck to access trees to perform a variety of tree care activities, 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. Awareness of reach capacity and load limitations
2. Given information about a site, be able to identify hazards and required set up procedures
3. Limitations of approach to power lines
4. Hazards of working with hydraulic oil

Performance evaluation

Performance
The apprentice should be able to:

1. Wear required PPE
2. Ensure vehicle is properly positioned
3. Safely set-up work site
4. Assess hazards
5. Safely place and secure outriggers
6. Perform a visual safety inspection of equipment and components according to operator's manual
7. Perform pre-flight test including drift test according to operator's manual
8. Operate/maneuver lift avoiding obstacles
9. Stow lift and secure vehicle for transport

Conditions
Given an aerial lift truck.

LINE B: B POWER EQUIPMENT

Competency: B3 Operate a Single Axle Non-Air Brake Dump Truck

Arborist Technicians typically operate dump trucks to transport tools, debris, and personnel. In addition they regularly pull a trailer or chipper behind the dump truck.

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:

- Safely use and operate dump trucks to transport tools, debris, and personnel, according to Industry standards and the authorities having jurisdiction.
- Safely operate the vehicle pulling a trailer or chipper behind the dump truck, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Perform pre-trip safety and maintenance inspection	• Safety and maintenance procedures
2. Attach trailer and/or chipper	• Trailer and chipper attachment
3. Drive the vehicle safely	• Operation of commercial vehicles as per motor vehicle regulations
4. Safely attach a variety of loads to a trailer and tie down when needed	• Tie down a variety of loads in a safe manner
5. Safely operate PTO and dump box	• PTO and dump box

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe use and operation of dump trucks to transport tools, debris, and personnel, and the safe operation of the vehicle pulling a trailer or chipper behind the dump 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 applicable highway and transportation legislation and regulations
2. Knowledge of Gross Vehicle Weight Rating and truck tow capacity
3. Knowledge of safe backup procedure
4. Knowledge of procedures and materials to secure loads

Performance evaluation

Performance — The apprentice should be able to:

1. Perform a pre-trip inspection
2. Drive truck through obstacle course in forward
3. Drive truck through obstacle course in reverse
4. Demonstrate ability to raise and lower dump box
5. Perform a trailer hook-up
6. Secure a load for transport
7. Drive truck and trailer through obstacle course in forward
8. Drive truck and trailer through obstacle course in reverse
9. Park and disconnect trailer
10. Park truck

Conditions — Given a single axle dump truck.

LINE B: B POWER EQUIPMENT

Competency: B4 Operate a Stump Grinder

Arborist Technicians occasionally use stump grinders to mechanically remove stumps.

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:

- Safely use stump grinders to mechanically remove stumps, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Use appropriate PPE	• Appropriate PPE • Underground hazards • Obstacles
2. Perform a work zone assessment	
3. Ensure site safety	• Follow site safety procedures
4. Identify emergency procedures	• Utilities
5. Safely load and unload stump grinder	• Safe loading and unloading for a trailer
6. Operate stump grinder in a safe manner according to owner's manual and all WorkSafeBC regulations	• Safe operation and maintenance procedures as per WorkSafeBC regulations

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe use of stump grinders, 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 appropriate PPE
2. Knowledge of pre-digging procedures
3. Knowledge of emergency procedures for damage to utilities

Performance evaluation

Performance The apprentice should be able to:

1. Wear appropriate PPE
2. Perform pre-trip inspection on equipment according to owner's manual
3. Safely unload grinder from trailer
4. Locate and demonstrate safety components of machine
5. Set-up and safely secure the work zone
6. Demonstrate basic manoeuvring
7. Operate grinder
8. Perform a maintenance check and change a tooth
9. Load and secure to trailer

Conditions Given a stump-grinder.

LINE C: C HAND AND SMALL POWER TOOLS

Competency: C1 Use and Maintain Hand Tools

An Arborist Technician will use and maintain a wide variety of hand tools in their daily job tasks in both ground and aerial situations. Tools include pruning shears, hand saws, shovels and axes (See pg. 87 for the complete list of hand tools).

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:

- Use and maintain a wide variety of hand tools in their daily job tasks in both ground and on ladders up to 3 meters off the ground, according to Industry standards. Tools will include pruning shears, hand saws, shovels, axes, etc. (See pg. 87 for the complete list of hand tools.)

LEARNING TASKS	CONTENT
1. Maintain hand tools to industry best practices	• Tools used in the trade (see pg. 87 for a complete list of tools) • General maintenance requirements of hand tools
2. Inspect hand tools before using	• Identify the right tool for the job
3. Clean hand tools after use	• Cleaning procedures for a wide variety of tools
4. Sharpen hand tools	• Saw, pruning shear and other equipment sharpening procedures
5. Use hand tools in a safe and effective manner on the ground and on ladders up to 3 meters off the ground	• Tool use procedures on the ground and on ladders
6. Store hand tools	• Cleaning and storage procedures

Achievement Criteria:

Theoretical evaluation

Given a series of multiple choice questions on the safe use and maintenance of a variety of hand tools, 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 by-pass and anvil pruning blades
2. Knowledge of tool materials, limitations and benefits
3. Knowledge of tool maintenance and storage procedures
4. Knowledge of tool selection and performance limitations

Performance evaluation

Performance
The apprentice should be able to:

1. Wear appropriate PPE
2. Select the correct tool for the job
3. Operate the hand tool with consideration of safety for self and others
4. Demonstrate tool sharpening technique on given hand tools
5. Demonstrate maintenance and storage procedures

Conditions
Given a variety of hand tools.

LINE C: C HAND AND SMALL POWER TOOLS

Competency: C2 Operate a Variety of Small Power Tools

An Arborist uses and maintains a wide variety of small power tools in their daily job task in ground and in aerial situations. An Arborist Technician only uses these on the ground or from ladders.

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:

- Safely use and maintain a wide variety of small power tools in their daily on the ground job tasks and on ladders up to 3 meters off the ground, according to Industry standards. (See pg. 87 for the complete list of power tools.)

