

CAREER ZONE: SUSTAINABLE FORESTRY AND FOREST PRODUCTS

Helping High School Students Prepare for a Career in the Sustainable Forestry and Forest Products Sector

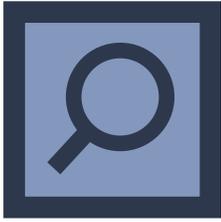


Ministry of
Education

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THIS GUIDE

This guide provides general background on the British Columbian sustainable forestry and forest products sector, followed by more specific information on the four primary forestry sub-sectors.

It also includes sample bundles of high school and post-secondary courses and training that illustrate how high schools, post-secondary institutions and industry partners and employers may work together to develop pathways individual students can follow to qualify for a career in the sustainable forestry and forest products sector.

This guide is an *introduction* only to the job and career possibilities within this sector. More detailed information is available from a variety of general and sector-specific sources mentioned throughout this guide.

WHAT IS A CAREER ZONE?

A Career Zone is a group of courses, certifications and work opportunities that BC high schools can develop to help Grade 11 and 12 students get ready to pursue a career in a particular industry while meeting provincial graduation requirements.

By working within a Career Zone in high school, students have the opportunity to:

- select the courses that match their specific skills, interests and career goals
- complete the pre-requisites of the post-secondary certificate, diploma or degree program of their choice
- take dual credit courses for a career head start and gain valuable post-secondary experience
- obtain industry-recognized career-preparation certifications
- acquire work experience relevant to their career goals





WHAT'S INCLUDED IN A CAREER ZONE?

A Career Zone includes a broad range of core courses and career-specific electives, industry-recognized certifications and work experience intended to prepare students for the careers they want while they are still in high school.

Individual BC School Districts are encouraged to develop their own Career Zones based on local labour market needs, student interests, industry and post-secondary partnerships and local work experience opportunities.

Career Zones should include:

- mathematics, language arts and science courses at the Grade 11 or Grade 12 level
- an applied skills elective at the Grade 11 or Grade 12 level
- where available, a variety of transition opportunities, including:
 - » dual credit courses
 - » Board/Authority Authorized (BAA) courses
 - » Independent Directed Studies
 - » Advanced Placement courses
 - » Work Experience 12A and 12B, as well as other workplace training opportunities, including co-op placements and summer internships
- industry-recognized career-preparation certifications, such as CPR, First Aid or Workplace Hazardous Materials Information System (WHMIS)

IS THERE ONLY ONE ROUTE WITHIN A CAREER ZONE?

Depending on their specific career goals, graduating students have a choice of four basic routes:

- apprenticeship route
- certificate or diploma route
- degree route
- direct-to-work route



INDUSTRY TRAINING AUTHORITY PROGRAMS

Youth [Train in trades \(TRN\)](#) allows high school students to take first level (classroom) technical training in a trade and receive credit for both high school and the apprenticeship. Technical training classes are most often taught at post-secondary institutions but can also be offered at school district facilities.

Youth [Work in trades \(WRK\)](#) lets students begin the work-based training component of an apprenticeship program while still in high school. Students “earn while they learn,” earning credits toward both their high school diploma and apprenticeship on-the-job training. WRK students complete up to 480 hours of work experience that counts toward their apprenticeship.

Apprenticeship Route

This route helps prepare students to apprentice in a trade as soon as they graduate.

An apprenticeship is a combination of:

- work-based training:
 - » 20% in school
 - » 80% on a work site, with an employer sponsor
- classroom learning at a college, institute, university or private trades training institution

All apprenticeship training is delivered by skilled, certified trades people with experience in the field.

In BC, successful apprenticeship training leads to a Certificate of Qualification (CoQ) awarded by the **INDUSTRY TRAINING AUTHORITY**, which is recognized across the province. About 50 trades also offer the Interprovincial (IP) Red Seal certificate, which is recognized across Canada.



Certificate or Diploma Route

The certificate or diploma route helps prepare students who have decided to pursue a career that requires fairly extensive additional training after high school graduation. This training requires a minimum of 13 weeks and usually one to two years, depending on the structure of the program and the institution.

Many certificate or diploma programs in BC allow students to move into an advanced-level degree program in the same subject area.



Degree Route

The degree route helps prepare students for a career that requires a four or five year degree from a post-secondary institution.

Some degree programs begin in one institution and are completed at another.

Direct-to-Work Route

Graduates who have the right preparation in high school have many direct-to-work job opportunities the sustainable forestry and forest products sector. These jobs require only on-the-job training and the appropriate industry-recognized career-preparation certifications. Students may be able to acquire these certifications while still in school or within a very short time after graduation.

Some jobs may require additional certificates that take a little longer to complete.

The direct-to-work route includes an option to enter the workforce immediately upon graduation or after a short certificate program taking 12 weeks or less.

IS IT POSSIBLE TO CHANGE A ROUTE?

It is always possible to change a route.

A Career Zone provides students with a solid foundation of core courses, electives, career-preparation certificates and work experience relevant to a particular industry—in this case, the sustainable forestry and forest products sector—that can be adapted to different routes as required.

NOT ALL INDUSTRY JOBS ARE IN THE FIELD

In addition to skilled and experienced people who work in the field or on the front lines, every industry needs people who work in the office, in such areas as IT, accounting, health and safety, human resources, investor or customer relations, communications, etc. While general certificates and degrees are available in these fields, it can help to have relevant courses, certifications and work experience within the industry sector.

Every industry also needs leaders: business managers, supervisors, executives. Many people occupying leadership roles start by first gaining relevant work experience then adding further on-the-job training, additional certifications or advanced degrees.

For example, a student may start on the apprenticeship route, then realize, as he or she learns and experiences more, that the post-secondary certificate or degree route would be better. The student can then add the additional courses, career-preparation certificates or work experience needed for that route.

A Career Zone helps enable students to make changes later, when they are already in a training program or the workforce. With the broad based, career-focused foundation they receive in high school, they will find it easier to upgrade their qualifications later.

Students and their parents should be open to the possibility that an inspiring course or a stimulating work experience may lead them to change their original career path.



