CAREER & TECHNOLOGY STUDIES

FORESTRY

GUIDE TO STANDARDS AND IMPLEMENTATION

INTERIM 1994

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MAY 1994

Alberta

EDUCATION
CURRICULUM STANDARDS BRANCH

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This document was prepared for:

<i>Administrators</i>	✓
<i>Counsellors</i>	✓
<i>General Audience</i>	
<i>Parents</i>	
<i>Students</i>	
<i>Teachers</i>	✓

Program/Level: Career and Technology Studies/Second

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NOTE: Shaded areas within this document have been approved for optional implementation. Assessment conditions and criteria are in draft form and will be validated 1994-97.

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CAREER AND TECHNOLOGY STUDIES

PROGRAM PHILOSOPHY/RATIONALE

Through Career and Technology Studies (CTS), secondary education in Alberta is responding to the many challenges of modern society, helping young people develop daily living skills, and nurturing a flexible, well-qualified work force.

In Canada's information society, characterized by rapid change in the social and economic environment, students must be confident in their ability to respond to change and successfully meet the challenges they face in their own personal and work lives. In particular, they must make decisions about what they will do when they finish high school. Many students will enter the work force, others will continue their education. All students face the challenges of growing independence and responsibility, and of entering the highly competitive workplace and/or post-secondary programs.

Secondary schools also face challenges. They must deliver, on a consistent basis, high quality, cost-effective programs that students, parents and community find credible and relevant.

CTS helps schools and students meet these challenges. Schools can respond more efficiently and effectively to student and community needs and expectations by using the opportunities in the CTS curriculum to design courses and access school, community and distance learning resources. Students can develop the confidence they need as they move into adult roles by assuming increased responsibility for their learning; cultivating their individual talents,

interests and abilities; and defining and acting on their goals.

As an important component of basic education in Alberta secondary schools, CTS promotes students' achievement by setting clear expectations and recognizing students' success. Students in CTS develop competencies—that is, the knowledge, skills and attitudes students must demonstrate, or what they know and can do.

These competencies can be applied now and in the future as students make a smooth transition into adult roles in the family, community, workplace and/or further education. To help ensure this transition for students, clearly stated expectations and standards have been defined with the assistance of teachers, business and industry representatives and post-secondary educators.

CTS 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.

A career encompasses more than activities related to a person's job or occupation; it involves one's personal life in both local and global contexts; e.g., as a family member, a friend, a community volunteer, a citizen.

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 expand their knowledge about careers, occupations and job opportunities and the education and/or training requirements involved. As well, they will recognize the need for lifelong 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 of and management of the impact the use of the technology may have on themselves, on others and on the environment.

Integrated throughout CTS are employability skills, those basic competencies that help students develop their personal management and social skills. Personal management skills are improved as students take increased responsibility for their learning, design innovative solutions to problems or challenges, and manage resources effectively and efficiently. Students' social skills improve through learning experiences that require them to work effectively with others, demonstrate teamwork and leadership, and maintain high standards in safety and accountability.

Further enhancing the employability skills, CTS reinforces and enhances learnings developed in core and other complementary courses. The curriculum emphasizes, as appropriate, the effective application of communication and numeracy skills.

Finally, in addition to the common outcomes described above, those students who focus on a particular area of study will develop career-specific competencies that support entry into the workplace and/or related post-secondary programs. Career-specific competencies can involve understanding and applying appropriate terminology, processes and technologies related to a specific career, occupation or job.

GENERAL LEARNER EXPECTATIONS

General learner expectations describe the basic competencies that are integrated throughout the CTS program.

Within an applied context that is relevant to personal goals, aptitudes and abilities, the student in Career and Technology Studies will:

- demonstrate the basic knowledge, skills and attitudes necessary for achievement and fulfillment in personal life
- develop an action plan that relates personal interests, abilities and aptitudes to career opportunities and requirements
- use technology effectively, linking and applying available tools, management and processes to produce a desired outcome
- develop personal management skills by:
 - linking theory and practice, using resources, tools, technology and processes responsibly and efficiently (managing learning)
 - applying effective and innovative decision-making and problem-solving strategies in the design, production, marketing and consumption of goods and services (being innovative)
 - selecting relevant, goal-related activities, ranking them in order of importance, allocating necessary time, and preparing and following schedules (managing resources)
- improve social interaction skills by:
 - demonstrating flexibility and cooperative work and communication behaviors (working with others)
 - participating as a team member by working cooperatively with others and contributing to the group with ideas, suggestions and effort (teamwork and leadership)
 - demonstrating high standards of diligence, attendance and punctuality, following safe procedures consistently, and recognizing and eliminating potential hazards (demonstrating responsibility)
- demonstrate appropriate verbal, written, composition, summarization and presentation skills
- use basic computation and measurement principles accurately and efficiently.

PROGRAM ORGANIZATION

CURRICULUM STRUCTURE

Career and Technology Studies is organized into *strands* and *modules*.

Strands in CTS define competencies that help students:

- build daily living skills
- investigate career options
- use technology (managing, processes, tools) effectively and efficiently
- prepare for entry into the workplace and/or related post-secondary programs.

In general, strands relate to selected industry sectors that offer positive occupational opportunities for students. Some occupational opportunities require further education after high school, and some allow direct entry into the workplace. The industry sectors encompass both goods-producing industries, such as agriculture, manufacturing and construction, and service-producing industries, such as business services, health services, and finance and insurance services.

Modules are the building blocks for each strand. They define what a student is expected to know and be able to do (exit-level *competencies*). Modules also specify prerequisites and facility and instructional parameters, where necessary.

The competencies a student must demonstrate to achieve success in a module are defined through the *module learner expectations*. Senior high school students who can demonstrate the module learner expectations (i.e., have the designated competencies) will qualify for one credit towards their high school diploma.

Module learner expectations are a culmination of the *specific learner expectations*, which provide a more detailed framework for instruction. They define the scope and depth of knowledge, skills and attitudes the student should acquire.

The following chart shows the 21 strands that comprise the CTS program and the number of modules available in each strand.

Strand	No. of Modules
1. Agriculture	31
2. Career Transitions	13
3. Communication Technology	32
4. <i>Community Health</i>	25*
5. Construction Technologies	46
6. <i>Cosmetology</i>	64*
7. Design Studies	31
8. <i>Electro-Technologies</i>	33*
9. <i>Energy and Mines</i>	27*
10. Enterprise and Innovation	8
11. <i>Fabrication Studies</i>	39*
12. <i>Fashion Studies</i>	37*
13. Financial Management	15
14. Foods	37
15. Forestry	21
16. Information Processing	43
17. Legal Studies	13
18. <i>Management and Marketing</i>	26*
19. <i>Mechanics</i>	49*
20. Tourism Studies	24
21. Wildlife	17

*Estimate

Note: As of September 1994, 13 of the 21 strands are available for optional implementation in Alberta junior and high schools. The remaining strands, indicated above in italics, will be phased in from September 1995 to September 1996. Provincial implementation of all strands is scheduled for September 1997.

LEVELS OF ACHIEVEMENT

Modules are organized into three levels of achievement: introductory, intermediate and advanced. As students progress through the levels, they will be expected to meet higher standards and demonstrate increased degree of competence, both in the general learner expectations and the module learner expectations.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Intermediate level modules build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

The following illustrates the relative emphasis on the aspects of career planning at each of the levels.

TYPES OF COMPETENCE

Two types of competence are defined within the CTS program: basic and career-specific.

Basic Competencies are generic to any career area and are developed within each module. Basic competencies include:

- personal management; e.g., managing learning, being innovative, ethics, managing resources
- social; e.g., communication, teamwork, leadership and service, and demonstrating responsibility (safety and accountability).

Career-specific Competencies relate to a particular strand. These competencies build daily living skills at the introductory levels and support the smooth transition to the workplace and/or post-secondary programs at the intermediate and advanced levels.

The following model shows the relationship of these two types of competencies within the 21 strands of CTS (numbers refer to the chart on page A.5):

CURRICULUM AND ASSESSMENT STANDARDS

CURRICULUM STANDARDS

Curriculum standards in CTS define what students must know and be able to do. Curriculum standards are expressed through general learner expectations for CTS, and through module and specific learner expectations for each strand.

ASSESSMENT STANDARDS

Assessment standards define how the student's performance will be judged. In CTS, each assessment standard defines the conditions and criteria to be used for assessing the competencies defined in each module learner expectation. Students must fully meet each assessment standard, including all of the criteria and conditions defined for the module. Assessment standards are in draft form, as are tools and weightings, and will be validated 1994-97.

Teachers throughout the province will be able to ensure students receive a fair and reliable assessment. Students will use the assessment standards to guide their efforts, ensuring they participate more effectively and successfully in the learning and assessment process. Standards at advanced levels are as much as possible linked to workplace and post-secondary entry-level requirements.

The following pages describe the Forestry strand in the Career and Technology Studies program.

FORESTRY

STRAND RATIONALE

Forests are a valuable source of natural wealth and cover almost two-thirds of Alberta. The resources found on or beneath these public lands are important to our economic strength and quality of life. Forested lands in Alberta and Canada provide wildlife habitat, vital watersheds, grazing lands, non-renewable resource development sites, outdoor recreation and tourism opportunities, and at the same time support the growth of the forest products industry.

Achieving harmony among these diverse and sometimes competing needs associated with our use of forested lands is a vital and continuous task. Integrated resource management ensures a balanced use of forest resources through public involvement and a team approach.

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

Forestry, a strand in Career and Technology Studies, will provide opportunities for students to learn about the dynamics of a forest ecosystem, as well as the many benefits and opportunities associated with forests. Conservation is viewed throughout the strand as a process for managing human use of the forest environment to ensure such use is sustainable. Students will develop practical knowledge of forest industry practices, and explore issues regarding the integrated and sustainable use of forest resources.

Within the philosophy of Career and Technology Studies, 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. In order to achieve these competencies, *the student 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

Parks Canada and the Canadian Wildlife Service. *The Nature of Canada: A Primer on Spaces and Species*. Ottawa, ON: Environment Canada, 1993.

- describe relationships among production, processing and marketing systems within our forests products industry
- monitor technologies and research programs designed to develop, conserve, protect, enhance and sustain the productivity of forested lands
- translate 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.