LEARNING TASKS	CONTENT
1. Knowledge of a wide variety of power tools	• Small power tools and their uses (see pg. 87 for a complete list of power tools)
2. Ability to identify the right tool for the job	• Identification of appropriate tools for specific uses
3. Ability to sharpen a wide variety of tools	• Sharpen a wide variety of tools
4. Knowledge of cleaning and storage	• Cleaning and storage procedures
5. Safe operation of small tools for ground situation and on ladders up to 3 meters off the ground	• Small power tool operation on the ground and on ladders

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe use and maintenance of a variety of small power tools, 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 appropriate PPE
2. Knowledge of safe work practices
3. Knowledge of tool materials and limitations and benefits
4. Knowledge of tool maintenance, storage and fuelling procedures
5. Knowledge of tool selection
6. Knowledge of basic maintenance of small engines

Performance evaluation

Performance The apprentice shall be able to:

1. Wear appropriate PPE
2. Select the correct tool for the job
3. Operate the tool with consideration of safety for self and others
4. Demonstrate tool sharpening, cleaning and fuelling techniques
5. Demonstrate maintenance and storage procedures

Conditions Given a variety of small power tools.

LINE C: C HAND AND SMALL POWER TOOLS

Competency: C3 Use and Inspect Ladders

An Arborist Technician regularly uses ladders to accomplish a wide variety of work tasks in a safe and effective manner.

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:

- Use ladders to accomplish a wide variety of work tasks in a safe and effective manner, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Inspect, set-up and use a variety of ladders in a safe manner	• Ladders and their uses • Safe ladder set-up in a variety of situations • Safe ladder use
2. Inspect ladders prior to use	• Safety features and problems
3. Maintain ladders to manufacturer's specification	• Maintenance and cleaning procedures
4. Transport ladders on the job site	• Safe ladder transportation and handling procedures
5. Store ladders	• Ladder storage

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the various ladders and their safe use, 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. PPE and WorkSafeBC regulations for ladder use
2. Knowledge of different ladder types
3. Knowledge of limits of approach
4. Knowledge of various ladder construction materials

Performance evaluation

Performance The apprentice should be able to:

1. Wear appropriate PPE
2. Perform a site inspection for safety hazards and terrain stability
3. Safely set-up and position a ladder
4. Set-up and secure an orchard ladder in position in uneven terrain
5. Ascend to the highest allowable work position and descend safely
6. Transport a ladder by hand
7. Load and secure a ladder for road transport

Conditions Given a variety of ladders.

LINE D: D TREE WORK AND MANAGEMENT

Competency: D1 Identify Common Trees in British Columbia

An Arborist Technician regularly identifies a variety of different tree species in order to make pruning, maintenance or planting decisions.

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:

- Demonstrate the ability to identify 30 of the common tree species in British Columbia.

LEARNING TASKS	CONTENT
1. Identify trees during all seasons of the year	• Binomial nomenclature (botanical name) 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, fruit, cones, leaf scar, stems, bark, inflorescences, leaf arrangement and morphology, growth habit
3. Explain the use of dichotomous keys for tree identification purposes	• Conifer and deciduous dichotomous keys
4. Describe broadleaf evergreens	• Angiosperm broadleaf evergreens
5. Describe coniferous plants	• Evergreen and deciduous species
6. Describe deciduous angiosperm	• Deciduous hardwoods

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the 30 common trees 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 trees
2. Describe growth habit
3. Describe morphological characteristics
4. Describe seasonal tendencies
5. Use a basic dichotomous key

LINE D: D TREE WORK AND MANAGEMENT

Competency: D2 Identify Common Shrubs in British Columbia

An Arborist Technician has a working knowledge of a variety of different shrub species and can identify them using a variety of different methodologies.

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:

- Given the necessary materials, the apprentice will demonstrate the ability to identify 20 of the common shrub species in British Columbia.

LEARNING TASKS	CONTENT
1. Identify shrubs during all seasons of the year	• Binomial nomenclature (botanical name) and general tree taxonomy to family
2. Describe the characteristic parts of shrubs to help correctly identify them	• Morphological characteristics of a variety of common shrubs including buds, fruit, cones, leaf scar, stems, bark, inflorescences, leaf arrangement and morphology, growth habit
3. Explain the use of dichotomous keys for shrub identification purposes	• Dichotomous keys

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the 20 of the common shrubs 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 shrubs
2. Describe growth habit
3. Describe morphological characteristics
4. Describe seasonal tendencies
5. Use a basic dichotomous key

LINE D: D TREE WORK AND MANAGEMENT

Competency: D3 Describe Basic Tree Biology and its Importance to Good Arboriculture Practices

An Arborist Technician applies their knowledge of basic tree biology to make informed decisions with respect to sound arboriculture practices.

Importance 1 (minimally) to 5 (extremely)	Frequency of use 1 (rarely) to 5 (daily)
3	2

Objectives:

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

- Describe basic biology and how it relates to sound arboriculture practices, according to Industry standards.

LEARNING TASKS	CONTENT
1. Describe the relation between structures and functions in a tree by discussing the interaction of each within a plant or tree	• Primary and secondary meristem growth, stem anatomy, auxins and hormones
2. Explain photosynthesis, transpiration and cell growth in tree parts	• Photosynthesis, transpiration, respiration, cell division and growth
3. Describe the basic functions of layers of tissue and the role each contributes	• Dermal/bark tissues • Phloem • Xylem • Parenchyma • Sclerenchyma • Cambium
4. Describe roots and their function	• Root structure and function
5. Discuss correct cuts based on tree biology	• Compartmentalization of decay in trees • Branch collars • Woundwood formations • Species resistance to decay

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on basic tree biology and how it relates to sound arboriculture practices, 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. Photosynthesis
2. Transpiration
3. Cell division and growth
4. Tree tissues (phloem, xylem, parenchyma, sclerenchyma, cambium and their functions in a tree)
5. Root structure and function
6. Compartmentalization
7. Branch and trunk collars

LINE D: D TREE WORK AND MANAGEMENT

Competency: D4 Safely Prune Trees to Appropriate Industry Standards

An Arborist Technician will regularly prune a wide variety of trees using appropriate techniques, and tools to Industry standards.

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:

- Use pruning tools, carry out pruning cuts, and canopy raise trees, as per Industry standards. (Tasks will only be carried out from the ground or from ladders up to 3 m in height.)