USEFUL CAREER PLANNING RESOURCES

- [WORKBC](#) provides profiles of more than 500 different occupations, with details on job duties, education and training required, employment outlook and average salaries or wages. The site also offers a comprehensive database of BC job postings and a blog featuring trends, job-search tips and employment programs.
- [EDUCATIONPLANNERBC](#) allows users to compare BC post-secondary programs.
- [TRADES TRAINING BC](#) helps students and employers find trades programs offered at 14 post-secondary institutions throughout BC.
- [ITABC](#) works with employers, employees, industry, labour, training providers and government to issue credentials, manage apprenticeships, set program standards and increase opportunities in the trades.
- [DISCOVERSKILLSBC](#) includes information about apprenticeships and careers in technology and resources to help students discover which trades are a good match for them.
- [THE GREENEST WORKFORCE](#) provides descriptions of various forestry careers, tracks which jobs are most in demand and matches job seekers with available jobs.

CAREER ZONE MAP

Like a transit map, the chart on the next page shows four possible routes from high school to a range of the most in-demand careers in the forestry industry.

Career Zone Map: Sustainable Forestry and Forest Products

This map shows the various routes high school students can take to achieve high-demand jobs in the sustainable forestry and forest products sector.

Routes start from the centre, with core high school courses, followed by options that help prepare students for the next steps along the route of their choice.

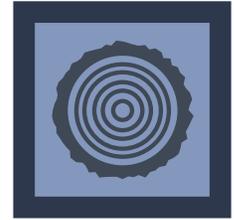
At any point, students may decide to switch their direction of travel and try a different route.

Bold indicates a high-demand job (*BC 2025 Labour Market Outlook*)





Photo: College of New Caledonia



FORESTRY CAREERS

The sustainable forestry and forest products sector continues to be central to BC's economy.

Today, the sector is responsible for 36% (\$12.9 billion) of BC's total exports and is the primary employer in many parts of the province. Forestry-related activities directly support more than 7,000 businesses and directly employ about 60,000 people.

The sustainable forestry and forest products sector consists of a number of separate, but inter-connected activities and a range of varied and interesting job opportunities in such areas as:

- forest planning and management, including silviculture and tree planting
- timber harvesting
- forest habitat and ecosystem conservation
- wood product manufacturing
- pulp, paper and bio-refining
- forest product marketing
- forest carbon and climate change adaptation
- urban forestry (planning and managing urban green-spaces and ecosystems) and arboriculture (tree care in urban environments)

FOR MORE INFORMATION:

[BC Labour Market Outlook](#)
[Forestry Innovation Investment Council of Forest Industries](#)
[Canadian Forests Website](#)
[Renewing Canada's Greenest Workforce](#)

In British Columbia alone, more than 30% of the current forest sector workforce will likely retire by 2020, opening many good job opportunities for the next generation of forestry professionals.

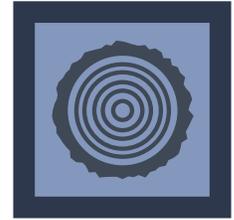


Sustainable Forestry Facts and Figures

- Forests cover 62% of the Province of British Columbia, with 24% (22 million hectares) available for harvesting. Of that amount, about 160,000 hectares—or less than 1%—are harvested on an annual basis.
- More than 14.8% of BC's land base is fully protected from forestry, mining or industrial development and much more falls under some type of special management regime, where values such as wildlife habitat, biodiversity or recreation take precedence.
- BC is the largest producer of renewable bioenergy in North America, owing in part to the booming BC wood pellet industry. There are currently 11 wood pellet plants operating here.
- 75% of BC's annual timber harvest comes from operations that are certified for sustainability or meet internationally recognized criteria for environmental management systems.
- More than 200 million trees are planted annually in British Columbia, or about three seedlings for every tree cut.
- Trees planted in BC have captured 2 billion tonnes of carbon. Over 4 million tonnes of carbon is stored in forest products each year.
- The forest industry has kept greenhouse gas emissions lower than 1980 levels despite a 23% increase in energy use and a 30% increase in pulp and paper production.
- Compared to other materials, wood requires less energy to extract, process, transport, construct and maintain over time.
- Wood is a better insulator than other materials: 15 times better than concrete and 400 times better than steel.



RECOMMENDED CORE COURSES AND ELECTIVES FOR CAREERS IN THE SUSTAINABLE FORESTRY AND FOREST PRODUCTS SECTOR



It is vital that students investigate the core courses and electives that will help them take the most direct route to the career they want in the sustainable forestry and forest products sector.

Core Courses

All BC high school students are required to take core courses in language arts, mathematics, social studies and science for graduation. But, in each core subject area, there are options that make it easier to go directly to work or to enter the post-secondary training program of their choice.

GRADUATION PLANNING RESOURCES:

[Graduation Planner](#)

[Graduation Requirements](#)

For example, students are required to complete a Language Arts 12 course to graduate, but they do not have to take a Mathematics 12 course. This means they need to pick their Mathematics 11 course (or courses) carefully to fulfill the pre-requisites of any post-secondary training they want to pursue. For instance, an apprenticeship might require Workplace Mathematics 11 or Foundations of Mathematics 11. Some post-secondary programs might require Pre-Calculus 11, while others also ask for Pre-Calculus 12.

Electives

Choosing the right electives is as important as choosing the core courses. For example, students wanting to apprentice as electricians need Physics 11.

All students, including those who intend to go direct-to-work without any additional training, will benefit significantly from gaining skills and work experience directly applicable to jobs in the sustainable forestry and forest products sector.

DUAL CREDIT OPTIONS

Dual credit courses (counted as elective credits) give BC high school students the opportunity to earn both high school and post-secondary credits at the same time.

Several BC school districts, in collaboration with a local post-secondary institute, offer dual credit options that might be of benefit to students interested in the sustainable forestry and forest products sector. Check with your school district.