Although students are at various stages of cognitive development, many will continue to use concrete operational thinking. Each module in Forestry provides opportunities for students to link concrete and psychomotor learning experiences to more abstract thought processes and levels of thinking. Students will be encouraged to transfer the competencies they have developed in other core and complementary school courses as well as through hobbies, interests and past experiences. As students learn to relate theory and practice in participatory situations, confidence will further their ability to meet personal and professional challenges.

STRAND ORGANIZATION

DEVELOPMENT MODEL

The development model depicts major emphases within the Forestry strand. Three dimensions that provide a basis for selecting and organizing content are represented in the model.

- 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 a different aspect of our use of species and ecosystems. Blended together, the themes enable students to understand our responsibility 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 develop a process for management planning.

SCOPE AND SEQUENCE

FORESTRY

— Prerequisite

---- Recommended prerequisite or corequisite

MODULE DESCRIPTIONS

Module FOR101: Why Forestry?

Students explain the social and environmental significance of forests, describe the impact of individuals on forests, and investigate career paths in forestry.

Module FOR102: Forest Regions of Canada

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

Module FOR104: Woods Survival I

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

Module FOR105: Mapping and Aerial Photography

Students interpret information conveyed through different types of maps and aerial photographs.

Module FOR106: Measuring the Forest I

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

Module FOR109: Basic Forest Ecology

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

Module FOR110: Forests Forever I

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

Module FOR201: Making a Difference in Forestry

Students analyze the impact of lifestyle on forests, and propose individual and shared actions that foster environmental stewardship.

Module FOR203: Managing Alberta's Forested Lands

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

Module FOR204: Woods Survival II

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

Module FOR206: Measuring the Forest II

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

Module FOR207: Harvesting and Forest Products

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

Module FOR210: Forests Forever II

Students explain forest management goals in Alberta, and describe current management practices used to address these goals.

Module FOR212: Users in the Forest

Students identify different users in the forest and explain the planning principles that are used in developing an integrated resource management plan.

Module FOR301: Issues in Forestry

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

Module FOR306: Measuring the Forest III

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

Module FOR307: 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.

Module FOR308: Forest Technology Applications

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

Module FOR309: Advanced Forest Ecology

Students investigate interrelationships among soil, water, air, trees and the environment, and explain how forests change.

Module FOR311: Silviculture: Growing the Forest

Students demonstrate knowledge of the techniques used in establishing, growing and harvesting tree crops.

Module FOR312: Stewardship: 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 or to Grade 9 students. Refer to C.3 and C.4 of this Guide for recommendations regarding the Forestry strand, or the *CTS Manual for Administrators, Counsellors and Teachers* for a summary of the recommended grade levels for each strand.

PLANNING FOR CTS

Defining Courses

Schools determine which strands and modules will be offered in a particular school, and will combine modules into courses.

Each module was designed for approximately 17 to 25 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. Refer to the *CTS Manual for Administrators, Counsellors and Teachers* for more information on course names and course codes.

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

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

The module parameters are defined for each module in Sections D, E and F of this Guide.

Degree of Flexibility

The CTS program, while designed using the modular structure to facilitate flexible time-tabling 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.

Integrating Basic Competencies

Basic competencies are also developed throughout the CTS program and within each module. Selected basic competencies will be emphasized within a module, depending on the nature of the career-specific competencies defined for the module.

Refer to the Assessment Tools section of this Guide for the description of student behaviours expected at each of the three developmental levels defined for the basic competencies.

Assessment of basic competencies could include input and reflection from the student, teacher, peers and workplace supervisors. Description of the observed behaviour could be provided through a competency profile for the module. Positive, ongoing interaction between the student and teacher will support motivation for student growth and improvement.

No mark would be assigned to the student's performance in the designated basic competencies, although a description of the level of performance should be included within the assessment of each module.

Assessing Student Achievement

Assessing the student's competency is a process of gathering information by way of observations of process, product and student interaction.

Where appropriate, assessment tools have been defined to assist the teacher and student in the assessment. Refer to the Assessment Tools section of this Guide to Standards and Implementation for copies of the various tools (worksheets, checklists, sample questions, etc.).

The relative weighting, or emphasis, for each assessment standard has also been established. The weighting is a guideline to help teachers determine a percentage grade for students.

Recognizing Student Achievement

At the high school level, successful demonstration of the exit-level competencies in a module qualifies the student for one credit. Refer to Section A of this Guide for more detailed information about how curriculum and assessment standards are defined in CTS. Refer to the *CTS Manual for Administrators, Counsellors and Teachers* for more information on how student achievement can be recognized and reported at the school and provincial levels.

Resources

A comprehensive resource base, including print, software and audio-visual, has been identified to support the Forestry strand. It is intended that these resources will form the basis of a resource centre, encouraging teachers and students to access a wide selection of resources and other information sources throughout the learning process. Unless otherwise noted, these resources are considered to be suitable for both junior and senior high school students.

Authorized resources may be obtained from the Learning Resources Distributing Centre or directly from the publisher or distributor. Refer to Section I of this Guide for the complete resource list including curriculum correlations and resource annotations. Additional sources refer to non-commercial or government agencies that offer resources that may be of assistance in this strand.

In addition to the resources, sample Student Learning Guides are available. These samples, designed for individual student or small group use, provide an instructional plan for selected modules and include the following components:

- Why take this module?
- What are the entry-level competencies?
- What are the exit-level competencies?
- What resources may be accessed?
- What assignments/activities must be completed?
- What are the time lines?
- How will the final mark be calculated?

Sample Student Learning Guides have been developed for the following modules in Forestry:

- Forest Regions of Canada
- Woods Survival I
- Woods Survival II
- Basic Forest Ecology
- Advanced Forest Ecology.

Copies of these sample learning guides can be obtained, by request, from the CTS Unit in print and/or disk format (Microsoft Word).

2. PLANNING FOR FORESTRY

The following suggestions are provided to assist teachers and school and school system administrators as they plan to deliver modules from the Forestry strand.

Selecting Modules

The scope and sequence chart, page B.5, provides an overview of the Forestry modules, indicating prerequisites and theme areas. Brief descriptions of the modules are on pages B.6 and B.7.

Course planning should take into consideration module sequences that link with both physical and human resources present in the school and community. Although not required, it is recommended that FOR101: Why Forestry? be a prerequisite/corequisite to all modules in the Forestry strand.

Two sample courses, based on introductory level modules and designed to be delivered to junior high school students, are outlined below.

Sample A: 50 hours of instruction

COURSE EMPHASIS
Introduction to Forestry
MODULES
Why Forestry? (FOR101) Forest Regions of Canada (FOR102)
RATIONALE/KEY LEARNINGS
Students examine the economic, environmental and social significance of forests, describe the impact of individuals on forests, and conduct research on forest regions of Canada.
The course complements the junior high science and social studies programs, and can be linked with other CTS strands including Tourism and Wildlife.

Sample B: 75 hours of instruction

COURSE EMPHASIS
Personal/Recreational Use of Forests
MODULES
Basic Forest Ecology (FOR109) Woods Survival I (FOR104) Making a Difference in Forestry (FOR201)
RATIONALE/KEY LEARNINGS
Students investigate the structure and functioning of forest ecosystems, develop basic skills required for responsible participation in a range of outdoor forest activities, and propose individual and shared actions that foster environmental stewardship.
The course complements the junior high core science program and complementary Environmental and Outdoor Education program, and can be linked with other CTS strands including Tourism and Wildlife.

Three sample courses, based on intermediate and advanced level modules and designed to be delivered to senior high school students, are as follows:

Sample C: 75 hours of instruction

COURSE EMPHASIS
Forest Inventory (assuming junior high transition)
MODULES
Measuring the Forest II (FOR206) Measuring the Forest III (FOR306) Forest Technology Applications (FOR308)
RATIONALE/KEY LEARNINGS
Students demonstrate appropriate strategies for sampling fibre and non-fibre values of the forest, explain management applications of data collected from a forest survey, and research applications of technology in forest inventory practices. This course can be linked with other CTS strands including Agriculture, Career Transitions, Information Processing, Tourism and Wildlife.

Sample D: 100 hours of instruction

COURSE EMPHASIS
Silviculture and Forest Harvest (assuming junior high transition)
MODULES
Advanced Forest Ecology (FOR309) Silviculture: Growing the Forest (FOR311) Harvesting and Forest Products (FOR207) The Forest Marketplace (FOR307)
RATIONALE/KEY LEARNINGS
Students investigate relationships among soil, water, air, trees and the environment, demonstrate techniques in establishing, growing, harvesting and processing tree crops, and research the production and marketing of forest products in Canada. The course can be linked with other CTS strands including Career Transitions, Management and Marketing, Mechanics and Wildlife.

Sample E: 125 hours of instruction

COURSE EMPHASIS
Forest Management (assuming junior high transition)
MODULES
Managing Alberta's Forested Lands (FOR203) Forests Forever II (FOR210) Users in the Forest (FOR 212) Issues in Forestry (FOR301) Stewardship: Balancing Needs (FOR312)
RATIONALE/KEY LEARNINGS
Students research the goals of forest management, and agencies/frameworks used to manage forested lands in Alberta. The module focuses attention on different users in the forest, the planning principles involved in integrated resource management, and individual/shared actions that foster environmental stewardship. This course can be linked with other CTS strands including Agriculture, Career Transitions, Energy and Mines, Legal Studies, Tourism and Wildlife.

Planning for Instruction

A "learn by doing" approach to instruction is recommended for the Forestry strand. Essentially, the teacher's role will become that of guide and partner in the learning process. The "learn by doing" approach requires the teacher to be facilitator and coach, rather than subject-based expert, as students actively participate in learning by doing and discovering.

Small group instruction is a good way to foster learning by doing and discovering. Small groups enable students to be active participants in learning, and develop independent and responsible learning habits. As students work in small group situations they will share information, solve problems, develop consensus, and help each other learn content and processes.

The community is a major stakeholder in education and can be an effective partner in the learning process. The use of community members and resources should be integrated into plans for instruction. Business, industry and government agencies offer a wide range of services and resources, as do local clubs, service groups and institutions. When planning for the use of community resources, teachers should ensure that related presentations and/or activities:

- are consistent with student knowledge and skill levels
- demonstrate sound pedagogy
- are exemplary of approved health and safety standards
- provide a balanced approach to curriculum topics and related issues.