LEARNING TASKS	CONTENT
1. Safely and effectively utilize appropriate tools	• Cutting tool selection • Hazard determination with respect to pruning

2. Use proper pruning cuts and principles	• Basic tree anatomy:
	  ○ Branch attachments
	  ○ Included bark
	  ○ Selecting scaffold branches
	  ○ Excurrent form
	  ○ Decurrent form
	• Prune trees using a variety of techniques
	• BC Landscape Standard and ANSI A-300 (Pruning Standard)
	• Hazardous conditions around trees

3. Select pruning strategy	• Pruning principles:
	  ○ Cleaning
	  ○ Thinning
	  ○ Raising
	  ○ Reduction

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe use pruning tools, carrying out pruning cuts, and canopy raising trees, 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. Selection of appropriate tools
3. Selection of appropriate pruning technique
4. Fall protection while using a ladder

Performance evaluation

Performance
The apprentice should be able to:

1. Wear appropriate PPE for work
2. Assess the tree and site for hazards
3. Select appropriate tools for pruning
4. Determine and then demonstrate appropriate pruning technique
    - Canopy cleaning
    - Canopy raising

Conditions
Given an on-site situation.

LINE D: D TREE WORK AND MANAGEMENT

Competency: D5 Safely Prune Shrubs to Appropriate Industry Standards

An Arborist Technician not only works with trees but will often have to prune shrubs in a variety of landscape settings using appropriate techniques and tools to Industry standards.

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:

- Demonstrate the ability to prune a wide variety of shrubs using appropriate techniques and tools, according to Industry standards. (Tasks will only be carried out from the ground or from ladders up to 3 m in height.)

LEARNING TASKS	CONTENT
1. Identify common evergreen and deciduous shrubs	• Identify common shrubs and their growth habits
2. Explain the effects of pruning for shrubs with different growth habits and functional characteristics	• Pruning timing
3. Prune shrubs for formal and natural form with a variety of tools	• Pruning tools and trimming tools (ie. Hand and power shears) • Pruning techniques for common deciduous and evergreen shrubs • Prune in a safe and efficient manner

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the pruning of a wide variety of shrubs using appropriate techniques and tools, 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 large woody shrubs
2. Describe growth habit
3. Describe pruning techniques for shrubs
4. Identify correct pruning tools for given shrubs

Performance evaluation

Performance The apprentice should be able to:

1. Wear appropriate PPE for work
2. Assess the shrub and site for hazards
3. Select appropriate tools for the tasks
4. Correctly prune a variety of shrubs for formal (shearing)
5. Correctly prune a variety of shrubs for natural form

Conditions Given an on-site situation.

LINE D: D TREE WORK AND MANAGEMENT

Competency: D6 Safely Plant Trees to Industry Standards

An Arborist Technician will occasionally have to plant trees and support trees in landscapes to accepted Industry standards.

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:

- Demonstrate the ability to plant, stake and guy trees to the BC Landscape Standard.

LEARNING TASKS	CONTENT
1. Plant trees using appropriate tools and methods according to the BC Landscape Standard	• Planting tools • Planting techniques
2. Support trees according to the BC Landscape Standard	• Staking and guying techniques and tools • Limitations of tree support • Tree support materials

Achievement Criteria:

Theoretical evaluation

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

Evaluation content to include, but not limited to:

1. Identify correct planting techniques
2. Proper species selection for location
3. Identify appropriate tools
4. Identify correct staking and guying techniques and equipment

Performance evaluation

Performance The apprentice should be able to:

1. Review BC One Call map
2. Wear appropriate PPE for the task
3. Plant trees in a safe and correct manner according to the latest edition of the BC Landscape Standard
4. Stake and guy trees in a safe and correct manner according to the latest edition of the BC Landscape Standard

Conditions Given an on-site situation.

LINE E: E FALLING AND BUCKING

Competency: E1 Demonstrate Safe Chain Saw Use

The Arborist Technician will use a chain saw for a number of tasks including cutting of trees and various 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:

- Demonstrate safe chain saw use and maintenance, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Check saws for correct operating condition	• Inspection and repair of handles, chain brake mechanism and safety features on chain saws required for operation • Importance of personal protective equipment
2. Explain and demonstrate handling criteria for control and balance	• Methods of handling to minimize effort, fatigue and maintain balance and full control • Approved starting methods • Correct use of chain saw to prevent kickbacks and cuts; including boring and limbing to control kickbacks • Safe procedure for placement of cuts in relation to positioning while operating chain saw
3. Explain and demonstrate sharpening methods for cutters, rakers and bar service	• Sharpening methods and filing of cutting teeth, rakers, and chain bar • Symptoms of inadequate sharpening methods like chain condition
4. Explain the fueling and lubrication requirements	• Calculate fuel mixture ratios

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe operation and maintenance of chain saws, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 75%.

Evaluation content to include, but not limited to:

1. Calculating fuel ratios
2. Safe work procedures
3. Knowledge of WorkSafeBC regulations for PPE
4. Knowledge of operation hazards and kickback
5. Knowledge of location and function of parts and safety components
6. Knowledge of maintenance procedures

Performance evaluation

Performance

The apprentice will complete an assessment, based on the following content:

1. Demonstrate inspection and repair of handles, chain brake mechanism and safety features on chain saws required for operation
2. Demonstrate sharpening methods and filing of cutting teeth, rakers, and chain bar
3. Demonstrate methods of handling to minimize effort, fatigue and to maintain balance and full control
4. Demonstrate correct use of a power saw to prevent kickbacks and cuts
5. Include boring and Iimbing to control kickbacks
6. Demonstrate safe procedure for placement of cuts in relation to positioning while operating a power saw
7. Demonstrate correct use of a power saw
8. Demonstrate use of small power saws using both hands and explain acceptable criteria

Criteria

Obtain a minimum achievement of 75%.

LINE E: E FALLING AND BUCKING

Competency: E2 Describe and Demonstrate the Process of Falling

An Arborist Technician will fall trees in a safe manner on a wide variety of sites.

