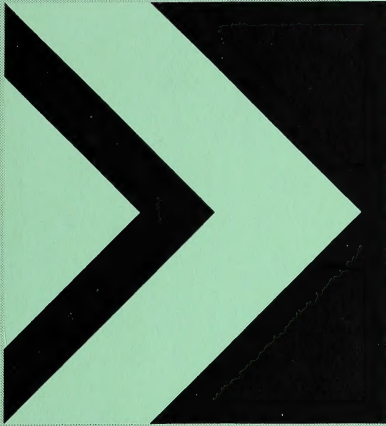


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CAREER & TECHNOLOGY STUDIES

LEARNING
FACILITATOR'S
MANUAL

Why Forestry?
FOR 1010



Distance
Learning

Alberta
EDUCATION

Advantages

Register with the
Learning Technologies Branch

Why Forestry? (FOR 1010)

The Learning Technologies Branch provides a variety of resources and services to help you register for the course. This includes information on the types of courses that will be available to you and how to contact us for more information.

LTB will work with you to ensure you have all the information you need to register for the course. If you have any questions, please contact us at Learning Technologies Branch, 10000 Saskatchewan Avenue, 11th Floor, Edmonton, Alberta T6G 1K6.

LEARNING FACILITATOR'S MANUAL



NOTE: This Forestry 1010 Learning Facilitator's Manual contains the Final Test and answers to the Final Test and to the teacher-assessed assignments; therefore, teachers should at all times keep it secure against unauthorized student access. The Final Test should be accessible to students only in supervised situations.

Forestry 1010
 Why Forestry?
 Learning Facilitator's Manual
 Learning Technologies Branch
 ISBN 0-7741-1372-3

This document is intended for	
Students	
Teachers	✓
Administrators	
Parents	
General Public	
Other	



You may find the following Internet sites useful:

- Alberta Education, <http://ednet.edc.gov.ab.ca>
- Learning Technologies Branch, <http://ednet.edc.gov.ab.ca/ltb>
- Learning Resources Distributing Centre, <http://ednet.edc.gov.ab.ca/lrdc>

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

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Teachers

Register with the Learning Technologies Branch

The Learning Technologies Branch is dedicated to upgrading and continually improving your Learning Facilitator's Manual so that it accurately reflects any necessary revisions we have had to make in the Student Module Booklet, Assignment Booklet, or the sample Final Test. The types of revisions that will be made are those that make the module more accurate, more current, or more effective.

LTB will send you the **latest enhancements** or **minor upgrades** for your Learning Facilitator's Manual if you return the following registration card to: Learning Technologies Branch, Box 4000, Barrhead, Alberta T7N 1P4, Attention: Instructional Design and Development.

✂

LTB Learning Facilitator's Manual Registration Card	
_____	_____
First Name	Surname
_____	_____
School Name	School Phone Number

School Address	
_____	_____
City	Postal Code
_____	_____
Course Title	Approximate Date of Purchase

✂



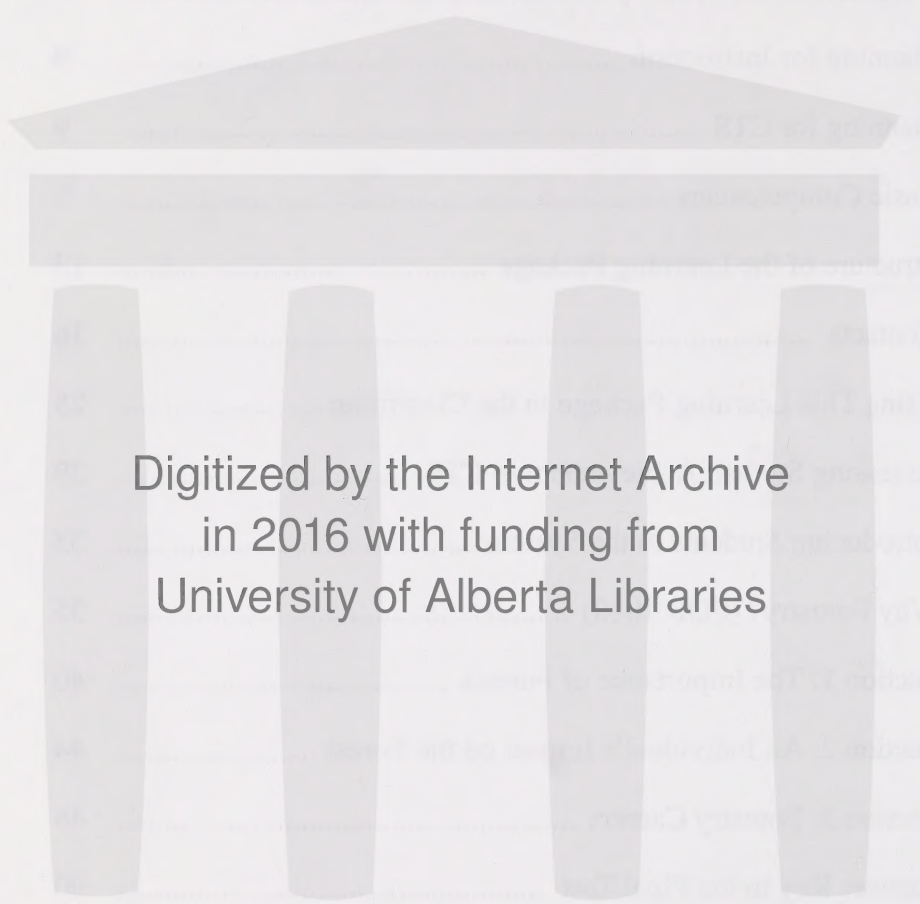
You can help ensure that distance learning courseware is of top quality by letting us know of areas that need to be adjusted. Call the Learning Technologies Branch, free of charge by dialling 310-0000, and ask for the Editing Unit. Also, a teacher questionnaire has been included at the back of most Learning Facilitator's Manuals. Please take a moment to fill it out.



We look forward to hearing from you!

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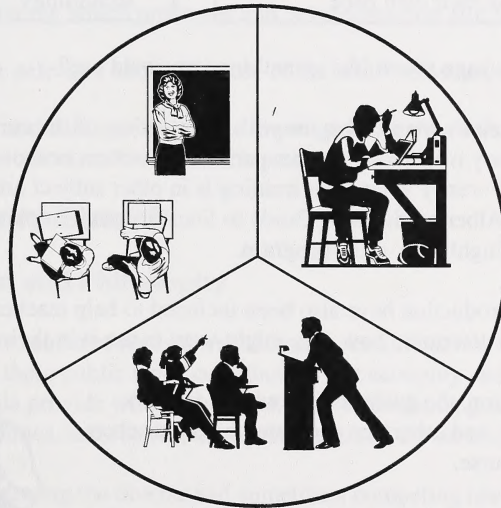
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Introduction

A survey of these course materials will confirm that this learning package has been specially designed for many kinds of teachers working in a variety of situations.

In Which Category Do You Fit?

- Small Schools Teacher
 - inexperienced
 - experienced, but in other subject areas
 - experienced in teaching Forestry, but wanting to try a different approach
- Distance Learning Teacher
 - travelling to schools within the region
 - using facsimile and teleconferences to teach students within the region
- Large Schools Teacher
 - inexperienced
 - experienced in teaching Forestry, but wanting to try a different approach



Because these materials have been created by experienced classroom teachers and distance learning specialists, they have many advantages for students and teachers, regardless of the situation.

Advantages for Students

Materials

- incorporate a strong learner-centred philosophy
- promote such qualities in the learner as autonomy, independence, and flexibility
- are developed through media that suit the needs and circumstances of the learner
- reflect the experiential background of Alberta students
- provide opportunities by overcoming barriers that result from geographical location
- promote individualized learning, allowing learners to work at their own pace

Advantages for Teachers

Materials

- allow teachers maximum teaching time and minimize preparation time
- include different routes through the materials to suit different learners
- incorporate a wide range of teaching strategies, in particular those using independent and individual learning
- deliver curriculum designed by education specialists that reflects the Alberta Education Program of Studies with an emphasis on Canadian content
- provide learning materials that are upwardly compatible with advanced educational technology

Does this learning package sound like something you could use?

This Learning Facilitator's Manual begins with an overview of the current Career and Technology program. This summary is included for inexperienced teachers or those teachers who have found themselves teaching Forestry when their training is in other subject areas. This brief description is not meant to replace the Alberta Education Guide to Standards and Implementation, but rather to help teachers confirm the highlights of the program.

Other parts of this introduction have also been included to help teachers become familiar with this learning package and determine how they might want to use it in their classrooms.

Beyond the introduction, the guide itself contains answers, models, explanations, and other tips generated by the teachers who authored this course.

The Student Module Booklets, Assignment Booklets, and LFMs are the products of experienced classroom teachers and distance learning specialists. It is the hope of these teachers that their experience can be shared with those who want to take advantage of it.



Overview of Career and Technology Studies

Program Philosophy

Career and Technology Studies offers all students important learning opportunities. Regardless of the particular area of study chosen, students in CTS will

- develop skills that they can apply in their daily lives now and in the future
- refine career-planning skills
- develop technology-related skills
- enhance employability skills
- apply and reinforce learnings developed in other subject areas

In CTS, students build skills they can apply in their everyday lives. For example, in the CTS program, particularly at the introductory levels, students have the opportunity to improve their ability to make sound consumer decisions and to appreciate environmental and safety precautions.

The integration of careers throughout the CTS program helps students make effective career decisions and target their efforts. Students in CTS will have the opportunity to broaden their knowledge about careers, occupations, and job opportunities and the training requirements involved. As well, they will recognize the need for life-long learning.

Students in CTS will have the opportunity to use and apply technology and systems effectively and efficiently, which involves

- a decision regarding which processes and procedures best suit the task at hand
- the appropriate selection and skilled use of the tools or resources that are available
- an assessment and management of the impact that the use of the technology may have on themselves, on others, and on the environment

Overview of the Forestry Strand

Strand Rationale and Philosophy

Forests are a valuable source of natural wealth and cover almost two-thirds of Alberta. The resources found on or beneath these public lands contribute to our economy and quality of life. Forested lands in Alberta and Canada provide wildlife habitats, vital watersheds, grazing lands, outdoor recreation and tourism opportunities, and support the development of the forest products industry.

Achieving harmony among the diverse and sometimes competing needs associated with forested lands is an important and continuing task. Through public involvement and a team approach, integrated resource management provides a process for achieving balanced use of forest resources.

Recently, global levels of public concern for forests has expanded to embrace practices that ensure sustainable use of forest ecosystems. Such sustainable use of resources and the environment today will not damage prospects for their continued use by future generations.

Forestry, a strand in Career and Technology Studies, will provide opportunities for students to examine the dynamics of forest ecosystems, as well as the many benefits and opportunities associated with forests. Conservation is viewed throughout this strand as a process for managing human use of the forest environment to ensure such use is sustainable. Students will develop practical knowledge of industry practices that support the integrated and sustainable development of forest resources.



Students in Forestry will develop the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively, as private citizens and members of the work force, toward the conservation and responsible use of water, land, air, forests, and wildlife. Within the philosophy of Career and Technology Studies, *the student in Forestry will*

- develop greater awareness of the economic, environmental, and social significance of the forest resource in Alberta and the rest of the world, and the benefits and costs of resource development
- describe relationships among production, processing, and marketing systems within the forest products industry
- describe technologies and research programs designed to develop, conserve, protect, enhance, and sustain the productivity of forested lands
- translate sustainable development and conservation goals into viable plans for managing the use of the forest resource
- develop competencies and behaviours that have broad application to environmental career paths, and specific application to careers within Alberta's forest industries

Strand Organization

Development Model

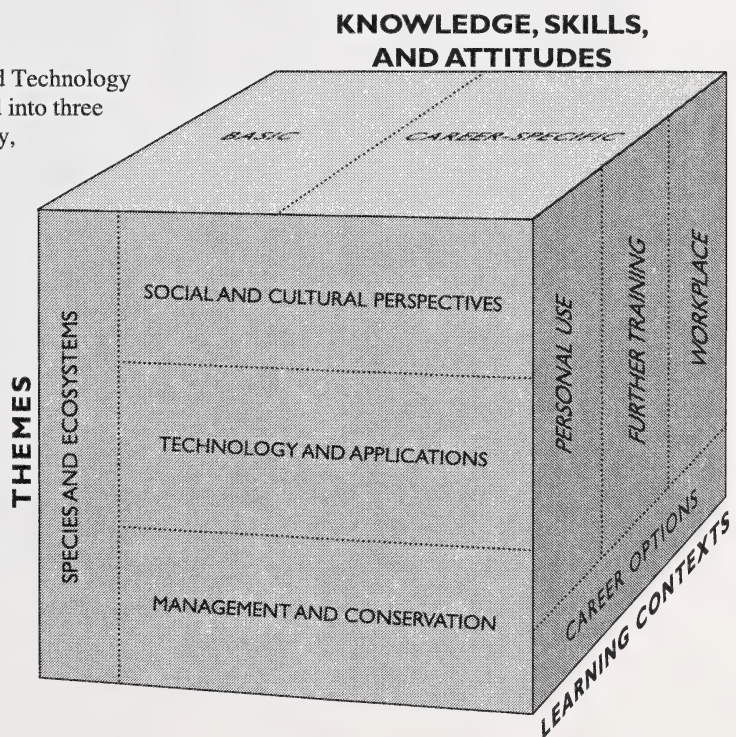
The development model depicts three dimensions that provide a basis for selecting and organizing content within the Forestry strand.

- The **KNOWLEDGE, SKILLS, AND ATTITUDES**, represented on the upper face of the model, provide structure for the course and focus attention on learning goals common to all CTS courses.
- The **LEARNING CONTEXTS**, represented on the right face of the model, foster the development of knowledge and behaviours that will enable students to meet the demands of daily living, further training, and the workplace.
- The **THEMES** provide situational and concrete learning experiences that support the development of knowledge, skills, and attitudes relevant to each of the learning contexts. Each theme focuses attention on the sustainable use of species and ecosystems. Blended together, the themes enable students to understand how it is possible to fulfill social, cultural, aesthetic, and economic goals through resource development, while embracing a conservation ethic so as to maintain essential ecological process, genetic diversity, and an adequate resource base for future generations.

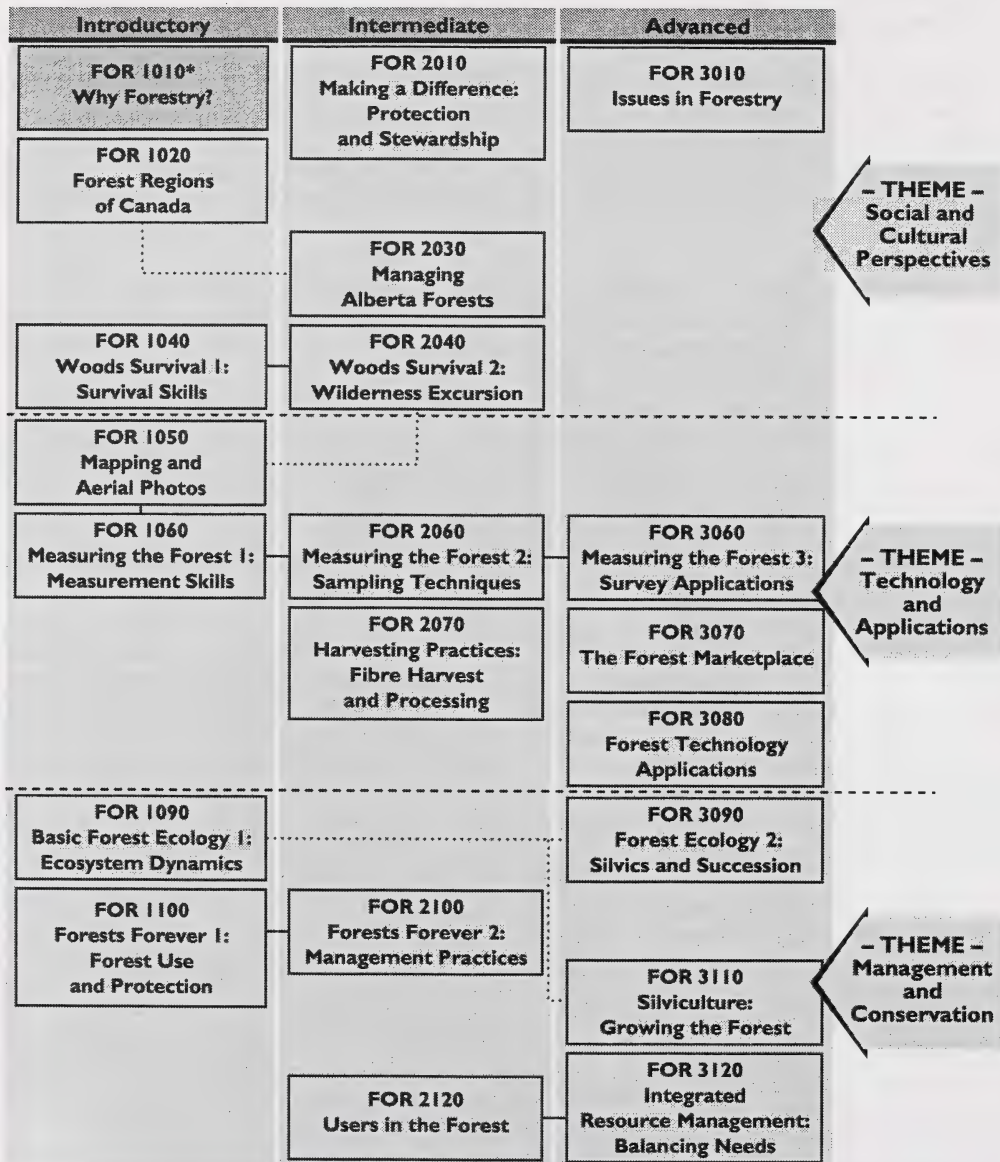
Levels

Forestry, like other Career and Technology Studies curricula, is organized into three levels of learning: introductory, intermediate, and advanced.

Introductory modules enable students to develop basic knowledge of forest regions and ecosystems and skills necessary for functioning in a forest environment. Intermediate and advanced level modules develop more specialized knowledge of silviculture practices and the harvest, processing, and marketing of forest products. Students examine forest management policies and programs and begin to plan for the sustainable development of forested lands.



The Forestry Strand



— Prerequisite
..... Recommended sequence
* Module provides a strong foundation for further learning in this strand

Module Descriptions

FOR 1010: Why Forestry?

Students explain the social, economic, and environmental significance of forests, describe the impact of individuals on forests, and identify career opportunities in forestry.

FOR 1020: Forest Regions of Canada

Students identify factors that determine the distribution of forests, as well as research forest regions of Canada, with an emphasis on specific species and forest associations found in Alberta.

FOR 1040: Woods Survival 1: Survival Skills

Students demonstrate basic skills required for responsible participation in a range of outdoor forest activities.

FOR 1050: Mapping and Aerial Photos

Students interpret information from different types of maps and aerial photographs used in the forest industry.

FOR 1060: Measuring the Forest 1: Measurement Skills

Students demonstrate basic forest measurement skills and apply these skills to sample fibre values in a forested region.

FOR 1090: Basic Forest Ecology 1: Ecosystem Dynamics

Students investigate forest ecosystems and explain the structure and functioning of trees.

FOR 1100: Forests Forever 1: Forest Use and Protection

Students describe past and present uses of Canada's forests and explain how research and technology assist in forest management.

FOR 2010: Making a Difference in Forestry: Protection and Stewardship

Students analyse the impact of attitudes, actions, and lifestyles on forests and propose individual and shared actions that foster environmental stewardship.

FOR 2030: Managing Alberta's Forests

Students research agencies and structures used to manage forested lands in Alberta.

FOR 2040: Woods Survival 2: Wilderness Excursion

Students plan, prepare for, and conduct an extended outdoor wilderness trip in the forest.

FOR 2060: Measuring the Forest 2: Sampling Techniques

Students research current forest inventory practices and demonstrate appropriate strategies for sampling the fibre and non-fibre value of forests.

FOR 2070: Harvest Practices: Fibre Harvest and Processing

Students research the steps involved in harvesting and processing the fibre resource.

FOR 2100: Forests Forever 2: Management Practices

Students explain Alberta's forest management goals and describe current management practices used to address these goals.

FOR 2120: Users in the Forest

Students identify different forest users and explain the planning principles used to develop an integrated resource management plan.

FOR 3010: Issues in Forestry

Students analyse current local and global issues in forest management and demonstrate individual and shared actions that foster environmental stewardship.

FOR 3060: Measuring the Forest 3: Survey Applications

Students explain management applications of data collected from a forest survey and examine the role of technology in current forest inventory practices.

FOR 3070: The Forest Marketplace

Students describe the range of consumer products and services derived from Canada's forests and research the production and marketing of forest products.

FOR 3080: Forest Technology Applications

Students examine research and technological applications in the forest industry, and examine changing career opportunities in the forestry sector.

FOR 3090: Forest Ecology 2: Silvics and Succession

Students investigate interrelationships among soil, water, air, trees, and the environment and explain how forests change over time as a result of these interrelationships.

FOR 3110: Silviculture: Growing the Forest

Students demonstrate knowledge of the techniques used to establish, grow, and harvest tree crops.

FOR 3120: Integrated Resource Management: Balancing Needs

Students develop and present an integrated plan for sustainable development of the forest resource.

Planning for Instruction

CTS provides increased opportunity for junior and senior high schools to design courses based on the needs and interests of their students and the circumstances within the school and community. Some strands may be appropriately introduced at the junior high school level. Other strands are more appropriately introduced at the senior high school level.

Planning for CTS

Defining Courses

Each module was designed for approximately seventeen to twenty-five hours of instruction. However, this time frame is only a guideline to facilitate planning. The CTS curricula are competency based, and the student may take more or less time to gain the designated competencies within each module.

A course will usually consist of modules primarily from the same strand but, where appropriate, may include modules from two or more strands.

Module selection and sequencing must consider the module parameters, which define

- prerequisites and corequisites (entry-level competencies)
- instructional qualifications, if specialized
- equipment and facility requirements, if specialized

Degree of Flexibility

The CTS program, while designed using the modular structure to facilitate flexible timetabling and instructional delivery, does not mandate the degree of flexibility a school or teacher will offer. The teacher and school will determine the degree of flexibility available to the student. Within the instructional plan established by the school, the student may

- be given the opportunity to progress at a rate that is personally challenging
- have increased opportunity to select modules that develop competencies he or she finds most relevant

Basic Competencies

Career and Technology strands were designed to stand alone or to be integrated with other strands for a customized course of studies to meet student needs.

Two sets of basic competencies follow. The first set is the **Basic Competencies Reference Guide** from the CTS Guide to Standards and Implementation. This guide may be used by teachers who are in contact with students in a classroom situation.

The second set, **Basic Competencies for Distance Learners**, is a modification for distance learning students of the **Basic Competencies Reference Guide**.

Basic Competencies Reference Guide

The following chart outlines basic competencies which students will endeavour to develop and enhance in each of the CTS strands and modules. A student's basic competencies should be assessed through observations involving the student, teacher(s), peers, and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Development Framework*. **As students progress through Stages 1, 2, 3, and 4 of this reference guide, they build on the competencies gained in earlier stages.** Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include the following:

- having students rate themselves and each other
- using reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas on which to focus
- building a student's portfolio

Stage 1— The student:	Stage 2— The student:	Stage 3— The student:	Stage 4— The student:
<p>Managing Learning</p> <ul style="list-style-type: none"> • comes to class prepared for learning • follows basic instructions as directed • acquires specialized knowledge, skills, and attitudes • identifies criteria for evaluating choices and making decisions • uses a variety of learning strategies 	<ul style="list-style-type: none"> • follows instructions with limited direction • sets goals and establishes steps to achieve them with direction • applies specialized knowledge, skills, and attitudes in practical situations • identifies and applies a range of effective strategies for solving problems and making decisions • explores and uses a variety of learning strategies with limited direction 	<ul style="list-style-type: none"> • follows detailed instructions on an independent basis • sets clear goals and establishes steps to achieve them • transfers and applies specialized knowledge, skills, and attitudes in a variety of situations • uses a range of critical-thinking skills to evaluate situations, solve problems, and make decisions • selects and uses effective learning strategies • co-operates with others in the effective use of learning strategies 	<ul style="list-style-type: none"> • demonstrates self-direction in learning, goal setting, and goal achievement • transfers and applies learning in new situations; demonstrates commitment to life-long learning • thinks critically and acts logically to evaluate situations, solve problems and make decisions • provides leadership in the effective use of learning strategies
<p>Managing Resources</p> <ul style="list-style-type: none"> • adheres to established timelines; uses time/schedules/planners effectively • uses information (material and human resources) as directed • uses technology (facilities, equipment, supplies) as directed to perform a task or provide a service • maintains, stores, and/or disposes of equipment and materials as directed 	<ul style="list-style-type: none"> • creates and adheres to timelines with limited direction; uses time/schedules/planners effectively • accesses and uses a range of relevant information (material and human resources) with limited direction • uses technology (facilities, equipment, supplies) as appropriate to perform a task or provide a service with minimal assistance and supervision • maintains, stores, and/or disposes of equipment and materials with limited assistance 	<ul style="list-style-type: none"> • creates and adheres to detailed timelines on an independent basis; prioritizes tasks; uses time/schedules/planners effectively • accesses a range of information (material and human resources) and recognizes when additional resources are required • selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis • maintains, stores, and/or disposes of equipment and materials on an independent basis 	<ul style="list-style-type: none"> • creates and adheres to detailed timelines; uses time/schedules/planners effectively, prioritizing tasks on a consistent basis • uses a wide range of information (material and human resources) in order to support and enhance the basic requirement • recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies) • demonstrates effective techniques for managing facilities, equipment, and supplies
<p>Problem Solving and Innovation</p> <ul style="list-style-type: none"> • participates in problem solving as a process • learns a range of problem-solving skills and approaches • practises problem-solving skills by responding appropriately to a clearly defined problem, specified goals, and constraints by <ul style="list-style-type: none"> – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action 	<ul style="list-style-type: none"> • identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints • applies problem-solving skills to a directed or a self-directed activity by <ul style="list-style-type: none"> – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action 	<ul style="list-style-type: none"> • thinks critically and acts logically in the context of problem solving • transfers problem-solving skills to real-life situations by generating new possibilities • prepares implementation plans • recognizes risks 	<ul style="list-style-type: none"> • identifies and resolves problems efficiently and effectively • identifies and suggests new ideas to get the job done creatively by <ul style="list-style-type: none"> – combining ideas or information in new ways – making connections between seemingly unrelated ideas – actively seeking out opportunities

<p>Communicating Effectively</p> <ul style="list-style-type: none"> uses communication skills; e.g., reading, writing, illustrating, speaking uses language in appropriate context listens to understand and learn demonstrates positive interpersonal skills in selected contexts 	<ul style="list-style-type: none"> communicates thoughts, feelings, and ideas to justify or challenge a position using written, oral, and visual means uses technical language appropriately listens and responds to understand and learn demonstrates positive interpersonal skills in many contexts 	<ul style="list-style-type: none"> prepares and effectively presents accurate, concise, written, visual, and/or oral reports providing reasoned argument encourages, persuades, convinces, or otherwise motivates individuals listens and responds to understand, learn, and teach demonstrates positive interpersonal skills in most contexts 	<ul style="list-style-type: none"> negotiates effectively by working towards an agreement that may involve exchanging specific resources or resolving divergent interests negotiates and works towards a consensus listens and responds to understand, learn, teach, and evaluate promotes positive interpersonal skills among others
<p>Working with Others</p> <ul style="list-style-type: none"> fulfills responsibility in a group project works collaboratively in structured situations with peer members acknowledges the opinions and contributions of others in the group 	<ul style="list-style-type: none"> co-operates to achieve group results maintains a balance between speaking, listening, and responding in group discussion respects the feelings and views of others 	<ul style="list-style-type: none"> seeks a team approach as appropriate based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of work load works in a team or group: <ul style="list-style-type: none"> encourages and supports team members helps others in a positive manner provides leadership/followership as required negotiates and works toward consensus as required 	<ul style="list-style-type: none"> leads, where appropriate, mobilizing the group for high performance understands and works within the context of the group prepares, validates, and implements plans that reveal new possibilities
<p>Demonstrating Responsibility</p> <p>Attendance</p> <ul style="list-style-type: none"> demonstrates responsibility in attendance, punctuality, and task completion <p>Safety</p> <ul style="list-style-type: none"> follows personal and environmental health-and-safety procedures identifies immediate hazards and their impact on self, others, and the environment follows appropriate/emergency response procedures <p>Ethics</p> <ul style="list-style-type: none"> makes personal judgements about whether a certain behaviour/action is right or wrong 	<ul style="list-style-type: none"> recognizes and follows personal and environmental health-and-safety procedures identifies immediate and potential hazards and their impact on self, others, and the environment assesses how personal judgements affect other peer members and/or family; e.g., home and school 	<ul style="list-style-type: none"> establishes and follows personal and environmental health-and-safety procedures assesses the implications of personal/group actions within the broader community; e.g., workplace 	<ul style="list-style-type: none"> transfers and applies personal and environmental health-and-safety procedures to a variety of environments and situations demonstrates accountability for actions taken to address immediate and potential hazards analyses the implications of personal/group actions within the global context states and defends a personal code of ethics as required
<p>*Developmental Framework</p> <ul style="list-style-type: none"> Simple task Structured environment Directed learning 			

Basic Competencies for Distance Learners

Eight basic competencies, identified by the following icons, are developed in each strand, though they may not necessarily appear in each module.