Plans for instruction must address both economic and environmental aspects of forestry. Provide opportunities for students to become involved in learning experiences that reflect a broad understanding of related issues and concerns. Presentations of course content that reflect a singular or narrow view of economic or environmental concerns are not consistent with learner expectations and must be avoided. For clarification of policy in this regard, refer to Alberta Education's Policy on Controversial Issues located in the *Alberta Education Policy Manual* (1989).

As in all CTS strands, students will identify, explore and prepare for future career opportunities. It is recommended that course planning include the integration of relevant career investigations throughout each module, rather than as a singular or isolated study. Career profiles and interviews will acquaint students with the many technical and professional careers associated with the forest industry.

Addressing Safety in Off-Campus Excursions

Outdoor trips and field excursions are recommended and should be an important part of teaching and learning throughout the Forestry strand. Safety must be a prime consideration in planning off-campus learning experiences. Both teachers and students should engage in activities

at their level of training and ability. Adequate instructional support, guidance and supervision must be provided at all times. Local jurisdiction and school policies must be understood by principals, teachers, parents, supervisors and students.

Preparation and Risk Anticipation

The preparation stage is the most important part of any off-campus excursion. At this stage of planning, potential risks can be anticipated and either avoided or moderated. The preparation stage should focus attention on:

- trip administration, including the use of parental permission forms, health information forms, school/system authorization forms and accident report forms
- a review of laws and regulations relevant to the excursion and activities that will be undertaken
- study of the area in which the trip is being conducted, and the identification of potential hazards and risks
- group size and the level of supervision that will be required (i.e., supervisor/student ratio)
- a briefing of parents, school administrators, park authorities or others who should be informed in the event of an accident regarding itineraries, participants and emergency response plans
- pre-trip logistics, including transportation, equipment, facility and departure date considerations
- student preparation, including background knowledge and experience, medical problems and/or needs, mental and physical preparedness, and training in specific skill areas.

On-Site Risk Management

Safety and risk management involves exercising situation-specific judgment throughout the course of an off-campus excursion. Judgment is the product of experience, and may include recognizing factors such as deteriorating weather, a decline in physical strength, or a more challenging task. Many of the hazard recognition skills can be taught in the classroom in the preparation stage.

A significant aspect of on-site risk management is group management. Teachers can exercise appropriate group management strategies by focusing attention on:

- pacing, including speed of travel, rest stops, distance travelled and fitness level of students
- group control, including position of leader, regrouping procedures, signal systems and buddy systems
- the establishment of group rules and norms
- clearly defined task allocations for each student
- objective hazard recognition in the field, including weather, terrain, flora and fauna
- subjective hazard recognition in the field, including hazard recognition in the field, including level of group energy and level of cooperation.

Emergency Response

If students have been well prepared for an off-campus excursion and appropriate group management strategies exercised, the teacher will have maximized opportunities for effective response to an emergency situation. An effective emergency response action plan should include considerations of:

- a suitable approach to the accident site
- first-aid supplies and techniques
- a strategy for signalling assistance
- an evacuation plan
- external assistance procedures
- group management throughout the emergency situation.

Identifying Linkages

Section H of this Guide describes linkages within CTS and with core and complementary programs.

Note that project modules from the Career Transitions strand may be combined with modules from Forestry to provide increased opportunity for students to develop expertise and refine their competencies.

Improving Smooth Transitions to the Workplace and/or Post-secondary Programs

Refer to Section H of this Guide for potential transitions students may make into the workplace and/or related post-secondary programs or other avenues for further learning.

MODULE CURRICULUM AND ASSESSMENT STANDARDS

INTRODUCTORY LEVEL

The following pages define the curriculum and assessment standards for the introductory level of Forestry.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Module learner expectations define the competencies a student must demonstrate to achieve success in a module. Assessment standards define the conditions and criteria to be used for assessing the competencies defined in the module learner expectations. These assessment standards and the accompanying assessment tools are in draft form and will be validated from 1994 to 1996.

Specific learner expectations provide a detailed framework for instruction and help students build the competencies defined in the module learner expectations. Additional information and suggestions for instruction are provided in the Notes column; teachers may wish to use this space to record their ideas for instruction or student projects.

Module FOR101:	Why Forestry?	D.3
Module FOR102:	Forest Regions of Canada	D.7
Module FOR104:	Woods Survival I	D.9
Module FOR105:	Mapping and Aerial Photography	D.13
Module FOR106:	Measuring the Forest I	D.17
Module FOR109:	Basic Forest Ecology	D.21
Module FOR110:	Forests Forever I	D.25

MODULE FOR101: WHY FORESTRY?**Level:** Introductory**Theme:** Social and Cultural Perspectives**Prerequisite:** None**Module Parameters:** Access to government, industry and community resources

Students explain the social and environmental significance of forests, describe the impact of individuals on forests, and investigate career paths in forestry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● explain the social, cultural, economic and environmental significance of forests	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● a historical account of the social and cultural significance of forestry. Account to include information on recreational, spiritual, aesthetic, medicinal and community significance● a list of six ways in which local forests (regional or provincial) have economic and/or environmental significance at local, national and global levels. Students to address direct and indirect employment, product export, tourism, subsistence and tax base● a report on forest products, by-products, goods and services. Report to address some of the lesser known aspects of forest use, including movie film, sausage casing, plastics, paint, floor cleaner and methanol	40
<ul style="list-style-type: none">● describe the impact of individual needs, wants and beliefs on the forest resource	<ul style="list-style-type: none">● reflection and debate on at least five ways that individual attitudes, consumerism, personal actions and lifestyles affect the forest resource. Debate to address conservation and preservation ethics, consumer practices, recreational choices, mass media hype and the use of environmentally friendly products <i>Assessment Tools (to be developed)</i> <i>Debate, Appendix 1.1</i>	30
<ul style="list-style-type: none">● research potential career paths in forestry	<ul style="list-style-type: none">● a report on two career paths in forestry. Report to address:<ul style="list-style-type: none">- nature of the work- entry requirements- training opportunities- predicted employment market- the results of personal interviews	30

MODULE FOR101: WHY FORESTRY? (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning communication teamwork, leadership and service. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Forest Role	<p><i>The student should:</i></p> <ul style="list-style-type: none"> present a historical perspective on the social and cultural significance of forests; e.g., <ul style="list-style-type: none"> recreational spiritual/aesthetic medicinal community dependence describe the economic significance of forests at local, national and global levels; e.g., <ul style="list-style-type: none"> direct and indirect employment forest products and export values tourism subsistence tax base describe the environmental significance of forests at local, national and global levels; e.g., <ul style="list-style-type: none"> wildlife and fisheries habitat watershed protection and maintenance water, air and soil quality maintenance of ecosystems climate change. 	<p>Interview people for whom the forest has a historical significance (e.g., seniors within the community, aboriginal peoples).</p> <p>Monitor the performance of forest industry in the stock market.</p> <p>Interview local industry representatives.</p> <p>Contact Forestry, Canada for current resource materials (ph. 435-7210).</p> <p>See <i>Alberta's Focus on Forests</i> (Activity 4.2- Products From Canadian Forests).</p>

MODULE FOR101: WHY FORESTRY? (continued)

Concept	Specific Learner Expectations	Notes
Personal Impact	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe the impact of individual attitudes, actions and lifestyle on the forest resource; e.g., <ul style="list-style-type: none"> conservation ethic preservation ethic consumer practices recreational patterns describe how consumer and marketing trends in society may affect the forest resource; e.g., <ul style="list-style-type: none"> needs versus wants mass media hype use of environmental friendly products propose personal strategies for using forests wisely that foster the attainment of social, cultural, economic and environmental goals; e.g., <ul style="list-style-type: none"> personal actions leadership roles. 	<p>Prepare an inventory of household materials used each day. How many of these materials are derived from the forest resource?</p> <p>Distinguish between wants and needs. Analyze the impact of advertisements on television.</p> <p>Debate a controversial issue.</p>
Career Paths	<ul style="list-style-type: none"> research career clusters and the range of occupational opportunities within the forestry sector; e.g., <ul style="list-style-type: none"> forest resource inventory forest biology/ecology forest resource protection forest products industry forest resource management forest recreation forest education gather employment statistics within one or more career clusters; e.g., <ul style="list-style-type: none"> types of careers number of workers employment trends infer career opportunities and trends from employment statistics infer impacts of the marketplace on employment opportunities consider possible forest industries in the future, and resulting career opportunities. 	<p>Interview people employed in the forestry sector. Determine general areas of specialization.</p> <p>Contact the "Career Hotline" (telephone 1-800-661-3753).</p> <p>Review National and provincial Occupational Profiles (NOC and POP).</p> <p>Contact senior management people in the forest industry; also producers of value-added products.</p>

MODULE FOR102: FOREST REGIONS OF CANADA

Level: **Introductory**

Theme: Social and Cultural Perspectives

Prerequisite: Knowledge of geographic regions of Canada (Recommended)

Module Parameters: Access to government and library resources

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> ● identify factors that determine the type and distribution of forests 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> ● conducting laboratory and/or field investigations to determine the effect of temperature, moisture or soil on plant growth. <p><i>Assessment Tool</i> <i>Investigating Terrestrial Ecosystems, LRDC Lab Investigations, FOR102-1</i></p>	20
<ul style="list-style-type: none"> ● locate and describe the forest regions of Canada 	<ul style="list-style-type: none"> ● preparing and presenting a report that explains how climate and land form determine growth and distribution of forests. <p><i>Assessment Tool</i> <i>Presentations/Reports, FOR102-2</i></p>	10
<ul style="list-style-type: none"> ● identify and describe trees that grow in specific regions of Canada and Alberta 	<ul style="list-style-type: none"> ● given outline maps of Canada and Alberta, locating and describing: <ul style="list-style-type: none"> – the eight forest regions of Canada and three forest regions present in Alberta – major tree species within each forest region. <p><i>Assessment Tool</i> <i>Sample Map: Forest Regions of Canada (to be developed)</i> <i>Sample Map: Forest Regions of Alberta (to be developed)</i></p>	30
	<ul style="list-style-type: none"> ● given access to actual (or photographed) tree, shrub and/or plant species within a forest region of Canada, preparing (following museum conservation rules) a leaf or twig collection including at least 20 native species. Each species to be identified using common and scientific names. 	40