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:

- Describe and demonstrate the process of falling, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Describe the practice of falling trees following industry safe work practices	• Review WorkSafeBC Faller Training Standard video clips demonstrating the real time procedure for falling a tree • Reference and review the safe work procedures in the BC Faller Training Standard InfoFlips
2. Describe the concepts of site assessment	• Correct methods of hazardous tree and site assessment • Requirements for supervision of hazardous area
3. Discuss preparing to fall the tree	• Placement of tools and equipment • Assess tree for hazards • Determine the high side of the tree • Assess the lean of the tree • Tree placement • Determine escape routes • Brush out around the tree and escape routes • Trees with flared butts • Thick bark • Appropriate undercut – Humboldt, Conventional, Open face
4. Demonstrate an undercut and a backcut	• Correct/clean undercut • Incomplete undercut • Using chain saw sight lines • Scribing • Demonstrate undercuts – Humboldt, Conventional, Open face

5.	Demonstrate use of axes and wedges	• Axe types • Types of wedges • Physics of wedging • PPE for wedging • Wedging a small diameter tree safe work procedures • Wedging a large diameter tree safe work procedures
6.	Demonstrate positive directional control	• Applying rigging principles to achieve positive directional control • Directional control and holding wood • Small diameter tree safe work procedures • Large diameter tree safe work procedures
7.	Explain alternative work methods	• Throw line, boom truck, crane or heavy equipment used to minimize hazards, effort and time • Methods of control to eliminate risks

Achievement Criteria:

Theoretical evaluation

Given a quiz on process of falling, the apprentice will demonstrate knowledge by correctly answering questions with a minimum achievement of 75%.

Performance evaluation

Performance — The apprentice will complete an assessment, based on the following content:

1. Demonstrate correct methods of hazardous tree and site assessment
2. Demonstrate correct construction of approved felling cuts (Humboldt, conventional, open face)
3. Demonstrate correct methods of applying wedges to the tree removal process
4. Demonstrate directional control of the tree during the tree removal process
5. Demonstrate additional methods of control to eliminate risks

Criteria — Obtain a minimum achievement of 75%.

LINE E: E FALLING AND BUCKING

Competency: E3 Practice Falling a Tree

An Arborist Technician will fall trees in a safe manner on a wide variety of sites.

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:

- Demonstrate falling a tree in a forest setting, including the development and verbal communication of their Safe Work Plan, according to industry safe work practices and authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Describe and/or demonstrate the practice of falling trees using Industry safe work practices	• Reference and review the safe work procedures in the BC Faller Training Standard InfoFlips • Demonstrate whole tree falling

Achievement Criteria:

Theoretical evaluation

Given a quiz on the practice of falling trees based on the WorkSafeBC Faller Training Standard, the apprentice will demonstrate knowledge by correctly answering questions with a minimum achievement of 75%.

Performance evaluation

Performance: The apprentice will complete an assessment on correct and safe falling techniques, based on the following content:

1. Wear appropriate PPE
2. Appropriate tools and equipment
3. Safe Work Plan (verbally explained) appropriate for the situation
4. Demonstrate appropriate body positioning during saw use
5. Select appropriate felling cut
6. Demonstrate appropriate use of felling aids (axe, wedges, directional control)
7. Demonstrate confidence and control using saw
8. Execute felling cuts properly
9. Cognizant of surroundings/use of escape route during falling
10. Demonstrate achievement of desired placement of tree

Conditions: In a field situation.

Criteria: Obtaining a minimum achievement of 75%.

LINE E: E FALLING AND BUCKING

Competency: E4 Manage Falling Hazards

An Arborist Technician will often have to identify and make decisions on how to fall trees based on falling hazards on a particular site.

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

Objectives:

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

- Given the necessary materials, according to Industry standards and the authorities having jurisdiction, identify and explain solutions to eliminate or minimize the hazards and reference the applicable OHS regulations.

LEARNING TASKS	CONTENT
1. Explain correct methods of managing hazards	• Methods for managing the following hazards: ○ Falling kickbacks ○ Steep slope ○ Upslope ○ Riparian falling ○ Heavy leaners ○ Limb tied trees ○ Dangerous trees ○ Cutup tree ○ Hung-up/catapult trees ○ Jackpot ○ Mechanical damage
2. Discuss safe work procedures for the falling hazards as they are encountered during field practice	• Review accident bulletins to determine root causes • Importance of never becoming over confident or complacent • Review BC Faller InfoFlips and DVDs

Achievement Criteria:

Theoretical evaluation

Given a quiz on implementing the best solution for falling hazards as they are encountered during field practice, the apprentice will demonstrate knowledge by correctly answering questions with a minimum achievement of 75%.

LINE E: E FALLING AND BUCKING

Competency: E5 Recognize Hazardous Weather Conditions

An Arborist Technician will make decisions on falling of trees based on their assessment of weather conditions.

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

Objectives:

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

- Recognize and describe hazardous weather conditions, according to Industry standards and authorities having jurisdiction.

LEARNING TASKS	CONTENT

1. Identify the hazards related to adverse weather conditions	• Hazard such as:
	  ○ Fog
	  ○ Wind
	  ○ Lightning
	  ○ Rain
	  ○ Unstable terrain
	  ○ Avalanche
	  ○ Snow
	  ○ Extreme temperatures
	• Solutions to eliminate or minimize hazard
	• Criteria whether to proceed or evacuate

2. Identify evacuation procedures	• OHS regulations

Achievement Criteria:

Theoretical evaluation

Given a quiz on recognizing hazardous weather conditions, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 75%.

Evaluation content to include, but not limited to:

1. Identifying and developing solutions to eliminate or minimize the hazard
2. Describing criteria whether to proceed or evacuate
3. Identify applicable evacuation procedures

LINE E: E FALLING AND BUCKING

Competency: E6 Recognize Dangerous Falling Practices

An Arborist Technician may occasionally encounter dangerous falling practices and must have the knowledge required to recognize these situations.

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

Objectives:

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

- Identify the hazards of unacceptable dangerous falling practices.
- Reference the applicable OHS Regulations.

LEARNING TASKS	CONTENT

1. Explain correct methods of falling cuts and dangers associated with dangerous falling practices	• Situations that contribute to unacceptable dangerous falling practices
	• Dangers created (barberchair) by incorrect or sloppy methods such as:
	  ○ Dutchman
	  ○ Sloping cuts
	  ○ Backcut below undercut
	  ○ Cut off holding wood
	• Applicable OHS regulations

2. Explain hazards created by brushing of standing timber and domino falling	• Review BC Faller Training Standard InfoFlips
3. Explain circumstances unique to falling difficulties	• Review accident bulletins to determine root causes • Importance of never becoming over confident or complacent

Achievement Criteria:

Theoretical evaluation

Given a quiz on recognizing dangerous falling practices, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 75%.