In addition, there are a of courses available as electives that would be valuable for students interested in forestry careers—for example:

- For all students interested in designing or manufacturing wood products:
 - » Drafting 11/12
 - » Woodwork 11/12
 - » Furniture and Cabinetry 12
 - » Coding for Manufacturing 12
- For students interested in the business side of the forestry industry:
 - » Accounting 11/12
 - » E-Commerce 12
 - » Entrepreneurship 11
 - » Marketing and Promotion 11
- For students interested in the research and development aspects of the forestry industry:
 - » Biology 11/12
 - » Chemistry 11/12
 - » Computer Information Systems 11/12
 - » Computer Programming 11/12
 - » Earth Science 11/12
 - » Environmental Science 11/12
 - » Geology 12
 - » Physics 12
- For students interested in growing trees, understanding forest ecology and forest health as well as forestry impact on habitats and ecosystems:
 - » Biology 11/12
 - » Earth Science 11/12
 - » Environmental Science 11/12

WORK EXPERIENCE 12A AND 12B

In Work Experience 12A and 12B are each 100 to 120 hours long, the community is the classroom. Work site placements help prepare students for the transition from high school to the world of work by providing opportunities to gain valuable workplace knowledge, determine (or change) career goals and develop job skills.

To find out more, see the [PROGRAM GUIDE FOR MINISTRY AUTHORIZED WORK EXPERIENCE COURSES](#).

- All students should also consider:
 - » relevant dual credit courses, where available
 - » relevant locally developed Board/Authority Authorized (BAA) courses, such as Civil Engineering Concepts, where available
 - » Work Experience 12A and 12B
- Students interested in an apprenticeship should consider:
 - » Youth Explore Trades Skills/Youth Explore Trades Sampler
 - » Youth [Train in Trades \(TRN\)](#) and
 - » Youth [Work in Trades \(WRK\)](#)

RECOMMENDED CAREER-PREPARATION CERTIFICATES FOR CAREERS IN THE SUSTAINABLE FORESTRY AND FOREST PRODUCTS SECTOR

Most forestry sector companies require applicants to have at least a high school diploma and a driver's licence. Acquiring relevant career-specific certificates can also ensure that students have a better chance of employment, or perhaps a higher level of employment, directly out of high school, college or university.

Certifications can take anywhere from a couple of hours to several weeks to complete. Useful **safety** certifications include:

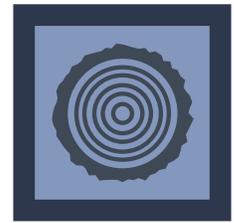
- CPR
- Construction Safety Training System
- Fall Protection
- Occupational First Aid Levels 1, 2 and 3
- Workplace Hazardous Materials Information System (WHMIS)

Other certifications, depending on your job interests within the forestry industry, include:

- Aerial Lift Platform, including boom and scissor lift
- ATV Safety
- Basic Chainsaw Operator
- Basic Firefighting (S-100)
- Class 5 Driver's Licence
- Forklift Awareness
- FOODSAFE

For more about forestry careers, visit:

- [EducationPlannerBC](#)
- [WorkBC](#)





Please note:

Some certifications are time-limited. For example, a CPR certificate is valid for three years only, then the person must re-certify.

It is a good idea for high school students to complete or renew their certifications close to graduation.

FORESTRY SUB-SECTORS

The forestry industry is one of BC's essential industries. It is also one of the most diverse, encompassing a broad range of jobs. Some of these jobs call for minimal training; others demand distinct skills. Many tradespeople—such as electricians or welders who have worked in construction, for example—transfer into the forestry sector and apply their skills in new ways.

For the purposes of this guide, we have divided the forestry sector into three sub-sectors:

- **Growing and Managing**
 - » The jobs involved in planning, planting and managing forests (including urban forests and other resources) to ensure they stay healthy, productive and sustain-able for many different users.
- **Harvesting**
 - » The jobs involved in accessing and harvesting trees and transporting them to wood processors/manufacturers.
- **Processing**
 - » The jobs involved in turning logs and wood by-products into various kinds of wood products, including lumber, pulp and paper and wood pellets.



Photo: Western Forest Products Inc.

FORESTRY SUB-SECTOR PROFILE #1: GROWING AND MANAGING

Forest landscapes and ecosystems, which include trees and forests in urban as well as rural and remote areas of BC, are an important part of BC's environment and our economy.

To ensure they remain healthy and sustainable—and continue to provide clean air and water, homes for wildlife, beautiful scenery and places for recreation, as well as the raw materials for construction and thousands of products we use every day—our forests must be well-managed.

Growing and managing forests sustainably includes determining such things as:

- when and where timber harvesting will be allowed and which areas will be reserved from harvest due to ecological, cultural or other sensitivities
- when areas require planting and with what species of trees, and
- whether reforestation has been successful, using indicators such as forest health, animal population status, soil compaction, etc.

Forest management includes:

Silviculture

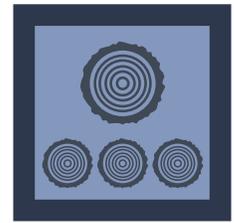
Silviculture is the practice of sustainable forest management. Forest professionals working in silviculture understand forest biology and ecology, as well as the role of both harvesting and reforestation and are specially trained in:

- growing, managing and caring for forests to meet human needs, and
- protecting/conserving important forest values, including wildlife habitat and recreation, old growth and conservation areas.

At the stand level, they may care for trees directly through careful pruning or thinning, diagnosing and treating pest invasions and by fertilizing trees when necessary. They may be employed by governments, forest companies, forestry consulting firms, utilities and environmental organizations.

Forest health protection/restoration

Forest protection includes the actions taken to protect or restore a forest or ecosystem affected by natural causes (such as fire, flood, disease or pests—like the mountain pine beetle) or man-made causes (such as





aggressive or unsustainable farming and timber harvesting, soil pollution or urban sprawl). Forest protection/restoration jobs range from wildland firefighter to forest scientist to urban forester.

Reforestation (tree planting)

Every year, some 500 million trees are planted in Canada to establish new forests where trees have been harvested. Typically, the responsibility for successful reforestation rests with the company (the forest licence holder) that had the trees harvested.

Forest professionals at these companies hire specialized tree-planting companies to carry out the delivery and planting of the trees. Tree planting companies, in turn, hire tree planters and pay them for each tree they plant.

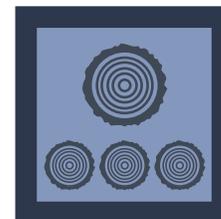
Some tree planting projects also require people to establish and run camps (including food services) for workers. In addition, the trees must also be grown in specialized nurseries before they can be planted, widening the scope of jobs involved in reforestation to include nursery workers, seed collectors, etc.

The following chart divides **Growing and Manage It** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



Photo: Western Forest Products Inc.