MODULE FOR102: FOREST REGIONS OF CANADA (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> ● demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <p>(At least 50% of the species identified and collected to be trees. If photographs are used in place of actual specimens, collection to include both closeup and full-view photos of each species.)</p> <p><i>Assessment Tool</i> <i>Native Trees of Canada, LRDC</i> <i>Museum Conservation Rules for Leaf/Twig Collection, FOR102-3</i></p> <ul style="list-style-type: none"> ● observations of individual effort and interpersonal interaction during the instructional period, with emphasis on: <ul style="list-style-type: none"> - locating appropriate information sources and applying a variety of learning skills - preparing and presenting accurate written, visual and/or oral reports - following safe laboratory procedures and eliminating potential hazards. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

MODULE FOR102: FOREST REGIONS OF CANADA (continued)

Concept	Specific Learner Expectations	Notes
Determining Factors	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● identify factors that enhance the development of forests and determine the distribution of living organisms within forest regions; e.g., <ul style="list-style-type: none"> - land form - climate ● describe relationships between climatic factors and the growth of trees; e.g., <ul style="list-style-type: none"> - temperature - moisture ● describe relationships between land forms and the distribution of forests; e.g., <ul style="list-style-type: none"> - topography - soil conditions ● suggest reasons for the distribution of trees in natural regions in Canada and Alberta. 	<p>Suggested resource: <i>Forest Regions of Canada</i> (Rowe, 1972).</p> <p>Perform a lab that demonstrates the effect of moisture on tree growth.</p> <p>Using a local map, indicate heavy concentrations of particular tree species. Suggest reasons for the distributions noted.</p>
Forest Regions	<ul style="list-style-type: none"> ● locate and describe the eight forest regions of Canada; e.g., <ul style="list-style-type: none"> - Boreal - Subalpine - Montane - Coast - Columbia - Deciduous - Great Lakes/St. Lawrence - Acadian ● read, interpret and create visual representations of species distribution in Canada and Alberta. 	<p>See <i>Alberta's Focus on Forests</i> (Activity 4.1- Trees of Alberta and Canada).</p> <p>Resources available from Canada Forestry Service include:</p> <ul style="list-style-type: none"> ● <i>Forest Regions of Canada</i> ● <i>Native Trees of Canada</i>. <p>Match common trees with their respective locations.</p> <p>Mapping exercises.</p>
Tree Identification	<ul style="list-style-type: none"> ● identify common trees and other plants that grow in specific regions of Canada and Alberta; e.g., <ul style="list-style-type: none"> - tree and shrub identification - non-woody plant identification ● prepare a display of details that help to identify local trees, shrubs and non-woody plants; e.g., <ul style="list-style-type: none"> - leaves - flowers/cones - twigs - bark. 	<p>Conduct field trips to locate and identify trees on-site.</p> <p>Use a key to assist in the identification of tree species.</p> <p>Leaf and twig collections.</p>

MODULE FOR104: WOODS SURVIVAL I**Level:** Introductory**Theme:** Social and Cultural Perspectives**Prerequisite/****Corequisite:** Current certification in Emergency First Aid

Module Parameters: Access to an outdoor forest environment and gear for outdoor expeditions; instructor must have current personal certification in Standard First Aid (St. John Ambulance)

Information regarding student safety and instructor certification is provided in Sections C and H of this Guide to Standards and Implementation.

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none">● demonstrate knowledge, skills and attitudes that are necessary for safe and comfortable outdoor experiences in the forest	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none">● identifying at least five physical hazards that may be imposed by a forest environment, and appropriate steps to take in avoiding/preventing and responding/dealing with each hazard● given access to a test bank on questions dealing with hypothermia, frostbite, fatigue, dehydration and fear in the outdoors, correctly responding to 15 out of 20 randomly selected test items● planning and assembling gear for a three-day trip in the outdoors. <p><i>Assessment Tool</i> <i>Sample Test Items: Woods Survival I, FOR104-1</i> <i>Task Checklist: Woods Survival I, FOR104-2</i> <i>JFW Green Tree Trailblazer Leader Manual — Woodstravel, LRDC</i></p>	20

MODULE FOR104: WOODS SURVIVAL I (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> participate in a range of outdoor forest activities that have minimal impact on the forest resource 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> safely using and maintaining outdoor tools and equipment, including knives, axes, saws, shovels, stoves and lanterns safely building and using outdoor fires demonstrating techniques for safely constructing a fallen tree shelter, lean-to shelter, snow cave shelter or other type of shelter demonstrating techniques for addressing hygiene and sanitation while in the outdoors packing and transporting gear required for a three-day trip in the outdoors. Transportation to be by human conveyance (e.g., backpack, sled) summative reflection (oral and/or written) on outdoor experiences, addressing individual and group preparedness, cooperation, responsibility and environmental ethics. <p><i>Assessment Tool</i> <i>Task Checklist: Woods Survival I, FOR104-2</i> <i>Reflection Guide for Outdoor Experiences, FOR104-3</i></p>	80
<ul style="list-style-type: none"> demonstrate effort to develop basic competencies. 	<ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> identifying appropriate ethical behaviour allocating time, materials and other resources participating as an effective team member following safe procedures and avoiding hazards. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	Integrated throughout

MODULE FOR104: WOODS SURVIVAL I (continued)

Concept	Specific Learner Expectations	Notes
Outdoor Survival Skills	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● identify, assess, avoid and/or respond to physical hazards that may be imposed by the forest environment; e.g., <ul style="list-style-type: none"> - particular terrain and conditions, including avalanche, lake and river ice, and bush travel - wildlife that may be encountered, including bears, bees, ticks, non-edible plants - changes in weather conditions that may affect personal and group safety ● identify, assess, avoid and/or respond to physiological and psychological factors often associated with outdoor experiences in the forest; e.g., <ul style="list-style-type: none"> - dealing with hypothermia, frostbite and dehydration. - understanding fatigue and when not to move - coping with adversities, such as getting lost or hurt ● list and explain necessary steps to take in emergency and survival situations in the forest; e.g., <ul style="list-style-type: none"> - what to do if lost or separated from the group - first aid and emergency response to injury - construction of emergency shelters - how to gather food from edible plants - en route organizational strategies, including lead and sweep, regrouping procedures, pacing ● select appropriate personal and group gear for outdoor forest activities; e.g., <ul style="list-style-type: none"> - personal gear, with consideration to maintaining body temperature and protection from injury - group gear, to meet requirements for food, shelter, travel and emergencies ● demonstrate safe use and appropriate care of outdoor hand tools, including knives, axes and saws ● demonstrate safe procedures for building and using outdoor fires; e.g., <ul style="list-style-type: none"> - signalling - warming - cooking 	<p>Forest hazards to be aware of:</p> <ul style="list-style-type: none"> ● dead-topped trees ● bees ● poisonous plants ● other wildlife ● unfamiliar waters ● forest fires. <p>View films and slide shows of forest expeditions that involve physical hazards.</p> <p>Invite guest speakers/ community resource persons to present information and advice on expeditions in the forest.</p> <p>Potential linkages with "Wilderness First Aid" certification course (Canadian Red Cross).</p> <p>Determine appropriate first-aid supplies.</p> <p>Engage students in simulation activities, role-playing and case studies.</p> <p>Review basic first aid and involve students in emergency response situations.</p> <p>Have students present a "fashion show" or produce a video that demonstrates appropriate equipment and its use.</p> <p>Conduct an equipment maintenance clinic.</p> <p>Practise fire building techniques—then plan and carry out a school yard "cookout".</p>

MODULE FOR104: WOODS SURVIVAL I (continued)

Concept	Specific Learner Expectations	Notes
Outdoor Survival Skills (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● explain techniques used to plan, pack, carry and prepare foods during outdoor forest expeditions; e.g., <ul style="list-style-type: none"> - nutritional requirements - portability and preservation factors - food preparation techniques - safe use of campfires ● explain techniques required for maintaining hygiene during outdoor forest expeditions; e.g., <ul style="list-style-type: none"> - water purification - personal cleanliness - group hygiene. 	<p>Involve students in menu planning for a hypothetical or proposed field trip.</p> <p>Invite guest speakers from a health department or from national/provincial parks.</p>
Forest Expeditions	<ul style="list-style-type: none"> ● plan and conduct safe outdoor expeditions in the forest; e.g., <ul style="list-style-type: none"> - research information from a variety of sources, including maps, aerial photographs, guidebooks, journals and local experts - interpret route information by selecting reasonable destinations, estimating travel time and anticipating obstacles - apply knowledge and skills while en route, including map reading and compass skills, knowledge of terrain and route selection, and mapping of key landmarks and directions ● use different modes of travel to confidently participate in a variety of forest activities; e.g., <ul style="list-style-type: none"> - snowshoes, skis, walking staff and canoe - hiking, backpacking, cross-country skiing, canoeing and bird-watching ● acquire and apply minimal impact skills while participating in outdoor forest expeditions; e.g., <ul style="list-style-type: none"> - proper trail use, including the avoidance of trail widening - campsite care, including the use of fires and stoves, tent site selection, and firewood selection - waste disposal techniques, including latrines, waste water disposal and garbage. 	<p>Examine maps, research books, reference materials, etc., on particular field sites to be visited.</p> <p>Access alternative routes with regard to time and preparation required for each.</p> <p>Conduct map reading and basic orienteering exercises in school yard.</p> <p>Plan and implement a sequence of skill development activities with a follow-up excursion.</p> <p>Discuss principles of "ecotourism". Consider carrying capacity of a forested area in relation to minimum environmental impact.</p> <p>Set up a model campsite in the school yard or a local park.</p>

MODULE FOR106: MEASURING THE FOREST I**Level:** Introductory**Theme:** Technology and Applications**Prerequisite****Corequisite:** Mapping and Aerial Photography (FOR105; Recommended)**Module Parameters:** Demonstration forest and measurement tools

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none">● explain the general goals and techniques of conducting a forest survey	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● preparing and presenting a report on forest surveys that describes:<ul style="list-style-type: none">– reasons for conducting forest surveys– techniques used to sample a forested area– how sample data is used to estimate forest populations. <i>Assessment Tool</i> <i>Presentations/Reports, FOR106-1</i>	10
<ul style="list-style-type: none">● demonstrate basic compass and measurement skills used in forest inventory practices	<ul style="list-style-type: none">● using a compass in the outdoors to orient a map, obtain a bearing, and perform a closed traverse (error in closure no greater than 5% of perimeter distance). <i>Assessment Tool</i> <i>Task Checklist: Orienteering, FOR106-2</i> <ul style="list-style-type: none">● given access to a plot of forested land, measuring chain, diameter tape, clinometer and increment borer, measuring (accurate to within 5%):<ul style="list-style-type: none">– horizontal distances up to 25 metres– the diameter of 10 trees– the height of 10 trees– the age of 10 trees. <i>Assessment Tool</i> <i>Task Checklist: Forest Measurement, FOR106-3</i>	70