Evaluation content to include, but not limited to:

1. Recognize situations that contribute to unacceptable dangerous falling practices
2. Describe how to avoid these unsafe practices
3. Identifying solutions to eliminate or minimize the hazard

LINE E: E FALLING AND BUCKING

Competency: E7 Identify Special Falling Techniques

An Arborist Technician will occasionally need to select and use special falling techniques due to site or tree conditions.

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

Objectives:

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

- Identify the hazards related to various special falling techniques.
- Describe how to safely perform each technique.
- Reference the applicable OHS Regulation.

LEARNING TASKS	CONTENT
1. Describe special falling techniques – falling against the lean, falling short stubby trees, jacking a tree over and refalling a cut up tree	• When special falling techniques should be used • Falling against the lean, falling short stubby trees, jacking a tree over, refalling a cut up tree as they are encountered in the field practice

Achievement Criteria:

Theoretical evaluation

Given a quiz on special falling techniques, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 75%.

Evaluation content to include, but not limited to:

1. Explain when a special falling technique should be used
2. Explain how to use special falling techniques

LINE E: E FALLING AND BUCKING

Competency: E8 Plan for Limbing and Bucking

Prior to limbing and bucking, an Arborist Technician will identify hazards and make falling and bucking decisions to reduce risk and increase safety.

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:

- Explain how terrain and ground debris will affect the limbing and bucking process.
- Identify the hazards and safe work practices relating to different weather conditions.
- Identify limbing hazards such as loaded limbs, ground debris, kickbacks and tripping hazards.
- Identify bucking hazards such as kick backs, pivot points, slide, roll and chain reaction, blow down/throw down and bind.
- Describe proper bucking procedures.
- Describe proper limbing procedures.

LEARNING TASKS	CONTENT

1. Describe bucking procedures	• Situations where terrain and ground debris could affect safe limbing and bucking
	• Hazards due to adverse weather conditions
	• Bucking hazards such as:
	  ○ Kickbacks
	  ○ Pivot points
	  ○ Slide
	  ○ Roll and chain reaction
	  ○ Blowdown/throw down
	  ○ Bind
	• Safe bucking procedures such as basic cut bottom bind, small tree top and bottom bind, large tree top and bottom bind

2. Describe limbing procedures	• Safe limbing procedures for bound or pinned loaded limbs and loaded limbs due to size and weight

Achievement Criteria:

Theoretical evaluation

Given a quiz on planning for limbing and bucking, the apprentice will demonstrate knowledge by correctly answering the questions with a minimum achievement of 75%.

Evaluation content to include, but not limited to:

1. Identify situations where terrain and ground debris could affect safe limbing and bucking
2. Identify hazards due to adverse weather conditions

LINE F: F RIGGING

Competency: F1 Describe Rigging Concepts Including Selection and Use of Ropes

Arborist Technicians regularly use a variety of ropes in rigging to control tree parts when pruning or tree removal.

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:

- Describe rigging concepts and demonstrate the selection and use of a variety of ropes in rigging to control tree parts when pruning or tree removal, according to Industry standards.

LEARNING TASKS	CONTENT
1. Explain rigging and related concepts	• Purpose • Methods/limitations • Requirements • Terminology
2. Identify and select the appropriate rope for the job	• Various rope types and sizes (3-strand, hollow-braids, double-braid, kernmantle ropes)
3. Inspect for wear, care and maintenance	• Care • Maintenance • Signs of wear
4. Attach rope and hardware	• Safe rope attachment to a variety of items
5. Establish safe working load limits (SWLL)	• Tensile strength and cycles to failure of rope characteristics (strength, stretch and durability)

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and using ropes for rigging, 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. Explain tensile strength in different rope types
2. Estimate load weights
3. Determine safe working load limits (SWLL)
4. Explain the concept of cycles to failure
5. Describe the different rope choices including 3-strand, hollow-braids, double braid and kernmantle ropes
6. Explain the characteristics of different rope types, and materials, including strength, stretch and durability
7. Identify signs and causes of rope failure

Performance evaluation

Performance The apprentice should be able to:

1. Select appropriate ropes for given situations
2. Inspect ropes for signs of wear and tear

3. Properly attach rope to rigging equipment
4. Demonstrate the storage, maintenance and care

Conditions Given a rigging situation.

NOTE: The performance evaluation for this F-1 competency will be combined with competency F-2 for a total score.

LINE F: F RIGGING

Competency: F2 Select and Use Knots, Hitches and Slings in Rigging

Arborist Technicians regularly use knots, hitches and slings to attach rigging hardware and ropes to tree parts and other ropes.

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 a variety of knots, hitches and slings to attach hardware and ropes to tree parts and other ropes, according to Industry standards.

LEARNING TASKS	CONTENT
1. Tie, dress and set each of the specified knots	• Timber hitch • Cow hitch • French and English prusik • Bowline • Running bowline • Sheet bend • Slippery hitch (Quick hitch) • Clove hitch • Slip knot • Girth hitch • ½ hitch • Butterfly knot (Alpine)
2. Attachment of ropes and slings	• Knots and their uses • Hardware
3. Attachment of ropes and slings to tree parts	• Attachment of hardware to ropes using various knots
4. Use knots to attach rigging or ropes for lowering tree parts	• Attachment of ropes to tree parts using knots • Knots and hardware for connecting links

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting and using knots and hitches for rigging situations, 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 different types of knots and their uses
2. Knowledge of hardware materials and components
3. Knowledge of using knots or hardware for connecting links

Performance evaluation

Performance

The apprentice should be able to:

1. Select the correct ropes and hardware for rigging
2. Demonstrate and explain the use of various knots including but not limited to:
    - Timber hitch
    - Cow hitch
    - French and English prusik
    - Bowline
    - Running bowline
    - Sheet bend
    - Slippery hitch (Quick hitch)
    - Clove hitch
    - Slip knot
    - Girth hitch
    - ½ hitch
    - Butterfly knot (Alpine)
3. For a given situation, select and attach hardware to ropes using knots
4. Use ropes and slings to attach hardware to tree parts using knots

Conditions

Given a rigging situation

NOTE: The performance evaluation for this F-2 competency will be combined with competency F-1 for a total score.

LINE F: F RIGGING

Competency: F3 Use Various Types of Hardware in Rigging Systems

Arborist Technicians use various types of hardware to assist in rigging systems. The safe and appropriate use of hardware is a critical safety element as failed or inappropriate hardware can lead to the load being dropped.