GROWING AND MANAGING POSSIBILITIES



Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Arborist Technician – see <i>Sample Bundle 1</i> for a possible route to this career. • Climbing Arborist • Heavy Duty Equipment Mechanic • Heavy Equipment Operator • Professional Cook <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Truck and Transport Mechanic 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Forest Technician/Technologist* • Forest Health Technologist* • Forest Operations Technologist* • Geographic Information Systems (GIS) Technologist* • Silviculturist/Silviculture Supervisor* • Surveyor • Timber Cruiser* • Wildland Firefighter <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Environmental Technician/Technologist* • Junior Supervisor/Manager: <ul style="list-style-type: none"> • Computer and Information Systems • Purchasing • Quality Control • Tree Planters • Safety Attendant • Urban Forest Technologist* • Warehouse Person <p><i>*See Sample Bundle 3 for a possible route to these careers.</i></p>	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Environmental Resources Technician Diploma • Fire Training Certificate • Forest Technology Diploma • Forest Resources Technology Diploma • Forest and Natural Areas Management Diploma • Natural Resources and Forest Technology Diploma • Light Warehouse Training Certificate • Management Skills for Supervisors Certificate • Project Management Associate Certificate
Degree	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Engineer: <ul style="list-style-type: none"> • Civil • Mechanical • Engineering Manager • Forest Engineer* • Forester* • Forest Management Planner* • Growth and Yield Analyst* • Horticulturalist 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Horticultural Science • Bachelor of Engineering • Bachelor of Science • Bachelor of Science in Forest Ecology and Management • Bachelor of Science in Forest Sciences • Bachelor of Science in Forest Resources Management • Bachelor of Science in Forestry • Bachelor in Urban Forestry



Route:	Job Possibilities:	Possible Credentials:
<p>Degree (cont)</p>	<ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Computer and Information Systems • Financial • Project Management • Quality Control • Supply Chain • Tree Planters • Silviculturist/Silviculture Supervisor* • Soil Scientist • Riparian Scientist • Urban Forester* • Wildlife Habitat Manager • Wildlife Scientist <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Biologist • Chief Forester* • Entomologist • Environmental Supervisor • Fire Scientist <ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Product • Quality <p><i>*See Sample Bundle 5 for a possible route to these careers.</i></p>	<p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications or articling into the forestry profession • a master's degree and/or • a doctoral degree
<p>Direct-to-Work</p>	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Compass Person • Forest Field Assistant • Forestry Restoration Worker • Kitchen Assistant • Office Support Worker • Plantation Brusher-Spacer • Receptionist • Silviculture Assistant • Timber Cruiser Assistant • Tree Nursery Worker • Tree Planter – <i>see Sample Bundle 6 for a possible route to this career.</i> • Surveyor • Truck Driver • Wildland Firefighter 	<p>On-the-job training is available for many forestry sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Coastal Forest Resource Certificate • Heavy Equipment Operator Technician Certificate • Truck Driver Certificate

FORESTRY SUB-SECTOR PROFILE #2: HARVESTING

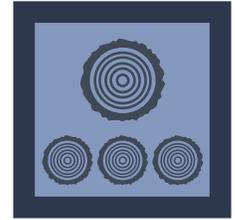
Most often, trees are harvested so logs and residual materials can be delivered to sawmills, pulp mills and other wood-processing plants and turned into value-added wood products. But trees may also be harvested for other reasons, including:

- improving the health of the forest
- controlling the types of trees that grow on a site
- improving access to an area for hikers, hunters and other recreational users, and
- creating space for agriculture, transmission lines, roads, houses, etc

When and how a stand of trees or an area of forest should be harvested is determined through forest management planning (see the **Growing and Managing** sub-sector on [page 15](#)).

The harvesting itself includes road construction, logging and log transportation, either by truck or boat. Harvesting operations may also require people to establish and run camps (including food services) for workers.

The following chart divides **Harvesting** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).





HARVESTING POSSIBILITIES

Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Heavy Duty Equipment Mechanic • Heavy Equipment Operator • Industrial Mechanic (Millwright) – see <i>Sample Bundle 2 for a possible route to this career.</i> • Machinist • Professional Cook <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Truck and Transport Mechanic 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accounting Technician and Bookkeeper • Administrative Assistant • Forest Technician/Technologist* • Forest Health Technologist* • Forest Operations Technologist* • Geographic Information Systems (GIS) Technologist* • Hand Faller • Junior Supervisor/Manager: <ul style="list-style-type: none"> • Computer and Information Systems • Logging • Operations • Procurement • Silviculture* • Log Scaler • Timber Faller • Tug Boat or Boom Boat Captain/Mate/Deckhand • Urban Forest Technologist* • Wildland Firefighter <p><i>Lower Demand:</i></p> <ul style="list-style-type: none"> • Junior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Project • Safety Attendant <p><i>*See Sample Bundle 3 for a possible route to these careers.</i></p>	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Coastal Log Scaling Certificate • Faller Certification (BC Forest Safety Council) • Fire Training Certificate • Forest Technology Diploma • Forest Resources Technology Diploma • Management Skills for Supervisors Certificate • Master Mariner Certificate • Project Management Associate Certificate • Small Vessel Machinery Operator Certificate

<p>Degree</p>	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Engineer: <ul style="list-style-type: none"> • Civil • Mechanical • Engineering Manager • Harvest/Operations/Engineering Planner • Professional Forester • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Computer and Information Systems • Financial • Logging • Procurement • Project Management • Supply Chain <p><i>Lower Demand:</i></p> <ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Quality 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Engineering • Bachelor of Science • Bachelor of Science in Forest Operations • Bachelor of Science in Forest Sciences • Bachelor of Science in Forestry <p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications • a master's degree and/or • a doctoral degree
<p>Direct-to-Work</p>	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Chaser/Landing Worker (logger) • Compass Person • Dryland Bundler/Strapper • Forklift Operator • Kitchen Assistant • Logging Equipment Operator • Log Loader • Log Sorter • Mechanical Shop Helper • Road Building Equipment Operator • Tire Repairer • Truck Driver (gravel, logging) • Wildland Firefighter <p><i>Lower Demand:</i></p> <ul style="list-style-type: none"> • Bucker (chainsaw operator) • Swamper (on a road crew) 	<p>On-the-job training is available for many forestry sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Class 1 Driver's Licence with Air Brakes Certificate • Heavy Equipment Operator Technician Certificate • Truck Driver Certificate