MODULE FOR106: MEASURING THE FOREST I (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> sample fibre volumes in a forested region demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> given access to a plot of forested land and suitable measurement tools, conducting (with assistance), a survey of fibre values in the region by establishing boundaries for a sample plot, measuring tree diameter, height and age within the plot, and estimating fibre volumes from sample data. <p><i>Assessment Tool</i> <i>Task Checklist: Forest Survey, FOR106-4</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, with emphasis on: <ul style="list-style-type: none"> generating alternatives and selecting an appropriate course of action allocating time effectively and following schedules participating as an effective team member by working cooperatively with others and contributing ideas following safe procedures and recognizing potential hazards. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>20</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
Forest Surveys	<p><i>The student should:</i></p> <ul style="list-style-type: none"> suggest reasons for conducting a forest survey; e.g., <ul style="list-style-type: none"> types of information gathered questions that are answered distinguish between forest samples and forest populations describe basic techniques used to sample a forested area; e.g., <ul style="list-style-type: none"> layout of sample plots data collection techniques explain how sample data may be used to estimate fibre volumes and other non-fibre forest resources. 	<p>Obtain assistance from government, industry or private forestry personnel.</p> <p>See <i>Alberta's Focus on Forests</i> (Activity 4.3—Surveying the Forest Resource).</p>

MODULE FOR106: MEASURING THE FOREST I (continued)

Concept	Specific Learner Expectations	Notes
Compass and Measurement Skills	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● apply basic compass skills to establish direction in the forest; e.g., <ul style="list-style-type: none"> – orient a map – establish and follow a bearing ● measure horizontal distance in the forest using pacing and chaining skills ● perform open and closed traverses in the forest using compass and chaining skills ● measure the diameter of trees using a diameter tape or other suitable equipment ● measure the height of trees using a clinometre and measuring tape or other suitable equipment ● demonstrate techniques used to determine the age of trees. 	<p>Develop basic skills in measuring direction and distance in the forest.</p> <p>Invite resource person from local government/industry to demonstrate:</p> <ul style="list-style-type: none"> ● compass and chain skills ● techniques in measuring the forest. <p>Borrow necessary equipment from local government/industry.</p> <p>Use short pieces of logs.</p>
Sampling Technique	<ul style="list-style-type: none"> ● apply compass and chaining skills to establish boundaries for a sample forest plot ● identify safety practices and policies relevant to gathering sample data in the forest ● gather data regarding one or more aspects of the fibre resource within the sample forest plot; e.g., <ul style="list-style-type: none"> – tree height/diameter – number and distribution of species – age of trees ● record sample data in appropriate tables and/or charts ● interpret sample data to make inferences regarding tree populations and fibre values in the forest region ● manipulate sample data as required to estimate fibre volumes. 	<p>Contact local government/industry to obtain existing sample data.</p>

MODULE FOR109: BASIC FOREST ECOLOGY**Level: Introductory****Content Focus: Management and Conservation****Prerequisite: Science 7 (Recommended)****Module Parameters: Science laboratory and forest environment**

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none">describe the interrelatedness of elements in the forest ecosystem	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">given access to resources on forest ecology, completing all components of a research project that examines:<ul style="list-style-type: none">interrelationships among at least three living and three nonliving elementspredator-prey-decomposer relationshipsdistribution of species on the basis of habitat requirements. <i>Assessment Tool</i> <i>Research Process, FOR109-1</i>	50
<ul style="list-style-type: none">describe structural units of the tree and their function in performing life processes	<ul style="list-style-type: none">given a test bank on interrelationships among elements in a forest ecosystem, correctly responding to 15 out of 20 randomly selected test items. <i>Assessment Tool</i> <i>Sample Test Items: Forest Ecosystems (to be developed)</i> <ul style="list-style-type: none">preparing and presenting a report on major tree parts (including roots, trunk, branches, leaves, flowers), their function and relationship to one another. <i>Assessment Tool</i> <i>Presentations/Reports, FOR109-2</i> <ul style="list-style-type: none">conducting directed laboratory and/or field investigations that demonstrate at least three vital life processes performed by trees (e.g., nutrient uptake, photosynthesis, respiration, transpiration, reproduction). <i>Assessment Tool</i> <i>Investigating Terrestrial Ecosystems, LRDC Lab Investigations, FOR109-3</i>	50

MODULE FOR109: BASIC FOREST ECOLOGY (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, with emphasis on: <ul style="list-style-type: none"> identifying and locating appropriate references and sources of information preparing and presenting accurate and concise written, visual and oral reports following safe laboratory procedures and eliminating potential hazards. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

MODULE FOR109: BASIC FOREST ECOLOGY (continued)

Concept	Specific Learner Expectations	Notes
Forest Ecosystems	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify living and nonliving elements within a local forest ecosystem; e.g., <ul style="list-style-type: none"> soil characteristics land form climate flora and fauna soil organisms describe the interrelatedness of elements within a local forest environment; e.g., <ul style="list-style-type: none"> relationship of soil, air and water characteristics to plant growth interactions and dependencies among living organisms explain the role of trees within a local forest ecosystem; e.g., <ul style="list-style-type: none"> exchange of gases water cycle nutrient cycling wildlife habitat soil conservation 	<p>Involves application of science concepts in a forest environment.</p> <p>Use field trips to identify ecosystem components based on first-hand observations.</p> <p>Conduct experiments to demonstrate the interrelatedness of air, water, soil and plant growth.</p> <p>Observe evidence of plant growth being affected by particular environmental conditions (e.g., light, soil, moisture, crowding).</p> <p>Draw food webs/energy chains based on observations.</p>

MODULE FOR109: BASIC FOREST ECOLOGY (continued)

Concept	Specific Learner Expectations	Notes
Forest Ecosystems (cont'd)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● analyze food relationships among living organisms within a local forest environment; e.g., <ul style="list-style-type: none"> - role of producers, consumers and decomposers - food chains and webs ● compare the ecological niches of selected plant and animal species native to Alberta. 	<p>Draw food webs/energy chains based on observations.</p> <p>Observe evidence of insect or other animal life living on a tree or shrub. Collect and observe samples of insects by placing a sheet of plastic under the plant and tapping branches with a stick.</p>
Tree Biology	<ul style="list-style-type: none"> ● explain the vital life processes performed by trees and other forest plants; e.g., <ul style="list-style-type: none"> - nutrient intake and transportation - photosynthesis - respiration and transpiration - reproduction - phenology (leaf flushings, leaf fall, flowering and cone production) ● describe structural units and component parts of the tree, and their function in performing vital life processes; e.g., <ul style="list-style-type: none"> - root - trunk/stem - leaf - flower ● infer interrelationships among tree structures, their functions, and vital life processes that are performed ● illustrate the approximate range of one or more tree species throughout North America. 	<p>Laboratory experiments and demonstrations.</p> <p>Perform laboratory experiments to demonstrate life functions.</p> <p>Draw and label a cross-section of a tree (top to bottom) that illustrates all components.</p> <p>Use a small tree to prepare a model that has the parts of the tree labeled.</p> <p>Consider relationships among roots, trunk, branches, leaves and flowers.</p>

MODULE FOR110: FORESTS FOREVER I**Level:** Introductory**Theme:** Management and Conservation**Prerequisite:** None**Module Parameters:** Access to government, industry and community resources

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">describe past and present uses of Canada's forests	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">a research project on the history of forest use in Canada. Research to address aboriginal subsistence, fur trade, land clearing for agriculture, urbanization, ship building, sawmilling, pulp and paper, value added products and recreational usesa descriptive account of at least three ways in which changes in forest use and/or ownership have affected the economy and the environmentpredictions regarding uses and/or ownership of Canada's forests in the future	20
<ul style="list-style-type: none">explain that increased demands on the forest have created a need for conservation and management of forested regions	<ul style="list-style-type: none">definitions and examples of sustainable yield and sustainable development within the context of Alberta's forested regionsparticipation in debate of a current issue related to the management of a forested region <i>Assessment Tools (to be developed)</i> <i>Debate, Appendix 1.1</i>	50
<ul style="list-style-type: none">research the role of technology in forest protection	<ul style="list-style-type: none">a rationale for protecting the forest resource. Rationale to address economic, environmental, recreational and health perspectivesa verbal and/or written report that describes major components of forest protection. Report to include:<ul style="list-style-type: none">forest fire managementsoil conservation and land reclamationpest and disease controlpersonal observation of four common insect pests and/or diseases that affect the forest, and comparison of biological and chemical methods of controlling each	30

MODULE FOR110: FORESTS FOREVER I (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> ethics managing resources teamwork, leadership and service demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Forest History	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe changing patterns of forest use in Canada and Alberta from past to present describe the history of forest land tenure in Canada and Alberta infer the impact of historical trends in forest use and ownership on people, the economy and the environment make predictions about the use of Canada's forest resources in the future. 	Trace the development of Alberta's forest land acts, policies, agencies and resource allocation.
Conservation and Management	<ul style="list-style-type: none"> compare different uses of forested regions in terms of their advantages and disadvantages; e.g., <ul style="list-style-type: none"> environmental economic social research the roles of different interest groups in managing the forest resource; e.g., <ul style="list-style-type: none"> government forest industry general public other stakeholder groups relate concepts of sustainable development and sustained yield to practical strategies for managing the forest resource; e.g., <ul style="list-style-type: none"> reforestation stand improvement 	<p>Debate and consensus building.</p> <p>Prepare a poster/collage/display that depicts different aspects of forest use.</p> <p>Visit local sites.</p>

MODULE FOR110: FORESTS FOREVER I (continued)

Concept	Specific Learner Expectations	Notes
Conservation and Management (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● debate an issue regarding sustainable development and/or sustained yield; e.g., <ul style="list-style-type: none"> – conduct research – develop a position – participate in debate ● examine demands that are placed on forested regions of Canada and Alberta; e.g., <ul style="list-style-type: none"> – industry – recreation – wildlife – environment ● develop consensus regarding a plan for the integrated use of a local forested area; e.g., <ul style="list-style-type: none"> – conduct research – generate alternatives – agree to a workable solution. 	<p>Invite resource people to critique debates.</p> <p>Examine existing management plans.</p>
Forest Protection	<ul style="list-style-type: none"> ● cite reasons for protecting the forest resource; e.g., <ul style="list-style-type: none"> – material and non-material benefits – environmental impact ● identify and describe major components of forest protection; e.g., <ul style="list-style-type: none"> – forest fire management – soil conservation and land reclamation – pest and disease control ● explain basic goals and techniques of forest fire management, soil conservation and land reclamation ● identify and describe symptoms of common forest pests and diseases ● compare different methods of pest and disease control; e.g., <ul style="list-style-type: none"> – biological methods – forest management – chemical methods. 	<p>Prepare a display of technologies used in forest protection.</p> <p>Invite a local forest ranger to explain components/ techniques of forest protection.</p> <p>Explain the fire triangle and how to control a fire by removing one or more legs of the triangle.</p>

MODULE CURRICULUM AND ASSESSMENT STANDARDS

INTERMEDIATE LEVEL

The following pages define the curriculum and assessment standards for the intermediate level of Forestry.