Careers: identify appropriate career linkages within the strand being studied



Communication: effectively present concise written, visual, and oral communications



Ethics: make judgements about whether behaviour is right or wrong on personal, community, and global levels



Innovation: recognize opportunities/problems and identify and suggest new ideas



Safety: assess potential risks, and follow personal and environmental safety procedures



Task Management: demonstrate an ability to locate and use resources and to use time effectively



Teamwork: work towards goals co-operatively, collaboratively, or independently, and acknowledge the opinions of others



Technology: effectively use technology when required

These icons will indicate to students and facilitators that a basic competency has been identified in the activity offered to the students.

Structure of the Learning Package

Basic Design

This learning package involves many other components in addition to this Learning Facilitator’s Manual. This module includes at least two print components: a Student Module Booklet and an Assignment Booklet.

Student Module Booklet



The Student Module Booklet contains guided activities that instruct students in a relevant, realistic setting. Within the framework of Career and Technology Studies, one module equals one credit.

This booklet has been specially designed to promote such qualities in the learner as autonomy, independence, and flexibility. The writer has incorporated such teaching strategies as working from the concrete to the abstract, linking the old to the new, getting students actively involved, and using advance, intermediate, and post organizers. Many other techniques are used to cater to individual learning styles and preferences. The booklet has been designed to include a variety of pathways and options because it is intended for a broad range of use within and beyond Alberta.

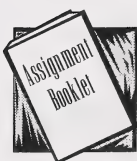
Contents
Overview Assessment
Section 1 Activity 1 Activity 2 etc.
Section 2 Activity 1 Activity 2 etc.
Module Summary
Appendix

The structure of the Student Module Booklet follows a systematic design. The booklet begins with a detailed table of contents that shows the students all of the main steps; this page acts as an organizer for students. The Module Overview introduces the module topic or theme and includes a graphic representation to help visual learners and poor readers. This introduction also includes an assessment statement, so students are informed of the weightings of each assignment.

The body of the Student Module Booklet is made up of two or more closely related sections. Each section contains student activities that develop skills and knowledge centred around a theme. The activities may include print, audio, video, computer, or Internet involvement. Computer and Internet activities are optional. At times, the student and the learning facilitator are allowed to choose the activity that best suits the student’s needs and interests. Each section also includes other activities such as the Extra Help and Enrichment as optional pathways. This flexibility caters to each student’s personal situation.

Following the last section is a modular summary that focuses on the skills and strategies that the student has learned. The Student Module Booklet ends with an Appendix that includes a Glossary and Suggested Answers for the self-assessment work.

Assignment Booklet



Accompanying each Student Module Booklet is an Assignment Booklet. The activities in the Assignment Booklets can be used for both formative and summative assessments. Students should complete these assignments when they have thoroughly reviewed the other module materials. You may decide to have students submit their work as soon as they have completed each sectional assignment or you may choose to let students complete all the sectional assignments within the module before evaluating their work. The Assignment Booklets have been designed for both in-classroom use and for distance learning. **If the Assignment Booklets are not being mailed, remove the green outside mailing covers before distributing the booklets to students.**

Media



INTERNET



VIDEOCASSETTE

Internet references are found throughout the module; exploring those references, however, is optional for students. In most cases, students are given suggested topics that they may explore through the Internet's search engines. In rare cases, students might be given a specific uniform resource locator (URL), but they should be aware that these addresses are subject to change.

Updated information about the Learning Technologies Branch and this module and others can be found by starting at the Learning Technologies Branch's home page at <http://ednet.edc.gov.ab.ca/ltb> or by going straight to the LTB Courses page at <http://ednet.edc.gov.ab.ca/ltb/400/courses.html>.

There are also activities in this module that require students to view videos. In some cases, the use of these videos is mandatory. These mandatory videos are listed on the following pages. It is important that you acquire these videos so students have access to them when needed. Optional videos are also mentioned at various points in the module. A list of the optional videos is also included on the following pages. More information about the videos appears later in this manual.

Materials, Media, and Equipment

Mandatory Components

Equipment (Hardware)	Media	Materials
<ul style="list-style-type: none"> videocassette player computer 	<ul style="list-style-type: none"> mandatory videos: <ul style="list-style-type: none"> <i>This Living World: The Forest</i> (King Motion Picture Corporation, 1992) 	<ul style="list-style-type: none"> LFM for Forestry 1010 one Student Module Booklet and one Assignment Booklet for each student There is a Final Test.

Videocassettes or laser videodiscs used in the course may be available from the Learning Resources Distributing Centre or ACCESS. You may also wish to call your regional library service for more information.

Optional Components

Equipment (Hardware)	Media	Materials
<ul style="list-style-type: none"> videocassette player computer 	<ul style="list-style-type: none"> optional videos: <ul style="list-style-type: none"> <i>The Rain Forest</i> (National Geographic) <i>This Living World: Wildlife Habitat</i> (King Motion Picture Corporation, 1992) <i>Boreal Forest Issues</i> (ACCESS BPN: 8210 01) 	

Contacts

Following is a list of organizations that may provide help and/or resources for the learning facilitator.

ACCESS: The Education Station

ACCESS offers a variety of resources and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS audio and video library tapes copied. ACCESS publishes listings of audio- and videocassettes as well as a comprehensive programming schedule. Of particular interest are the CTS videos, which are available with utilization guides. The guides outline key points in each video and suggest questions for discussion, classroom projects, and other activities. Video topics are listed in the Support Learning Resources section of this guide. The videos and accompanying support material can be obtained from ACCESS.

Government Sources

National Film Board of Canada (NFB)

The NFB has numerous films and videotapes that may be suitable for Career and Technology Studies strands. For a list of NFB films and videotapes indexed by title, subject and director, or for purchase of NFB films and videotapes, call 1-800-267-7710 (toll free) or Internet address: <http://www.nfb.ca>

ACCESS: The Education Station and some school boards have acquired duplication rights to some NFB videotapes. Please contact ACCESS: The Education Station or consult the relevant catalogues in your school or school district.

The Edmonton Public Library and the Calgary Public Library have a selection of NFB films and videotapes that can be borrowed free of charge with a Public Library borrower's card. For further information, contact:

Edmonton Public Library
Telephone: 403-496-7000
Calgary Public Library
Telephone: 403-260-2650

For further information contact:

Statistics Canada
Regional Office
8th Floor, Park Square
10001 Bellamy Hill
Edmonton, AB T5J 3B6
Telephone: 403-495-3027
Fax: 403-495-5318
Internet address: <http://www.statcan.ca>

Statistics Canada produces periodicals, reports, and an annual year book.

Resource Centres

Urban Resource Centres

Instructional Services

Elk Island Public Schools
2001 Sherwood Drive
Sherwood Park, AB T8A 3W7
Telephone: 403-464-8235
Fax: 403-464-8033
Internet Address: <http://ei.educ.ab.ca>

Learning Resources Centre

Red Deer Public School Board
4747 - 53 Street
Red Deer, AB T4N 2E6
Telephone: 403-343-8896
Fax: 403-347-8190

Instructional Materials Centre

Calgary Separate School Board
6220 Lakeview Drive SW
Calgary, AB T3E 5T1
Telephone: 403-298-1679
Fax: 403-249-3054

School, Student, Parent Services Unit

Program and Professional Support Services
Sub Unit
Calgary Board of Education
3610 - 9 Street SE
Calgary, AB T2G 3C5
Telephone: 403-294-8542
Fax: 403-287-9739

After July 1, 1997, please contact the School, Student, Parent Services Unit regarding the relocation of the Loan Pool Resource Unit.

Learning Resources

Edmonton Public School Board
Centre for Education
One Kingsway Avenue
Edmonton, AB T5H 4G9
Telephone: 403-429-8387
Fax: 403-429-0625

Instructional Materials Centre

Medicine Hat School District No. 76
601 - 1 Avenue SW
Medicine Hat, AB T1A 4Y7
Telephone: 403-528-6719
Fax: 403-529-5339

Resource Centre

Edmonton Catholic Schools
St. Anthony's Teacher Centre
10425 - 84 Avenue
Edmonton, AB T6E 2H3
Telephone: 403-439-7356
Fax: 403-433-0181

Instructional Media Centre

Northern Lights School Division No. 69
Bonnyville Centralized High School
4908 - 49 Avenue
Bonnyville, AB T9N 2J7
Telephone: 403-826-3366
Fax: 403-826-2959

Regional Resource Centres**Zone 1**

Zone One Regional Resource Centre
P.O. Box 6536
10020 - 101 Street
Peace River, AB T8S 1S3
Telephone: 403-624-3187
Fax: 403-624-5941

Zone 2/3

Central Alberta Media Services (CAMS)
182 Sioux Road
Sherwood Park, AB T8A 3X5
Telephone: 403-464-5540
Fax: 403-449-5326

Zone 4

Information and Development Services
Parkland Regional Library
5404 - 56 Avenue
Lacombe, AB T4L 1G1
Telephone: 403-782-3850
Fax: 403-782-4650
Internet Address: <http://rtt.ab.ca.rtt/prl/prl.htm>

Zone 5

South Central Alberta Resource Centre
(SCARC)
Golden Hills Regional Division
435A Hwy 1
Westmount School
Strathmore, AB T0J 3H0
Telephone: 403-934-5028
Fax: 403-934-5125

Zone 6

Southern Alberta Learning Resource Centre
(SALRC)
Provincial Government Administration Building
909 Third Avenue North, Room No. 120
Box 845
Lethbridge, AB T1J 3Z8
Telephone: 403-320-7807
Fax: 403-320-7817

Other Government Sources

Alberta Advanced Education and Career Development

Information Development and Marketing
9th Floor, City Centre Building
10155 – 102 Street
Edmonton, AB T5J 4L5
Telephone: 403-422-1794
Fax: 403-422-5319
E-mail: careerinfo@aeed.gov.ab.ca

Alberta Careers Beyond 2000
Alberta Careers Beyond 2000: Industry Sector Profiles
Alberta Careers Beyond 2000: Occupational Profiles.

Videos on career planning and entrepreneurial topics are available through the library of this department. Call 403-422-4752 for more information. The following videos are representative of the library's holdings:

The Entrepreneur
Get a Job
A Head for Business
The Seven Phases of a Job Interview.

Alberta Agriculture, Food and Rural Development

Website: www.agric.gov.ab.ca

Publications
7000 – 113 Street
Edmonton, AB T6H 5T6
Telephone: 403-427-2121
Fax: 403-427-2861

Publications List (a comprehensive listing of free and inexpensive print materials on a variety of topics in agriculture; updated each year).

Multi-Media Branch
7000 – 113 Street
Edmonton, AB T6H 5T6
Telephone: 403-427-2127
1-800-292-5697
Fax: 403-427-2861

Audio Visual Catalogue (an annotated listing of films and videos available for loan upon request; updated each year).

4-H Branch

2nd Floor, 7000 - 113 Street
Edmonton, AB T6H 5T6
Telephone: 403-427-2412
Fax: 403-422-7755

4-H Project Materials

Crop Diversification Centre North (*formerly Alberta Tree Nursery and Horticulture Centre*)
R.R. #6, 17507 Fort Road
Edmonton, AB T5B 4K3
Telephone: 403-422-1789
Fax: 403-422-6096

Crop Diversification Centre South

(*formerly Alberta Special Crop and Horticulture Research Centre*)
S.S. 4
Brooks, AB T1R 1E6
Telephone: 403-362-1300
Fax: 403-362-1306

Alberta Environmental Protection

Website: www.gov.ab.ca/~env/index.html

Strategic and Regional Support Education Branch (*handles inquiries formerly directed to the Environmental Council of Alberta*)

11th Floor, South Petroleum Plaza
9915 - 108 Street
Edmonton, AB T5K 2G8
Telephone: 403-427-6310
Fax: 403-422-5136
E-mail: envedu@env.gov.ab.ca

Land Conservation Education Program
Pesticide Education Program
The Water Literacy Program
Focus On Series

Poster Education Series
(Workshops and presentations on these program materials can be arranged.)

Communications Division

9th Floor, Petroleum Plaza, South Tower
9915 - 108 Street
Edmonton, Alberta T5K 2G8
Telephone: 403-427-8636
Fax: 403-422-6339

EP LINK (a newsletter about projects, programs and activities undertaken by Alberta Environmental Protection staff)

Edmonton District Fish and Wildlife Office

(handles inquiries regarding all Conservation Education Programs)

14515 - 122 Avenue
Edmonton, AB T5L 2W4
Telephone: 403-422-2605
Fax: 403-427-5695

Project Wild

Alberta Conservation and Hunter Education Program

Alberta Fishing Education Program

Provincial Film Library

(handles the booking and distribution of Conservation Education films and videos)

2nd Floor, 11510 Kingsway Avenue
Edmonton, AB T5G 2Y5
Telephone: 403-427-4381
Fax: 403-452-0668

Natural Resources Service

(handles inquiries formerly directed to Fish & Wildlife Services)

Information Centre
9920 - 108 Street
Edmonton, AB T5K 2M4
Telephone: 403-944-0313

Land and Forest Service

Forest Protection Division
9920 - 108 Street
9th Floor, Great West Life Building
Edmonton, AB T5K 2M4
Telephone: 403-427-8474
Fax: 403-427-0085
E-mail: fandrade@env.gov.ab.ca

Junior Forest Wardens Program**Recreation and Protected Areas Division**

(handles inquiries formerly directed to Alberta Parks)

2nd Floor Oxbridge Place
9820-106 Street
Edmonton, AB T5K 2J6
Telephone: 403-427-6781
Fax: 403-427-5980

Alberta Justice

Chief Provincial Firearms Office
Ground Floor, 10365 - 97 Street
Edmonton, AB T5J 3W5
Telephone: 403-427-0437
Fax: 403-427-1100

Canadian Firearms Safety Course

Canadian Heritage, Parks Canada

(handles inquiries formerly directed to Parks Canada)

Website (for Canada's Environmental Report):

<http://199.212.18.12/folio.pgi/soe>

Telephone: 1-800-748-7275

E-mail: NATLPARKS-AB@PCH.GC.CA

Calgary Office:

552, 220 - 4th Avenue SE
Calgary, AB T2G 4X3

Edmonton Office:

220 Canada Place
9700 Jasper Avenue
Edmonton, Alberta T5J 4C3

Environment Canada

Inquiry Centre
351 St. Joseph Blvd.
Hull, PQ K1A 0H3
Telephone: 819-997-2800
Fax: 613-953-2225

Action 21

27th Floor, #10 Wellington Street
Hull, PQ K1A 0H3
Telephone: 1-800-668-6767

Environmental Citizenship Series:

A Primer on Environmental Citizenship
The Nature of Canada: A Primer on Spaces and Species

A Primer on Climate Change
A Primer on Water

Communications Division

Environmental Conservation Branch
Western & Northern Region
(handles inquiries formerly directed to the Canadian Wildlife Service)

200, 4999 - 98 Avenue
Edmonton, AB T6B 2X3
Telephone: 403-951-8720
Fax: 403-495-2615

Wildlife & environmental publications**Industry Canada**

(handles inquiries formerly directed to Industry & Science Canada)

Website: <http://strategis.ic.gc.ca>

Northern Region

540 Canada Place
9700 Jasper Avenue
Edmonton, AB T5J 4C3
Telephone: 403-495-4782

Or

Southern Region
#400, 639 - 5th Avenue SW
Calgary, AB T2P 0M9
Telephone: 403-292-4575

Natural Resources Canada

Website: www.nrcan.gc.ca

Canadian Forestry Service
(handles inquiries formerly directed to Forestry Canada & Northern Forestry Research Centre)

Websites: www.nrcan.gc.ca/cfs
www.nofc.forestry.ca

5320 - 122 Street
Edmonton, Alberta T6H 3S5
Telephone: 403-435-7210
Fax: 403-435-7359
E-mail: @nofc.forestry.ca

Distribution Section
Communications NRCan
580 Booth Street, 20th Floor
Ottawa, ON K1A 0E4
Telephone: 616-992-0759 / 616-995-6783
Fax: 616-996-9094

(A Publications List is available upon request.)

Professional Associations

ATEC

12th Floor, Sterling Place
9940 - 106 Street
Edmonton, AB T5K 2N2
Telephone: 403-422-0781
Fax: 403-422-3430

• Resources previously available through ATEC may now be available from Training Resource Centre, Grant MacEwan Community College.

*Occupational Standards for:
Freshwater Angling Guide
Outdoor Guide
Hunting Guide*

Alberta Forest Technologists Association

5320 - 122 Street
Edmonton, AB T6H 3S5
Telephone: 403-432-1962
Fax: 403-432-7046

Alberta Land Surveyors Association

2501 CN Tower
10004 - 104 Avenue
Edmonton, AB T5J 0K1
Telephone: 403-429-3374
1-800-665-2572

Alberta Registered Professional Foresters Association

Website: www.nofc.forestry.ca/arpfa

5320 - 122 Street
Edmonton, AB T6H 3S5
Telephone: 403-432-1177
Fax: 403-432-7046
E-mail: arpfa@nofc.forestry.ca

Alberta Society of Professional Biologists

Website: www.ccinet.ab.ca/aspb

#2 - 9804 - 47th Avenue
Edmonton, AB T6E 5P3
Telephone: 403-434-5765
Fax: 403-435-7503
E-mail: aspb@ccinet.ab.ca

Alberta Teachers' Association

Website: www.teachers.ab.ca

Barnett House
11010 - 142 Street
Edmonton, AB T5N 2R1
Telephone: 403-453-2411
1-800-232-7208
Fax: 403-455-6481

CTS Council

*Environmental and Outdoor Education Council
Alberta Global Education Project
Science Council*

Association of Canada Land Surveyors

Box 5378
Station Merivale #120
162 Cleopatra Drive
Nepean, ON K2G 5X2
Telephone: 613-723-9200
Fax: 613-224-9577
E-mail: aclsaatc@magi.com

Canadian Association of Plant Physiologists

Website: under construction at time of printing

c/o Department of Botany
University of Guelph
Guelph, ON N1G 2W1
Telephone: 519-824-4120
Fax: 519-767-1991

Industry Organizations

Alberta Forest Products Association

Website: www.abforestprod.org

11738 Kingsway Avenue
Edmonton, AB T5G 0X5
Telephone: 403-452-2841
Fax: 403-455-0505

Our Growing Resource: Alberta's Forest Industry...Meeting Global Challenges ForestLine (a quarterly publication that informs AFPA members and the public about Alberta forest industry news, events, and people)
AFPA Membership Directory (provides listings of lumber, secondary manufacturing, and pulp and paper industries and organizations).

Alberta Logging Association

10916 - 97 Avenue
Grande Prairie, AB T8V 3J8
Telephone: 403-538-2950

Industrial Vegetation Management Association of Alberta

Suite 410, 2424 - 4th Avenue SW
Calgary, AB T2S 2T4
Telephone: 403-541-9600
Fax: 403-244-4621

Off Campus Facilities

The following facilities may offer opportunities for observation and/or practical experience in aspects of resource management and environmental education. Contact the facility for information regarding programs offered to school groups.

Environmental Training Centre (formerly the Forest Technology School)

Website: www.gov.ab.ca/env/cms/hrd/etc/etc.html

Alberta Forest Service Museum
1176 Switzer Drive
Hinton, AB T7V 1V3
Telephone: 403-865-8200
Fax: 403-865-8266
E-mail: envtrain@env.gov.ab.ca

Cache Percotte Environmental Training Centre
1176 Switzer Drive
Hinton, AB T7V 1V3
Telephone: 403-865-8234 (information)
Telephone: 403-865-8200 (bookings)

(Provides programs that develop awareness, appreciation, respect and responsible use of the natural environment as well as outdoor recreation skills. Through partnerships with the Alberta Forest Products Association, the centre also provides programs on responsible forest management practices in Alberta.)

Bennett Environmental Education Centre

Website: www.epsb.edmonton.ab.ca/services/bennettc

Edmonton Public Schools
9703 - 94 Street
Edmonton, AB T6C 3W1
Telephone: 403-468-1439
1-800-664-6630
Fax: 403-466-3370
E-mail: bennettc@epsb.edmonton.ab.ca

Calgary Zoo

Website: www.calgaryzoo.ab.ca

Botanical Gardens and Prehistoric Park
P.O. Box 3036, Station "B"
Calgary, AB T2M 4R8
Telephone: 403-232-9386 (program bookings)
E-mail: through website

Environmental Resource Centre

Website: www.dc.ab.ca

10511 Saskatchewan Drive
Edmonton, AB T6E 4S1
Telephone: 403-433-8711
Fax: 403-439-5081
E-mail: dc@ccinet.ab.ca

Kananaskis Field Station

Website: www.ucalgary.ca/~biology/kananaskis

Coordinator of School Programs
Bio Sciences 186
University of Calgary
2500 University Drive NW
Calgary, AB T2N 1N4
Telephone: 403-220-5355
Fax: 403-673-3671
E-mail: mmappin@acs.ucalgary.ca

Conservation Education Camps

Alford Lake Conservation Education Centre
Box 369
Caroline, AB T0M 0M0
Telephone: 403-722-2423
Fax: 403-722-2423

Crowsnest Portable Camp
1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403-297-2838
Fax: 403-297-2839

**Narrow Lake Conservation Education
Centre**
14515 - 122 Avenue
Edmonton, Alberta T5L 2W4
Telephone: 403-422-2606
Fax: 403-427-5695

Fish Hatcheries / Brood Stations

Cold Lake Fish Hatchery
Box 8159
Cold Lake, AB T0A 0V0
Telephone: 403-639-4087
Fax: 403-639-3598

Raven Brood Trout Station
Box 160
Caroline, AB T0M 0M0
Telephone: 403-722-2180
Fax: 403-722-3784

Sam Livingston Fish Hatcheries
1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403-297-6561

Other Agencies

Alberta Forestry Association
101, 10526 Jasper Avenue
Edmonton, AB T5J 1Z7
Telephone: 403-428-7582
Fax: 403-428-7557

*Forest Resources Directory
Alberta's Focus on Forests
Woodlot Management Information Series
Woodlot Management Guide for the Prairie
Provinces*

Alberta Safety Council
201, 10526 Jasper Avenue
Edmonton, AB T5J 1Z7
Telephone: 403-428-7555
1-800-301-6407
Fax: 403-428-7557

(Provides a range of occupational health and safety training programs endorsed by industry partners.)

Alberta Science and Technology Hotline

Website: www.cadvision.com/calg_sci_net

Peace River Hotline, Northwest Alberta
Telephone: 403-539-9847
Fax: 403-539-0522

Northeast Alberta, including Edmonton and Red
Deer Regions:
Telephone: 403-448-0055
Fax: 403-453-2711

Calgary Region
Telephone: 403-263-6226
Fax: 403-230-8488
E-mail: scihot@cadvision.com

Praxis Hotline, Medicine Hat Region
Telephone: 403-526-4237

(The *Alberta Science and Technology Hotline* provides teachers with a direct line to the science community to access information and expertise.)