FORESTRY SUB-SECTOR PROFILE #3: PROCESSING

Logs taken out of the forests of BC are processed in many ways to create a variety of products, including:

- solid wood products, such as lumber for building construction, veneer and plywood, shakes and shingles, poles, piling, fencing, mine timbers and posts
- composite wood products, such as laminated timbers, insulation board, hard-board and particle board
- fibre wood products, such as pulp and paper
- waste-wood products, such as pellet fuel made from compacted sawdust

The following chart divides **Processing** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



Photo: University of Northern British Columbia

PROCESSING POSSIBILITIES

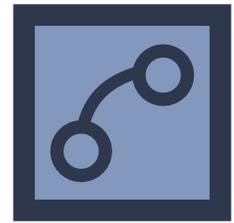
Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Boom Truck Operator • Crane Operator • Electrician, Industrial • Industrial Mechanic (Millwright) – see <i>Sample Bundle 2 for a possible route to this career.</i> • Instrumentation and Control Technician • Heavy Duty Equipment Mechanic • Machinist • Parts and Warehousing • Pipefitter • Saw Filer • Welder <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Truck and Transport Mechanic 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accounting Technician and Bookkeeper • Administrative Assistant • Drafting Technologist or Technician • Electrical and Electronics Engineering Technologist or Technician • Lumber Grader • Machine Fitter • Materials Handler • Mechanical Engineering Technologist or Technician • Parts/Warehouse Worker • Power Engineer • Quality Control Manager • Shipping Coordinator <p><i>Lower Demand:</i></p> <ul style="list-style-type: none"> • Junior Manager/Supervisor: <ul style="list-style-type: none"> • Advertising, Marketing and Public Relations • Computer and Information Systems • Financial • Food Services • Human Resources • Manufacturing • Product • Project • Supply chain • Safety Attendant 	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Business Administration Diploma • Computer Aided Design and Drafting Diploma • Light Warehouse Training Certificate • Management Skills for Supervisors Certificate • Millwright/Machinist Certificate • Project Management Associate Certificate • Business Administration Diploma





Route:	Job Possibilities:	Possible Credentials:
Degree	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accountant • Engineer: <ul style="list-style-type: none"> • Chemical • Civil • Electrical • Industrial • Mechanical • Engineering Manager • Financial Auditor • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Advertising, Marketing and Public Relations • Computer and Information Systems • Financial • Human Resources • Manufacturing • Quality Control • Saw/Pulp Mill • Scheduling • Supply Chain <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Human resources • Product • Project • Sales 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Commerce • Bachelor of Engineering • Bachelor of Science • Bachelor of Science in Forestry • Bachelor of Science in Wood Products Processing – see <i>Sample Bundle 3 for a possible route to this career.</i> • Bachelor of Technology in Manufacturing <p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications • a master's degree and/or • a doctoral degree
Direct-to-Work	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Forklift Operator • Materials Handler • Mill Labourer • Office Support Worker • Parts/Warehouse Worker • Pulping, Papermaking and Coating Control Operator • Receptionist • Sawmill Machine Operator • Security Guard • Stenciller • Strapper/End Stacker Helper <p><i>Lower Demand:</i></p> <ul style="list-style-type: none"> • Cleaner/Janitor • Marketing/Salesperson • Truck Driver 	<p>On-the-job training is available for many forestry sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Certificate in Sales and Marketing • Heavy Equipment Operator Technician Certificate • Truck Driver Certificate

SUSTAINABLE FORESTRY AND FOREST PRODUCTS SECTOR CAREER ROUTES – SAMPLE BUNDLES



The six sample bundles of high school and post-secondary courses and training that follow illustrate how high schools, post-secondary institutions and industry partners and employers may work together to develop a particular path for students to follow.

SAMPLE BUNDLE 1: APPRENTICESHIP ROUTE – ARBORIST TECHNICIAN

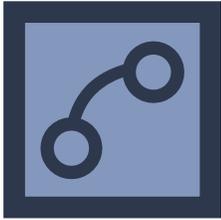
Arborist technicians are responsible for pruning and performing other ground-based work on urban trees in public parks, along city streets and small, privately owned forests. This work involves identifying plants, selecting rigging gear, knowing how to fall, limb and buck trees, assist climbers, chip brush, cut wood and clean up sites after tree care operations. The Arborist Technician apprenticeship can lead to two other apprenticeship levels: Climbing Arborist and Utility Arborist.

The one-year Arborist Technician apprenticeship—offered by **KWANTLEN POLYTECHNIC UNIVERSITY**—combines technical training and work-based training. The technical training is eight weeks. The work-based training totals 1,600 hours. Based on a 30-hour workweek, this involves just over 53 weeks of training. The curriculum used by Kwantlen for technical training was developed and approved by the arboriculture industry.

WHAT KWANTLEN SAYS ABOUT THIS PROGRAM

Journeypersons in arboriculture are in demand. Municipal parks departments and the large private arboriculture industry sector are looking to certified arborist technicians to fill a significant number of ground arborist positions.

Students interested in this apprenticeship should have a strong desire for hands-on outdoor work, enjoy nature and living things, be concerned about the environment and have entrepreneurial talents. Individuals with allergies to dust, pollen or plant products, or specific chemicals should be aware of the potential impact on their health. Physical fitness and a healthy back are required for a successful career in arboriculture.



APPRENTICESHIP – ARBORIST TECHNICIAN

Core High School Courses and Electives	Career-preparation Certificates	Arborist Technician Apprentice Program	Credential
<p><i>Required:</i></p> <ul style="list-style-type: none"> • English 10 or better <p><i>Recommended:</i></p> <ul style="list-style-type: none"> • Math 11 or 12 • Science 11 or 12 • Applied skills elective 11 or 12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B • Youth Explore Skills Trades Sampler • Youth Explore Skills Trades • Youth Train in Trades (TRN) • Youth Work in Trades (WRK) 	<p><i>Required:</i></p> <ul style="list-style-type: none"> • Class 5 Driver's Licence <p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • Occupational First Aid Level 1 • WHMIS 	<p>Classroom training includes:</p> <ul style="list-style-type: none"> • The Safety Conscious Arborist • Plant Identification • Biology, Pruning and Planting • Falling and Bucking • Rigging and Climbing • Tools and Equipment 	<ul style="list-style-type: none"> • ITA Certificate of Qualification



Photo: Roy Rea, UNBC

SAMPLE BUNDLE 2: APPRENTICESHIP ROUTE – INDUSTRIAL MECHANIC (MILLWRIGHT)

Millwrights install, repair, overhaul and maintain machinery and heavy mechanical equipment, such as conveyor systems, in repair shops, plants, construction sites, mines, logging operations, ski hills and most production and manufacturing facilities. Millwrights also perform routine maintenance activities, such as cleaning and lubricating equipment, adjusting valves and seals, and investigating breakdowns.