Intermediate level modules help students build on the competencies developed at the introductory level and focus on developing more complex competencies. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Module FOR201:	Making a Difference in Forestry	E.3
Module FOR203:	Managing Alberta's Forested Lands	E.7
Module FOR204:	Woods Survival II	E.11
Module FOR206:	Measuring the Forest II	E.17
Module FOR207:	Harvesting and Forest Products	E.21
Module FOR210:	Forests Forever II	E.25
Module FOR212:	Users in the Forest	E.29

MODULE FOR201: MAKING A DIFFERENCE IN FORESTRY**Level: Intermediate****Theme: Social and Cultural Perspectives****Prerequisite: None****Module Parameters: Access to government, industry and community resources**

Students analyze the impact of lifestyle on forests, and propose individual and shared actions that foster environmental stewardship.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● assess the impact of personal attitudes, actions and lifestyle on the forest resource● describe strategies for reducing, reusing and recycling● demonstrate commitment to environmental stewardship through personal and shared actions	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● inferences regarding the impact of personal attitudes, actions and lifestyles on the forest resource. The student will consider consumerism, needs versus wants, conservation ethics and recreational choices● a personal inventory of at least 10 daily practices that affect the forest resource	20
	<ul style="list-style-type: none">● proposals for reducing, reusing and recycling in the home and community environment● an analysis of economic and environmental trade-offs that occur through reducing, reusing and recycling● the results of research on four recent products developed through recycling techniques	20
	<ul style="list-style-type: none">● a presentation recommending five changes to personal lifestyle that will affect the forest in positive ways● volunteer week (five hours) with an environmental organization whose major goal is sustainable forest development● a proposal for a fundraising campaign in support of environmental stewardship● participation in a debate on the impact of lifestyle on forest environments <i>Assessment Tools</i> <i>Debates, Appendix 2.1</i>	60

MODULE FOR201: MAKING A DIFFERENCE IN FORESTRY (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> a letter written to a Member of Parliament regarding a forestry issue of personal concern, and critique of the response received observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> ethics managing resources teamwork, leadership and service demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Attitudes, Actions and Lifestyle	<p><i>The student should:</i></p> <ul style="list-style-type: none"> explain how societal attitudes, actions and lifestyle may affect the forest resource; e.g., <ul style="list-style-type: none"> conservation ethic consumer practices recreational patterns describe factors that influence consumer and marketing trends, and how these trends may affect the forest resources; e.g., <ul style="list-style-type: none"> social economic environmental compile a personal inventory of possessions and material purchases made over the last year distinguish among personal needs and wants, as reflected through personal inventory assess the impacts of personal actions and lifestyle on the forest resource. 	<p>Plan for student-directed projects. Encourage students to express personal views and values.</p> <p>Consider 10 personal actions and their consequences on the forest.</p> <p>See <i>Alberta's Focus on Forests</i> (Activity 5.6—What's in the Waste-basket—Reassessing Our Needs).</p> <p>Student debates.</p>
Reduce, Reuse and Recycle	<ul style="list-style-type: none"> describe and assess societal trends in the consumption of material goods identify common refuse that can be reused in practical and economical ways conduct research on materials that are being recycled and the products that are produced 	<p>Examples:</p> <ul style="list-style-type: none"> fence posts jewellery paper synthetic fibres.

MODULE FOR201: MAKING A DIFFERENCE IN FORESTRY (continued)

Concept	Specific Learner Expectations	Notes
Reduce, Reuse and Recycle (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● analyze trade-offs that occur through reducing, reusing and recycling; e.g., <ul style="list-style-type: none"> – economic – environmental. 	<p>Consider the advantages and disadvantages of</p> <ul style="list-style-type: none"> ● disposable cups versus reusable cups ● disposable diapers versus cloth diapers.
Environmental Stewardship	<ul style="list-style-type: none"> ● propose personal strategies for using the forest resource that foster the attainment of social, cultural, economic and environmental goals; e.g., <ul style="list-style-type: none"> – personal actions – leadership roles ● plan, conduct and assess a school-wide campaign to increase awareness of lifestyle, conservation and the environment; e.g., <ul style="list-style-type: none"> – establish goals – plan and conduct – assess results ● debate an issue regarding the impacts of lifestyle on the forest resource; e.g., <ul style="list-style-type: none"> – conduct research – develop a position – participate in debate ● identify constructive ways in which individuals can influence public decisions that affect the forest and all its resources; e.g., <ul style="list-style-type: none"> – voting – lobbying – seeking office – supporting compatible interest groups ● assess the goals and objectives of one or more conservation groups. 	<p>Develop consensus on a relevant issue.</p> <p>Ask students to prepare a contract expressing personal commitment to environmental stewardship. Review the contract after a period of time to ascertain if contract obligations are being met.</p> <p>Write letters to government agencies, industry and/or environmental groups. Critique response received.</p>

MODULE FOR203: MANAGING ALBERTA'S FORESTED LANDS**Level:** Intermediate**Theme:** Social and Cultural Perspectives**Prerequisite/****Corequisite:** Forest Regions of Canada (FOR102; Recommended)**Module Parameters:** Access to government agencies responsible for forest management

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● explain how Alberta's forested lands are administered	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● a historical account of changes that have occurred in the ownership and administration of forested lands in Alberta● an explanation of different land tenures (public and private) in Alberta● identification and mapping of different land management areas (green and white) in Alberta● identification of at least five agencies or groups responsible for managing forested lands within Alberta's boundaries, and the mandates of each agency or group	20
<ul style="list-style-type: none">● research government legislation and policies affecting the forest resource	<ul style="list-style-type: none">● the results of research on the role of important government acts in managing the forest, including:<ul style="list-style-type: none">- Forest Act- Forest and Prairie Protection Act- Provincial Parks Act- Forest Reserves Act● identification of at least four regulations and/or guidelines established in association with government acts for managing the forest, and the purpose of each	40
<ul style="list-style-type: none">● describe different ways of allocating land and timber in forest management	<ul style="list-style-type: none">● explanations of five types of timber dispositions issued by Alberta Land and Forest Services. Each explanation to address the intent of the disposition, and the responsibilities of the holder● identification of other types of dispositions used to manage activities on forested lands, including:<ul style="list-style-type: none">- grazing leases, permits and licences- hunting, fishing and trapping permits and licences- surface mineral leases- commercial trail riding permits	40

MODULE FOR203: MANAGING ALBERTA'S FORESTED LANDS (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning managing resources communication. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Administration of Forested Lands	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe major changes that have occurred from past to present in the ownership and administration of forested lands in Alberta; e.g., <ul style="list-style-type: none"> Federal jurisdiction Provincial status <i>Natural Resource Transfer Act</i> describe different land tenures in Alberta today; e.g., <ul style="list-style-type: none"> public (provincial and federal crown lands) private identify, locate and compare different land management areas in Alberta; e.g., <ul style="list-style-type: none"> white area green area describe the mandates of agencies or groups responsible for managing forested lands within Alberta's boundaries, and the proportion of land under their jurisdiction; e.g., <ul style="list-style-type: none"> Alberta Environmental Protection (Land and Forest Services, Parks Services, Fish and Wildlife Services) Parks Canada private ownership Metis or Native Indian Forestry Canada. 	<p>Use archives, films and library resources to research the history of forestry in Alberta.</p> <p>Contact Alberta Environmental Protection to request maps of land management areas in Alberta.</p> <p>Research how the management of Alberta's forested lands became a responsibility of the provincial government.</p> <p>Construct a circle graph depicting land ownership distribution in Alberta (e.g., provincial public, provincial private, federal public, aboriginal lands).</p>

MODULE FOR203: MANAGING ALBERTA'S FORESTED LANDS (continued)

Concept	Specific Learner Expectations	Notes
Government Legislation and Policies	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● explain how activities in Alberta's forests are subject to a variety of government acts and regulations ● research the role of important government acts in managing the forest; e.g., <ul style="list-style-type: none"> - <i>Forest Act</i> - <i>Forest Reserves Act</i> - <i>Forest and Prairie Protection Act</i> - <i>Provincial Parks Act</i> - <i>Wilderness Areas, Ecological Reserves and Natural Areas Act</i> ● research the role of regulations and guidelines established in association with government acts in further managing the forest; e.g., <ul style="list-style-type: none"> - Timber Management Regulations (Timber Operating Groundrules, Reforestation Standards) - Forest and Prairie Protection Regulations (Part I and II) - Forest Land Use Regulations (Recreation, Mineral, Pipeline, Grazing) ● assess the short- and long-term effects of selected government acts and regulations on forested land. 	<p>Contact Alberta Environmental Protection to request various acts, regulations and guidelines used in managing forested lands.</p> <p>Avoid detailed analysis of acts and regulations—<u>OVERVIEW ONLY</u>.</p>
Allocation Procedures	<ul style="list-style-type: none"> ● explain the use of dispositions (e.g., authorizations in the form of permits, licences or other legal agreements) in managing commercial activities on forested lands ● identify criteria used to establish forest land and timber dispositions and reservations; e.g., <ul style="list-style-type: none"> - fibre production - recreation - agriculture - wildlife habitat - integrated use ● explain the intent of different timber dispositions issued by the Alberta Forest Service, and the responsibilities of holders of these dispositions; e.g., <ul style="list-style-type: none"> - Forest Management Agreements (FMAs) - Quota Certificates - Timber Licences - Commercial Timber Permits - Local Timber Permits 	<p>Identify different public land users.</p> <p>Prepare a flowchart that describes land and timber dispositions used in forest management.</p>

MODULE FOR203: MANAGING ALBERTA'S FORESTED LANDS (continued)

Concept	Specific Learner Expectations	Notes
Allocation Procedures (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● describe other types of dispositions that are used to manage activities on forested lands; e.g., <ul style="list-style-type: none"> – grazing leases, permits and licences – hunting, fishing and trapping permits and licences – surface mineral leases – commercial trail riding permits ● research the role of consultation (with other resource users) and public involvement in establishing land and timber dispositions. 	Role-playing.