Alberta Wilderness Association
PO Box 6398, Stn. D
Calgary, AB T2P 2E1
Telephone: 403-283-2025
Fax: 403-270-2743
E-mail: awa@web.net

Canadian Forestry Association

185 Somerset Street West, Suite 203
Ottawa, ON K2P 0J2
Telephone: 613-232-1815
Fax: 613-232-4210

National Forest Education Resources Catalogue

Canadian Foundation for Economic Education

501, # 2 St. Clair Avenue West
Toronto, ON M4V 1L5
Telephone: 416-968-2236
Fax: 416-968-0488

Environomics: Exploring links between the economy and the environment

Entrepreneurship: A Primer for Canadians
Labour Market: Teacher's Resource Package

Canadian Nature Federation

Website: www.web.net/~cnf

1 Nicholas Street, Suite 520
Ottawa, ON K1N 7B7
Telephone: 613-562-3447
Fax: 613-562-3371
E-mail: cnf@web.net

Canadian Parks and Wilderness Society

Website: www.afternet.com/~tnr/cpaws/cpaws.html

401 Richmond St W
Toronto, ON M5V 3A8
Telephone: 416-972-2720
Fax: 416-979-3155
E-mail: cpaws@web.net

Canadian Wildlife Federation

Website: www.toucan.net/cwf-fcf/cwfhome.html

2740 Queensview Drive
Ottawa, ON K2B 1A2
Telephone: 613-721-2286
1-800-563-9453
Fax: 613-721-2902
E-mail: info@cwf-fcf.org

FEESA

Website: www.telusplanet.net/public/feesa

900, 10150 - 100 Street
Edmonton, AB T5J 0P6
Telephone: 403-421-1497
Fax: 403-425-4506
E-mail: feesa@telusplanet.net

FEESA offers education training and resource materials focusing on a variety of environmental and educational needs. Programs are developed in partnership with business, industry, government, environmental and education groups.

Green Teacher

Website: www.web.ca/~greentea/

95 Robert Street
Toronto, ON M5S 2K5
Telephone: 416-960-1244
Fax: 416-925-3474
E-mail: greentea@web.ca

A magazine by and for educators to enhance environmental and global education across the curriculum.

The Pembina Institute for Appropriate Development

Website: www.dvnet.drayton-valley.ab.ca/environ.pembina.htm

P.O. Box 7558
Drayton Valley, AB T7A 1S7
Telephone: 403-542-6272
Fax: 403-542-6464
E-mail: piad@ccinet.ab.ca

The Canadian Environmental Education Catalogue

RADARSAT International

Website: www.rsi.ca

Client Services
3851 Shell Road, Suite 200
Richmond, BC V6X 2W2
Telephone: 604-244-0400
Fax: 604-244-0404
E-mail: info@rsi.ca

Provides a range of information, products and services relevant to applications of remote radar satellite sensing technology in gathering environmental and resource data.

The Science Alberta Foundation

2100, 700 - 6th Avenue SW
Calgary, AB T2P 0T8
Telephone: 403-260-1996
Fax: 403-260-1165
E-mail: litebulb@supernet.ab.ca

The Science Alberta Foundation promotes science literacy throughout the province. Their programs are hands-on, and include travelling exhibitions and professional development courses.

Recycle Infoline

(handles inquiries previously directed to the Alberta Special Waste Management Corporation)
12th floor South Petroleum Plaza
9915 - 108 Street
Edmonton, AB T5K 2G8
Telephone: 1-800-463-6326
Fax: 403-427-0413

Provides information regarding environmental and hazardous wastes.

Red Cross Society

Website: www.redcross.ca

737 - 13 Avenue SW
Calgary, AB T2R 1J1
Telephone: 403-541-4445
Fax: 403-541-4428

*Emergency First Aid
Standard First Aid
Basic Rescuer CPR*

Safety Care Incorporated

Website: www.safetycare.com.au

3354 Tennyson Avenue
Victoria, BC V8Z 3P6
Telephone: 250-475-6775
Fax: 250-475-6705

*Videos:
Safe Operation of a Chainsaw
Chainsaw Maintenance and Safety*

The SEEDS Foundation

440, 10169 - 104 Street
Edmonton, AB T5J 1A5
Telephone: 403-424-0971
Fax: 403-424-2444

St. John Ambulance

Provincial Headquarters
10975 - 124 Street
Edmonton, AB T5M 0H9
Telephone: 403-452-6565
Fax: 403-452-2835

*Emergency First Aid
Standard First Aid
Basic Rescuer CPR
First Aid in the Wilderness*

1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403-297-2838

World Wildlife Fund Canada

Website: www.wwfcanada.org

#504, 90 Eglinton Avenue E
Toronto, ON M4P 2Z7
Telephone: 416-489-8800
1-800-267-2632
Fax: 416-489-3611 (or 8055)
E-mail: panda@wwfcanada.org

Additional Websites of Note**Alberta Forest and Building Products**

<http://www.gov.ab.ca/dept/edi/export/forest.html>

Canadian Biodiversity Information Network

<http://www.doe.ca/ecs/biodiv/biociv.html>

EcoNet

<http://www.igc.apc.org/forest>

Mitsubishi Corporation

<http://mcweb.mitsubishi.co.jp/>

State of Canada's Forests

<http://ncr157.ncr.forestry.ca/sof/sof.html>

Western Canada Wilderness Committee

<http://www.ccinet.ab.ca/wcwc/>

Using This Learning Package in the Classroom

Conventional Classroom

Whether your classroom has desks in rows or tables in small groups, you may be most comfortable with a learning system that you can use with all your students in a paced style. In other words, you may want a package that will suit all of your students, so they can move through the materials as one group or several small groups. Because these materials contain different routes or pathways within each module, they can address various learning styles and preferences. The materials also include many choices within the activities to cater to different thinking levels and ability levels. Because of their versatility and flexibility, these materials can easily suit a conventional classroom.

Open Learning Classroom

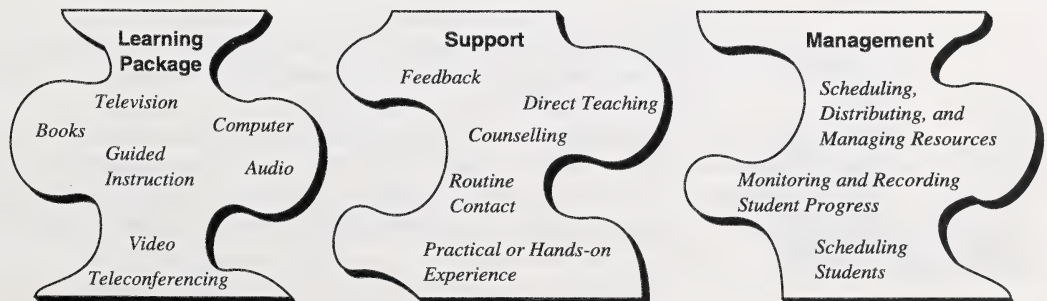
Open learning is the concept of opening up opportunities by overcoming barriers of time, pace, and place by giving the learners a package specially designed to enable them to learn on their own for at least some of the time.

Such a concept is not new. Many teachers can recite attempts to establish an individualized learning system as they recognized the importance of trying to personalize courseware to meet each individual's needs. But these past efforts often failed because of lack of time and lack of quality materials that conformed to Alberta specifications.

Owing to advanced educational technology and improved Alberta-specific learning packages, a student-centred approach is now possible. Improved technology now allows us to provide support to learners individually, regardless of their pace or location. A teacher cannot be in twenty-eight places at one time offering guidance. Media and a well-designed learning package, however, can satisfy individual needs. Technology can also help provide an effective management system needed to track the students as they progress independently through the materials.

The key to a successful open learning system depends on three vital elements: a learning package specially designed to enable students to learn effectively on their own for at least some of the time; various kinds of learner support; and a management system and style that ensures that the open learning system runs smoothly.

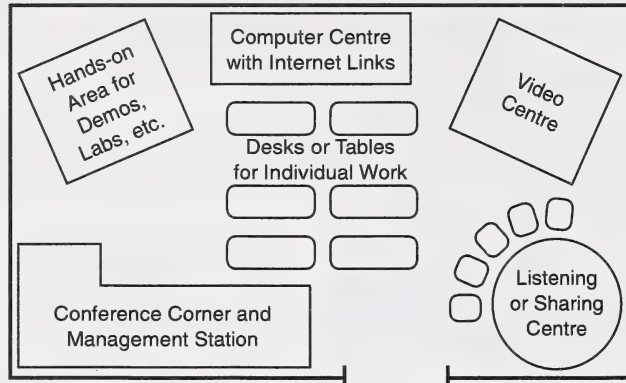
The Key to a Successful Open Learning System



Learning Package

The specially designed learning package needed for a successful open learning system has been developed for you. The objectives teach current Alberta specifications using strategies designed for individualized instruction. As the learning facilitator, you need to be sure to have all of the components in the learning package available to students as needed.

If you are able to acquire media and appropriate hardware to meet your class needs, media centres can be established.



You may not have the luxury to have enough hardware to set up a permanent video or computer centre in your classroom. In that case, students should be encouraged to plan ahead. Perhaps every three to five days they should preview their materials and project when they would need a certain piece of media. This would allow you to group students, if necessary, or reserve media as required.

CTS Centre

Since many of the strands in Career and Technology Studies overlap and complement one another, consideration should be given to establishing a CTS Resource Centre. One or two copies of each resource could be established in this central area for the use of all CTS students.

Support

Support is definitely a key element for successful learning, and when you're planning an individualized, non-paced program, you need to carefully plan when and how support will be given.

The materials contain a form of consistent support by providing immediate feedback for activities included in the Student Module Booklet. Students have solutions, models, explanations, and guides included in the Appendix of every booklet. These aids are included so students can receive immediate feedback to clarify and reinforce their basic understanding before they move on to higher levels of thinking.

As the learning facilitator, you may need to offer more support and personal guidance to those students having difficulty. The activities include choices and pathways. If a student is struggling, you may need to encourage that student to work on all of the choices rather than on only one. This would provide additional instruction and practice in a variety of ways.

You may also have to reinforce the need for students to do the sectional activities carefully and thoroughly before attempting the assignments in the Assignment Booklet.

Another form of support is routine contact with each individual. This contact might be achieved with a biweekly conference scheduled by you; or, as students reach a certain point (e.g., after each section is completed), they may be directed to come to the conference area.

Special counselling may be needed to help students through difficult stages. Praise and encouragement are important motivators, particularly for those students who are not used to working independently.

Direct teaching may be needed and scheduled at certain points in the program. This teaching might involve small groups or a large group. It might be used to take advantage of something timely (e.g., current legal cases; international events or situations, such as terrorist activity, that affect the tourism industry), something prescheduled like the demonstration of a process, or something involving students in a hands-on, practical experience.

Support at a distance might include tutoring by phone, teleconferencing, faxing, or planned visits. These contacts are the lifeline between learners and distance education teachers, so a warm dialogue is essential.

Management

Good management of an open learning system is essential to the success of the program. Leadership and promotion of the system are essential. The following areas also need action to ensure that the system runs smoothly:

- **Scheduling, Distributing, and Managing Resources**—As discussed earlier, in order to do these tasks efficiently you may need to develop media centres or a system for students to reserve the necessary resources.
- **Scheduling Students**—Students and teachers should work together to establish goals, module completion timelines, and daily timelines. Although students may want to study for long periods of time (e.g., all morning), learning facilitators should discourage this practice. Concentration, retention, and motivation are improved by taking scheduled breaks.
- **Monitoring Student Progress**—You will need to record the date that each student completes each section and the Final Test. Your data might also include the projected date of completion if you are using a student-contract approach.



Sample of a Student Progress Chart

Forestry 1010		Section 1	Section 2	Section 3	Final Test
<i>Billy Adams</i>	P				
	A				
<i>Louise Despins</i>	P				
	A				
<i>Violet Klaissian</i>	P				
	A				
P = Projected Completion Date A = Actual Completion Date					

The student could keep a personal log as well. Such tracking of data could be stored easily on a computer.

- Recording Student Assessments—You will need to record the marks awarded to each student for work completed in the module Assignment Booklet. The mark from this Assignment Booklet will contribute to a portion of the student's final mark. Other criteria may also be added (a special project, effort, attitude, etc.). Whatever the criteria, they should be made clear to all students at the beginning.

Sample of a Student Assessment Chart

Forestry 1010	Section 1	Section 2	Section 3	Average of Assignments	Other	Final Test	Final Mark
<i>Billy Adams</i>	67	71	59	66			
<i>Louise Despins</i>	51	50	54	52			
<i>Violet Klaissian</i>	84	79	83	82			

Letter grading could easily be substituted.

- Recording Effectiveness of System—Keep ongoing records of how the system is working. This data will help you in future planning.

Sample of a System Assessment Chart

FOR 1010			
Date	Student Module Booklet	Assignment Booklet	Resources/Media

The Role of the Teacher in an Open Learning Classroom

The teachers in a conventional classroom spend a great deal of time talking to large groups of learners. The situation in open learning requires a different emphasis. Teachers will probably meet learners individually or in very small groups.

With this approach, it is necessary to move beyond the idea of a passive learner depending largely on a continually supportive teacher. The teacher must aim to build the student's confidence, to stimulate the learner into self-reliance, and to guide the learner to take advantage of routes that are most meaningful and applicable to the learner.

These materials are student centred, not teacher centred. The teacher needs to facilitate learning by providing general support to the learner.

Assessing Student Achievement in CTS

The CTS assessment standards assess two basic forms of competency:

- **What a student can do**

- make a product (e.g., wood bowl, report, garment)
- demonstrate a process
 - strand-related competencies (e.g., keyboarding, hair cutting, sewing techniques, lab procedures)
 - basic competencies (e.g., resource use, safety procedures, teamwork)

- **What a student knows**

- knowledge base needed to demonstrate a competency (link theory and practice)

CTS Defines Summative Assessment Standards

The assessment standards and tools defined for the CTS modules focus on the final (or summative) assessment of student achievement.

Assessment throughout the learning period (or formative assessment) will continue to assess how students are progressing. Teachers direct and respond to students' efforts to learn—setting and marking tasks and assignments, indicating where improvement is needed, sending out interim reports, congratulating excellence, and so on.

Teachers will decide which instructional and assessment strategies to apply during the formative learning period. As formative and summative assessment are closely linked, some teachers may wish to modify the assessment tools included in the CTS Guide to Standards and Implementation to use during the instructional process. Teachers may also develop their own summative assessment tools as long as the standards are consistent with the minimum expectations outlined by Alberta Education.

Grading and Reporting Student Achievement

When a student can demonstrate ALL of the exit-level competencies defined for the module (Module Learner Expectations), the teacher will designate the module as “successfully completed.” The teacher will then use accepted grading practices to determine the percentage grade to be given for the module—a mark not less than 50 percent.

The time frame a teacher allows a student to develop the exit-level competency is a local decision. Note: The Senior High School Handbook specifies that students must have access to 25 hours of instruction for each credit. Students may, however, attain the required competencies in less time and may proceed to other modules.

Teachers are encouraged to consult their colleagues to ensure grading practices are as consistent as possible.

High school teachers may wish to refer to “Directions for Reporting Student Achievement in CTS” for information on how to use the CTS course codes to report credits students have earned to Alberta Education. For further information refer to the CTS Guide to Standards and Implementation.

Self-Assessment

Self-assessment helps students recognize their own strengths and weaknesses. Through activities that require self-assessment, students also gain immediate feedback and clarification at early stages in the learning process. Teachers need to promote a responsible attitude towards these self-assessment activities. Becoming effective self-assessors is a crucial part of becoming autonomous learners. By instructing, motivating, providing positive reinforcement, and systematically supervising, learning facilitators will help students develop a positive attitude towards their own progress.

For variation, students may be paired and peer-assessing may become part of the system. The teacher may decide to have the student self-assess some of the activities, to have a peer assess other activities, and to become directly involved in assessing the remainder of the activities.

When the modular activities have been assessed, students should be directed to make corrections. This task should be made clear to students right from the beginning. It is important to establish the correct association between the question and the response to clarify understanding, aid retention, and be of use for study purposes.

Many of the activities include choices for students. If students are having difficulty, more practice may be warranted, and students may need to be encouraged to select more of the choices.

Each section within a Student Module Booklet includes additional types of activities called Extra Help and Enrichment. Students are expected to be involved in the decision as to which pathway best suits their needs. They may decide to do both.

Self-assessment techniques can also be introduced at the individual conferences. Such questions as the following might be included:

- What steps are you taking to improve your understanding of this topic?
- What method of study do you use most?
- How do you organize the material to help you remember it?
- What steps do you follow when you complete an assignment?
- What could you do to become an even better reader?
- Do you have trouble following directions?
- Did you enjoy this module?

A chart or checklist could be used for recording responses.

Assignments

This module contains a separate booklet called the Assignment Booklet. This booklet is an informal evaluation tool for assessing the knowledge or skills that the student has gained from the module. **The student's mark for the module may be based solely on the outcome of learning evident in the Assignment Booklet; however, you may decide to establish a value for other variables, such as attitude or effort. You may also decide to use a final test or final project to make up part of the final mark.** It is important that you establish at the beginning of the module those outcomes that will be assessed, and ensure that all students clearly understand what is expected.

Formal Assessment

This LFM includes a formal Final Test that can be photocopied for each member of the class. The test, closely linked to the learning outcomes stated in the Student Module Booklet, gives the teacher precise information concerning what each student can or cannot do. Answers, explanations, and marking guides are also included. The values of the Final Test and module are the decision of the classroom teacher.

Assessment Tools

A variety of assessment tools have been developed for each strand of the CTS program. For more particulars, refer to the Guide to Standards and Implementation, available on the Internet at http://ednet.edc.gov.ab.ca/cts/cts_curricdocs.html. The following example is one of many assessment tools that have been developed.

Assessment Framework: Presentations/Reports

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • sets goals and follows instructions accurately • responds to directed questions and follows necessary steps to find answers • accesses basic in-school/community information sources • interprets and organizes information into a logical sequence • records information accurately, using correct technical terms • uses time effectively <p>Presentation</p> <ul style="list-style-type: none"> • demonstrates effective use of at least one medium of communication. Examples follow: <p><i>Written:</i> spelling, punctuation, grammar, basic format</p> <p><i>Oral:</i> voice projection, body language</p> <p><i>Audio-Visual:</i> techniques, tools</p> <ul style="list-style-type: none"> • uses correct grammatical convention and technical terms through proofreading/editing • provides an introduction that describes the purpose of the project • communicates information in a logical sequence • states a conclusion based on a summary of facts • provides a reference list of three or more basic information sources 	<p><i>The student:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • sets goals and describes steps to achieve them • uses personal initiative to formulate questions and find answers • accesses a range of relevant in-school/community resources • interprets, organizes, and combines information into a logical sequence • records information accurately with appropriate supporting detail and using correct technical terms • plans and uses time effectively • gathers and responds to feedback regarding approach to task and project status <p>Presentation</p> <ul style="list-style-type: none"> • demonstrates effective use of at least two communication media. Examples follow: <p><i>Written:</i> spelling, punctuation, grammar, format (formal/informal)</p> <p><i>Oral:</i> voice projection, body language, appearance</p> <p><i>Audio-Visual:</i> techniques, tools, clarity</p> <ul style="list-style-type: none"> • maintains acceptable grammatical and technical standards through proofreading and editing • provides an introduction that describes the purpose and scope of the project • communicates ideas into a logical sequence with sufficient supporting detail • states a conclusion by synthesizing the information gathered • provides a reference list that includes five or more relevant information sources 	<p><i>The student:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • sets goals and describes steps to achieve them • uses personal initiative to formulate questions and find answers • accesses a range of relevant information sources and recognizes when additional information is required • interprets, organizes, and combines information in creative and thoughtful ways • records information accurately, using appropriate technical terms and supporting detail • plans and uses time effectively, prioritizing tasks on a consistent basis • assesses and refines approach to task and project status based on feedback and reflection <p>Presentation</p> <ul style="list-style-type: none"> • demonstrates effective use of a variety of communication media. Examples follow: <p><i>Written:</i> spelling, punctuation, grammar, format (formal/informal, technical/literary)</p> <p><i>Oral:</i> voice projection, body language, appearance, enthusiasm, evidence of prior practice</p> <p><i>Audio-Visual:</i> techniques, tools, clarity, speed and pacing</p> <ul style="list-style-type: none"> • maintains acceptable grammatical and technical standards through proofreading and editing • provides an introduction that describes the purpose and scope of the project • communicates thoughts/feelings/ideas clearly to justify or challenge a position • states a conclusion by analysing and synthesizing the information gathered • gives evidence of adequate research through a reference list including seven or more relevant information sources

Introducing Students to the System

Your initiation to these learning materials began with a basic survey of what was included and how the components varied. This same process should be repeated with the class. After the materials have been explored, a discussion might include the advantages and the disadvantages of learning independently or in small groups. The roles of the student and teacher should be analysed. The necessary progress checks and rules need to be addressed. Your introduction should motivate students and build a responsible attitude towards learning autonomously.

Skill Level

It is important for students to understand that there are certain skills that they will need in order to deal successfully with the course materials. Those skills are as follows:

- understanding and using instructional materials (table of contents, index, list of illustrations, appendices, bibliography, and glossary)
- interpreting maps, graphs, and charts
- using reference materials
- recognizing special symbols
- understanding and using different forms of media

Other general skills follow: using reliable study methods, outlining, and learning to read at a flexible rate.

To decide the level and amount of instruction needed to accommodate the varied levels among students, you may wish to prepare and administer skill inventories or pretests. If most students need help with a particular skill, you may want to plan a total-class instructional session. If only certain students lack a skill, you may want to set up a temporary skills group to help students who need it, or you may want to develop a skills file for this purpose.

Reading Level

These course materials are largely print based, but poorer readers need not be discouraged. It is important that you assure students that these materials have been designed for easy reading. The authors have employed special strategies to reduce and control the reading level. Some of them are as follows:

- the conscious selection of vocabulary and careful structuring of sentences to keep the materials at an independent reading level

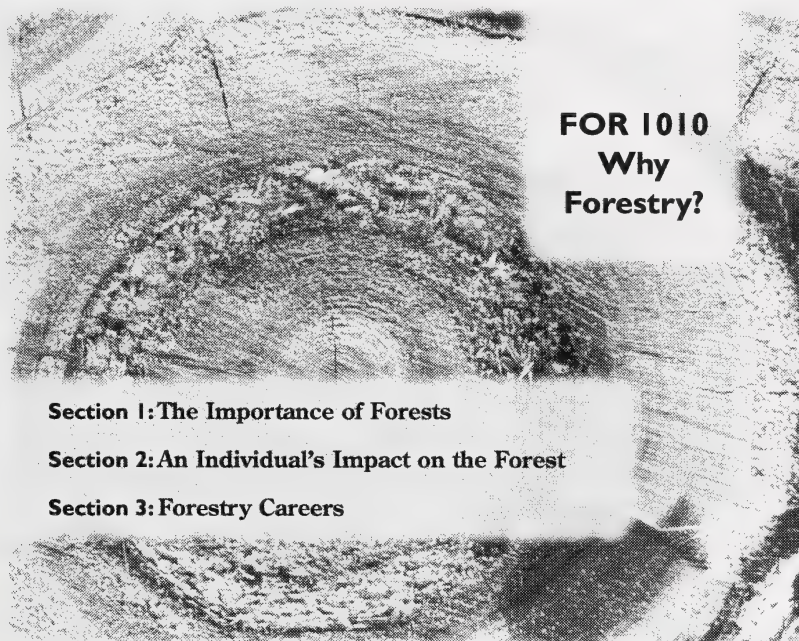
- the integration of activities, examples, and illustrations to break text into appropriate-sized chunks
- the inclusion of many kinds of organizers (advance, graphic, intermediate, concept mapping, post organizers) to help give students a structure for incorporating new concepts
- the recognition that vocabulary and concepts are basic to understanding the content and, thus, must be handled systematically (defined in context, signalled in marginal notes or footnotes, and cited in a glossary)
- the acknowledgement that background knowledge and experience play a vital role in comprehension
- the systematic inclusion of illustrations, videos, audiocassettes, and software to help poorer readers and visual learners
- a use of a variety of formats (paragraphs, lists, charts, etc.) to help struggling readers who do not absorb or retain main ideas easily in paragraph format
- the inclusion of media and activity choices to encourage an active rather than passive approach
- the development of instruction in a meaningful setting rather than in a contrived, workbook style
- the use of purposeful reading, viewing, and doing to produce better interpretation of the course materials
- the recognition that students need structured learning experiences when reading, viewing, or listening to instructional materials; and the acknowledgement that the recognized reading process provides such a structured framework by emphasizing the following phases: developing pupil readiness, determining the purpose, providing guided instruction and feedback, ensuring opportunity to reread or review if necessary, and including enrichment or extensions

To help make the learning package more readable, you can begin your module preparation by reading (viewing, listening to) all the related materials that are going to be used. You will need this solid understanding in order to link the content to the students' experiential base. This linking may be done through class brainstorming sessions concerning the topic or by using visuals and guided questions to predict what the module might be about. Such a strategy helps poorer readers strengthen their abilities to be able to predict new vocabulary.

Why Forestry? (FOR 1010)

Overview

Forestry 1010 is designed to provide students with a general introduction to the forest industry. Upon completion of the module, students should appreciate the important roles that forests play in the environment and the importance of the forest industry to the economy and people's standard of living. They'll realize the importance of proper forest management practices and the impact that people's personal choices can have on the forests. Students will also understand the nature of the forest industry and be familiar with many of the occupations involved directly and indirectly in the forest industry. By the end of this module they might even have decided whether or not they'll pursue a career in forestry.



Assessment

The evaluation of this module will be based on three assignments and a final test. The assignments will be weighted as follows:

Section 1 Assignment	30 marks
Section 2 Assignment	42 marks
Section 3 Assignment	28 marks
TOTAL	100 marks

For anyone teaching this module or any other module in the Forestry strand, the *Guide to Standards and Implementation* is invaluable. You can get the guide off the Internet at the following URL:

<http://ednet.edc.gov.ab.ca/cts/forestry/forhome.html>

The guide gives you all the curriculum information you need as well as an extensive list and description of these resources. More importantly it gives you a comprehensive list of agencies involved in forestry and education that could be very useful as resources. The guide provides the addresses and publications that are available from these agencies. Wonderful stuff!

Resources

Three essential resources are Alberta Environmental Protection Education Branch, Alberta Forest Products Association, and FEESA.

Another excellent resource is *Alberta's Focus on Forests*, available through the Learning Resources Distributing Centre (LRDC). It's important to be aware that this resource does have a slight forest industry bias. The activities, lessons, and descriptions of resources are very useful. You will, though, have to balance it out with the environmental perspective. *Alberta's Focus on Forests* is targeted at the Junior High level, but many of the activities would work with Senior High students as well. The background information alone makes it worth purchasing this resource.

Before you begin teaching Forestry 1010, you might want to view the video *Education Centre: Teaching Forestry* (28.50 min.) available through ACCESS. It discusses teaching forestry using a balanced approach.

Suggestions for Forestry Teachers

Be flexible in your planning by taking into consideration your students' experiences and interests. Some students will have jobs in forestry or family involved in the forestry sector. These students can be used as resources in the classroom. You might be teaching in a community that is very dependent on forestry; your problem might be limiting your resources!