Millwright is designated as Industrial Mechanic (Millwright) under the Interprovincial Red Seal program.

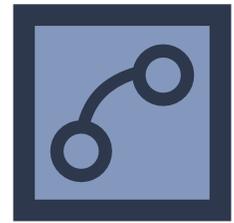
This apprenticeship is suited for those who have an aptitude and interest in mechanics and math and enjoy investigation, analysis and problem solving. Physical demand can vary, but there is a considerable amount of lifting, bending and manual dexterity.

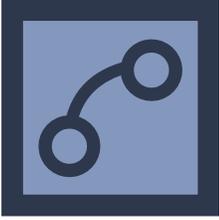
A number of post-secondary institutions across BC offer an Industrial Mechanic (Millwright) apprenticeship program, including **NORTHWEST COMMUNITY COLLEGE**.

BUILDING SKILLS

Northwest Community College offers a 20-week **Industrial Mechanic (Millwright) Foundation** course. Foundation students learn trade attributes and employability skills and are provided ongoing opportunities to apply the practical skills taught throughout the program in hand, power, and machine tool use, and perform various shop projects in stationary industrial machinery and mechanical equipment maintenance, troubleshooting, overhauling and installation.

Students who successfully complete the Foundation program are eligible for ITA credit in Industrial Mechanic (Millwright) Level 1 technical training apprenticeship and 425 work-based hours.





NWCC's program generally takes four years to complete. It includes four levels of in-school technical training, seven weeks each, combined with 6,600 hours of work-based training. A student who successfully completes the millwright apprenticeship program may choose to write the Red Seal Interprovincial Examination. The holder of a Red Seal Certificate can work anywhere in Canada.

APPRENTICESHIP – INDUSTRIAL MECHANIC (MILLWRIGHT)

Core High School Courses and Electives	Career-preparation Certificates	NWCC Millwright Apprentice Program	Credential
<p><i>Required:</i></p> <ul style="list-style-type: none"> English 12 (or mature student and English 10) <p><i>Recommended:</i></p> <ul style="list-style-type: none"> Math 11 or 12 Science 11 or 12 Applied skills elective 11 or 12 Relevant locally developed Board/ Authority Authorized (BAA) courses, where available Work Experience 12A and 12B Youth Explore Skills Trades Sampler Youth Explore Skills Trades Youth Train in Trades (TRN) Youth Work in Trades (WRK) 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> CPR Occupational First Aid Level 1 WHMIS 	<p><i>Level 1:</i></p> <ul style="list-style-type: none"> Work Practices Trade Science Use Tools Cut, Fit and Fabricate <p><i>Level 2:</i></p> <ul style="list-style-type: none"> Trade Science Lubricants, Seals and Bearings Install Equipment Cut, Fit and Fabricate Service Power Transmissions Service Fluid Power <p><i>Level 3:</i></p> <ul style="list-style-type: none"> Install Equipment Service Pumps Service Fluid Power Service Power Transmissions Service Material Handling Systems <p><i>Level 4:</i></p> <ul style="list-style-type: none"> Work Practices Trade Science Install Equipment Service Fluid Power Service Compressors Operational Equipment Effectiveness 	<ul style="list-style-type: none"> ITA Certificate of Qualification Interprovincial Red Seal Certificate

SAMPLE BUNDLE 3: CERTIFICATE OR DIPLOMA ROUTE – FORESTRY TECHNOLOGIST

According to [Work BC](#), the future prospects for Forestry Technologists and Professional Foresters are extremely good. Potential employers include forest companies, government ministries, and independent forestry consultants.

Jobs across the sustainable forestry and forest products sector—both in the wilderness and in the cities—include:

- **Forest Operations Supervisor**, responsible for tree harvesting, safety, log quality, costs, compliance with plans and environmental protection
- **Planning Forest Technologist**, responsible for collecting data and assisting in the creation of operational plans and for planning for ecosystem-based forest management operations
- **Urban Forest Technologist**, helping to keep cities and parks forested and green
- **Silviculture Supervisor**, helping to ensure first that the right trees are planted in the right place, then that they are well tended and can grow well
- **Timber Cruiser**, responsible for estimating the volume, quality, composition and value of a stand of timber
- **Forest Health Technologist**, responsible for identifying, evaluating and developing plans to mitigate damage to forest health from insects, diseases, invasive plants, etc.

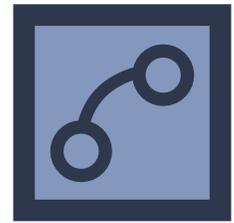
ABCFP

The people who manage forests in BC are required to belong to the forestry profession.

The Association of BC Forest Professionals (ABCFP) regulates two categories of forest professionals responsible for looking after BC's forests, forest lands and forest resources:

- **Registered Forest Technologist**, which requires a diploma in forestry or a diploma in natural resource management specializing in forestry.
- **Registered Professional Forester**, which requires a bachelor of science in forestry or a science-based degree in natural resource management specializing in forestry.

BCIT, the College of New Caledonia, Selkirk College and Vancouver Island University (VIU) all offer similar forest technology programs that provide important foundational skills for working as a forest professional in BC.