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:

- Safely use various types of hardware to assist in rigging systems, according to Industry standards and authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Select appropriate hardware for the load	• Hardware devices used in rigging • Load specifications for hardware • Material strengths
2. Inspect hardware for wear	• Wear characteristics • Load limits and their impact on the life span of hardware
3. Attach hardware to other rigging including ropes	• Hardware attachment procedures to various rigging parts including ropes
4. Maintain hardware	• Maintenance and storage procedures
5. Demonstrate proper carabineer selection and loading	• Carabiner selection • Use of carabineers
6. Demonstrate the safe use of arborists blocks and pulleys	• Use of blocks and pulleys
7. Demonstrate the use of web slings for rigging	• Use of rope slings – loopies, whoopies, spider legs and one-eyed sling • Use of web slings

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on safely using hardware for rigging, 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 a wide range of hardware devices used in rigging
2. Knowledge of rigging hardware rejection criteria
3. Knowledge of safe working load limits and their impact on the life span of hardware
4. Knowledge of different material strengths for hardware selection
5. Knowledge of application of rigging hardware

Performance evaluation

Performance The apprentice should be able to:

1. Select appropriate hardware and ropes using knots, slings and spider legs
2. Attach hardware to various rigging parts including ropes, slings and spider legs
3. Demonstrate the maintenance and storage procedures for hardware and equipment

Conditions Given a rigging situation.

NOTE: The performance evaluation for this F-3 competency will be combined with competency F-4 for a total score.

LINE F: F RIGGING

Competency: F4 Select and Use Friction Control Devices for Rigging

An Arborist Technician regularly uses friction control devices to control loads while lifting and lowering tree parts. The correct use of these devices has critical safety implications as the wrong device can lead to the load moving too fast or falling while lifting or lowering.

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 a variety of friction control devices to control loads while lifting and lowering tree parts, according to Industry standards.

LEARNING TASKS	CONTENT
1. Select appropriate friction control device for the job	• Friction control devices • Functions • Limitation • Selection of correct devices for specific situations • Dynamic load vectors, shock loading, angles of incidence, force, mass and impact • Bend ratios of rope
2. Inspect for wear, maintenance and care	• Signs of wear • Maintenance procedures
3. Attach friction control device	• Attachment procedures
4. Set up a rigging system incorporating port-a-wrap, Hobbs or GRCS, figure 8, Munter hitch friction control devices and tree wraps	• Raising and lowering loads with a variety of friction control devices • Tie-of load while using friction devices • Use of pulleys for redirecting rigging ropes

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the safe use of a variety of friction control devices used to control loads while lifting and lowering tree parts, the apprentice will demonstrate knowledge by correctly answering questions to a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Safe work positioning
2. Knowledge of limitations of devices
3. Knowledge of dynamic vector loads, shock loading and angles of incidence force, mass and impact
4. Knowledge of tree dynamics, system dynamics and force management
5. Knowledge of materials used in the manufacturing of hardware, ropes, slings and spider legs
6. Knowledge of the use of knots and slings
7. The types of knots used with friction control devices

Performance evaluation

Performance — The apprentice should be able to:

1. Develop a work plan
2. Safely secure the work zone
3. Communicate verbally and visually
4. Select appropriate friction control device
5. Inspect devices and equipment for wear and tear
6. Install a friction control device
7. Install a mechanical advantage rope system (for tensioning lines, for pulling trees over and for lifting heavy loads)
8. Demonstrate the use of friction control devices such as port-a-wrap, Hobbs, GRCS, figure 8, Munter hitch, and tree wraps
9. Demonstrate safe worker position in relation to equipment location
10. Communicate verbally and visually throughout the exercise
11. Demonstrate the maintenance and storage procedures for hardware and equipment

Conditions — Given a friction control device situation.

NOTE: The performance evaluation for this F-4 competency will be combined with competency F-3 for a total score.

LINE G: G CLIMBING

Competency: G1 Select and Inspect Basic Climbing Gear

An Arborist Technician (grounds person) must have the knowledge and ability to select, inspect and maintain the appropriate climbing ropes and climbing equipment for safety.

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:

- Demonstrate ability to select, inspect and maintain climbing ropes and climbing equipment for safety, according to Industry standards.

LEARNING TASKS

1. Select, inspect and maintain climbing ropes and climbing equipment

CONTENT

- Appropriate PPE
- Climbing lines
- Throw lines and throw bags
- Saddles
- Double auto locking carabiners
- Approved lanyard and adjuster
- Slings
- Hand saw
- First aid kit
- Climbing spurs
- Split tails and micro pulley
- Friction saver

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on selecting, inspecting and maintaining climbing ropes and climbing equipment for safety, 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 climbing ropes and climbing equipment
2. Identify defects in climbing rope and climbing equipment

Performance evaluation

Performance

The apprentice should be able to:

1. Identify wear and types of defects in climbing ropes and climbing equipment:
    - Appropriate PPE
    - Climbing lines
    - Throw lines and throw weights
    - Saddles
    - Double auto locking carabiners
    - Approved lanyard and adjuster
    - Slings
    - Hand saw
    - First aid kit
    - Climbing spurs
    - Split tails and micro pulley
    - Friction saver

Conditions

Given a site situation.

LINE H: H EMERGENCY RESPONSE

Competency: H1 Evacuate Worker

An Arborist Technician will occasionally have to perform an emergency evacuation procedure for themselves and others in a safe and effective manner. Although this is an occasional activity, the 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:

- Demonstrate the ability to assist, from a ground position, with emergency evacuation procedures in a safe and effective manner, according to Industry standards and the authorities having jurisdiction.