- Use the resources available in your community. Take field trips, (to a forest, mill, museum, etc.), bring in guest speakers (environmentalists, foresters, mill owners, etc.), and have the students complete the assignments using resources in the local business community.
- Use the newspaper for up-to-date events in the business world. Follow a forestry issue being covered in the paper or follow a forest company's stocks.
- Over the course of Forestry 1010, observe plant and animal life in a nearby forest or treed area. At least monthly, go out and record and sketch observations. Note any changes in the types and numbers of plants, insects, and animals; growth of vegetation; and consequences of animal and human contact.
- Contact forestry companies such as ALPAC or MacMillan Blodel for teacher-resource packages. They have excellent visuals to make a display or to put in a resource centre.
- Alberta Environmental Protection Education Branch, Alberta Forest Products Association, and FEESA will provide some very useful information. The addresses are listed in the Contacts section of this LFM and in the *Guide to Standards and Implementation*.
- Some possible field trips could include the following sites:
 - Huestis Demonstration Forest, Whitecourt
 - Jumping Pound Demonstration Forest, Kananaskis Country
 - Kananaskis Centre for Environmental Research

Ideas for Displays (You could make each of the following ideas a topic for students to report on to the rest of the class.)

Collections

trees and shrub samples
diseases
speciality products

cone samples
wood sections
wood products

bark samples
paper products

Flowcharts

sawmill
harvesting (stump to mill)
pulpmill
paper manufacture

shingle mill
log transportation: land, water, coast, interior
reforestation

Displays: charts and posters

faller's equipment
high-lead yarding
ground-lead yarding
skidding
log transportation
paper products

wood products
sorting
yarding machines
various beam constructions and their stress limits
comparison of flex of various woods of strand length

Models, Pictures, or Sketches

logging truck
logging road bridge
log dump
falling operation
landing
high-lead
tired skidders
cat skidders
hand logging

rail show
sawmill—land, water
ground-lead logging
historical logging
forest fire
road building
bush mill
self-dump barge
sorting pond

shay engine
logging camp
super truck
lookout tower
planned logging area
river drive
old falling of trees
log flume

Environmental Displays

greenhouse effect
soil erosion
gas exchange
water cycle

biodiversity
rain forest ecosystem
boreal ecosystem

Listing of Larger Mills by Type in Alberta

Type of Mill	Company Name	Location
Pulp and Paper Mills	Alberta-Pacific Forest Industries Inc.	Grassland
	Alberta Newsprint Company	Whitecourt
	BPCO Inc.	Edmonton
	Daishowa-Marubeni International Limited	Peace River
	IKO Industries Ltd.	Calgary
	Millar Western Pulp Ltd.	Whitecourt
	Slave Lake Pulp Corporation	Slave Lake
	Weldwood of Canada Limited	Hinton
	Weyerhaeuser Canada Ltd.	Grande Prairie
Panelboard Mills	Ainsworth Alberta Inc.	
	Blue Ridge Lumber (1981) Ltd.	Blue Ridge
	Tolko Industries Ltd.	
	Sunpine Forest Products	Strachan
	Weyerhaeuser Canada Ltd.	Drayton Valley, Edson, Slave Lake
	Zeidler Forest Industries Ltd.	Edmonton, Slave Lake
Sawmills producing more than 10 MM fbm annually	Atlas Lumber (Alberta) Ltd.	Sentinel
	Bissell Bros. Lumber Ltd.	Enilda
	Blue Ridge Lumber (1981) Ltd.	Blue Ridge
	Boucher Bros. Lumber Ltd.	Nampa
	Brewster Construction Ltd.	Red Earth
	Buchanan Lumber	High Prairie
	Canadian Forest Products Ltd.	Grande Prairie, Hines Creek
	Cowley Forest Products Ltd.	Cowley

Type of Mill	Company Name	Location
Sawmills producing more than 10 MM fbm annually	High Level Forest Products Ltd.	High Level
	La Crete Sawmill	La Crete
	Manning Diversified Forest Products Ltd.	Manning
	Millar Western Industries Ltd.	Whitecourt, Boyle
	Mostowich Lumber Ltd.	Fox Creek
	Northland Forest Products Ltd.	Fort McMurray
	Rocky Wood Preservers Ltd.	Rocky Mountain House
	Spray Lake Sawmills (1980) Ltd.	Cochrane
	Spruceland Millworks Ltd.	Spruce Grove
	Sundance Forest Industries Ltd.	Edson
	Sunpine Forest Products Ltd.	Sundre
	Tara Forest Products Ltd.	Calling Lake
	Tomen Alberta Timber Industries Ltd.	Fort Assiniboine
	Vanderwell Contractors (1971) Ltd.	Slave Lake
	Weldwood of Canada Limited	Hinton
Weyerhaeuser Canada Ltd.	Drayton Valley, Grande Cache, Grande Prairie	
Zeidler Forest Industries Ltd.	Slave Lake	

Forestry 1010 Videos

Mandatory:

- *This Living World: The Forest* (King Motion Picture Corporation, 1992)

Optional:

- *The Rain Forest* (National Geographic)
- *This Living World: Wildlife Habitat* (King Motion Picture Corporation, 1992)
- *Boreal Forest Issues* (ACCESS BPN: 8210 01)

¹ Alberta Economic Development and Tourism, "Listing of Larger Mills by Type in Alberta," table, *Review of the Economic Impact of the Forest Industry in Alberta*, August 1994, Appendix D.

Section 1: The Importance of Forests

Key Concepts

- the social and cultural significance of forests
- the economic significance of forests
- the environmental significance of forests

In this section, students will explore the world of traditional Native peoples who depended on Canada's forests not only for the necessities of life but also for their cultural needs and spiritual well-being. Students will discover that the forest industry touches every facet of their lives, giving them many of the products that they use every day. As well, they'll come to appreciate how many jobs are dependent on the forest industry and how much wealth the industry generates. Students will also learn about the important roles that the world's forests play in maintaining air, water, and soil quality, climate, and the Earth's biodiversity.

Classroom Suggestions

The following ideas could be used at the beginning of this module to get students to start thinking about things they will be investigating later.

- Involve students in a discussion about how important forestry is to the everyday lives of the students and Canadians in general. Take an inventory of the forest products in the classroom. Then move to the rest of the school and finally to the home. Lead the students into the broader perspective by looking at the role forestry plays in the environment and the Canadian and Alberta economy.
- Have students bring objects or pictures of things made of forest products. Set up a display with all of the products. You could even categorize them if you wish.

Section 1: Activity 1

The objective of this activity is to make students aware of the importance of forestry in the past. The focus of this activity is on the way in which Canada's Native peoples depended on forests for food, shelter, clothing, and tools, as well as their spiritual, recreational, and aesthetic needs. This historical case study enables the students to view forestry through the eyes of a different culture.

Classroom Suggestions

You might want to expand on this activity's narrow focus on traditional Native forest use to include how European settlers and Alberta's pioneers made use of forests and forest products. Seniors would be a good resource here. Have a senior come in and speak about pioneer life and the pioneer's dependence on forests. A trip to Fort Edmonton Park or a similar historical interpretive centre would be a fascinating field trip, allowing students to experience a taste of pioneer life. Plan a field trip to a museum to study artifacts of this time period.

Not all cultures use resources the same way; it depends on a culture's values and level of technology. Have students compare the resources used by early Native people to get and prepare their meals to what was used to get and prepare the student's evening meal.

Each culture has its own particular glasses through which it views the world. Traditional Native culture views people as a part of the Earth. Forests were to be shared and respected, not owned or destroyed. Western culture has tended to view nature as subservient, to be exploited for its own interpretation of the word "progress." A tree traditionally has been viewed by Western society as so many cubic meters of timber; whereas in traditional Native culture, each tree is valued as an integral part of nature. Discuss these ideas with the class. Have them create posters, collages, cartoons, or displays or present skits that contrast the two viewpoints.

Have a representative of a Native group come and speak about the traditional Native philosophy of nature and forestry use.

Make a display of pictures of Native and/or pioneer life.

Have students write a diary entry of a typical day and then another from the perspective of a pioneer or a Native living a few hundred years ago.

Try to have the class play lacrosse (a traditional native American game using forest products), use snowshoes, or make a tepee.

Compare and contrast early Native and contemporary Canadian life using the following chart.

Compare and Contrast		
	Early Native Life	Contemporary Canadian Life
shelter		
household items		
transportation		
arts and entertainment		
spiritual		
tools		
clothing		
food and medicine		

Section 1: Activity 2

The purpose of this activity is for students to become aware of the very real importance of forestry to the Canadian and Alberta economies.

In this activity, students will investigate the number of people directly and indirectly employed in forestry, the range of forest products, the value of forest exports, and the forest tax base in Alberta and Canada. Students will also examine the use of forests for tourism and recreation.

Classroom Suggestions

Organize a field trip to a mill.

Have students create displays of forestry products.

Take a poll in the community to find out how many people are employed indirectly or directly in forestry.

Make a class scrapbook. Collect newspaper articles and pictures dealing with the forest industry and forestry issues.

Have students make a poster or collage illustrating the advantages of expanding the forest industry. Then have students make a poster or collage illustrating the disadvantages of expanding the forest industry.

Give students cassette recorders or video cameras to make one-minute radio or TV commercials explaining the economic significance of forests to their audiences. Have students consider the following things:

- location
- people in commercial
- purpose, e.g., public relations by the forest products association, to inform the public of the economic importance of forests
- audience, e.g., Canadian public
- role, e.g., representative of the forest industry

Section 1: Activity 3

The purpose of this activity is for students to be conscious of the important environmental role forests play on the local, national, and global levels. Students will study the role forests play in maintaining air, water, and soil quality; protecting the watershed; regulating climate; providing animal habitat; and maintaining ecosystems and biodiversity.

Classroom Suggestions

Look at a problems discussed in this activity, such as

- greenhouse effect
- desertification
- soil erosion
- extinction of species

Break the class into groups, and assign each group a topic to research and present to the class. In this assignment, students are given the role of environmentalists. Their task is to write a report about the issue they've been assigned and present the report to their superiors. Discuss the following:

- What are the causes of. . .?
- What are some of the effects of. . .?
- What are some possible solutions to. . .?

Have students complete the following as they do research:

Reasons to Develop Canada's Forests	Reasons to Preserve Canada's Forests	Reasons to Develop the World's Rain Forests	Reasons to Preserve the World's Rain Forests

For students to appreciate the number and variety of animals that live in the forest soil, get a container of dead leaves and soil from a wooded area. Spread this material out and using a magnifying glass, sift through the material carefully. Have the students identify the animals found using reference books.

Discussion question: If people are aware of the problems caused by deforestation, why do people continue to destroy forests?

Debate: Be it resolved that forestry development should stop in order to preserve our environment.

Have students write a story from the tree's point of view, describing its role in the ecosystem.

Have students draw a forested area including wildlife, soil, and plants. Illustrate the water cycle within this system.

Have students describe orally, in writing, or through artwork the beneficial results of transpiration:

- for the plants
- for the air that surrounds a forest
- for the climate of forested areas

Section 1 Assignment (30 marks)

1. Answers may vary. The following examples are typical responses. (1 mark each)
 - a. Shelter: Wood, bark, and animal skins were used to make longhouses, tepees, and other dwellings.
 - b. Food: The forests provided berries, edible bark, maple sap, and fish and game.

- c. **Medicine:** Leaves and bark were used to make medicinal teas, or to smoke, or to help heal wounds or treat illnesses; many berries have medicinal properties.
- d. **Clothing:** Flexible bark and animal skins were used to make clothing.
- e. **Transportation:** Bark, branches, logs, and leather were used for canoes and travois.
- f. **Aesthetic and Spiritual:** Forests provided beauty and serenity and wood and animal materials for making ceremonial masks and musical instruments.
- g. **Tools:** Wood was used for bows and the shafts of arrows and spears and the handles of axes, branches and birch bark were used to make traps and containers.
- h. **Arts and Entertainment:** Wood and leather were used to make lacrosse sticks, dolls, and musical instruments.

2. Answers will vary. Use the following information to evaluate student responses. (2 marks each)

- a. Tree roots hold the soil in place so that it is not carried away by the wind. Trees slow water flow, and they absorb water that otherwise would erode the soil. Trees provide shade that helps reduce the evaporation of soil moisture. They also provide windbreak that slows the wind, further reducing the amount of water evaporation. Trees fertilize the soil with their decaying leaves.
- b. Trees absorb water in their spongy root systems, hold the water, and slowly release it. Trees help prevent flooding and land slides, and they provide a source of moisture during dry periods. Trees help the water cycle by pulling water out of the soil and slowly releasing it into the air. The shade of trees prevents excessive evaporation during dry spells.
- c. Trees provide a habitat and food for many types of animals. Many animals make their homes in trees and could not exist without them. Other animals which rely on this first group of animals for food would also not survive if there were no trees. The extinction of one animal, plant, or microorganism affects others in the life cycle that are in some way tied to the extinct life form.
- d. Trees take carbon out of the atmosphere and, thus, help slow the greenhouse effect. As well, trees release oxygen that people and animals need to exist.
- e. Trees prevent or restore deserts by providing ground cover, holding moisture, and reducing erosion. Trees slowly release water through transpiration that cools an area during hot spells.

3. Answers will vary. If Canada did not have a forest industry, the Canada we know would not exist. Use the following information to evaluate student responses. (2 marks each)

- a. At least 1 in 16 Canadians would be unemployed, as would be those individuals and businesses that served those in the forest industry.
- b. The government would have to operate with much less money. Millions of dollars that used to come from stumpage fees would be gone. Taxes paid by forestry companies and income taxes paid by individuals employed in forestry would also disappear. The result would be cutbacks in services such as education, healthcare, parks and recreation, welfare, pensions, road maintenance, and police.
- c. The Canadian balance of trade would be changed dramatically because Canada's greatest export at the present time is forest products. Instead of exporting wood and paper products, Canada would have to import these things from other countries that still had a forest industry. Money that now enters Canada because of forestry exports would stop and money would be sent out of Canada to buy forestry products. As a result, there wouldn't be as much money for other imports such as California oranges, Japanese TVs, American computers, and so on.
- d. Consumers would have fewer products. Newspapers, books, paper, wood, houses, furniture, and any other forest-related products would be more scarce and more costly. Some substitute products would be introduced, but they would almost certainly be much more costly than the forest-based products they would be replacing.

- e. People would survive, but their lifestyles would suffer. Consumer products that they have relied on in the past would be scarcer and costlier.
- f. Entire communities that existed solely on forestry would become ghost towns.

Section 2: An Individual's Impact on the Forest

Key Concepts

- maintain a forestry journal
- forestry values
- different perspectives on the issue of clearcutting
- forestry stakeholders
- evaluating impact on forests of personal actions

In this section, students reflect on their personal impact on the forest. Students will describe the impact of individual attitudes, actions, and lifestyles on the forest; research the impact of different perspectives on forestry use; propose personal actions for using forests wisely.

Classroom Suggestions

Do Activity 5.2 in *Alberta's Focus on Forests*. It's a simulation in which students take different roles such as a UN advisory committee dealing with the issue of deforestation of the rain forest.

- Have students role play the perspectives presented on page 17 in Activity 5.2.
- Help students develop critical thinking skills. Critical thinkers realize there is more than one point of view on any issue. It is important for people not to polarize themselves; they should try to consider alternative viewpoints. Explain to students that forestry issues can be very emotional. Emotions should, however, not overshadow reasonable discussion. People are more successful at convincing others of their position if they can rationally support their position with facts, figures, and relevant examples.
- Have the students try to arrive at a consensus using a consensus model like the one that follows:
 - Look at the issue from the other person's point of view.
 - Identify the main issues and concerns. Try not to take a definite position on the issue.
 - Look at all the available options you can follow to achieve consensus.
 - Arrive at a solution (consensus) that is acceptable to everyone involved.

Invite a representative from the Green Party to your class to explain the party's platform, and a representative from one of the traditional political parties to explain that party's environmental policies. Instruct the students to consider not just the effect on the environment, but the social and economic effects of each suggested plan to protect the environment.

Do Activity 4.5 in *Alberta's Focus on Forests*. Students will role play a public forum dealing with the environmental issues created by pulp and paper production.

Make recycled paper. The instructions are in Activity 4.4, p. 65 in *Alberta's Focus on Forests*.

Do Activity 4.8 in *Alberta's Focus On Forests*, which involves debating the use of chemicals to control insect pests.

Research successful social action. For example, when the Daishowa paper company planned to log in Canada, a citizen's group began a campaign that forced the company to back down. Group members started using their consumer power to stop buying products made by Daishowa Paper Manufacturing Co. Ltd. of Japan. They put pressure on wholesalers and other companies to cancel Daishowa contracts. The citizens group was successful in their goal.

Have groups of students create simulated TV news reports. Give them these instructions:

Imagine that you're going to make a two-minute TV news item for broadcast throughout Canada. You have clips of interviews and other shots. Your purpose is to show the importance of sustainable timber harvesting, and you want to present a balanced report that includes a variety of perspectives.

Create a story board and make small sketches of each scene. Whom will you interview? What locations will you show? What linking shots will hold your news item together? Do you want studio shots of the presenter? Would you include any maps or pictures? Will you incorporate music into this production? If so, what kind of music would set the tone you're looking for? When you have planned your storyboard, write the news script to go with it.

Have students practise evaluating arguments by asking themselves the following questions:

- What reasons are given to support the arguments?
- Were there any contradictions in the arguments?
- Were irrelevant facts cited?
- How would someone who disagrees with this argument respond?
- Which argument do you think is strongest and why?

Section 2 Assignment (42 marks)

1. Answers will vary. Use the following information to evaluate student responses. (5 marks)

Clearcutting	
Pros	Cons
<ul style="list-style-type: none"> • For the boreal forest, clearcutting is effective and appropriate. • Pine and aspen trees regenerate best on open sites. • Clearcutting can enhance the habitat of certain animals such as deer, moose, caribou, and elk. • If managed properly (leaving buffer strips around water courses to reduce erosion and sedimentation, reducing the size of clearcuts, using 3–4-pass clearcutting over longer periods of time), clearcutting is a good harvesting method. • As the human population increases, so does the need for paper products. Clearcutting is necessary to satisfy that demand. (In Alberta, the only manageable method of harvesting the required amount of timber is clearcutting.) • Clearcutting is the simplest, safest, and least expensive way to log and regenerate forests. • Clearcutting restricts the spread of some tree diseases. • Clearcutting gives the forest industry the ability to compete in the global market place, where success depends very much on keeping operating costs low. A healthy forest industry helps the entire Alberta and Canadian economies. 	<ul style="list-style-type: none"> • Forests may be more valuable if left intact. • Large-scale clearcutting negatively affects soil, fish and wildlife habitat, tourism opportunities, unsettled Native land claims, and Native land use. • There are other methods of harvesting, such as selective harvesting, shelter-wood harvesting, and narrow-strip cuts, which might be more appropriate for some situations. • The majority of animal species are negatively affected by clearcuts. Regrowth forests are not as biologically diverse as the original ones. • Even a two-pass clearcut has very limited recreation value.

2. Responses will vary. The student's position needs to be clearly stated, and there must be adequate details and examples to support the position. Any information from the chart that is consistent with the student's position is acceptable. (5 marks)
3. Use the following information to evaluate student responses. (1 mark per box)

Stakeholder	Generally Values	Supports Clearcutting Yes/No/Sometimes
Aboriginal Peoples	Preservation or Conservation	No
Environmentalism	Preservation	No
Forest Industry	Economic Growth	Yes
Wildlife Supporter	Conservation	Sometimes (if it improves habitat)
Recreational User	Preservation or Conservation	No
Forest Service	Conservation	Sometimes (if sustainable)

4. Use the *Forestry Journal Evaluation Guidelines* presented in Section 2: Activity 1. If the student achieves a standard of 1, assign a grade of 5 marks. For a standard of 2 assign 7 marks. For a standard of 3 assign 9 marks. For a standard of 4, assign 10 marks. For a standard of 0, assign 0 marks. (10 marks)
5. a. Responses will vary. The following are examples of typical responses. (1 mark each)
- Action 1: Plant trees.
- Action 2: Recycle paper and cardboard.
- Action 3: Support financially or join and help work in an organization that lobbies governments and puts pressure on companies to improve environmental standards.
- Action 4: Consume less.
- Action 5: Support companies that use environment friendly packaging.
- b. Responses will vary depending on the responses to Part A. For many of the actions, more than one box can be ticked. Use your judgment. (1 mark for each action)

Section 3: Forestry Careers

Key Concepts

- sectors of the forest industry
- examine the occupations within each forestry sector
- plan and conduct an interview with a forestry worker
- forestry trends
- employment statistics

The purpose of this section is to have students become aware of the range of forestry careers and to research at least one forestry career through an interview with someone working in the forest industry. Students will also examine employment statistics and current trends in forestry to help them make an informed career choice.

Classroom Suggestions

It is very important that students get as real a feel as possible for the career that they're investigating, so job-shadowing should be considered.

Plan a career day. It's a wonderful opportunity to bring in people involved in the forestry field, so that students have an opportunity to discuss what day-to-day work conditions are like.

After each student has researched a career that interests them, have each student give a report to the rest of the class to inform them of important aspects of the career. Another option is to have students take on the role of a worker in a particular forestry occupation and then have the other students interview the role-player.

It is very important that you have an extensive supply of information about various forestry careers. The school's counsellors or the library will be of great assistance. The Career Hotline 1-800-661-3753 will also send out information. Some information to get you started has been included on the following pages.

Section 3 Assignment (28 marks)

1. a. Responses will vary. Use the Forestry Career information at the end of this LFM to evaluate the student's chart. Mark for accuracy, detail, and completeness. **(12 marks)**
 - b. Responses will vary. Give full marks for a response that demonstrates thoughtful reflection about the nature of the job, the student's personality and interests, and the student's perceived ability to meet the requirements. It's possible that some students will indicate that after careful investigation and consideration, the job no longer appeals to them. Give the student full marks for thoughtfully and fully explaining why he or she is no longer interested in the job. **(4 marks)**

Here's an example: I am interested in this because it is only a two-year program and I can make the entry requirements. I like the outdoors and physical work . As well, I am concerned about the environment.

2. Answers will vary. Students should provide the job title and list the main duties involved. One mark each. Here are some examples:
 - Faller—harvests timber by cutting down trees
 - Forester—plans and supervises forestry practices and silviculture, advises governments, and educates members of the public
 - Logging-Machinery Operator—operates heavy equipment at logging sites
 - Forestry Technician—mainly labour-intensive forestry work such as planting and tending trees, surveying, measuring, mapping, using chainsaws
 - Forest Technologist—supervises work crews, involved in tree planting, silviculture, and forest inventories, laying out cutblocks
3. Use the following information to evaluate student responses. **(2 marks each)**
 - a. A value-added industry is one in which the raw resource is refined in some way. This is a growth industry in Canada. More companies in the value-added industry are hiring people to develop new products, and to manufacture and market them.
 - b. New technology has reduced the number of people needed to work in some areas. (However, in Alberta, a forestry boom as a result of new technology has made harvesting Alberta forests viable. This has led to great employment opportunities in Alberta forestry.) New technology is requiring those involved in forestry to be more highly skilled and educated. There are no longer the employment opportunities for unskilled labourers in forestry as there once were.
 - c. Because the public in Canada and other nations is much more environmentally conscious, the forest industry has had to employ more people to work in public relations to inform them of the environmental practices the companies are implementing. As well, more people are being hired to research and implement good environmental practices.

Note: The following forestry careers and occupational profiles are reproduced by permission of Alberta Advanced Education and Career Development. Up-to-date occupational information can be accessed at the following URL:

<http://www.aecd.gov.ab.ca/occinfo/>

Forestry Careers

Careers in Sawmill/Panel Mill Operation

Sawmill/panel mill operation involves the conversion of raw timber into dimension lumber, panel boards, plywood, wood chips, mouldings, treated lumber, speciality lumber, and other wood products. Logs are moved through the mill, where they undergo several processes and treatments. The main objective is to utilize and recover the highest possible amount of product from the raw fibre (logs) available. Skilled workers ensure that the mill equipment and physical plant run smoothly.

Some **sawmill/panel mill operation** activities include

- moving logs using heavy equipment, forklifts, cranes, and conveyors
- sorting logs according to species and diameter
- cutting logs into appropriate lengths for processing
- removing sand and dirt from logs
- debarking logs
- measuring log dimensions with laser scanner
- determining placement of log cuts to obtain optimum product
- cutting logs into lengths with circular saw
- sawing logs into planks using headsaw
- resawing planks to obtain proper width and thickness
- edging sides of lumber to make straight and even
- planing and sanding lumber and plywood
- trimming boards to make square and cut to standard lengths
- grading lumber according to quality, size, type of wood
- seasoning lumber by air drying or placing in kiln
- installing, maintaining, or repairing equipment
- setting, sharpening, and repairing sawblades
- monitoring plant systems
- sending rough lumber to planer mill
- using wood waste and chips to fuel mill or sending it to pulp mills
- sending finished products to wholesalers and manufacturers

Some people who enjoyed these **school subjects** have found a rewarding career path in sawmill/panel mill operation:

- physical education
- industrial arts
- mathematics

People working in sawmill/panel mill operation may **enjoy or excel in** the following:

working with one's hands	mechanical aptitude
working on or producing things	manual dexterity
performing routine, physical work	well-coordinated and agile
operating equipment	stamina and alertness
fixing or repairing	

Individuals who have succeeded in sawmill/panel mill operation may have the following **personal qualities or work preferences**:

- repeating set tasks
- working with machines, processes, techniques
- taking responsibility
- decision-making
- meeting strict standards
- having a variety of responsibilities
- detailed, organized work following set sequence
- scientific or technical work
- working with people as part of a team

Working conditions may involve indoor work, outdoor work, or a combination thereof, depending on the occupation and employer:

working with machinery	rotating shift work
working with computers	weekend work

Typical **employers** in the field of sawmill/panel mill operation include:

lumber mills	panelboard mills
pulp and paper mills	raw materials yards
plywood mills	

Some examples of **sawmill/panel mill operation occupations** are

carpenter	grader	plumber
crane operator	instrument mechanic	power engineer
drafting technologist	labourer	saw operator
edger	log-cut-off sawyer	sawfiler
electrical engineering tech.	machinist	supervisor
electrician	mechanical engineering tech.	welder
equipment operator	millwright	
forestry equip. operator	painter	

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.

Careers in Forest Protection

Forest Protection involves the safeguarding of forests, largely through the prevention, early detection, and suppression of fires. Forest fires consume millions of dollars, both in terms of lost resources and in the efforts required to extinguish them. Because approximately half of all forest fires are caused by people, fire prevention programs are focused upon public education and monitoring human activity in forests. Fire detection mechanisms include lookout stations, aircraft patrols, infra-red heat scanners, and an electronic lightning sensor system. Weather-forecasting and monitoring are also used to predict the level of fire danger.