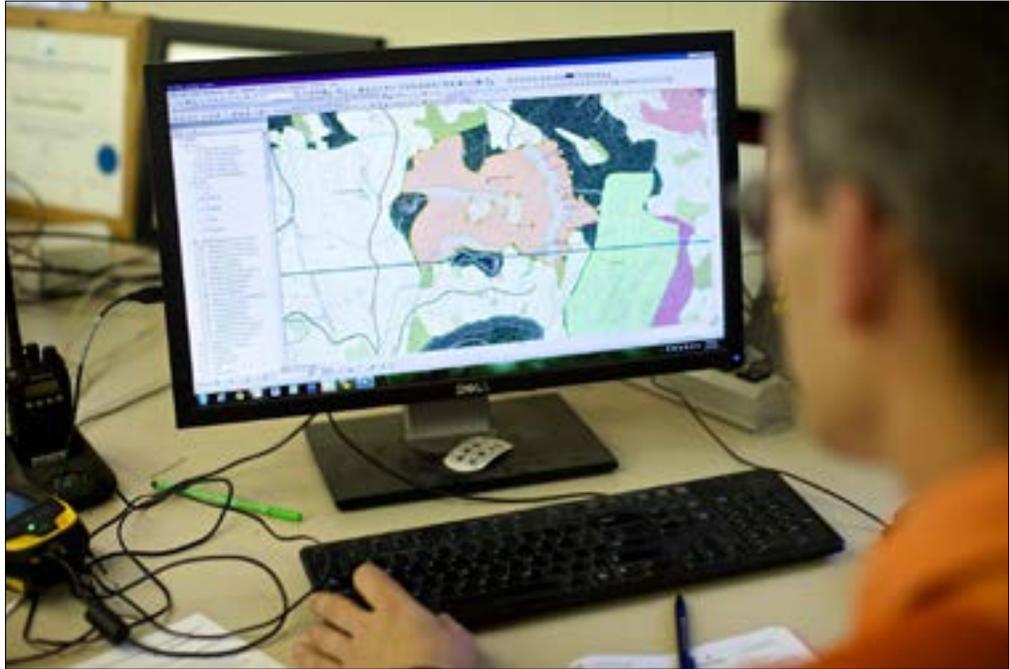
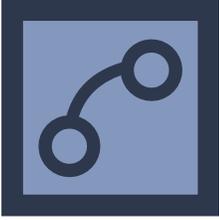


Photo: Western Forest Products Inc.

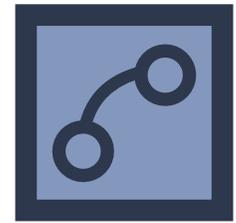
For example, VIU's two-year **FOREST RESOURCES TECHNOLOGY DIPLOMA** emphasizes the recognition and appreciation of all the major values of the forest, including timber, recreation, wildlife, range, fish, water and visual landscapes.

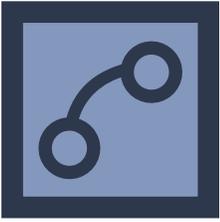
MuMuch of the coursework is hands-on and conducted in the VIU Forest, located 10 minutes from campus. In the summer, between the first and second year of the program, all students are expected to obtain a forestry-related job to broaden their knowledge of practical forestry. Graduates of this program meet the required standard for membership in the Association of BC Forest Professionals (ABCFP) as Registered Forest Technologists (RFT).

Graduates may also choose to transfer to UBC and obtain a Bachelor of Science in Forestry, or continue at VIU and obtain either a Bachelor of Natural Resource Protection, a Bachelor of Arts in Geography (Resource Management), or an Advanced Diploma in Geographic Information Systems (geo-mapping).

CERTIFICATE OR DIPLOMA – FOREST TECHNOLOGIST

Core High School Courses and Electives	Career-preparation Certificates	VIU Forest Resources Technology Program	Credential
<p><i>Required:</i></p> <ul style="list-style-type: none"> • English 12 • Math 11 • Science 11 <p><i>Recommended electives:</i></p> <ul style="list-style-type: none"> • Math 12 • Applied skills elective 11 or 12 • Business Education 11/12 courses • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Required:</i></p> <ul style="list-style-type: none"> • Occupational First Aid Level 1 with Transportation Endorsement <p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • WHMIS • Driver's Licence 	<p><i>Year 1 courses include:</i></p> <ul style="list-style-type: none"> • Forest Surveying • Forest Inventory • Forest Botany • Forest Ecology • Forest Hydrology and Riparian Management • Forest Resources Administration • Forest Soils • Fire Management <p><i>Special session:</i></p> <ul style="list-style-type: none"> • Field Skills <p><i>Year 2 courses include:</i></p> <ul style="list-style-type: none"> • Forest Biometrics • Silviculture • Integrated Resource Management • Forest Harvesting Systems • Forest Road Design • Forest Pathology • Forest Entomology 	<ul style="list-style-type: none"> • Forest Resources Technology Diploma





SAMPLE BUNDLE 4: DEGREE ROUTE – BACHELOR OF SCIENCE IN WOOD PRODUCTS PROCESSING

UBC'S FACULTY OF FORESTRY, Department of Wood Science, offers a four-year Bachelor of Science in Wood Products Processing that it calls a "fusion of science, engineering and business."

The program was developed in direct response to the demand for university graduates qualified to become leaders in the wood products sector, including advanced manufacturing practices. Students learn the technical and theoretical skills needed to design and build everything from house frames to avant-garde furniture, and have access to the extensive facilities of the [Centre for Advanced Wood Processing](#)—Canada's national centre of excellence for wood products.

The program has won the Yves Landry Foundation Award for the Most Innovative Manufacturing Technology Program at the University Level and the Alfred Scow Award for Outstanding Contributions to the Student Experience and Learning Environment at the University of British Columbia.



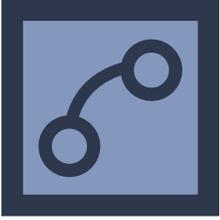
DEGREE – BACHELOR OF SCIENCE IN WOOD PRODUCTS PROCESSING



Core High School Courses and Electives	Career-preparation Certificates	UBC Wood Products Processing	Credential
<p><i>Required: Grade 12</i></p> <ul style="list-style-type: none"> • English 12 • Pre-Calculus 12 • Physics, Chemistry or Biology 12 • One other approved Grade 12 course <p><i>Required: Grade 11</i></p> <ul style="list-style-type: none"> • English 11 • Other language 11 • Pre-Calculus or Foundations of Math 11 • Physics 11 • Chemistry 11 • An approved social studies course <p><i>Recommended:</i></p> <ul style="list-style-type: none"> • Applied skills elective 11 or 12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • WHMIS • Occupational First Aid Level 1 • Driver's Licence 	<p><i>Four-year program includes courses in:</i></p> <ul style="list-style-type: none"> • Math • Physics • Chemistry • English • Economics <p><i>As well as wood-related courses, such as:</i></p> <ul style="list-style-type: none"> • Introduction to wood Products and Global Trade • Wood Adhesives and Coating • Wood Anatomy and Identification • Wood Sawmilling and Drying • Industrial Engineering • Globalization and Sustainability • Environmental Facilities Design • Furniture Construction • Machine Components • Engineering Economics • Wood Finishing and Protection 	<ul style="list-style-type: none"> • Bachelor of Science in Wood Products Processing



Photo: Western Forest Products Inc.