LEARNING TASKS	CONTENT
1. Recognize potential hazards to rescuer	• Operator control system on aerial man lifts • Electrical step and touch potentials
2. Assist in bucket rescue from a ground position	• Manual override systems • Assess injured person's condition
3. Perform bucket extraction activities from the ground	• Rescue techniques
4. Practice emergency response plan	• Conditions and procedures for emergency assistance
5. Discuss tree rescues and their importance	• Suspension trauma
6. Discuss the different reasons for possible rescue	• Types of injuries to worker(s) and work site situations
7. Discuss types of rescues	• Use of bucket trucks and control systems, extraction rescue procedures
8. Discuss all possible injuries that may require rescues. Emphasis on electrical hazards and second victim scenario	• Equipment failure – slips and falls, injury by swinging branches, etc. • Scenarios for potential power line contact • Potential electrical hazards for rescuers

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on assisting with emergency evacuation procedures in a safe and effective manner from a ground position, the apprentice will demonstrate knowledge by 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 required safety equipment for worksites

Performance evaluation

Performance The apprentice should be able to:

1. Assess the situation for hazards (ie. Electrical, overhead, ground)
2. Determine whether or not to call for emergency assistance and if so which ones
3. Use ground controls on bucket truck to lower the boom
4. Demonstrate extraction of the victim
5. Assist with climber rescue:
   - Assess and secure site
   - Select and supply appropriate tools equipment
6. Communicate patient status to EMS (Emergency Medical Services)

Conditions Given a rigging scenario.

LINE H: H EMERGENCY RESPONSE

Competency: H2 Review and Describe First Aid Certification Requirements

With proper certification, an Arborist Technician may be required to apply First Aid.

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

Objectives:

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

- Describe the requirements for Level 1 First Aid Certification, according to the authorities having jurisdiction.

LEARNING TASKS	CONTENT

1. Review definitions pertaining to occupational First Aid certification requirements.	• First Aid
	  ○ In cases in which a person will need medical treatment, treatment for the purpose of preserving life and minimizing the consequences of injury until medical treatment is obtained
	  ○ Treatment of minor injuries that would otherwise receive no medical treatment or that do not need medical treatment
	• First Aid attendant – a person who holds a valid First Aid certificate

2. Explain the purpose of occupational First Aid Training	• Provide workers with prompt, easily accessible, and appropriate First Aid treatment and to keep a record of each treatment • Make employees more safety conscious and reduce the incidence of injuries at work • Provides protection, security and prompt treatment in case of injury • Can save lives, reduce the severity of injuries and promote speedy recovery
3. Examine a typical occupational First Aid Training Program	• A typical one day course gives participants critical knowledge and the confidence to effectively manage an emergency without panic or confusion

4. Explain the focus of a typical occupational First Aid Training Program	• The focus is on giving first aid for common injuries that could occur. It gives participants the basic skills needed to reduce shock, contain injuries and, in many cases, save lives. These skills include:
	  ○ Emergency Management, including C Spine Control
	  ○ Obstructed airways
	  ○ Artificial respiration and CPR for adults
	  ○ Major bleeding control
	  ○ Records and Reporting

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions on the requirements for First Aid certification, 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. Definitions pertaining to occupational First Aid Certification requirements
2. The purpose of occupational First Aid Training
3. A typical occupational First Aid Training Program

NOTE: Certification for Level 1 First Aid must be renewed every three years

LINE H: H EMERGENCY RESPONSE

Competency: H3 Describe Precautions and Procedures to Prevent and Suppress Fires

An Arborist Technician may be called on to apply basic fire prevention and/or suppression on a work site to a limited range of fires.

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

Objectives:

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

- Describe basic fire prevention and/or suppression on a worksite to a limited range of fires, according to Industry standards.

LEARNING TASKS	CONTENT
1. Identify fire prevention procedures on job sites	• Basic fire science including impact of weather conditions on fire spread • Fire behavior • Prevention procedures
2. Identify appropriate fire extinguishing equipment	• ABC fire extinguisher use • Shovel use • Back pack water tank
3. Explain procedures to extinguish fires	• Fire suppression techniques
4. Explain suppression techniques for small wild fires	• Use and limitations of basic fire fighting equipment

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions, the apprentice will demonstrate knowledge of basic fire prevention and/or suppression on a worksite, by correctly answering the questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Basic fire science
2. Different classes of fire extinguishers and their use
3. Fire behavior
4. Prevention techniques for Arborist Technicians
5. Identify sources of fire – electrical, fuel and material
6. Safe fueling procedures
7. Fire suppression techniques
8. Use and limitations of basic fire fighting equipment

LINE H: H EMERGENCY RESPONSE

Competency: H4 Implement Spill Response

An Arborist Technician may have to respond to a spill of hazardous materials and must implement the appropriate response and reporting procedures as required by government regulations.

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

Objectives:

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

- Demonstrate the ability to implement the appropriate response and reporting procedures as required by government regulations.

LEARNING TASKS	CONTENT
1. Identify hazardous products common to worksites such as gas, oil, diesel fuel, cleaning agents. fertilizers, pesticides	• WHMIS and MSDS
2. Identify reportable quantities and spill containment	• TDG – Schedule 2 • Spill kit
3. Describe reporting requirements	• BC Provincial Emergency Program

Achievement Criteria:

Theoretical evaluation

Given a series of multiple-choice questions, the apprentice will demonstrate knowledge of implementing the appropriate response and reporting procedures as required by government regulations, by correctly answering questions with a minimum achievement of 70%.

Evaluation content to include, but not limited to:

1. Hazardous products common to work sites and WHMIS and MSDS
2. Reportable quantities, spill containment and TDG
3. Reporting requirements as per BC Provincial Emergency Program
4. The characteristics of hazardous spill materials common to arboriculture: fertilizers, pesticides, oil and fuels, hydraulic fluids, some plants

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

Arborist Technician 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:

- Internet access
- Library resources
- Laboratory facilities for teaching basic tree biology
- Storage facility for tools and climbing gear
- 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
- Secure site with in-ground stumps for practice
- Secure site with large trees and variable slopes

C – Hand and Small Power Tools
- Access to site with varied plant material and conditions

D – Tree Work and Management
- Access to a large range of plant material common to the area
- Sites with multiple plant choices of genera, age and condition of trees for pruning
- Site locations that require tree planting or suitable 'mock' planting locations

E – Falling and Bucking
- Secure site for chain saw practice
- Access to trees and sections for falling practice

F – Rigging
- Secure site with variable terrain and mature trees conducive to rigging practice

H – Emergency Response
- Secure site for evacuation practice

Tools and Equipment

Material and equipment list is based on a class of 20 apprentices with 2 instructors. The apprentices must provide their own Personal Protective Equipment. Where applicable, equipment may be rented for instructional purposes.