The suppression of forest fires begins with the strategic placement of personnel and equipment in areas of high risk. When a forest fire is first detected, a number of resources are activated. "Initial attack crews," comprised of three to five people, are often the first mode of attack. In remote areas, small squads of firefighters (known as "rapattack" crews) fly into the site via helicopter and rappel down to the fire. Larger crews are kept on standby at predetermined sites. Air tankers are used to drop water and chemical fire retardants on fires. Fires which cannot be controlled via initial attack strategies require the organized response of many more personnel.

Some **forest protection** activities include:

- developing public education campaigns including media and publications
- surveilling forests from lookout towers and stations
- conducting aircraft surveillance patrols
- operating infra-red head scanners
- monitoring electronic lightning locator system
- training workers to watch for signs of fire
- removing brush and dead trees to reduce fire hazard
- directing fire-fighting operations
- planning controlled burns
- monitoring fires
- evaluating effectiveness of fire retardants
- piloting helicopters and air tankers
- ensuring good safety practices
- managing telecommunications

Some people who enjoyed these **school subjects** have found a rewarding career path in forest protection:

biological sciences
chemistry
physics

physical education
English

People working in forest protection may **enjoy or excel in** the following:

working with things, numbers, or objects
working with people as part of a team
good organizational and communication skills
preparing documents and writing reports
working with machines, processes, and techniques
detailed, organized work
well-coordinated and agile
stamina and alertness

Individuals who have succeeded in forest protection may have the following **personal qualities or work preferences**:

taking responsibility
decision-making
working with machines, processes, and techniques
meeting strict standards

The personal **values** of people working in forest protection typically include:

concern for the environment
appreciation of outdoors and wilderness

Working conditions may involve indoor work, outdoor work, or a combination thereof, depending on the occupation and employer:

deskwork
meetings
working at computers
using electronic monitors and communication equipment
travel
work in small or large crews
relatively isolated work site

variety of terrain and weather conditions
live in small communities
long hours
shift work
risk of injury
vigorous physical activity

Typical **employers** in the field of forest protection include

government departments or agencies
private consulting firms

Some examples of **forest protection occupations** are

administrator	forester
computer operator	rapattack crew member
forest firefighter	initial attack crew member
forest scientist	meteorologist
forest technologist	pilot

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.

Careers in Pulp/Newsprint Mill Operation

Pulp/newsprint mill operation refers to the mill operations and maintenance involved in converting raw timber and wood waste into newsprint or pulp, which can then be utilized in the production of paper products such as writing paper, facial tissue, paper bags, disposable diapers, and cardboard boxes.

Wood is converted into cellulose or pulp by breaking it into chips; “cooking” the chips in a “digester” using chemicals, heat, and pressure or mechanically separating (refining) the wood fibres; and extracting unwanted chemicals and resins from the wood fibres. (Where recycled paper is created, different processes are used to convert used paper into pulp.) The pulp is purified by passing it through a number of cleaners and screens. Pulp for certain paper products is then bleached. Following this, the pulp is typically dried and made into blocks for shipping. Alternately, newsprint pulp is fed into a machine where the wood fibres are matted into paper. The paper is pressed, dried, rolled, and cut. Some paper products may undergo additional finishing processes before being wrapped and shipped.

The by-products of processing are often harmful to the environment and are carefully monitored and controlled. Skilled workers ensure that the mill equipment and physical plant run smoothly.

Some **pulp mill operation** activities include

- obtaining wood chips from harvesting and other mill operations
- moving logs using heavy equipment, forklifts, and conveyors
- removing sand and dirt from logs
- debarking timber
- reducing wood to small chips using mechanical chipper
- cooking or refining chips to obtain wood fibres
- washing pulp to remove chemicals and impurities
- mixing pulp with sizing, fillers, and chemicals
- testing pulp for quality and desired characteristics
- operating pulp or paper machine
- checking paper quality
- monitoring paper drying and rolling
- inspecting products for defects
- testing paper for bursting, tearing, and folding strength
- cutting and packaging paper for shipment
- installing, maintaining, or repairing mechanical, electrical, electronic, and rotating equipment and piping
- setting, sharpening, and repairing sawblades
- monitoring plant systems
- testing effluent (waste) and air emissions for compliance with environmental regulations
- sending finished products to wholesalers and manufacturers

Some people who enjoyed these **school subjects** have found a rewarding career path in pulp mill operation:

physical education	mathematics
industrial arts	physics
chemistry	

People working in pulp mill operation may **enjoy or excel in** the following:

working on or producing things	operating equipment
detailed, organized work following set sequence	fixing or repairing
scientific or technical work	mechanical aptitude
working with machines, processes, or techniques	manual dexterity

Individuals who have succeeded in wood management may have the following **personal qualities or work preferences**:

repeating set tasks	meeting strict standards
taking responsibility	having a variety of responsibilities
decision-making	

Working conditions may include the following, depending on the occupation:

some dust, fumes, odours	rotating shift work
risk of injury	weekend work

Typical **employers** in the field of pulp mill operation include

bleached kraft pulp mills	de-inking mills
thermo-mechanical pulp mills	raw materials yards
newsprint mills	

Some examples of **pulp mill operation occupations** are

carpenter	engineering technologist	pipefitter
chemical engineer	equipment operator	plumber
chemical technologist	forestry equipment operator	power engineer
civil engineer	instrument mechanic	process engineer
computer technician	laboratory technologist	process technologist
crane operator	labourer	pulp machine technician
drafting technologist	machinist	pulp mill fiberline operating tech.
effluent technologist	mechanical engineer	sawfiler
electrical engineer	millwright	tester
electrician	painter	welder

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.

Careers in Harvesting

Harvesting or logging is the process of cutting down trees, preparing logs for transport, and delivering them to the mill. Blocks of trees (know as a cutblock) are harvested in small irregular patterns with a mechanical harvester. The trees are then skidded (dragged) to a landing (clearing), where they are stripped of their branches, trimmed of any rot, and their tops removed by a delimiting machine. The logs are then ready to be loaded on trucks and hauled to the mill yard. Although harvesting was at one time a very labour-intensive process, the use of heavy equipment has significantly reduced the amount of time and effort involved in timber removal. On some sites, specially-designed machines perform several combined functions, thus further reducing the amount of labour required.

Some **harvesting** activities include

- establishing strategies for the felling, removal and transportation of timber
- estimating tree volumes and identifying trees to be harvested
- surveying land (cruising)
- drafting plans
- building logging roads using graders and other heavy equipment
- planning location of landing and cutting sequence
- marking trees to be cut
- constructing logging trails and landings using bulldozer
- shearing and gathering trees with feller-bunchers or other heavy equipment
- fastening steel cable around trees (choking) in preparation for skidding
- dragging trees from felling site to landing using specialized tractor (skidder)
- stripping and trimming trees using delimiting machine
- cutting (bucking) logs into manageable lengths
- hoisting logs onto logging trucks using cranes and other heavy equipment
- hauling timber from landing to sorting area, mill, or railroad
- supervising logging crews

Some people who enjoyed these **school subjects** have found a rewarding career path in harvesting:

- physical education
- industrial arts

People working in harvesting may **enjoy or excel** in the following:

performing routine, physical work	seeing immediate results from efforts
operating equipment	fast reflexes
using hands	

Individuals who have succeeded in harvesting may have the following **personal qualities or work preferences**:

having a variety of responsibilities	taking responsibility
repeating set tasks	meeting strict standards
working under stress	

Working conditions may include the following, depending on the occupation:

outdoor work	live in small communities or camps
rotating shift work	significant degree of physical activity
seasonal work	variety of terrain and weather conditions
work as part of team	risk of injury
relatively isolated work site	some noise and vibration

Typical **employers** in the field of harvesting include

- logging companies
- private contractors

Some examples of **harvesting occupations** are

civil engineer	logging truck driver
civil engineering technologist	survey technician
faller	timber cruiser
forest engineer	truck driver
forest equipment operator	

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.

Careers in Wood Management

Wood management involves the administration of timber from harvesting to the point where it is processed into lumber and other wood products. Careful planning and monitoring is required to ensure that mills receive an adequate supply of raw materials. It is important to obtain the maximum possible yield of timber from an area while minimizing the environmental impact and avoiding timber damage and waste. Factors such as timber size, topography, and available equipment must be taken into consideration to ensure that the timber is removed safely and efficiently.

Some **wood management** activities include

- developing detailed harvesting plans
- laying out logging areas
- establishing strategies for the felling, removal and transportation of timber
- planning the layout and construction of access roads
- surveying land (cruising)
- drafting plans
- hiring logging contractors
- supervising harvest operations
- organizing transportation from cut area to mill site
- managing raw materials yard at mill
- measuring log volumes/weighting loads of logs (scaling)
- keeping records of the amount and condition of each load of logs
- recording volumes of wood in yard
- maintaining safety practices

Some people who enjoyed these **school subjects** have found a rewarding career path in wood management:

- biological sciences
- mathematics
- English

People working in wood management may **enjoy or excel** in the following:

- working with things, numbers, or objects
- working with people as part of a team and in business relationships
- good organizational and communication skills
- preparing documents and writing reports
- working with machines, processes, and techniques
- detailed, organized work

Individuals who have succeeded in wood management may have the following **personal qualities or work preferences**:

taking responsibility	decision-making
working with people	meeting strict standards
flexibility	having a variety of responsibilities
influencing people	ability to work alone

The personal **values** of people working in wood management typically include

- concern for the environment
- appreciation of outdoors and wilderness

Working conditions may involve indoor work, outdoor work, or a combination thereof, depending on the occupation and employer:

deskwork	relatively isolated work site
meetings	live in small communities
working at computers and drafting tables	shift work in some occupations
travel	significant degree of physical activity
work alone or in small crews	variety of terrain and weather conditions

Typical **employers** in the field of wood management include

- forest products companies (lumber, pulp and paper, plywood, panelboard)
- government departments or agencies
- private consulting firms

Some examples of **wood management occupations** are

computer operator	forestry equipment operator
dispatcher	log scaler
drafting technologist	scales operator
forest technologist	survey technician
forester	timber cruiser

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.

Careers in Forest Management

Forest management plays an important role in ensuring the long-term survival of forested land. Sound forest management balances the interests of the forest products industry, recreational users, and agriculture, while preserving wildlife, vegetation, and natural resources. Through long-range planning, the most appropriate use of the land is determined, areas to be harvested are chosen, and reforestation strategies are developed. Silviculture is an important aspect of forest management, relating to the growth, care, and regeneration of forests. Government regulations prevent forest companies from harvesting more timber than a forest can grow in any given year. Therefore, when trees are harvested, the site is replanted with seedlings, whose growth is protected and monitored.

Some **forest management** activities include

- determining most appropriate use of land
- estimating tree volumes and identifying trees to be harvested
- planning access roads
- monitoring harvest
- watershed management and erosion control
- surveying land
- mapping and aerial photography
- computer modelling, record keeping, and data entry
- deciding which species should be replaced on site
- collecting cones, extracting, and cleaning seeds
- developing genetically superior seedlings
- growing seedlings in nurseries or plots
- preparing site for planting (scarification)
- tendering planting contracts
- planting seedlings
- fertilization and thinning of trees
- clearing away competing vegetation
- pest and disease management
- monitoring growth of new forests
- fish and wildlife management

Some people who enjoyed these **school subjects** have found a rewarding career path in forest management:

- biological sciences
- English

- mathematics
- physical education

People working in forest management may **enjoy or excel in** the following:

- working with things, numbers, or objects
- working with people as part of a team and in business relationships
- good organizational and communication skills
- preparing documents and writing reports
- working with machines, processes, and techniques
- detailed, organized work

Individuals who have succeeded in forest management may have the following **personal qualities or work preferences**:

- taking responsibility
- working with people
- flexibility
- influencing people
- decision-making

- meeting strict standards
- having a variety of responsibilities
- repeating set tasks
- ability to work alone

The personal **values** of people working in forest management typically include

- concern for the environment
- appreciation of outdoors and wilderness

Working conditions may involve indoor work, outdoor work, or a combination thereof, depending on the occupation and employer:

- | | |
|--------------------------------------|---|
| deskwork | relatively isolated work site |
| meetings | live in small communities |
| working at computers/drafting tables | significant physical activity |
| travel | variety of terrain and weather conditions |
| work alone or in small crews | long hours |

Typical **employers** in the field of forest management include

- government departments or agencies
- forest products companies (lumber, pulp and paper, plywood, panelboard)
- private consulting firms
- nurseries
- contractors (planting, surveying, thinning)

Some examples of **forest management occupations** are

- | | | |
|---------------------|--------------------------|----------------------|
| computer operator | nursery operator | survey technician |
| forester | nursery worker | timber cruiser |
| forest technologist | regeneration surveyor | tender |
| forestry worker | scarification supervisor | tree planter/thinner |
| mapping technician | silvicultural technician | wildlife biologist |

Additional information may be obtained by consulting the snapshot glossary of forestry occupations, Occupational Profiles, your library, or school counsellor.¹

¹ *Forestry Careers*, March 1997. Reproduced with permission from Alberta Advanced Education and Career Development.

Occupational Profiles

Forest Technologist

Life/Biological Sciences Occupations
 CCDO 2135-199,2135 -272, 7511-110,
 NOC 2223

Forest technologists perform many of the technical day-to-day forestry jobs which are basic to the scientific management of forested areas.

Forest technologists are involved in a variety of duties which may include any of the following general activities:

- reforestation—or forest renewal—includes nursery and silviculture operations, site preparation, seeding and tree planting programs, cone collection, and tree improvement
- surveying, measuring, and mapping forest areas and access roads
- doing regeneration surveys (assessing the new forest growth of areas previously logged)
- conducting and/or supervising forest inventories by counting and measuring trees, listing their species, and determining the amount of timber and other forest resources in an area
- laying out cutblocks (drawing detailed timber-harvesting plans)
- log scaling (measuring log volumes)
- keeping records of the amount and condition of each load of logs
- supervising road construction
- inspecting trees and collecting samples of plants, seeds, foliage, bark, and roots to record insect and disease damage
- assisting in laboratory/field experiments with plants, animals, insects, diseases, and soils
- supervising timber harvesting and primary processing
- supervising other forestry workers/technologists

Forest technologists who are employed with the provincial forest service are called *forest officers*. They perform additional functions such as

- managing forest protection activities including fire control, fire-crew training, coordination of fire detection, and public education
- issuing fire permits, timber permits, and other forest use licences
- supervising land-use activities such as livestock grazing and recreation activities to ensure compliance with regulations
- supervising pipeline, seismic and mining operations, and oil and gas drilling sites which disturb sections of the forest

The work of many forest technologists involves them in vigorous outdoor life. Others, concerned with administration planning and various phases of research, work indoors conducting experiments, analysing data, and writing reports on projects.

For those technologists who work outdoors, there may be daily commuting to the site or routine separations from home for periods of a week or more. They may stay in small rural communities or in modern camps which usually provide comfortable quarters and wholesome food. Forest technologists are often called upon to work 12- to 16-hour shifts fighting forest fires.

Qualifications

Forest technologists who work outdoors must be physically fit and able to lift items in excess of 25 kg. Because they frequently work with instruments, they must have mechanical ability, and manual and visual dexterity. They also must have good personal and communication skills as they deal with a wide range of people of various backgrounds.

Much like foresters, forest technologists usually enjoy the wilderness and outdoors, and have a genuine concern for the environment, and are good decision makers and enjoy independence.

Although the occupational title **forest technologist** or **forest technician** denotes the kinds and levels of duties and functions the individual performs, as described here, the terms are also used by specific employers in government, industry, and by post-secondary institutions in ways that are not always consistent with these descriptions.

Forest technologists are graduates of a two- or three-year forest technology program. The Northern Alberta Institute of Technology (NAIT) in Edmonton offers the only Forest Technology program in Alberta. The first year of this program is spent in Edmonton with five weeks in the fall at the Kidney Lake Field Training Camp in the Swan Hills. The second year of training is spent at the Environment Training Centre in Hinton.

- Basic entrance requirements to NAIT include an Alberta high school diploma or equivalent with at least 50% in Math 30 or 33, English 30 or 33, plus Chemistry 20 and Biology 20.

Forest technologists must obtain summer work experience in the forestry field as a prerequisite for employment. Like foresters, they may obtain summer employment with industry or government doing work that forestry workers usually do year round.

The Forestry Youth program, operated by Land and Forest Services, Alberta Environmental Protection, provides work-related forestry experience for senior high school students.

Employment and Advancement

Entry-level positions for forest technologists may include log scalers, timber cruisers, or supervisors of tree-planting crews. Permanent positions for forest technologists are usually gained once a few years work experience is obtained.

The work of forest technologists can involve one of several levels—helping foresters develop forestry plans, supervising the forestry workers and technologists who acquire the data for the plans, or actually doing the field work to implement the plans.

Forest technologists, with significant experience and appropriate qualifications, may also provide consulting services to

- forest products industries (lumber, pulp and paper, plywood, panelboard)
- industries associated with the production and marketing of forest products
- various federal/provincial government departments or agencies
- schools, technical institutes, and universities
- oil and mining companies
- power companies

Forest technologists also can be hired on as forest guardians to supervise land use and public activities in one of the forest recreation areas and campgrounds operated by the Parks Services of Alberta Environmental Protection.

Employment prospects in the forest industry are good with the increased number of mills operating in Alberta. The skills and background of forest technologists can be used in other areas such as with provincial parks, survey crews, reclamation work, and the oil and gas industry. With further education and training, forest technologists can advance to forester positions as well.

Salary

Annual starting salaries for forest technologists range from **\$28 000 to \$31 000** and sometimes include benefits such as room and board and a company vehicle. Some senior forest technicians/technologists may earn **\$40 000 or more annually (1995 figures)**.

Other Sources of Information

Contacts

Alberta Forest Products Association (AFPA), 200, 11738 Kingsway Avenue, EDMONTON, Alberta, T5G 0X5.

Alberta Forestry Association (AFA), Suite 101, Alberta Block, 10526 Jasper Avenue, EDMONTON, Alberta, T5J 1Z7.

Alberta Forest Technologist's Association, Suite 55, Commonwealth Building, 9912 – 106 Street, EDMONTON, Alberta, T5K 1C5.

Canadian Institute of Forestry (CIF), Rocky Mountain Section, c/o Department of Forest Science, 855 General Sciences Building, University of Alberta, EDMONTON, Alberta, T6E 2H1.

Director, Environment and Training Centre, Alberta Environmental Protection, 1176 Switzer Drive, HINTON, Alberta, T7V 1V3.

Extension Services Officer, Land and Forest Services, Alberta Environmental Protection, 10th Floor, Bramalea Building, 9920 – 108 Street, EDMONTON, Alberta, T5K 2M4.

Canadian Forest Service, Northern Forestry Centre, 5320 – 122 Street, EDMONTON, Alberta, T6H 3S5.

Forestry Youth Program, Land and Forest Services, Alberta Environmental Protection, 10th Floor, Bramalea Building 9920 – 108 Street, EDMONTON, Alberta, T5K 2M4.

Program head, Forest Technology, Northern Alberta Institute of Technology (NAIT), 11762 – 106 Street, EDMONTON, Alberta, T5G 2R1.

Resource Materials

A Growing Opportunity: Alberta's Forest Resources, and *Alberta's Forests*, Alberta Environmental Protection Information Centre, Main Floor, Bramalea Building, 9920 – 108 Street, EDMONTON, Alberta, Canada, T5K 2M4 OR 703 – 6 Avenue SW, CALGARY, Alberta, T2P 0T9.

ALM Media Marketing, a booklet which contains information on obtaining free loan videos and films, Canadian Pulp and Paper Association (CPPA), 19th Floor, Sun Life Building, MONTREAL, Quebec, H3B 4T6

Canada's Forest Heritage, Canadian Forest Service, Program Communications, 351 St. Joseph Boulevard, HULL, Quebec, K1A 1G5.

Farming Canada's Forests, and several environmental pamphlets, Canadian Pulp and Paper Association (CPPA), 19th Floor Sun Life Building, 1155 Metcalfe Street, MONTREAL, Quebec, H3B 4T6.

Forest Care Codes of Practice, Alberta Forest Technologists' Association, Suite 55, Commonwealth Building, 9912-106 Street, EDMONTON, Alberta, T5K 1C5.

Forestry pamphlet, Public Service Commission of Canada, Room 830, 9700 Jasper Avenue, EDMONTON, Alberta, Canada, T5J 4C3.

What Wood You See in Your Future? video. Contact any high school counsellor in Alberta or the nearest Career Development Centre; for details, see For further information below.

For further information on career planning, occupations and educational programs, contact the nearest Career Development Centre (see the "Government of Alberta" listings in the telephone directory) or telephone the Career Information Hotline at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).

Researched and produced in March 1995

Forester/Forestry Scientist

Life/Biological Sciences Occupations
 CCDO 2139-110
 NOC 2122

Foresters manage and develop forested lands and related renewable resources for industrial, recreational, and ecological purposes. They ensure that forest land is used wisely to optimize production of forest resources while minimizing adverse impacts on the land, water, and wildlife.

Foresters and forestry scientists are involved generally in a number of activities which include

- reforestation—or forest renewal—overseeing seed and tree planting programs of areas where trees have been removed by harvesting or burned over by forest fires
- assessing the impacts of wild fires, insects, diseases, and pollution on our forests and developing strategies to minimize forest losses
- overseeing forest engineering activities such as road layout and construction, bridge construction, and culvert installation
- planning and supervising timber-harvesting operations to achieve minimal timber damage and waste, and minimize impacts on wildlife, soils, and water resources
- long range planning of forest-land use activities such as recreational activities, domestic grazing, timber harvesting, and oil/gas drilling, and mining operations
- advising government and industrial officials on forest-management issues and assessing new forest management applications
- providing public education and awareness

Foresters may also work in land inspection and enforcement to ensure that forest-cleared lands are reclaimed to their most suitable end use, and/or that outdoor recreational activities and commercial land uses comply with the guidelines and regulations set for forested public lands.

Forestry scientists may conduct a wide range of forest research which often relates to

- investigating the impacts of forest operations on soils, water, wildlife and their habitats, etc.
- assessing human and environmental impacts on forests such as air pollution, tree diseases, insects, fire, and climate change
- conducting studies on forest biomass as energy alternatives
- developing and testing new forest products and harvesting processes
- conducting research on tree improvement which involves developing superior trees by genetically selecting, growing, and tending trees with the best qualities
- conducting studies on ecological land classification
- investigating new or alternative silvicultural treatment to minimize the negative impact of forest removal and/or enhancing forest renewal opportunities

Watershed protection and wildlife management are also key areas of concern for foresters. Such activities may include

- monitoring wildlife populations and assessing impacts of forest operations on population and habitats
- studying water yield variations following surface disturbances

Some forester/forestry scientist positions involve an active, vigorous outdoor life. These foresters/forestry scientists spend a considerable amount of time in the field working by themselves or in small crews, and may have to drive for many hours to work sites or bush camps. They may spend hours hiking in rugged country, wet muskeg areas, or over steep terrain in all kinds of weather conditions to carry out their duties. They may be required to lift equipment weighing up to 25 kg depending on the work setting.

Other forester/forestry scientist positions involve indoor work and are concerned primarily with administration, planning, and various phases of research and teaching. Such work usually entails

- handling correspondence
- attending meetings
- making presentations
- accumulating and analysing data
- completing reports and forms

Qualifications

Because much of the work of foresters involves planning, they should have the ability to always envision the broader picture. They also must be able to direct the work of assistants and to oversee several different projects at the same time. They, therefore, must have good leadership and communication skills, and enjoy contact with people.

Foresters/forestry scientists usually have a keen interest in all aspects of nature and a serious concern for the environment. They are intent on working with renewable resources, and like the choice of working outdoors or inside. Forestry work offers individuals variety, independence, and the opportunity to be creative and help society.

Foresters are graduates of university bachelor's degree programs in Forestry. Often individuals interested in obtaining forestry research positions need a postgraduate degree at the Master's (M.Sc.) or Doctoral (Ph.D.) level.

The University of Alberta (Edmonton) is the only university in Alberta that offers professional programs in most areas of forestry—bachelor's, master's and doctoral level degrees.

The University of Alberta's Bachelor of Science (B.Sc.) degree program in Forestry emphasizes the integrated management of forest-based resources.

- Basic entrance requirements to this program include
 - an advanced Alberta high school diploma or the equivalent
 - English 30, Math 30, Biology 30, Chemistry 30, and one other Grade 12 science or humanity, and a minimum overall average of 65%

A modified first year may be taken by students at the following colleges and universities in Alberta:

- Athabasca University
- Augustana University College (Camrose)
- Concordia University College of Alberta (Edmonton)
- Grande Prairie Regional College
- Medicine Hat College
- Mount Royal College (Calgary)
- Red Deer College
- The King's University College (Edmonton)
- The University of Calgary
- The University of Lethbridge

The Forestry Youth program, operated by Land and Forest Services of Alberta Environmental Protection, provides work-related forestry experience for senior high students.

Because forestry is very competitive, summer work experience is virtually a prerequisite for permanent employment. Both industry and government provide summer employment for forestry students in forestry worker or technical positions.

Employment and Advancement

Foresters/forestry scientists are employed primarily by

- forest products industries (lumber, pulp and paper, plywood, panelboard)
- industries associated with the production and marketing of forest products
- various federal or provincial government departments or agencies
- schools, technical institutes, and universities
- power companies
- oil and mining companies

They may also work as private consultants to any of the above mentioned employers or to various authorities and interest groups.

After several years of work in junior level positions, foresters may assume responsibility for assessing the data gathered by forest technologists and forestry workers, plan and implement projects, and supervise the technologists and forestry workers who carry out the fieldwork. With more experience, foresters may move into senior-management and administrative positions, where they become concerned with the development of policies.

Several provinces in Canada have Registered Professional Forester (RPF) associations. Foresters must have a university degree and a minimum of two years of forestry experience. The Canadian Institute of Forestry (CIF), a nation-wide organization, invites all forestry students and forestry professionals to become members.

Although employer demand for forestry graduates rarely exceeds supply, the employment outlook seems to be expanding, particularly within the forest industry. Opportunities for advancement into top management positions are also good within the forestry sector. Such possibilities include the running of facilities as forest superintendents or woodlands managers or being involved in wood products manufacturing or marketing. With the upgrading of standards of environmental-protection legislation, there has been a considerable demand for the services of experienced forestry consultants as well.