MODULE FOR204: WOODS SURVIVAL II**Level:** Intermediate**Theme:** Social and Cultural Perspectives**Prerequisite:** Woods Survival I (FOR104)**Prerequisite/
Corequisite:** Mapping and Aerial Photography (FOR105; Recommended)**Module Parameters:** Access to an outdoor forest environment and gear for outdoor expeditions; instructor must have personal certification in Standard First Aid (St. John Ambulance)

Information regarding student safety and instructor certification is provided in Sections C and H of this Guide to Standards and Implementation.

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">plan and prepare for an extended outdoor wilderness trip in the forest	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">presentation of group plans for an extended outdoor wilderness trip in the forest. Plans to address:<ul style="list-style-type: none">trip goals and objectivesdestination and length of stayschedules and agendasafety considerationsmenu planningcheck list of equipment and suppliesprojected costs and a budgetguidelines for minimal environmental impact <i>Assessment Tools (to be developed)</i> <i>Trip Planning Checklist, Appendix 2.1</i>	20
<ul style="list-style-type: none">safely conduct and conclude an extended outdoor wilderness trip in the forest with minimal environmental impact	<ul style="list-style-type: none">within at least a 72-hour timeframe and through access to an outdoor forest environment, demonstration of procedures for setting up camp, preparing meals, complying with pertinent legislation, breaking camp, and ensuring least possible environmental impact <i>Assessment Tools (to be developed)</i> <i>Tent Set-Up Checklist, Appendix 2.2</i> <ul style="list-style-type: none">demonstration of practical knowledge and skills within at least three areas of wilderness travel. The student may:<ul style="list-style-type: none">perform a closed compass traverse to within 5% accuracy	80

MODULE FOR204: WOODS SURVIVAL II (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> ● demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> – identify 25 tree, shrub and/or other plant species – identify five different animal tracks and scat – identify five different poisonous plants – demonstrate safe food preparation techniques for four edible wild plants (or plant parts) ● a post-trip assessment that provides observations and personal impressions, summarizes activities well done and problems encountered, and makes recommendations regarding future trips ● observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> – ethics – managing resources – teamwork, leadership and service – demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Trip Planning and Preparation	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● establish specific objectives for an outdoor wilderness trip; e.g., <ul style="list-style-type: none"> – goals and expectations – length of trip – destination – general schedule and agenda ● incorporate guidelines for environmental awareness into trip planning and preparations; e.g., <ul style="list-style-type: none"> – principles of ecotourism – consideration for carrying capacity – strategies for minimum impact land use 	<p>Hold pre-trip meeting to confirm trip details. Obtain information regarding special needs (e.g., physical limitations, special dietary requirements). Discuss trip expectations.</p> <p>List potential environmental impacts of the trip. Write before-and-after journal entries to document affect on a campsite.</p>

MODULE FOR204: WOODS SURVIVAL II (continued)

Concept	Specific Learner Expectations	Notes
Trip Planning and Preparation (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● identify and obtain appropriate supplies, equipment and personal gear for the trip; e.g., <ul style="list-style-type: none"> – water, food and grub box – tents, stoves, axe – first aid and survival kits – clothing and foot wear – toiletries ● plan for weather and seasonal conditions; e.g., <ul style="list-style-type: none"> – identify hazards particular to the area – listen to weather and news reports and forecasts ● conduct a pre-trip assessment of supplies, equipment and personal gear; e.g., <ul style="list-style-type: none"> – compare to trip checklist – assess quality, quantity and condition – assess relative to weather and seasonal conditions – obtain missing and/or speciality items ● prepare supplies, equipment and personal gear for transportation ● plan courses of action to cope with potential emergency situations in the wilderness; e.g., <ul style="list-style-type: none"> – extreme weather conditions – fire or flood – injury and illness – avalanche. 	<p>Contact local outdoor gear supplier for information and instruction on supplies and equipment. List all supplies/equipment to be taken on trip. Identify items that may have significant environmental impact—consider alternatives that would lessen impact.</p> <p>Establish methods of regular and emergency communication, and a contingency plan to be used if regular communication is interrupted.</p> <p>Compare supplies and checklist. Ensure all equipment is in satisfactory working condition. Pack supplies/equipment in waterproof containers.</p> <p>Potential linkages with "Wilderness First Aid" certification course (Canadian Red Cross).</p> <p>Outline requirements for survival and first-aid kits.</p>
	<ul style="list-style-type: none"> ● follow guidelines for safe travel in the forest; e.g., <ul style="list-style-type: none"> – inform responsible person of travel plans – follow travel schedule as planned – use orientation and navigational skills – identify potential hazards and take necessary precautions – dress according to mode of travel, weather and season – watch for changes in current weather conditions 	<p>Students need a written plan so everyone knows who is responsible for each function. Become familiar with hazards particular to the area. Listen to news and weather reports. Carry survival equipment. Reroute, postpone or cancel trip if conditions threaten safety.</p>

MODULE FOR204: WOODS SURVIVAL II (continued)

Concept	Specific Learner Expectations	Notes
Conducting and Concluding the Trip	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● set up a wilderness camp site, following guidelines for comfort, safety and least possible environmental impact; e.g., <ul style="list-style-type: none"> – select camp site considering <ul style="list-style-type: none"> ● site exposure and drainage ● access to water and firewood ● impact on flora and fauna ● proximity to potential dangers – erect tent or lean-to – assemble other amenities – protect food from wildlife and spoilage – protect equipment from the elements ● follow minimal impact guidelines in establishing: <ul style="list-style-type: none"> – latrine location and toilet procedures – wash area and procedures – fire site and use – methods of garbage and waste water disposal ● comply with local, provincial and federal legislation relevant to activities that are undertaken ● assume outdoor camp duties on a rotational basis; e.g., <ul style="list-style-type: none"> – meal preparation – camp maintenance and hygiene ● demonstrate practical knowledge and skills in at least three areas relevant to wilderness travel; e.g., <ul style="list-style-type: none"> – closed compass traverse – tree/shrub/vegetation/twig identification – animal track and scat identification – use of equipment – survival skills ● monitor the activities of wildlife in the area and take precautions to avoid dangerous situations 	<p>Select dry, level ground. Consider potential hazards including fire, rock slides, avalanches, dead materials close to shelter, etc.</p> <p>Use biodegradable soap. Be aware of local fire restrictions. Use driftwood or deadfall whenever possible.</p> <p>Consider land use, permits, seasonal restrictions, quotas, etc. Seek clarification if necessary. Report violations.</p> <p>Students should practise food preparation at home first. Have students participate in all areas of preparation, operation and clean-up. Alternate chores during trip.</p> <p>Dispose of garbage properly. Store food safely. Maintain safe distance.</p>

MODULE FOR204: WOODS SURVIVAL II (continued)

Concept	Specific Learner Expectations	Notes
Conducting and Concluding the Trip (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● follow appropriate procedures to break camp; e.g., <ul style="list-style-type: none"> – pack supplies, equipment and personal gear – take down shelter – clean site – do circle tour of site ● conclude the wilderness trip and conduct a post-trip assessment; e.g., <ul style="list-style-type: none"> – observations and personal impressions – problems encountered – recommendations regarding future trips. 	<p>Bury waste and remove all signs of toilet pit. Do circle tour of campsite—look for garbage and misplaced equipment.</p> <p>Have students “bring back in image” of a favourite spot or something they considered special about the trip. Develop images through drawings or descriptive writings.</p> <p>Develop a slide/tape presentation based on the outdoor wilderness trip.</p> <p>Consider:</p> <ul style="list-style-type: none"> ● satisfaction with equipment and supplies ● suitability of environment or route ● inconsistencies between trip and expectations.

MODULE FOR206: MEASURING THE FOREST II**Level:** Intermediate**Theme:** Technology and Applications**Prerequisite:** Measuring the Forest I (FOR106)**Module Parameters:** Demonstration forest and measurement tools

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> research specific sampling techniques used to gather information about the forest resource sample fibre and non-fibre values in a forest region 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> demonstrations of different sampling techniques and their application in gathering data about specific forest resources. Demonstrations to include random sampling, systematic sampling, transect sampling and plot sampling identification of bias and error in sampling techniques, and problems related to the use of sample data in estimating forest populations development and presentation of a sampling design appropriate to gathering information about a specific fibre and/or non-fibre forest resource (e.g., trees, rabbits, soil, grass, insects). The sampling design will include: <ul style="list-style-type: none"> goals/outcomes for the forest survey the type and amount of data to be collected sampling techniques suited to the type of information required boundaries of sample plots within the forested region an appropriate data collection sheet the collection and recording of sample data on 0.01% of a local representative forested area. Data collected should be accurate to within 5% based on the manipulation of sample data, estimations of fibre and/or non-fibre resources within a forested region an assessment of strengths and weaknesses of the sample data and statements made about the forest resources <p><i>Assessment Tools (to be developed)</i> <i>Forest Survey Tally Sheet, Appendix 2.3</i> <i>Cruise Tally Sheet, Appendix 2.4</i> <i>Single Tree Volume Tables, Appendix 2.5</i></p>	<p>20</p> <p>80</p>

MODULE FOR206: MEASURING THE FOREST II (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> ● demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> ● observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> - being innovative - managing resources - teamwork, leadership and service - demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Sample Designs	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● research different sampling designs and techniques; e.g., <ul style="list-style-type: none"> - random and systematic - transect and plot - nested plots - surveys and questionnaires ● describe sample designs and techniques most suited to gathering data about specific forest components; e.g., <ul style="list-style-type: none"> - distribution of tree species - growth, age and/or volume of trees - soil, water and/or wildlife characteristics - potential for recreation and/or agriculture ● identify bias and error in sampling design, and problems related to the use of sample data in estimating forest populations. 	