SAMPLE BUNDLE 5: DEGREE ROUTE – BACHELOR OF SCIENCE IN FOREST ECOLOGY AND MANAGEMENT

The University of Northern BC's **NATURAL RESOURCES MANAGEMENT PROGRAM** includes a four-year, nationally accredited degree in forest ecology and management. (Similar programs are offered at **UBC** and **Thompson Rivers University**.)

The program recognizes that management of any natural resource has implications for all other natural resources, and emphasizes multiple and sustainable resource management practices.

The Forest Ecology and Management major:

- provides students with a thorough understanding of the science, philosophy, and contemporary practice of forest management
- combines classroom study with active outdoor learning experiences, including in UNBC's two research forests
- is accredited by the Canadian Forestry Accreditation Board, and
- meets certification requirements for students to apply to become Registered Professional Foresters

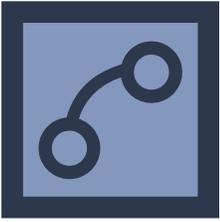
Government, industry and private experts assist in course presentations.





DEGREE – BACHELOR OF SCIENCE IN NATURAL RESOURCE MANAGEMENT/ FOREST RESOURCE MANAGEMENT

Core High School Courses and Electives	Career-preparation Certificates	UNBC Forest Ecology and Management	Credential
<p><i>Required: Grade 12</i></p> <ul style="list-style-type: none"> • English 12 • Principles of Math 12 or Pre-Calculus 12 • Physics, Chemistry or Biology 12 • One other approved Grade 12 course <p><i>Required: Grade 11</i></p> <ul style="list-style-type: none"> • English 11 • Other language 11 • Pre-Calculus or Foundations of Math 11 • Physics 11 • Chemistry 11 • An approved social studies course <p><i>Recommended:</i></p> <ul style="list-style-type: none"> • Applied skills elective 11 or 12 • Relevant locally developed Board/Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • Occupational First Aid Level 1 • Driver's Licence 	<p><i>Four-year program includes courses in:</i></p> <ul style="list-style-type: none"> • Forestry • Conservation • Ecology • Forest Biology • Chemistry • Silviculture • Natural Resource Planning • Mapping/GIS • Math/Statistics • Social Sciences • First Nations Studies • Communications • Economics 	<ul style="list-style-type: none"> • Bachelor of Science in Forest Ecology and Management



SAMPLE BUNDLE 6: DIRECT-TO-WORK ROUTE – TREE PLANTER

Tree planting is rigorous and physically demanding outdoor work that takes place in all types of weather.

The money a tree planter makes is 100% dependent on how many trees he or she can plant, not only in a day but also for duration of the planting season. Fit and skilled workers can plant more trees, with fewer injuries and are better able to plant for months at a time.

Selkirk College offers a free, eight-week, pre-season **FIT TO PLANT TRAINING PROGRAM** intended to help tree planters get in shape and prevent work-related injuries. The College reports that “Planters who followed this eight-week pre-season fitness program were able to sustain a higher planting rate all day long. They had 12.5% higher productivity and 40% fewer injuries.”

Fit to Plant is based upon the latest in sports science techniques and is specific to the types of movements used in planting. Most workouts can be kept under 30 minutes. The program includes a video and a downloadable Fit to Plant Training Program guide, so students can schedule their own workouts and track their progress.

The program aims to:

- increase aerobic power
- strengthen muscles and tendons to protect against wear and tear
- speed up reflexes to protect joints

Tree planters who are short on time can also download Selkirk College’s 10-day [Desperate Planter’s Last Chance Program](#).

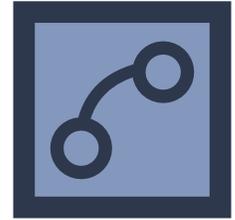
IT’S NOT EASY!

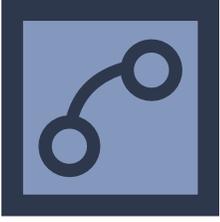
Tree planting involves hard work, often in remote and rough conditions.

A number of workers have published descriptions of tree planting that may be helpful for anyone considering a job planting trees. See [Replant.ca](#) for an introduction to tree planting life and work.

DIRECT-TO-WORK – TREE PLANTER

Core High School Courses and Electives	Career-preparation Certificates	Selkirk College Fit to Plant Program	Credential
<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • English 12 • Math 12 • Science 12 • Applied skills elective 11 or 12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • Occupational First Aid Level 1 • Driver's Licence 	<ul style="list-style-type: none"> • Fit to Plant video available online • Downloadable Fit to Plant Training Program guide/training log • Student will need to buy a TheraBand kit (can be ordered online from www.plant-a-tree.com) 	





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- Jennifer Jones, Teal Jones
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- Zach Maralia, Canfor Corporation
- Jan Marston, TimberWest Forest Corp.
- Brenda Martin, Truck Loggers Association
- Rob Martin, BC Ministry of Forests, Lands, and Natural Resources
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- Edward Morrice, College of New Caledonia (CNC)
- Lisa Perrault, Western Forest Products Inc.

- Katy Player, Canfor Corporation
- Heather Press, Tolko Industries
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- Shawn Rice, BC Ministry of Forests, Lands, and Natural Resources
- Erin Strong, Pinnacle Pellet
- Tim Thorpe, School District #22
- Anna Tikina, BC Council on Admissions AND Transfer (BCCAT)
- Mark Todd, Canfor Corporation
- Martin Tooms, School District #22
- Cory Williams, Industry Training Authority (ITA)

Uncaptioned Photos: Thinkstock



Photo: Western Forest Products Inc.