Foresters with several years of work experience also possess the flexibility to move from one natural-resource management field to another. Their skills, for example, can be used in such areas as land-use planning, reclamation work, vegetation control, survey crews, and with provincial parks.

Salary

Annual starting salaries for foresters and forestry scientists range between **\$38 000–\$48 000 (1995 figures)** and may include such benefits as room and board and a company vehicle.

Foresters and forestry scientists with a few years of experience earn approximately **\$44 000–\$55 000** and those in senior positions can earn in excess of **\$60 000** annually (1995 figures).

Other Sources of Information

Contacts

Alberta Forest Products Association (AFPA), 200, 11738 Kingsway Avenue, EDMONTON, Alberta, T5G 0X5.

Alberta Forestry Association (AFA), Suite 101, Alberta Block, 10526 Jasper Avenue, EDMONTON, Alberta, T5J 1Z7.

Alberta Registered Professional Foresters Association (ARPFA), Suite 55, Commonwealth Building, 9912 – 106 Street, EDMONTON, Alberta, T5K 1C5.

Canadian Forest Service, Northern Forestry Centre, 5320 – 122 Street, EDMONTON, Alberta, T6H 3S5.

Canadian Institute of Forestry (CIF), Rocky Mountain Section, c/o Department of Forest Science, 855 General Sciences Building, University of Alberta, EDMONTON, Alberta, T6E 2H1.

Department of Renewable Resources, Faculty of Agriculture, Forestry, and Home Economics, 751 General Services Building, University of Alberta, EDMONTON, Alberta, T6G 2H1

Extension Services Officer, Land and Forest Services, Alberta Environmental Protection, 10th Floor, Bramalea Building, 9920 – 108 Street, EDMONTON, Alberta, T5K 2M4.

Forestry Youth Program, Land and Forest Services, Alberta Environmental Protection, 10th Floor, Bramalea Building 9920 – 108 Street, EDMONTON, Alberta, T5K 2M4.

Resource Materials

A Growing Opportunity: Alberta's Forest Resources, and *Alberta's Forests*, Alberta Environmental Protection Information Centre, Main Floor, Bramalea Building, 9920 – 108 Street, EDMONTON, Alberta, Canada, T5K 2M4 OR 703 – 6 Avenue SW, CALGARY, Alberta, T2P OT9.

ALM Media Marketing, a booklet which contains information on obtaining free loan videos and films, Canadian Pulp and Paper Association (CPPA), 19th Floor, Sun Life Building, MONTREAL, Quebec, H3B 4T6

Canada's Forest Heritage, Forestry Canada Program Communications 351 St. Joseph Boulevard, HULL, Quebec, K1A 1G5.

Farming Canada's Forests, Canadian Pulp and Paper Association (CPPA), 19th Floor, Sun Life Building, 1155 Metcalfe Street, MONTREAL, Quebec, H3B 4T6.

Forest Care Codes of Practice, Alberta Forest Products Association, Suite 200, 11738 Kingsway Avenue, EDMONTON, Alberta, T5G 0X5

Forestry pamphlet, Public Service Commission of Canada, Room 830, 9700 Jasper Avenue, EDMONTON, Alberta, Canada, \ T5J 4C3.

What Wood You See in Your Future? Video. Contact any high school counsellor in Alberta or the nearest Career Development Centre; for details.

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The information contained in this profile was current as of the date shown. Salaries, employment outlook and educational programs may change. Please check the information before making any career decisions.

Researched and produced in March 1995

Park Warden/Park Ranger

Services Occupations
CCDO 6119-110, NOC 222

Park wardens and park rangers are responsible for resource management, visitor services, maintenance, and recreation management in national and provincial parks. Park warden is the job title generally used in the national park system; park ranger is the job title generally used in the provincial park system.

Park wardens/rangers are responsible for

- safeguarding the public while they are visiting the park,
- minimizing conflict between park visitors
- protecting the natural resources of the park

Park wardens/rangers are trained in first aid and life-saving techniques, and must take charge of the situation when visitors are lost, injured, or endangered. They work in cooperation with police, fish and wildlife officers, and resource management, and enforcement agencies.

Other duties may include

- monitoring and managing resources
- taking statistical surveys
- assisting in forest fire suppression
- overseeing the operation of park facilities
- supervising and training park employees
- offering information and assistance to park visitors
- responding to correspondence, completing reports, and preparing budgets
- initiating park management and operational plans
- supervising the construction or repair of facilities and maintenance of equipment
- enforcing specific laws and regulations when necessary

Park wardens/rangers frequently patrol their areas by truck, boat, or plane, or on foot, skis, or horseback. They watch for potential hazards and assess the condition of the park, its wildlife, and other natural resources.

Park wardens in national parks spend much of their time conducting natural resource inventories of land forms, water, climate, and plant and animal life within the park. They implement resource management plans to ensure the continued existence of plant and animal species. This may involve monitoring wildlife, capturing animals, and relocating or destroying them if they are diseased or too numerous. In some national parks, park wardens may specialize in resource management, law enforcement, or public safety.

Park wardens/rangers work both indoors and outdoors, sometimes in extreme weather conditions or on rough terrain. Some risk is involved in capturing and handling animals, and enforcing regulations. The work may be seasonal, although the trend toward the year-round operation of parks is creating more permanent employment opportunities. Park wardens/rangers are often required to be on call during off-duty hours in case of emergencies.

Qualifications

Park wardens/rangers must

- have the communication skills, tact, and self confidence required to relate to people from many different backgrounds
- be able to cope with heavy workloads during major tourist seasons,
- be in good physical condition,
- be able to take on a leadership role and remain calm in stressful situations.

Experience and expertise in cross-country skiing, boating, mountain climbing, hiking, and trail-riding can be beneficial for park wardens and park rangers. They should have a keen interest in all aspects of nature and a serious concern for the environment. They should also know how to prepare meals in the wilderness.

To qualify for employment as a park warden or a park ranger, the minimum educational requirement is graduation from a post-secondary resource-management diploma program or a related conservation field.

Lethbridge Community College offers a specialization in renewable-resource management that includes parks management in its two-year Environmental Science program. The entrance requirement is a high school diploma or equivalent with 55% or better in each of the following: English 30, Biology 30, Chemistry 20, and Math 20. A satisfactory mark in the Computer Placement Test (CPT) is also required. The college offers a post-diploma certificate in conservation enforcement as well.

Lakeland College in Vermillion offers a parks and recreation specialization in its two-year Environmental Sciences program. The entrance requirement is a high school diploma or equivalent with at least 50% in English 30 (65% in English 33), Biology 30, and Math 20 or 23 or equivalent.

Other two-year diploma programs and university degree programs related to natural-resource management are listed in Post-Secondary Education Programs (PSEP), a publication available at Alberta Career Development Centres and most secondary schools.

Many post-secondary students gain valuable experience by working in national or provincial parks during the summer. They often work as groundskeepers, equipment operators, maintenance workers, lifeguards, gate attendants, and interpretive assistants. Interested secondary school students might consider joining the Junior Forest Wardens of Alberta. Club members learn about wildlife, conservation, fire fighting, forestry-resource management, first aid, and woodlore.

Employment and Advancement

Park wardens are employed in national parks and park rangers are employed in provincial parks. Since the number of people interested in park warden and park ranger positions is far greater than the number of job openings available each year, competition for these positions is very keen.

Newly employed park wardens/rangers gradually take on more responsibility and may advance to more specialized positions in larger parks in the areas of enforcement, public safety, or administration, for example. Advancement to specialist positions such as ecologist require a university degree in the natural sciences, preferably a masters degree, and considerable experience.

Salary

Annual salaries for park wardens/rangers range from **\$1940 to \$3670 a month (1991 figures)**.

*For further information on career planning, occupations, and educational programs, contact the nearest **Career Development Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

Researched and produced 1992

Logging/Forestry Equipment Operators

Trades and Technical Occupations
CCDO 7513-122, 7513-130, 8715-110
NOC 8241

Logging/forestry equipment operators play a major role in the mechanical harvesting of timber. The work of forestry equipment operators covers a broad range of logging operations used to convert standing trees into forms suitable for use in mills.

Logging/forestry equipment operators operate several types of sophisticated forestry equipment that are most often tracked or rubber-tired machines used for travelling in rough terrain. Most of the machines require the manipulation of levers and foot pedals. Much of the equipment is also electronically controlled and monitored by a computer on board.

Depending on the harvesting method being used, several logging/forestry equipment operators may be required.

- **Feller-buncher operators** are the first ones into a cutting area. They operate modified tracked backhoe-like machines that cut the trees at the base and pile them in bunches in preparation for being moved elsewhere. Their work is important in that this establishes the work pattern for other operators.
- **Delimber operators** operate machines that ensure that all rot and limbs have been removed from the trees and the tops have been properly trimmed to meet required specifications.
- **Tree-processor operators** operate machines which can fell, de-limb, and cut trees into logs of full or shortwood lengths for further processing at the mills. These operators then bunch the trees into piles for delivery to the roadside.

- **Slasher operators** operate machines which cut tree-length pieces into consistent, pre-determined lengths. These limbed pieces are usually slashed at the roadside. The operator must pile processed pieces back beside the road for the log loader operator to load on to trucks.
- **Forwarder operators** operate machines similar to a skidder but with a loader to transport wood cut to length by a processor to the roadside.
- **Log loader operators** load the logs piled at the roadside onto the logging trucks to be transported to the mill. These operators handle equipment much like cherry pickers with mechanical grapple tongs that grip logs for lifting. Log loader operators then raise the logs as smoothly and accurately as possible and place them on logging truck trailers to form balanced loads within legal axle-weight limits.
- **Portable chipper operators** operate machines which reduce whole trees to chips and blow them into tractor-trailer units. These chips are then hauled to pulp or paper manufacturing plants.

Skidder operators may also be required, please refer to the *Power-Saw* and *Skidder Operator* profile.

Logging/forestry equipment operators must work as effective members of a team as the work of one operator greatly affects the work of others.

Although the work of logging/forestry equipment operators is often repetitious, it takes skill, concentration, and the ability to make quick decisions. Increasingly, operators are being called upon to make harvesting decisions which can have an impact on long-term silvicultural and forest health circumstances.

Logging/forestry equipment operators must use safety equipment and protective clothing because they are in constant danger of injury from falling trees and branches, and flying particles from chain saws, delimiters, cut-off saws or chippers. They are exposed to the normal hazards of operating any type of machinery. The risks have been greatly reduced through advances in technology, safety engineering and operating procedures.

Logging/forestry equipment operators work outdoors under a variety of conditions including extremes of weather (rain, snow, cold and dampness), and noise. They may work on steep, wet or uneven terrain. Their work often includes day or night shifts.

Logging/forestry equipment operators may commute daily to the logging site or may have to stay away from home for periods of a week or more. Modern logging camps usually provide comfortable quarters and wholesome food.

Operators regularly lift equipment weighing between 6 and 10 kilograms and occasionally may be required to lift loads weighing up to 25 kilograms.

Qualifications

Forestry equipment operators must

- be in good physical condition
- have above average eye/hand coordination
- have the ability to judge distances

Operating forestry equipment requires more skills than just being able to operate a machine. Logging/forestry equipment operators must utilize the following skills and knowledge:

- good decision-making skills
- observation skills necessary to accurately identify tree species
- efficient felling patterns
- sound logging practices
- awareness of potential environmental disturbances
- good map reading skills
- keen awareness of the limitations of the equipment they are operating
- the ability to make innovations and adaptations to suit local conditions

Familiarity with computers is an asset.

Since logging companies face heavy fines for environmental damage, a good working knowledge of the provincial harvesting rules and regulations governing logging is essential as well.

Logging/forestry equipment operators usually enjoy the outdoors, variety, having some competition, being independent, working with their hands or machines, making decisions and doing precise work.

There are no formal educational requirements for entry into logging/forestry equipment operator occupations. Employers prefer to hire applicants with a minimum of grade 10 education, St. John's First-aid Certificates and Workplace Hazardous Materials Information Systems (WHMIS) training (available through most post-secondary institutions). Experience in machine operation is also an asset.

Most companies provide on-the-job training under the supervision of an experienced, competent worker. The length of the training period varies with the type of machine and with the individual's ability, but it usually takes six months before operators are able to handle the machinery adequately. On-the-job training may be supplemented by a few weeks of training sponsored by the equipment manufacturer. Industry-wide training programs are currently being developed.

The Alberta Vocational College (AVC) - Lesser Slave Lake offers a Logging Equipment Operator program in Grouard and other northern communities. Applicants for this program must be

- at least 18 years of age
- out of school for at least one year
- in good physical health

Heavy equipment operation and logging experience would be an asset in applying to the program. An individual interview may be required.

Because machinery maintenance is required during the off season and when breakdowns occur, operators should have some mechanical ability to be able to handle minor repairs and recognize major problems. They should also have knowledge of proper operating procedures and preventative maintenance practices such as the use of oil and grease and hydraulic fluid.

Employment and Advancement

Employment opportunities for logging/forestry equipment operators are usually found with

- logging contractors
- forestry and lumber companies
- pulp and paper companies

Employment prospects in the forestry industry are good with an increased number of mills operating in Alberta. There are frequent opportunities for operators to learn new techniques on a variety of equipment. With several years of work experience and demonstrated leadership abilities, forestry equipment operators can advance to crew foreman positions and supervisory levels. Those who are able to purchase their own equipment can become private contractors.

Logging/forestry equipment operators in Alberta often work on a seasonal basis, usually from September/October to March/April (varies with the arrival/departure of frost and how wet it is). Some private contractors are able to work on a year-round basis depending on the method of logging and where the cutblocks are located. Many companies combine their logging operations with other heavy equipment work to create year-round employment.

Logging/forestry equipment operators can utilize their skills in other areas in the operation of other heavy duty equipment like backhoes, crawler tractors, scarifiers and graders. (See the *Heavy Equipment Operator* profile.)

Salary

Starting salaries for logging/forestry equipment operators vary according to the employer and the type of work performed. They can earn an average rate of between **\$11 and \$19 an hour plus overtime**. Skilled operators can earn between **\$20 and \$24 an hour (1995 figures)**. Logging/forestry equipment operators may also work on a piecework basis where their wages are based on the volume and quality of work performed.

Other Sources of Information

Contacts

Alberta Forest Products Association (AFPA),
#200, 11738 Kingsway Avenue, EDMONTON, Alberta, T5G 0X5.

Alberta Logging Association (ALA), Provincial Office, 10916B-97 Avenue, GRANDE PRAIRIE, Alberta, T8V 3J8.

Program Head, Logging Program, Alberta Vocational College (AVC) - Lesser Slave Lake, Grouard Campus, Bag 3000,
GROUARD, Alberta, T0G 1E0.

Resource Materials

What Wood You See in Your Future? video. Contact any high school counsellor in Alberta or the nearest Career Development Centre for details.

For further information on career planning, occupations and educational programs, contact the nearest Career Development Centre or Canada Alberta Service Centre (see the "Government of Alberta" listings in the telephone directory) or telephone the Career Information Hotline at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).

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Researched and produced in January 1996.

Forestry Technician

Trades and Technical Occupations

CCDO 7511-110, -113, -116, -118, -122

NOC 2223

The duties of forestry technicians, sometimes called forestry crew workers, woodworkers, or forestry assistants/aides, cover a range of forestry operations which assist foresters and forest technologists with the management of forested areas.

Forestry technicians perform a number of forestry activities which may include

- surveying, measuring, and mapping forest areas and access roads
- surveying of regrowth on recently cut areas
- conducting forest inventories by counting and measuring trees, and listing their species within plots for determining the volume of timber in an area
- laying out cutblocks, haul roads, and skid trails (detailed drawings of timber harvesting areas)
- log scaling (measuring log volumes)

- keeping records of the amount and condition of logs reaching mills
- marking trees for harvesting operations
- inspecting trees and collecting samples of plants, seeds, foliage, bark, and roots to record insect and disease damage

Some forestry workers may use

- chainsaws and clearing saws to thin and space trees in new forest-growth areas
- manual tools and chemicals to control weeds and undergrowth in new forest-growth areas of previously logged stands

Forestry technicians also may be involved in detecting and fighting forest fires in any number of capacities such as

- operating lookout towers
- combating forest fires on initial attack crews or fire suppression crews
- operating radios
- working at airtanker bases

Forestry technicians work outdoors in a variety of conditions including extremes of weather (rain, snow, cold, and dampness); and on steep, wet or uneven terrain.

Forestry technicians may commute daily to work in the woods or may have to stay away from home for periods of a week or more. They may stay in small rural communities or in modern camps which usually provide comfortable quarters and wholesome food. When fighting forest fires, forestry workers are often called upon to work twelve- to sixteen-hour shifts for several days at a time.

Forestry technicians may be required to lift loads weighing between 6 and 10 kilograms.

Qualifications

Forestry technicians require excellent health and in good physical condition because their work is often strenuous.

Forestry technicians usually enjoy variety, being outdoors, working with their hands, and working independently, or as members of a team. Those who work as rappattack or initial attack crew members find fighting forest fires offers excitement, high precision work, and a good wage.

Training required by forestry technicians is available from the following post-secondary institution:

- Fairview College (Northern Region) offers a twenty-week Forestry Operations certificate program in High Level. Applicants must have Grade 9 or equivalent and be in good physical condition.
- Alberta Vocational College in Lac La Biche offers a 33-week Forest Technician certificate program. Applicants to the program must be 18 years of age, have a Grade 10 education, be in good physical health, and have a responsible, positive and mature attitude.
- Alberta Vocational College in Lesser Slave Lake offers a 33-week Forestry Technician certificate program in Grouard and Grimshaw. Applicants for this program must be at least 18 years of age, have a minimum Grade 10 education, be in good physical health and have a responsible, positive and mature attitude.

In addition to formal education, it is very important for technicians to have knowledge of provincial ground-rules and regulations to perform their duties properly.

Employment and Advancement

Employment opportunities for forestry technicians are usually provided by

- logging companies
- pulp and paper companies
- forestry-consulting firms
- private contracting firms
- the provincial government

There are a variety of seasonal and permanent positions in the forest industry for forestry technicians.

With subsequent training and certification:

In the area of silviculture, forestry technicians can work as members of tree planting and thinning crews and as nursery workers.

In the area of timber management, forestry technicians can work on timber management crews as compass persons, regeneration surveyors, timber cruisers, and mapping technicians.

In the area of forest protection, forestry technicians can work as aerial observers, fire fighters, initial attack crew members, fire look-out personnel (tower personnel), timekeepers, helitack crew members, radio operators, forestry warehouse persons, and airtanker base assistants.

In the area of recreation, forestry technicians may assist recreation crew members construct and maintain recreation areas or supervise recreation areas as forest guardians.

With private forestry companies or forestry consulting firms, forestry technicians can be employed as log scalers, logging supervisors, woodland assistants/technicians, millworkers, thinning crew members, fire-suppression crew members, and road engineering assistants.

Employment prospects in the forestry industry are good with the increased number of mills operating in Alberta.

The skills and work experience of forestry technicians can be useful for working in other areas such as with provincial parks, survey crews, vegetation control, reclamation work, the oil and gas industry, woodlot management, or working as forestry equipment operators.

Forestry technicians who obtain more schooling can become forest technologists and those with further education and training can advance to forester positions as well.

Salary

Starting salaries for forestry technicians vary according to the type of work performed. Helitack crew members can expect to earn approximately **\$13 an hour**. Other forestry technicians can earn **\$10 to \$14 an hour** or approximately **\$21 500 to \$26 500 a year**; those with several years of experience can earn about **\$25 000 to \$31 000 a year**, and sometimes up to **\$45 000 a year** in private industry (all 1995 figures).

Other Sources of Information

Contacts

Alberta Forest Products Association (AFPA), 200, 11738 Kingsway Avenue, EDMONTON, Alberta, T5G 0X5.

Alberta Forest Technologist's Association, Suite 55, Commonwealth Building, 9912-106 Street, EDMONTON, Alberta, T5K 1C5.

Alberta Forestry Association (AFA), Suite 101, Alberta Block, 10526 Jasper Avenue, EDMONTON, Alberta, T5J 1Z7.

Alberta Logging Association (ALA), 10916B – 97 Avenue, GRANDE PRAIRIE, Alberta, T8V 3J8.

Canadian Institute of Forestry (CIF), Rocky Mountain Section, c/o Department of Forest Science, 855 General Services Building, University of Alberta, EDMONTON, Alberta, T6E 2H1.

Program Head, Forest Technician Program, Alberta Vocational College (AVC), Box 417, LAC LA BICHE, Alberta T0A 2C0.

Program Head, Forestry Operations, Fairview College (Northern Region), Bag 3000, FAIRVIEW, Alberta, T0H 1L0.

Program Head, Forestry Technician Program, Alberta Vocational College (AVC), Lesser Slave Lake, Mission Street, GROUARD, Alberta, T0G 1C0.

Program Head, Forest Technology, Northern Institute of Technology (NAIT), 11762-106 Street, EDMONTON, Alberta, T5G 2R1.

Resource Materials

What Wood You See in Your Future? video. Contact any high school counsellor in Alberta or the nearest Career Development Centre; for details. For further information.

For further information on career planning, occupations and educational programs, contact the nearest Career Development Centre (see the "Government of Alberta" listings in the telephone directory) or telephone the Career Information Hotline at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).

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Researched and produced in January 1996

Log Scaler

Trades and Technical Occupations

CCDO 7516-118, 122

NOC 2223

Log scalers inspect logs for defects, measure them to determine total volume, and estimate the marketable content of logs for use as sawlogs or pulpwood.

Log scalers estimate the usable volume of timber harvested to determine how much the company owes loggers for cutting the timber, and the provincial government or landowner for timber dues.

In forested coastal areas, log scalers often work year-round scaling logs for grade as well as volume. In Alberta, log scalers estimate volume only and their work may be seasonal.

Duties and responsibilities vary somewhat from one job to another. For example, some companies expect log scalers to buck (cut) logs into usable lengths before scaling them. In other companies, buckers perform this task. In general, however, log scalers

- measure log lengths and diameters using scale sticks and logger tapes
- use conversion tables to estimate gross volume
- estimate the loss of board footage caused by saw waste, defects and shape of tree
- cull logs containing excessive amounts of unsound wood
- calculate the difference between gross volume and unusable volume to obtain usable volume
- keep records of the amount, condition and species of each load of logs scaled

Log scalers often take their measurements in the field, and later use computer programs to calculate and keep track of data. However, some bush scaling is done to determine volumes within logging cutblocks.

Log scalers work outdoors, primarily in the fall and winter months. They work eight-hour days with some overtime required when there is sufficient daylight available. Some log scalers do other kinds of work in the warmer months.

Log scalers often work in remote locations. Some Alberta-certified log scalers work in other provinces scaling loads that originate in Alberta.

This work requires standing for long periods of time. Safety precautions are required to reduce the risk of injury when working with logs and around large equipment.

Qualifications

Log scalers need

- physical stamina
- the numerical and computer skills required to calculate volumes and keep accurate records
- the ability to judge spatial relationships
- knowledge of different tree species

Those who are self-employed also need business management skills.

This type of work appeals to people who enjoy working outdoors, working with numbers, and having routine tasks that require a high degree of accuracy. Log scalers must estimate usable volumes to within three percent of government check scalers' volume calculations.

There are no standard minimum education requirements for log scalers. Employers generally prefer to hire people who have experience in the logging industry, or post-secondary education in forestry.

Log scalers must be certified by the provincial government. The Environmental Training Centre in Hinton offers five-day provincial certification courses for log scalers at the Centre and through Alberta Vocational Colleges (AVCs) at Grouard and Lac La Biche. The AVCs may also offer ten-day courses which cover the same course content, but allow more time for hands-on experience. Graduates who pass the course examination are certified as Alberta permitted scalers.

Instruction for Alberta log scaler certification is also offered as part of forestry certificate and diploma programs offered at the Northern Alberta Institute of Technology (NAIT) in Edmonton, and AVCs in locations throughout northern Alberta. See the **Forest Technologist** and **Forestry Technician** profiles, or contact the institutions concerned, for more information about these programs.

Employment and Advancement

Log scalers are employed by pulp and paper mills, sawmills and woodland contractors.

Experienced log scalers can move into other positions in mills, advance to supervisory positions or become self-employed contractors. Advancement opportunities are best for those who have post-secondary education in forestry.

There are fewer than one thousand log scalers in Alberta, and employment in this occupation is not expected to grow significantly. However, the employment turnover rate is quite high so there is often work available.

Salary

Methods and amounts of payment for scaling services vary. Log scalers working on a contract basis may be paid by the volume scaled (e.g., \$4 per cubic metre) or by the day (e.g., \$200 per day). Those employed by the government to check the accuracy of other scalers' work earn **\$14 to \$17 an hour (1996 figures)**.

Other Sources of Information

Contacts

*For further information on career planning, occupations and educational programs, contact the nearest **Career Development Centre** or **Canada Alberta Service Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

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Researched and produced in April 1996

Sawmill Machine Operators

Trades and Technical Occupations

CCDO 8231

NOC 9431

Sawmill machine operators operate, monitor and control automated machines and equipment that process logs into lumber, shingles and shakes.

Sawing logs into boards and planks of varying widths and thicknesses requires a fairly standard series of operations, but the processes used vary from one sawmill to another. In some sawmills, the work of sawmill machine operators is labour intensive. In other mills, technological advances have decreased the amount of manual labour required.

Sawmill machine operators may use various types of automated equipment to

- move logs from storage yards on to transfer decks
- convey logs through scanners which determine the most productive way to cut them, and through cut-off saws which cut the logs to optimum lengths
- debark logs
- send logs through laser scanners which determine the most profitable cutting patterns for each log
- feed logs through various types of saws, edgers and trimmers to produce rough lumber
- sort and stack lumber according to length and thickness
- move stacks of lumber to storage yards and, later, to and from drying kilns
- feed rough lumber through planers to give it a smooth (dressed) surface

In general, sawmill machine operators

- use front end loaders and stationary deck cranes to feed logs into the sawmill
- operate equipment from consoles or control rooms to scan logs for size and quality; convey logs and lumber to and from saws; saw logs into rough lumber; saw, trim, sort, stack, put in dry kiln and plane rough lumber into dressed lumber of various sizes; and saw or split shingles and shakes
- monitor logs and lumber movement to ensure cuts are made according to specifications
- clean and maintain equipment

Sawmill machine operators work about forty hours a week in shifts. Sawmills usually operate 24 hours a day, five days a week. The environment is often noisy, dusty, and hot/cold. Safety equipment such as hard hats, safety shoes, safety glasses, gloves and ear protection are required to reduce risk of injury.