Power Equipment

1 – Stump grinder (minimum 25 hp complete with guards)
1 – Equipment trailer suitable for grinder with fold down ramps
1 – Chipper (12-inch WorkSafeBC approved) - Wiring suitable for trailer/chipper
1 – Single axle non-air brake dump truck
1 – Flat deck/equipment trailer
1 – Over center truck mounted aerial lift and non-air brake single axle dump truck (which may be the same unit)

Hand and Small Power Tools

4 – Climbing chain saws
4 – Mid size bucking chain saws
4 – Telescopic/extension chainsaws
5 – Full wrap handle chain saws
8 – Chain saw tools
10 – Wedges
5 – Hatchets
5 – Hand axes
4 – Barricades
1 – Gas backpack blower
1 – Gas hedge trimmer
1 – Gas extension trimmer
8 – Secateurs
8 – Loppers
8 – Pole pruners
10 – Pole saws (or attachments)
10 – Hand saws
1 – Drill (electric)
10 – Rakes
10 – Shovels
2 – Mattocks
10 – Spades
10 – Brooms
1 – Pitchfork
1 – Pry bar
1 – Post driver
3 – 8 ft orchard ladders (industry standard)
3 – 12 ft orchard ladders (industry standard)
3 – 20 ft extension ladders (aluminum, industry standard)
6 – Wheel chocks
3 – Grease guns
1 – Bench Grinder for sharpening tools
1 – Wood dolly
1 – Back pack water tank
1 – ABC fire extinguisher
1 – Wheel barrel

Rigging and Climbing Gear

2 – Fall arrest harnesses and lanyard
10 – 10’ loopies (1/2” or 5/8”)
10 – 12’ whoopies (1/2” or 5/8”)
8 – Spider legs
6 – Prusik loops
4 – Eye-and-eye split tails
4 – One eye slings
4 – Single eye split tails
2 – ¾ ton Arborist rigging blocks
4 – Pulleys
4 – CMI pulleys
2 – Micro pulleys
6 – Steel double auto locking carabiners
1 – Mechanical advantage kit
2 – Port-a-wraps (large steel)
1– Hobbs or GRCS rigging device
2 – Saddles (full body harness, conventional arborist saddle)
2 – Approved (steel core and rope) lanyards and adjusters
1 – Tree climbing spurs
2 – 36” steel ring friction saver
1 – Personal first aid kit with pressure bandage

Materials
Utility rope for securing ladders
8 – Ratchet style tie-downs for equipment
Barrier/caution tape
6 – Work zone signage
15 – Traffic cones
Assorted chain saw files
Flat chain saw files
Chain saw depth gauges
3 – Gasoline cans
3 – 4 x 8 sheets plywood
2 – 150 ft lengths 1/2 inch to 3/4 inch rigging lines
Samples of various rope construction types, materials and condition
1 – 6' length of rope per student at ½"
1 – 6' length of rope per student at 5/8"
2 – Climbing lines 150 feet
2 – Throw lines 200 feet
2 – Throw bags 8 oz to 14 oz
1 – Pair binoculars
8 – Hand lens (10x min)
2 – Microscopes and applicable slides
Plant models (samples of twigs, leaves, driftwood)
Soil
2 – Spill kits
1 – Rescue dummy
Models if available for MSI and RSI discussion
Printed copies of all applicable regulations for student reference in the classroom
100 – Trees and/or sections
Mixed gas and bar oil as required

Reference Materials

Required Reference Materials for Apprentices:

Arborist Technician 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

InfoFlips – BC Faller Training Standard, WorkSafeBC

BC Landscape Standard, 7th Ed, BCLNA, 2008

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

Tree Climbers' Guide. Lilly, S. 3rd Ed. ISA Publication

Trees in Canada, John Farrar, Fitzhenry & Whiteside Publishing, 1995

Required Resources for Instructors:

Arborist Technician Apprenticeship Training Program – Apprentice Manual

BC Faller Training Standard, WorkSafeBC

Suggested Texts:

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

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

The Tree Climbers Knots, Lingens, D.

Required Audio/Visual Resources for Instructor:

BC Faller Training Standard – DVD's Discs 1, 2 and 3, WorkSafeBC

Additional Audio/Visual Resources:

Aerial Rescues, National Arborist Association

Bucket Truck Rescue, BC.Hydro

Brush Chipper Operations and Safety Training, Vermeer Manufacturing Company, 2000

The Path of Least Resistance, WorkSafeBC

Website Resources:

- 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
- British Columbia IPM Regulations
  http://www.bclaws.ca/civix/document/id/complete/statreg/604_2004
- 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
- BC One Call
  http://www.bconecall.bc.ca
- BC Provincial Emergency Program
  http://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery
- British Columbia Motor Vehicle Act and other statutes and regulations
  http://www.icbc.com/about%20ICBC/company_info/corporate_governance/statutes-regulations
- BC Ministry of Environment (MOE)
  http://www.env.gov.bc.ca/wld/
- 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

- Canadian Environmental Protection Act
  http://www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=2140D763-1

- Commercial Vehicle Safety and Enforcement (CVSE)
  http://www.th.gov.bc.ca/cvse/

- 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.bclaws.ca/civix/document/id/complete/statreg/96318_00

- 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

- Provincial Regulations
  http://www.bclaws.ca/

- Rigging Knots
  http://www.arbormaster.com/Rigging%20Knots.pdf

- 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 OHS Guidelines, Limits of Approach Part 19
  http://www2.worksafebc.com/publications/OHSRegulation/GuidelinePart19.asp#SectionNumber:G19.9

- 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:

- Arborist Technician – 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

- Instructors must have a Provincial Instructor's Diploma Program or be registered in the Program

OR

- Hold a Bachelors or Master's degree in Education

Instructor(s) Qualification Requirements for Specific General Areas of Competency

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

C – Hand and Small Power Tools
- Minimum 5 years trade experience

D – Tree Work and Management
- Diploma in Arboriculture or Horticulture
- ISA certified preferred

E – Falling and Bucking
- Minimum 5 years trade experience
- Certified Faller/QST or Certified Utility Arborist/ Assessor

F – Rigging
- Minimum 5 years trade experience

G – Climbing
- Minimum 5 years trade experience
- ISA Certified Tree Worker/Climber Specialist preferred

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
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
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 processess 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
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 shoot – a secondary, upright shoot arising from the trunk, branches or roots of a plant
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
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