Qualifications

Sawmill machine operators must be able to

- perform repetitious tasks and remain alert to avoid accidents
- work as part of a team

This type of work appeals to people who enjoy having work responsibilities that require accuracy and follow a predictable routine.

Employers generally prefer to hire high school graduates, but may hire people with less education if they have experience operating machinery or equipment.

Sawmill machine operators are trained on the job. They usually start in entry-level labouring positions. After a number of years, employees are offered machine operating positions as they become available. With experience and satisfactory performance operating one type of machine, they advance to more complex tasks.

In unionized sawmills, union membership is a condition of employment.

Employment and Advancement

Sawmill machine operators are employed in sawmills and planing mills. The employment turnover rate in many sawmills is low so job openings are relatively infrequent.

Advancement to head sawyer or planer operator positions requires years of experience in other sawmill machine operating positions with the same company. Without further education, advancement opportunities beyond head sawyer or planer operator positions are limited.

Economic and environmental factors, and increasing computerization are expected to continue to have a negative effect on employment demand for sawmill machine operators.

Salary

Hourly wages for sawmill machine operators vary considerably from one employer to another. Some sawmills pay machine operators **about \$8 to \$13.50 an hour**. Union mills pay about **\$16 to \$23 an hour (1996 figures)**. Benefits also vary.

Other Sources of Information

Contacts

*For further information on career planning, occupations and educational programs, contact the nearest **Career Development Centre** or **Canada Alberta Service Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

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Researched and produced in April 1996

Pulpmill Machine Operators

Trades and Technical Occupations

CCDO 8161-178, 182, 254, 354, 8163-118, 182, 8165-130, 8167-142, 338, 8251
NOC 9432

Pulpmill machine operators operate and monitor processing machinery and equipment to produce pulp for use in the production of paper.

Pulpmills use different processes to extract cellulose fibres from wood chips, sawmill residues, and other raw materials. In "Kraft" mills, huge pressure cookers called digesters mix wood chips with soda-based chemicals to break the fibres down into pulp. In "CTMP" mills, a chemithermomechanical (CTMP) process is used.

Pulpmill machine operators' duties and responsibilities vary depending on the type of equipment but, in general, they

- operate and monitor screening equipment, mixing tanks, washers, and other machinery and equipment used in cellulose processing

- observe equipment and machinery panel indicators, gauges, level indicators and other equipment instruments to detect machinery and equipment malfunctions and ensure processing steps are carried out according to specifications
- communicate with the control operator to make process adjustments, and start up or shut down machinery and equipment as required
- collect processing samples and conduct titration tests, pH readings and other routine tests on pulp and solutions
- maintain and complete production reports

Pulpmill machine operators work an average of 40 hours a week in shifts. They work in an environment that is often hot, humid and noisy. Kraft mills are sometimes smelly. Safety shoes, ear plugs and other safety equipment are required to reduce the risk of injury.

Qualifications

Pulpmill machine operators must be able to

- work in a potentially hot, damp and/or dusty environment
- remain flexible about lunch breaks, waiting until operational demands permit time
- remain alert to indications that machines need adjusting, and constantly monitor processes and digital control systems to ensure that quality standards are met
- work well as part of a team

Machine operators working in pulp mills operating on a self-directed work team structure also need the management skills required for activities such as planning and scheduling, budgeting, training and coaching other workers.

The minimum education requirement is a high school diploma. Some employers require a fourth class power engineering certificate. Computer skills, particularly data input, word processing, spread sheet development, and digital/analog outputs for controlling processing equipment, are a definite asset.

Pulpmill machine operators usually start in entry-level labouring positions and progress to higher level positions when they become available.

Union membership may be a condition of employment.

Employment and Advancement

Pulpmill machine operators are employed by pulp and paper companies in mills generally located near forested areas.

Experienced machine operators may advance to pulping control operator positions, but further advancement opportunities are limited.

Although the outlook for the pulp and paper industry is generally favourable, the continuing computerization of pulpmill operations is expected to have a negative impact on employment demand for pulpmill machine operators.

Salary

Hourly wages for pulpmill machine operators range from approximately **\$17 to \$26 an hour (1996 figures)**. Evening and night shift workers may earn more.

Other Sources of Information

Contacts

*For further information on career planning, occupations and educational programs, contact the nearest **Career Development Centre** or **Canada Alberta Service Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

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Researched and produced in April 1996

Sawfiler

Trades and Technical Occupations

CCDO 8319-150

NOC 7383

Sawfilers repair, set and sharpen band saw, chain saw, handsaw, circular saw and other types of saw blades. Circular sawfilers deal with all types of saws except band saws.

Sawfilers and circular sawfilers work in the lumber and wood product manufacturing industries where their services are needed to keep lumber and wood products processing plants operating smoothly.

Sawfilers and circular sawfilers are responsible for the overall maintenance of sawmill blades and knives such as chipper knives. Maintenance of sawfiling equipment is a very important aspect of the job. Sawfilers use hand tools, filing machines and welding equipment to

- sharpen saws
- shape saw teeth for different cutting purposes
- straighten bent saws
- adjust circular and band saw tension

They may also work with millwrights or other personnel to align equipment so lumber is cut straight. The use of computers, sophisticated electronic equipment and lasers is common in this trade.

Sawfilers and circular sawfilers may be required to live and work in remote areas where sawmills are located. They work indoors, usually in a "saw room" or shop. The work is noisy and involves some heavy lifting. They lift loads weighing up to and in excess of 25 kilograms. Sawfilers and circular sawfilers work 40 hours a week plus overtime when required and may have to work shifts.

Qualifications

To be successful in their trade, sawfilers and circular sawfilers need

- good manual dexterity and eye-hand coordination
- good reading, writing and math skills
- mechanical aptitude
- the strength and stamina required to lift heavy saws and equipment
- a willingness to keep up with new developments in saw technology
- dedication to producing a quality product
- patience

Computer skills and programming knowledge are definite assets.

The work is most rewarding for those who enjoy a variety of precision work that requires some creativity.

Sawfilers and circular sawfilers generally acquire their skills through apprenticeship training or learning informally on-the-job. Apprenticeship training is administered by Alberta Apprenticeship and Industry Training. To enter the Sawfiler program or the Circular Sawfiler program, applicants must have at least Grade 9 education or equivalent (or pass an entrance exam), and find an appropriate employer who is willing to hire and train an apprentice. *Employers generally prefer to hire high school graduates and may select apprentices from among their current employees.*

To register, the apprentice and the employer complete an application form together and submit it to the closest Apprenticeship and Industry Training office located at most Alberta Career Development Centres and Canada Alberta Service Centres. Once the application is approved, a contract is drawn up and signed by the apprentice and the employer.

The **term of apprenticeship for sawfilers** is four years (four 12-month periods with a minimum of 1650 hours of employment each). In addition to the on-the-job training, the term also requires four weeks of classroom training for each year. The **term of apprenticeship for circular sawfilers** is three years (three 12-month periods with a minimum of 1650 hours of employment each year). In addition to the on-the-job training, the term also requires four weeks of classroom training for each year. An applicant who has successfully completed related courses of study or work experience, and has the employer's recommendation, can apply for credit toward the apprenticeship.

The **classroom training** is arranged by Alberta Apprenticeship and Industry Training and is currently being offered at the British Columbia Institute of Technology (BCIT) in Burnaby, British Columbia. (On-the-job training is offered in Alberta while classroom training is held in British Columbia). When apprentices attend training, they are required to pay the applicable tuition and purchase course supplies. Human Resources Development Canada may provide income support for apprentices attending classroom training. For more detailed information, contact your local Canada Employment Centre.

After successfully completing the required examinations and hours of employment, an apprentice is awarded a Journeyman Certificate.

Employment and Advancement

Sawfilers and circular sawfilers are employed in the lumber and wood products industries, usually in sawmills and pulp mills. Some employers require their employees to be union members, others do not. Employment prospects for sawfilers and circular sawfilers vary with conditions in the logging industry.

There are limited opportunities for sawfilers and circular sawfilers to advance to supervisory positions. With additional training, sawfilers may transfer their skills to related occupations such as welder, machinist or millwright. Others may be promoted to supervisory positions.

Salary

Apprentice sawfilers earn at least 50 percent of the journeyman wage in their place of employment in the first year, 60 percent in the second, 70 percent in the third, and 85 percent in the fourth year. Apprentice circular sawfilers earn at least 50 percent of the journeyman wage in their place of employment in the first year, 60 percent in the second, and 70 percent in the third year. Journeyman wage rates vary, but generally range from **\$14 to \$22 an hour plus benefits**.

Other Sources of Information

Resource Materials

Books

Armstrong Sawfiler's Handbook by P.S. Quelch. Published by Armstrong Manufacturing Company, Portland, Oregon, U.S.A., 97208.

For further information on career planning, occupations and educational programs, contact the nearest Career Development Centre or Canada Alberta Service Centre (see the "Government of Alberta" listings in the telephone directory) or telephone the Career Information Hotline at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).

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Researched and produced in March 1997

Heavy Equipment Technician

Trades and Technical Occupations
CCDO 8584
NOC 7312

Heavy equipment technicians repair, overhaul and maintain mobile heavy equipment such as highway transport vehicles, construction and earth-moving equipment, tractors and mobile industrial equipment.

Heavy equipment technicians employed by organizations that maintain their own heavy duty equipment (e.g., commercial trucking lines, construction firms, oil, mining and logging companies) usually follow a regular checklist of inspections for preventative maintenance and make any necessary repairs. In general, heavy equipment technicians

- keep equipment cleaned, lubricated and maintained
- diagnose faults or malfunctions
- adjust equipment and repair or replace defective parts, components or systems
- test repaired equipment for proper performance and to ensure that the work done meets manufacturers' specifications and legislated regulations

In large or specialized shops, heavy equipment technicians may specialize in engine overhaul, power shift transmissions, fuel pumps and injectors, hydraulic controls, electrical and electronic equipment, air conditioning, or track equipment.

The working environment for heavy equipment technicians varies considerably from one job to another. Some heavy equipment technicians work in modern laboratories overhauling fuel injection pumps and delivery systems. Others work in construction fields, sometimes in an oily or greasy environment or in inclement weather. Travel requirements and hours of work also vary. There is some risk of injury involved in working with heavy equipment and power tools.

Lifting equipment in excess of 25 kilograms may be required.

Qualifications

To be successful in this trade, heavy equipment technicians need

- good vision, hearing and sense of smell to diagnose problems
- the strength and stamina required to work with heavy equipment and work in cramped or awkward positions
- the ability to work alone or as part of a team
- mechanical ability and an interest in all types of machinery and engines, electronics and precision equipment
- the ability to think logically and keep up with changes in technology

The work is most rewarding for those who enjoy achieving expertise with precise work, problem solving and working with their hands.

In Alberta, the *Apprenticeship and Industry Training Act* requires that anyone working in the trade be a certified journeyman or a registered apprentice. To enter the Heavy Equipment Technician apprenticeship program, applicants must have at least Grade 11 education or equivalent (or pass an entrance exam), and find an appropriate employer who is willing to hire and train an apprentice. *Employers generally prefer to hire high school graduates or technical school graduates and may select apprentices from among their current employees.* Courses in English, mathematics and science are particularly important.

To register, the apprentice and the employer complete an application form together and submit it to the closest Apprenticeship and Industry Training office located at most Alberta Career Development Centres and Canada Alberta Service Centres. Once the application is approved, a contract is signed by the apprentice and the employer.

The **term of apprenticeship** is four years (four 12-month periods with a minimum of 1500 hours of employment each year). In addition to the on-the-job training, the term also requires eight weeks of classroom training for each year. An applicant who has successfully completed related courses of study and work experience, and has the employer's recommendation, can apply for credit toward the apprenticeship.

The **classroom training** is arranged by Alberta Apprenticeship and Industry Training and is currently being offered at the Northern Alberta Institute of Technology (NAIT) in Edmonton, the Southern Alberta Institute of Technology (SAIT) in Calgary, Fairview College, Keyano College in Fort McMurray, Lakeland College in Vermillion, Lethbridge Community College, Olds College, and Red Deer College. When apprentices attend training, they are required to pay the applicable tuition fee and purchase course supplies. Human Resources Development Canada may provide income support for apprentices attending classroom training. For more detailed information, contact your local Canada Employment Centre.

After successfully completing the required examinations and hours of employment, an apprentice is awarded a Journeyman Certificate. Graduate heavy equipment technicians apprentices who pass an approved interprovincial exam qualify for the Interprovincial Red Seal which means their trade qualifications are recognized throughout most of Canada.

Outside of the apprenticeship program, four post-secondary institutions offer related programs:

- Fairview College offers a one year General Mechanic Certificate program
- NAIT offers a two-year Industrial Heavy Equipment Technology program and a one-year Diesel Mechanic Certificate Program
- Red Deer College offers a Pre-Employment Heavy Equipment Technician programs
- SAIT offers a one-year Heavy Equipment Technician program

Admission requirements for these programs vary. Prospective mechanics are advised to talk to employers before choosing a method of training.

Employment and Advancement

Heavy equipment technicians are employed by firms that own or lease heavy equipment used in the construction, mining, forestry, material handling, landscaping, land clearing, farming and transportation industries. In industries that are sensitive to economic changes, heavy duty mechanics may experience periods of unemployment. Overall, employment growth for heavy equipment technicians for the next few years is expected to be average.

Experienced heavy equipment technicians may advance to shop supervisor or service manager positions. With additional training, they can transfer their skills and knowledge to positions in sales or purchasing, positions in planning or preventative maintenance, or related occupations such as aircraft mechanic, farm equipment mechanic, millwright or auto service technician.

Salary

Apprentice heavy equipment technicians earn at least 60 percent of the journeyman wage in their place of employment in the first year, 70 percent in the second, 80 percent in the third, and 90 percent in the fourth year. Journeyman wage rates vary, but generally range from **\$16 to \$28 an hour plus benefits**.

Other Sources of Information

Contacts

Mechanical Programming, Keyano College, 8115 Franklin Avenue, FORT MCMURRAY, Alberta, T9H 2H7.

Northern Alberta Institute of Technology, 11762-106 Street, EDMONTON, Alberta, T5G 2R1.

*For further information on career planning, occupations and educational programs, contact the nearest **Career Development Centre** or **Canada Alberta Service Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

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Researched and produced in March 1997

Environmental Education Specialist

Environmental Occupations
CCDO 2133-130
NOC 4131

Environmental education specialists help create an awareness of the relationship between human activities and the natural environment. They develop and promote strategies that encourage others to make responsible choices regarding consumer decisions, government policies and corporate responsibilities.

Environmental education specialists promote taking responsible actions towards the natural environment. Their duties and responsibilities vary from one position to another in this evolving field but, in general, they

- research specific issues such as consumerism, lifestyle choices, resource development, wildlife management, forestry and water quality
- synthesize environmental information from many sources and make it understandable to others through written articles and presentations
- set up internal programs within business and industry to promote responsible attitudes towards the environment
- teach courses and lead workshops and other programs about issues related to living within and caring for the natural environment
- promote the integration of scientific, social and economic factors in environmental decisions
- produce educational materials for schools, youth groups, communities, field programs and libraries
- interpret natural and human history through field study groups and school programs
- educate the public through newspaper and magazine columns, articles, and radio commentaries
- integrate environmental education into traditional subject areas such as science, social studies, economics, language arts and mathematics
- participate in meetings and conferences with other concerned groups interested in preserving and interpreting the natural environment

Environmental education specialists focus on

- **environmental consumer education**, providing information about consumer goods and services and describing issues that may influence their living and purchasing habits
- **concern for the natural world**, offering nature programs through schools, nature centres, television programs or working with special interest groups (e.g., bird watchers, friends of the environment)
- **responsible actions**, providing information that empowers people to take action for the environment in the work place, at home and at school
- **issues management**, providing people with perspectives from all sides of an issue so their decisions are based on a solid understanding of the scientific, social and economic impacts of the decision

Hours of work for environmental education specialists vary. They may be required to work evenings and weekends.

Environmental education specialists work indoors much of the time. They may visit outdoor worksites or nature centres as part of their research activities, or conduct outdoor presentations to groups. They attend many meetings outside of their offices, and may be required to travel.

Qualifications

Environmental education specialists need the following characteristics:

- strong interpersonal, communication and problem-solving skills
- the analytical skills required to determine what is valid and reliable information
- writing skills for developing education guides, and preparing reports and articles
- the ability to work collaboratively with diverse groups of people
- consulting skills to assess needs and develop potential action plans

This work is most rewarding for those who enjoy helping people and influencing society, and compiling and coordinating information in innovative ways to prepare teaching materials.

Most environmental education specialists have **at least a bachelor's degree** in education, general arts, sciences, social sciences, business, human ecology or environmental science. The University of Alberta (Edmonton), University of Calgary and University of Lethbridge offer undergraduate degrees in many of these fields. Athabasca University also offers arts and science undergraduate degrees. Some employers prefer to hire environmental education specialists who also have valid teaching certificates (for more information, see the Secondary School Teacher occupational profile).

The **University of Alberta** offers Bachelor of Science (B.Sc.) and Master of Science (M.Sc.) degree programs in Human Ecology and in Environmental and Conservation Sciences through the Faculty of Agriculture, Forestry and Home Economics. The admission requirement for the Bachelor degree program in Human Ecology is an Alberta high school diploma with English 30, Math 30, Biology 30 or Chemistry 30, and two other approved 30-level subjects. The admission requirement for the Bachelor degree program in Environmental and Conservation Sciences is an Alberta high school diploma or equivalent with English 30, Math 30, Biology 30, Chemistry 30 and one other approved 30-level subject.

Employment and Advancement

Environmental education specialists work for

- environmental and conservation societies
- naturalist clubs
- outdoor education centres
- heritage and interpretation centres
- school boards
- corporations
- government departments

Some are self-employed consultants who work on a contract basis on specific projects.

There are many volunteer work opportunities with non-profit environmental groups which can provide useful practical experience and important contacts for a job search.

For the foreseeable future in Alberta, the employment outlook in this occupation is expected to be average compared to all other occupations.

Salary

Salaries for full-time environmental education specialists vary, but average about **\$24,000 to \$38,000 a year (1996 figure)**. Annual salaries may be lower for those working for non-profit organizations.

Other Sources of Information

Contacts

Alberta Environmental Protection, Environmental Education, 11 Floor, 9915 108 Street, EDMONTON, Alberta, T5K 2G8.
E-mail address: envedu@env.gov.ab.ca

Chair, Department of Human Ecology, 110 Home Economics Building, University of Alberta, EDMONTON, Alberta, T6G 2M8.
E-mail address: linda.capjack@ualberta.ca
Internet URL: <http://www.ualberta.ca/~hecol/index.htm>

Executive Director, FEESA, An Environmental Education Society, 9 Floor, 10105 100 Street, EDMONTON, Alberta, T5J 0P6.
E-mail address: feesa@telusplanet.net
Internet URL: <http://www.telusplanet.net/public/feesa>

Heritage Appreciation Coordinator, Alberta Environmental Protection/Natural Resources Service, 9820 106 Street, EDMONTON, Alberta, T5K 2J6
E-mail address: bogston@env.gov.ab.ca
Internet URL: <http://www.gov.ab.ca/~onu/index.html>

Professor and Assistant Dean, Coordinator of Faculty Research, Faculty of Education, University of Calgary, 2500 University Drive NW, CALGARY, Alberta, T2N 1N4.
E-mail address: bshapiro@acs.ucalgary.ca

*For further information on career planning, occupations and educational programs, contact the nearest **Career Development Centre** or **Canada Alberta Service Centre** (see the "Government of Alberta" listings in the telephone directory) or telephone the **Career Information Hotline** at 1-800-661-3753 (in Edmonton call 422-4266). Hearing impaired individuals can reach the Hotline by calling 1-800-232-7215 for message relay (in Edmonton call 422-5283).*

*The information contained in this profile was current as of the date shown. **Salaries, employment outlook and educational programs** may change. Please check the information before making any career decisions.*

Researched and produced in April 1997¹

Note: Alberta Environmental Protection, Land and Forest Service, provides descriptions of seasonal employment opportunities similar to the occupational profiles produced by Alberta Advanced Education and Career Development. The Land and Forest Service seasonal employment opportunities are reprinted on the following pages for your convenience.

Seasonal Employment Opportunities

Introduction

Each year the Land and Forest Service employs approximately 1000 seasonal employees. Normally there is a 90% returnee rate, leaving approximately 100 positions available each year for new recruitment. Students and graduates from recognized Forestry Institutes and Universities are usually given first preference for hire, although there are some positions where this is not a prerequisite.

The majority of positions are recruited to one of our four forest regions in the province, with a few positions working out of the Edmonton Head Office.

¹ Occupational Profiles, March 1997. Reproduced with permission from Alberta Advanced Education and Career Development.

The types of forestry jobs available are in the following areas:

- Forest Management Crew Member
- Forest Management Crew Leader
- PSP Crew Member
- PSP Crew Leader
- Forest Guardian
- Recreation Crew Member
- Recreation Crew Leader
- Range Survey Crew Member
- Range Survey Crew Chief
- Aerial Observer
- Fire Lookout
- Rapattack Member
- Rapattack Sub-Leader
- Rapattack Leader
- Initial Attack Unit Member
- Initial Attack Unit Leader
- Airtanker Base Manager
- Loaderman
- Fire Guardian

The following pages will outline in more detail the present pay scale, benefits, and a brief description of the major seasonal positions available.

Seasonal Positions by Functions

Forest Management

- Forest Management Crew Member
- Forest Management Crew Leader
- PSP Crew Member
- PSP Crew Leader
- Forest Guardian
- Recreation Crew Member
- Recreation Crew Foreman
- Range Survey Crew Member
- Range Survey Crew Chief

Forest Protection

- Rapattack Member
- Rapattack Sub-Leader
- Rapattack Leader
- Initial Attack Unit Member
- Initial Attack Unit Leader
- Airtanker Base Manager
- Loaderman
- Fire Guardian
- Aerial Observer
- Fire Lookout

Forest Management Crew Leader

- Responsible for the quantity and quality of work done by his/her 2-person crew. This includes checking the Forest Management Crew Member bearing and diameter measurement; and checking the tally cards for correctness and neatness before handing them to the Field Project Coordinator at the end of the day.
- Organize the daily work so that it may be completed in an efficient, proper, and safe manner; and in accordance with the Field Project Coordinators' instructions.
- Ensure that all the necessary equipment is maintained in good working order and is carried to the job.
- Must be fully trained in the use of standard forest inventory equipment. This includes compasses, topofils, chains, diameter tape, clinometers, increment borers, and angle-wedge prisms.
- Must be able to read and use forest-cover maps and aerial photography.
- Must be able to distinguish the tree species found in Alberta's forests.
- Should have at least one full season's experience as a Forest Management Crew Member.
- Should have a valid emergency first aid certificate.

Forest Management Crew Member

- Responsible, in conjunction with the crew leader, for producing good quality and quantity of work.
- Works in an efficient, proper, and safe manner; and in accordance with the crew leaders instructions.
- Should be capable of and using forest-cover maps and aerial photography.
- Must be capable of using a compass and scale to accurately estimate the locations of plots on the ground from their equivalent map location.
- Must be able to identify the tree species found in Alberta's forests.
- Must be capable of using standard forest inventory equipment such as compasses, topofilis, chains, diameter tapes, and increment borers.
- Should have a valid emergency first aid certificate.

Forest Guardian

General Duties

- To keep the public safe from resource hazards and dangerous activities.
- To emphasize education, awareness, and appreciation of our natural resources and facilities.
- To promote proper care of facilities, resources, and appropriate behaviour, as defined by laws and regulations.
- To minimize conflicts between activities and promote consideration of other user's needs and interests.
- To provide basic tourist information.

In summary, to help visitors spend enjoyable time in the forested areas of Alberta.

Specific Duties

- To establish contact with Forest users and to develop a user awareness.
- To plan and conduct district patrols of Forest Recreation Areas, Forest Recreation Trails, random camping areas, and back country.
- To provide assistance, as required, to district staff, Fish and Wildlife Officers, Provincial Parks Officers, and R.C.M.P. Officers.
- To maintain a professional level of personal appearance and conduct.
- To maintain up-to-date records, surveys, and forms as required by PHQ, the Region, and/or District.
- To serve as a source of assistance to anyone in distress.
- To recognize fire hazard and risk.
- To investigate and action fires within patrol area.
- To assist with or, in the absence of a caretaker, assume caretaking responsibilities.
- To assist district staff in other Forest Service activities as required, including supervision of other staff.

Recreation Crew Foreman

- To supervise the recreation crew in all aspects of their work and administration.
- To liaison closely with the supervising Forest Officer.
- To provide leadership and direction to crewman.
- To ensure tools and equipment is properly maintained.
- To ensure records are kept.

Recreation Crew Member

- To work with District and Region i/c of recreation in providing clean, safe, and functional recreation facilities and opportunities.
- To do the construction, rehabilitation, and landscaping work involved in upgrading and new construction programs.
- To assist in layout of upgrading and new construction work.
- To do major maintenance projects such as painting or removing hazardous trees/limbs.

Range Survey Crew Chief

The Range Survey Crew Chief supervises the crew members. Responsible for the organization and compiling of maps, photos, and background data for areas to be surveyed by the crew. Compiles inventory of forage species and soils and analyses present livestock-management practices. From the data collected throughout the summer, writes the preliminary range management plans.

Range Survey Crew Member

Range surveys are conducted on range allotments within the Rocky Mountain Forest Reserve (Eastern Slopes). The Range Survey Crew Member inventories forage species and soils, analyses present livestock-management practices, identifies potential range-improvement sites, and maps the surveyed sites.

Forest Protection**Fire Lookout**

As a fire lookout person you would be stationed at one of our 130 fire-lookout tower sites which are located throughout the forested area of the province. Your main duty is to spot and report forest fires. Other duties will include taking daily weather readings and providing a communication link with air and ground stations. Applicants must have a minimum of Grade 10 education, be willing to work in isolated locations, physically fit, and in good medical condition with excellent eyesight.

Rapattack Leader (WFUI-R Leader)

As a crew leader you are in charge of a rapattack fire aerial attack unit of seven (7) men and one (1) medium rotary-wing aircraft. The rapattack unit is assigned throughout the province to forest regions based on fire hazard and risk. This unit provides aggressive initial attack on forest fires within its assigned area. The Crew Leader is responsible for crew administration, maintaining fitness standards, organization, training, and must direct firefighting operations of the unit. In low hazard periods the crew will be assigned other project work. Considerable fire and supervisory experience is a necessity.

Rapattack Sub-Leader (WFUI-R Sub-Leader)

Acts as assistant to the Rapattack Leader and fills in during the Crew Leader's absence. The Crew Sub-Leader maintains new training and preparedness levels. Provides supervision and direction in absence of the Crew Leader or in certain field situations. Supervision and previous fire experience is a necessity.

Rapattack Member (WFUI-R Member)

One of five (5) crew members on the rapattack unit and is responsible for maintaining fitness, training standards, and following direction of Sub-Leader and Leader in firefighting or project activities.

Aerial Observer

Works out of the Region or District headquarters and acts as aerial observer in fixed-wing aircraft when patrols are scheduled for fire detection purposes. The aerial observer acts as a supplement to fixed and remote fire-detection systems. The aerial observer often acts in a supporting role in other fire-management or suppression activities in the region or district.

Initial Attack Unit Leader (WFUI Leader)

The initial attack unit is usually stationed at a District headquarters and consists of a four (4)-man fire initial attack unit. The Crew Leader supervises the unit in fire situations or project workloads. Maintains training and physical fitness standards of the unit. When fire hazards dictate, the unit may be assigned a helicopter and moved to field man-up centres in readiness for fire action. These crews often perform various project work in Forest Management functions in addition to their primary role as a rapid initial attack force. Considerable fire experience is a prerequisite.

Initial Attack Unit Member (WFUI Member)

Assigned to a four (4)-man initial attack unit at a District and works under the supervision of the Initial Attack Unit Leader. Maintains training and physical fitness standards as outlined in the initial attack unit manual.

Airtanker Base Manager

Must have had past experience as an Airtanker Base Loaderman and knowledge of fire retardants, airtankers, and procedures. The Airtanker Base Manager is in charge of one of the provinces 15 airtanker bases. Works under the direction of the Forest Protection Officer and is responsible for managing the airtanker base facility, retardant mixing, and loading operations. The airtanker base accommodates one or more airtanker groups. On a fire call the base manager gives direction to the Loaderman and loads the aircraft with fire retardant for rapid initial attack or support to forest fires.

Loaderman

Under the direction of the Airtanker Base Manager assists in the operation and maintenance of the airtanker base. During a fire call the Loaderman performs the loading operation of retardant into the aircraft.

Fire Guardian

Responsible for the issuance of fire permits within a District. Primarily responsible for fire prevention in a settlement area where fire permits are required for brush and debris burning associated with agricultural land clearing. Also assists in fire pre-suppression and fire suppression as required.

Salary & Benefits

Permanent Salary Schedule

Forest Officer I-II	\$13.79/hr-\$16.50/hr
Forester I-II	\$17.43/hr-\$21.42/hr

Seasonal Salary Schedule

Forestry Aide I	Tree Planter	\$11.26/hr-\$13.30/hr
Forestry Aide II	F/M Crew Member Initial Attack Unit Member Rapattack Member Recreation Crew Member Airtanker Base Loaderman	\$12.02/hr-\$14.28/hr
Forestry Aide III	F/M Crew Leader Initial Attack Unit Leader Rapattack Crew Sub-Leader Recreation Crew Leader Fire Guardian Airtanker Base Manager Aerial Observer Small Crew Foreman Forest Guardian	\$12.66/hr-\$15.08/hr
Forestry Aide IV	Rapattack Leader	\$13.09/hr-\$15.59/hr
Lookout	Fire Lookout Person	\$11.64/hr-\$14.28/hr

Benefits

- 6.0% Holiday Pay
- 3.6% Statutory Holiday Pay
- After 1450 hours worked (exclusive of overtime) in a 12-month period—1% holiday pay and six (6) days paid sick leave.
- After 2850 hours worked (exclusive of overtime) in a 24-month period—temporary position and eligible for benefits.

Accommodation and Meals

Bunkhouse

- \$100.00/month

Meals

- \$15.00/day with a cook
- \$8.00/day without a cook

How To Apply

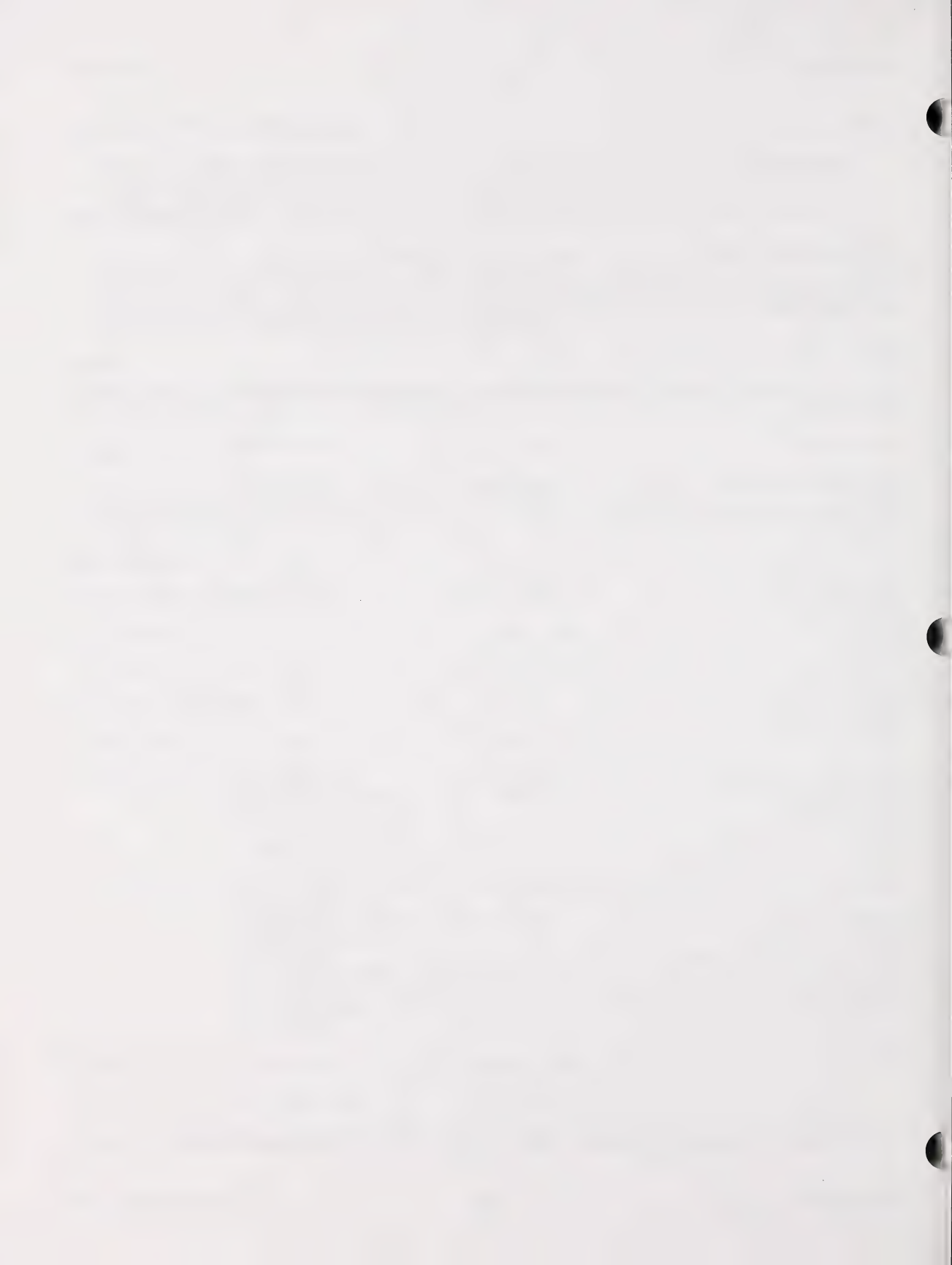
PROSPECTIVE APPLICANTS SHOULD CONTACT OR FORWARD APPLICATIONS NO LATER THAN THE FIRST WEEK IN JANUARY TO:

Regional Address	Contact	Phone Number
Southern East Slopes Region Box 1720 Rocky Mountain House, Alberta T0M 1T0	Andy Gesner Business Officer	845-8250 Fax 845-2645
Northern East Slopes Region c/o Provincial Building 5020 – 52 Avenue Whitecourt, Alberta T7S 1N2	Evert Smith Business Officer	778-7165 Fax 778-6160
Northeast Boreal Region Box 450 Lac La Biche, Alberta T0A 2C0	Business Officer	623-5240 Fax 623-4584
Northwest Boreal Region 2nd Floor, Provincial Building 9621 – 96 Avenue Peace River, Alberta T8S 1T4	Ken McCrae Business Officer	624-6221 Fax 624-5511

RAPATTACK APPLICATIONS SHOULD BE FORWARDED NO LATER THAN NOVEMBER 30 TO:

Land and Forest Service Forest Protection Division 10th Floor, Great West Life Building 9920 – 108 Street Edmonton, Alberta T5K 2M4 ¹	Revie Lieskovsky	427-7925 Fax 422-7230
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¹ Land and Forest Service, *Seasonal Employment Opportunities* (EDMONTON: Alberta Environmental Protection, 1997). Reproduced by permission.



Final Test

Security

Included here is the answer key to the Final Test and the student's copy of the Final Test. Teachers should keep these secure against unauthorized student access. Students should not have access to the test until it is assigned in a supervised situation. The answers should be stored securely and retained by the teacher at all times.

Convenience

The student's copy of the Final Test is designed for photocopying and faxing.

WHY FORESTRY?

FINAL TEST ANSWER KEY

Part A: Matching Definitions (11 marks)

- | | | | | | |
|------|------|------|------|-------|-------|
| 1. d | 3. h | 5. c | 7. g | 9. f | 11. b |
| 2. i | 4. j | 6. e | 8. k | 10. a | |

Part B: True and False (16 marks)

- | | | | |
|----------|----------|-----------|-----------|
| 1. false | 5. true | 9. false | 13. true |
| 2. true | 6. true | 10. false | 14. false |
| 3. false | 7. false | 11. true | 15. true |
| 4. false | 8. true | 12. false | 16. true |

Part C: Label (5 marks)

1. a photosynthesis 2. e transpiration 3. c carbon dioxide 4. b oxygen 5. d absorption

Part D: Matching (4 marks)

1. a Conservationist 2. d Preservationist 3. b Economic Growth 4. c Recreation and Aesthetic

Part E: Chart (10 marks)

The following are possible answers.

Advantages of Increased Forestry	Disadvantages of Increased Forestry
<p>Example: more jobs</p> <ul style="list-style-type: none"> • lower prices for wood-based products • increased exports—good balance of trade • increased tax revenue that supports government programs • more products available to consumers • improves habitat for certain animals such as caribou • improves some recreational opportunities due to logging roads making some forests more accessible • opens up forest for other uses (hunting, agriculture, golf courses, etc.) • better standard of living 	<p>reduced fertility of soil (with no trees, there are no fallen leaves that decay to form the humus for soil)</p> <ul style="list-style-type: none"> • destruction of habitat for most wildlife • desertification may result • increased greenhouse effect—more carbon in atmosphere • less gas exchange, possibly less oxygen in atmosphere • loss of some biodiversity • reduced tourism and recreation if the environment is unattractive • water cycle is disturbed • aesthetically less pleasing • soil erosion • increased pressure to harvest old growth forests • more conflicts with environmentalists and other forestry stakeholders

Part F: Short Answer (9 marks)

1. Answers will vary, possibilities include

- libraries
- Canada Employment Centres
- Career Hotline
- school counsellors
- talking to people with related careers

(3 marks)

2. Answers may vary.

Perspective	Consequence
<ul style="list-style-type: none"> • Environmentalists, conservationists, and preservationists worry about the effect clearcutting has on the quality of water, air, and wildlife habitat. They would ban or severely restrict clearcutting. • Recreation and tourist groups want clearcutting limited because it is less aesthetically pleasing. Tourists don't want to look at clearcuts and neither do campers and hikers. They would limit clearcutting. • The forest industry supports clearcutting because it is economical. It needs to be efficient to stay competitive with the rest of the world. 	<ul style="list-style-type: none"> • It could possibly result in costlier wood products, a slow down in the forest industry, and a loss of jobs. • Same as above. • The status quo would be maintained. However, if current restrictions were lifted, there would possibly be more production, cheaper wood products, and more jobs.

(6 marks)

3. Answers may vary. Changes like not polluting, carrying out all litter, limiting noise production, using fewer mechanized recreation products, going smaller not larger, buying less would make recreation use less harmful to the forest. **(2 marks)**

4. Answers will vary. The following are possibilities.

Career	Description
<ul style="list-style-type: none"> • Faller/Power Saw Operator • Forester/Forestry Scientist • Logging Machinery Operator • Forestry Technician • Forest Technologist 	<ul style="list-style-type: none"> • harvest timber by cutting down trees • plan and supervise reforestation, timber harvesting, advise governments, and educate the public • operate heavy equipment to fell and process trees at logging sites • labour-intensive work such as operating chain saws, surveying, measuring, mapping, and reforestation • day-to-day technical jobs—supervise labourers, public relations work, reforestation, silviculture, report writing, record keeping, inspection of trees for disease, and conducting experiments

(4 marks)

5. Answers will vary.

Trend	Affect on Employment
<ul style="list-style-type: none"> • Changes in technology have resulted in less labour-intensive employment. • There is a need for more research for forestry to be more environmentally friendly. • There is a need for more public relations to appease the public and other countries that forestry is environmentally conscious. • More value-added industries are developing because they have a market and are profitable. 	<ul style="list-style-type: none"> • Workers need to have more education and skills to be employed. • There is an increased need for more researchers, scientists, and technologists. • More people who are able to do public relations work are needed. • More employment in value-added industries such as producing panel board, medium-density fibre board, and oriented-strand board.

(4 marks)

WHY FORESTRY?

FINAL TEST

GENERAL INSTRUCTIONS

YOU HAVE **ONE HOUR TO COMPLETE THIS TEST**. Work through the entire test answering the questions you are sure you know. You will then be able to concentrate on the questions of which you are not quite sure.

TOTAL MARKS: 65

PART A: Matching Definitions 11 marks

PART B: True and False 16 marks

PART C: Label 5 marks

PART D: Matching 4 marks

PART E: Chart 10 marks

PART F: Short Answer 19 marks

Value**PART A: MATCHING DEFINITIONS****11**

Match the following terms with the appropriate definitions. Use the answer sheet at the end of Part A to record your answers.

Terms

- | | |
|----------------------------|-------------------------|
| a. biodiversity | g. transpiration |
| b. silviculture | h. ecosystems |
| c. stumpage fees | i. renewable |
| d. sustainable development | j. annual allowable cut |
| e. photosynthesis | k. clearcutting |
| f. regeneration | |

Definitions

1. development through which the use of a natural resource is in harmony with nature, allowing the resource to renew itself so that it can be used indefinitely
2. a term that describes resources, such as timber, which have the capacity to continue to produce indefinitely if properly managed
3. a term that describes the complex interaction of all living things of a particular environment with each other and their habitat
4. the maximum amount of timber that a forestry company can cut from a particular forest-management unit in a given year without adversely affecting the sustainability of the resource
5. fees paid by forestry companies for permission to engage in logging on Crown land
6. the process by which chlorophyll in plants uses the energy in sunlight to transform carbon dioxide and water into carbohydrates and oxygen
7. the process by which water vapour is released into the atmosphere through the leaves of a plant
8. a tree harvesting method in which all of the trees are removed from an area
9. the renewal of a forest crop by natural or artificial means
10. the variety of plant and animal life
11. the science of growing and managing forests

PART A: RESPONSE PAGE

- | | | | |
|-------|----|-------|-----|
| _____ | 1. | _____ | 7. |
| _____ | 2. | _____ | 8. |
| _____ | 3. | _____ | 9. |
| _____ | 4. | _____ | 10. |
| _____ | 5. | _____ | 11. |
| _____ | 6. | | |

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____

Value

PART B: TRUE AND FALSE

16 Indicate whether each of the following statements is true or false by writing **T** or **F** in the blank beside the statement.

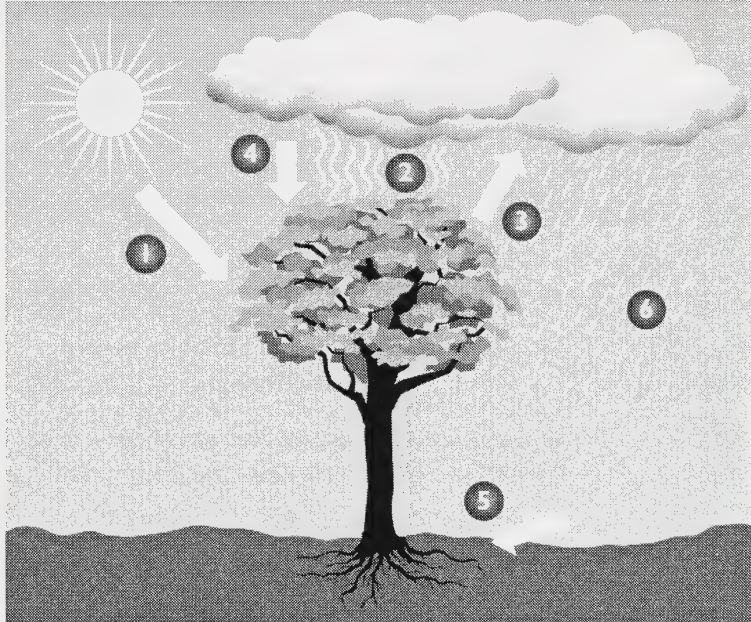
- _____ 1. The early Native Peoples of Canada had a great impact on the forests because they relied so heavily on the forests and their resources for their basic needs.
- _____ 2. Some Native groups still use the forest for traditional hunting, trapping, and gathering activities.
- _____ 3. The boreal forest makes up 3/4 of the world's forests.
- _____ 4. Most early Native groups obtained their food from farming.
- _____ 5. Canada's forests are diverse and contribute substantially to the wealth of Canada.
- _____ 6. One in sixteen Canadians is employed in the forest industry.
- _____ 7. Mining exports are slightly larger than forestry exports in Canada.
- _____ 8. Forestry is an important economic activity in Alberta.
- _____ 9. Tourism is Alberta's number one money-making industry.
- _____ 10. Only concrete has more insulation value than wood.
- _____ 11. Today, there are over 5000 products made from trees.
- _____ 12. Forests grow on 25% of Canada's land base, this represents 5% of the world's total forest land.
- _____ 13. The annual timber harvest equals 0.4% of Canada's productive forest land base.
- _____ 14. Fifty percent of the world's animal species live in the boreal forest.
- _____ 15. A quarter of all medicines come from rain forest plants and animals.
- _____ 16. Values motivate actions and attitudes toward issues.

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____

Value

PART C: LABEL

5 Use the terms from the list to label the following diagram.



Labels

- a. photosynthesis
- b. oxygen
- c. carbon dioxide
- d. absorption
- e. transpiration

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____

Value

PART D: MATCHING

4

Match the following values with the appropriate statements.

- a. Conservationist
- b. Economic Growth
- c. Recreation and Aesthetics
- d. Preservationist

- _____ 1. I would like to save the forests from being damaged and keep the vital functions of the forest operating. I support sustainable development and would support regulating timber harvesting.
- _____ 2. I support an end to global deforestation and a program of ecologically based reforestation. I support sustainable development, but I would like to see most large-scale mechanical timber harvesting stopped.
- _____ 3. I value the forest for providing useful products and for supporting the economy. I support sustainable development, and I believe in harvesting of the forest in the most efficient manner possible.
- _____ 4. I value the beauty and grandeur of the forests and the opportunity for enjoyable pursuits.

Name of Student _____

Student I.D. # _____

Name of School _____

Date _____

Value

PART E: CHART

10

Assume that current forest management practices—including clearcutting—will continue in the future. List **five** advantages and **five** disadvantages of expanding the forest industries in Canada. An example has been done to get you started.

Advantages of Increased Forestry	Disadvantages of Increased Forestry
Example: more jobs	reduced fertility of soil (with no trees, there are no fallen leaves that decay to form the humus for soil)

Name of Student _____ Student I.D. # _____

Name of School _____ Date _____

Value**PART F: SHORT ANSWER****19**

1. List **three** sources of information about careers.

(3 marks)

(6 marks)

2. List **three** forestry stakeholders and describe their perspectives on the clearcutting issue. Then indicate the likely consequence of each perspective.

Perspective	Consequence

(2 marks)

3. Describe how someone could modify their recreation use of the forest to make it less harmful to the forest.

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____

(4 marks)

4. List
- two**
- forestry careers and describe the job of each.

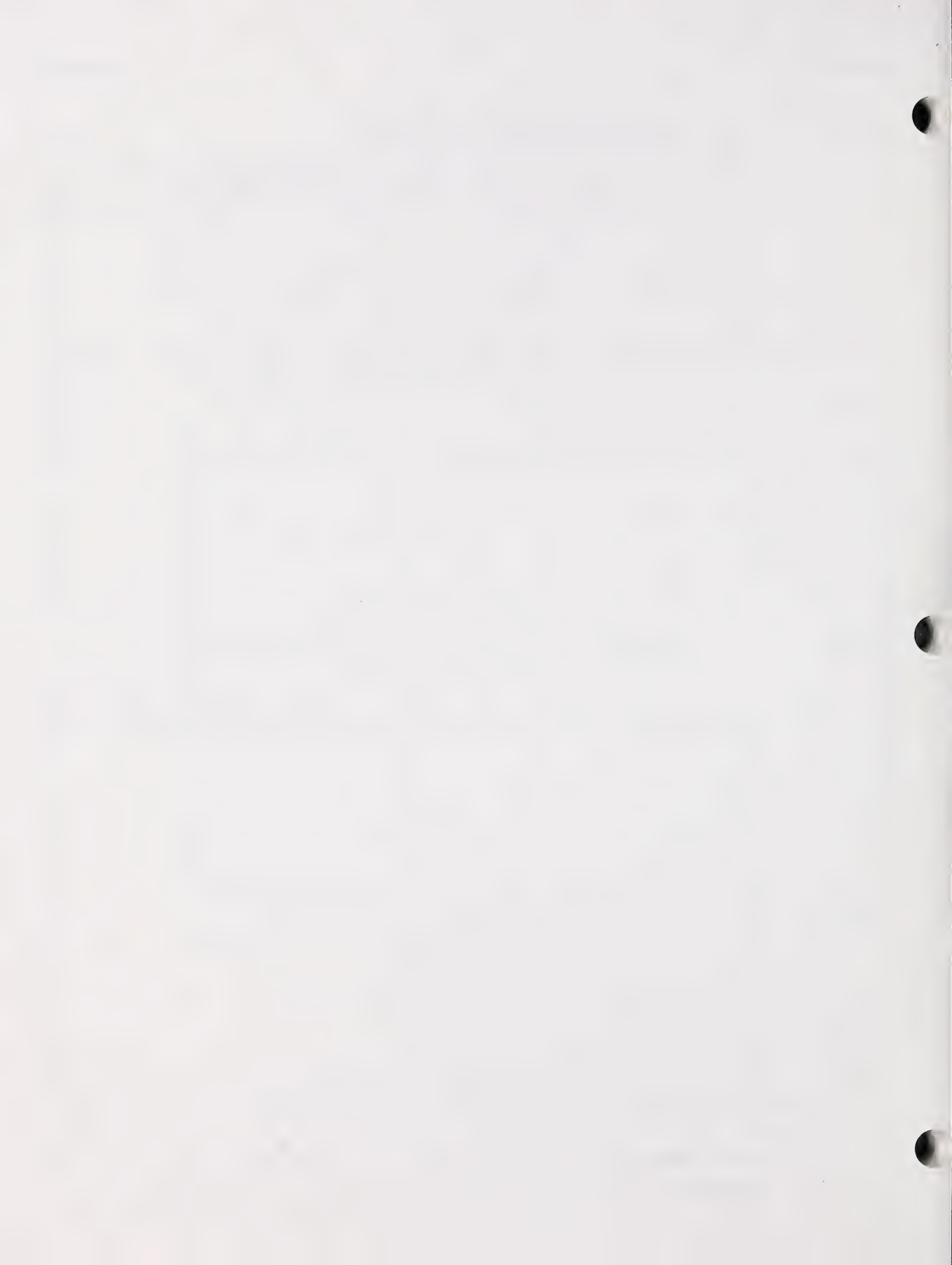
Career	Description

(4 marks)

5. Describe
- two**
- trends in forestry and how they might affect employment.

Trend	Effect on Employment

Name of Student _____	Student I.D. # _____
Name of School _____	Date _____



TEACHER QUESTIONNAIRE FOR WHY FORESTRY? (FOR 1010)

This course is designed in a new distance learning format, so we are interested in your responses. Your constructive comments will be greatly appreciated, as future course revisions can then incorporate any necessary improvements.

Teacher's Name _____ Area of Expertise _____

School Name _____ Date _____

Design

1. The modules follow a definite systematic design. Did you find it easy to follow?

Yes No If no, explain.

2. Did your observations reveal that the students found the design easy to follow?

Yes No If no, explain.

3. Did you find the Learning Facilitator's Manual helpful?

Yes No If no, explain.

4. Part of the design involves stating the objectives in student terms. Did you find this helped the students understand what they were going to learn?

Yes No If no, explain.

5. The Learning Facilitator's Manual contains answers to the questions in the Assignment Booklet and a sample test. Did you find these helpful?

Yes No If no, explain.

6. Did the Follow-up Activities prove to be helpful?

Yes No If no, explain.

7. Were students motivated to try these Follow-up Activities?

Yes No If no, give details.

8. Suggestions for computer and video activities are included in the course. Were your students able to use these activities?

Yes No Comment on the lines below.

9. Were the assignments appropriate?

Yes No If no, give details.

10. Did you fax assignments? Yes No

11. If you did fax, did you get satisfactory results from using this procedure?

Yes No If no, give details.

Instruction

1. Did you find the instruction clear?

Yes No If no, give details.

2. Did your observations reveal that the students found the instruction interesting?

Yes No If no, give details.

3. Did you find the instruction adequate?

Yes No If no, give details.

4. Was the reading level appropriate?

Yes No If no, give details.

5. Was the work load adequate?

Yes No If no, give details.

6. Was the content accurate and current?

Yes No If no, give details.

7. Did the content flow consistently and logically?

Yes No If no, give details.

8. Was the transition between booklets smooth?

Yes No If no, give details.

9. Was the transition between print and media smooth?

Yes No If no, give details.

Additional Comments

Thanks for taking the time to complete this questionnaire.
Your feedback is important to us. Please return this
questionnaire to the address on the right.

Fax Number: 674-6561

Instructional Design and Development
Learning Technologies Branch
Box 4000
Barrhead, Alberta
T7N 1P4

Note: Please ensure that each of your students has completed and forwarded a copy of the Course Survey.



LRDC

Producer

Forestry 1010
Learning Facilitator's
Manual

1997