MODULE FOR206: MEASURING THE FOREST II (continued)

Concept	Specific Learner Expectations	Notes
Fibre and Non-fibre Values	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● establish goals/outcomes for a forest survey ● identify the type and amount of information regarding the forest resource that is required ● design techniques for sampling the forest region that are most suited to gathering the type of information required ● measure and locate the boundaries of sample plots within the forest region ● identify safety practices and policies relevant to gathering sample data in the forest ● gather data regarding the volume and/or condition of timber resources within the sample plots; e.g., <ul style="list-style-type: none"> – tree height/diameter – age of trees – number and distribution of species ● gather data regarding the nature of other non-fibre resources present within the sample plots; e.g., <ul style="list-style-type: none"> – soil and water quality – distribution of wildlife – potential for recreation/agriculture ● record sample data regarding fibre and non-fibre resources in appropriate tables and charts ● manipulate sample data as required to estimate fibre volumes and other non-fibre values within the forest region ● assess the strengths and weaknesses of the sample data and statements made about the forest resource. 	Develop, as a class project, a sampling design appropriate to surveying a specific forest resource. Use the sampling design to collect data. Make estimates regarding forest population based on data collected. Discuss validity/ reliability of results.

MODULE FOR207: HARVESTING AND FOREST PRODUCTS**Level:** Intermediate**Theme:** Technology and Applications**Prerequisite:** None**Module Parameters:** Access to forest harvest and forest products industry

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> identify steps involved in developing a plan for forest harvest describe the mechanics of harvesting trees research techniques used in fibre utilization and product formation 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> identification of at least five factors involved in developing a plan for forest harvest definitions and examples of allowable cut, sustained yield and multiple use within the context of forest harvest planning an explanation of different methods of forest harvest, including clear cutting, selective cutting and shelter wood cutting examples of natural and artificial regeneration, and the advantages/disadvantages of each identification of at least five environmental concerns to be addressed in harvest planning the results of research on major stages in the harvesting procedure from stump to mill. Research to address: <ul style="list-style-type: none"> methods of falling, bucking, delimbing, skidding, loading, hauling, slash disposal and site rehabilitation different technologies (e.g., machines, processes) used in the harvesting procedure a summary of safety legislation and requirements relevant to a harvesting operation identification of five categories/types of forest products, and five consumer products within each category the preparation of flowcharts that describe the steps involved in converting a log to: <ul style="list-style-type: none"> dimensional lumber in a sawmill pulp in a kraft pulpmill pulp in a mechanical pulpmill a report that describes at least two relatively new innovations in milling and/or pulping technology 	<p>20</p> <p>50</p> <p>30</p>

MODULE FOR207: HARVESTING AND FOREST PRODUCTS (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> being innovative managing resources communication demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Harvest Plan	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify major components of a plan for harvesting the forest; e.g., <ul style="list-style-type: none"> when and how much to cut method of harvest and logging regeneration and environmental protection relate the concepts of allowable cut, sustained yield and multiple use to forest harvest practices explain applications of forest inventory information in establishing a plan for harvest; e.g., <ul style="list-style-type: none"> identification of tree species determining timber quality, volume and age layout of cutting area and landing sites planning for forest access describe applications of different methods of forest harvest; e.g., <ul style="list-style-type: none"> clearcutting selective cutting shelter wood cutting describe applications of different methods of forest regeneration; e.g., <ul style="list-style-type: none"> natural artificial identify environmental concerns to be addressed through harvest plans; e.g., <ul style="list-style-type: none"> protection of sensitive areas impact on downstream values landslide and erosion hazards. 	<p>Investigation of a harvest plan establishes background knowledge for FOR212 (Users in the Forest) and FOR312 (Stewardship: Balancing Needs).</p> <p>Discuss essential components of a forest harvest plan—<u>DO NOT</u> make a plan. Use resource persons from government and industry if possible.</p> <p>Discuss considerations in determining size and location of harvesting tracts.</p> <p>Consider plans for establishing roads and landings needed for a local harvest operation.</p> <p>Discuss the scheduling of equipment and estimated completion date for harvest operations.</p>

MODULE FOR207: HARVESTING AND FOREST PRODUCTS (continued)

Concept	Specific Learner Expectations	Notes
Harvest Techniques	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● identify stages in the harvesting procedure from stump to mill; e.g., <ul style="list-style-type: none"> – falling, bucking and delimbing – skidding – loading and hauling ● research techniques and equipment used to fell, buck and delimb trees in a forest harvest operation ● research techniques and equipment used to transport logs from stump to landing site in a forest harvest operation; e.g., <ul style="list-style-type: none"> – horses – mechanical skidders ● research techniques and equipment used to transport logs from landing site to mill in a forest harvest operation ● research techniques used in slash disposal and site rehabilitation following logging operations in a forest area ● identify safety legislation and requirements relevant to visiting a forest harvest site. 	<p>Plan for field-based instruction that will enable students to follow the tree from harvest to finished product.</p> <p>Discuss safety measures used in felling trees.</p> <p>Have students orally describe the processes to follow in felling, bucking and delimbing a tree.</p> <p>Use print material and guest speakers from forest industry and forest industry suppliers.</p> <p>Have students work with a local landowner in reclaiming an eroded forest area.</p>
Fibre Products	<ul style="list-style-type: none"> ● identify major categories of forest products and give examples of each; e.g., <ul style="list-style-type: none"> – pulp and paper – lumber – veneer and plywood – board products – chemical and medicinal products ● research the steps and processes involved in log utilization at a sawmill ● research the steps and processes involved in fibre utilization at a pulp mill; e.g., <ul style="list-style-type: none"> – mechanical – chemical. 	<p>Prepare reports based on information gathered through visits to a sawmill and pulpmill.</p> <p>Make a list of general duties performed at a sawmill.</p> <p>Demonstrate techniques and processes involved in producing a fibre product (e.g., paper).</p> <p>Prepare a list of safety regulations pertinent to sawmills and pulp mills.</p>

MODULE FOR210: FORESTS FOREVER II**Level:** Intermediate**Theme:** Management and Conservation**Prerequisite:** Forests Forever I (FOR110)**Module Parameters:** Access to government agencies responsible for forest planning, research and management

Students explain forest management goals in Alberta, and describe current management practices used to address these goals.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● explain the goals of forest management in Alberta	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● a statement of the goals of forest management in Alberta	40
<ul style="list-style-type: none">● identify different types of forest use and the views of different users in the forest	<ul style="list-style-type: none">● definitions and examples of sustainable development, sustained yield and allowable cut within the context of forest management● identification of two economic, two environmental and two social needs addressed through the management of forested lands in Alberta● a list of a least 12 current uses/values of Alberta's forests● a summary of the views of at least five different forest stakeholder groups● identification of at least two potential conflicts that may arise among different stakeholder groups, and possible strategies for resolving each conflict	20
<ul style="list-style-type: none">● describe current practices used to manage Alberta's forested lands	<ul style="list-style-type: none">● definitions and examples of conservation and preservation within the context of forest management● identification of five agencies responsible for managing Alberta's forested lands, and the mandates of each● at least four examples of certificates, agreements, permits and/or licences that make Alberta's forests available for commercial harvest	40

MODULE FOR210: FORESTS FOREVER II (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> predictions regarding at least six factors likely to influence forest management practices in the future <p><i>Assessment Tools (to be developed)</i> <i>Hardisty Creek Land Management Plan, Appendix 2.6</i> <i>Mystic Mountain, Appendix 2.7</i> <i>Possum Creek Valley Management Plans, Appendix 2.8</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> being innovative ethics managing resources teamwork, leadership and service demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies,</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Forest Management Goals	<p><i>The student should:</i></p> <ul style="list-style-type: none"> explain the goals of sustainable development within the context of Alberta's forests relate the concept of sustained yield to a system of harvesting and reforestation explain applications of "annual allowable cut" in forest management practices identify scientific, economic and social factors addressed through the management of forested lands in Alberta; e.g., <ul style="list-style-type: none"> the silvics of trees growing in the area a cycle for utilization and replacement the goals of different stakeholder groups. 	

MODULE FOR210: FORESTS FOREVER II (continued)

Concept	Specific Learner Expectations	Notes
Forest Uses and Users	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● compare current uses and values of Alberta's forests; e.g., <ul style="list-style-type: none"> – recreation and aesthetics – wildlife habitat – fibre production – range lands – coal and petroleum projects – hunting and trapping – water, air and soil quality – ecosystem maintenance – job creation ● describe the views of different forest stakeholder groups and potential conflicts that may arise; e.g., <ul style="list-style-type: none"> – recreational – environmental – industrial ● explain the need for consultation with other resource users and public involvement in forest management. 	<p>See <i>Alberta's Focus on Forests</i> (Activity 4.3–Forest Perspectives; Activity 5.1–Forest Values).</p> <p>Role-playing. Discussion. Interviewing.</p>
Forest Management Practices	<ul style="list-style-type: none"> ● identify components of conservation and utilization in current forest management practices ● describe the mandates of agencies responsible for managing Alberta's forested lands; e.g., <ul style="list-style-type: none"> – Alberta Forest Service – Fish and Wildlife – Public Lands – Land Information Services ● describe current management practices that make Alberta's productive forests available to industry for commercial harvest; e.g., <ul style="list-style-type: none"> – forest management agreements – quota certificates – commercial timber permits – local timber permits ● consider factors likely to influence future forest management practices; e.g., <ul style="list-style-type: none"> – new knowledge and technology – increased public participation. 	<p>Resource persons from relevant agencies.</p> <p>Group research and presentations.</p>

MODULE FOR212: USERS IN THE FOREST

Level: Intermediate

Theme: Management and Conservation

Prerequisite: None

Module Parameters: Access to government, industry and community resources

Students identify different users in the forest and explain the planning principles that are used in developing an integrated resource management plan.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● identify different uses of the forest and the needs of each forest user● explain the principles of integrated land use● research the development of a plan for integrated resource management	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● identification of at least four major categories of forest use (e.g., industry, recreation, tourism, environmental) and at least 10 different forest users within each category● eight examples of the multiple use of Alberta's forests	30
	<ul style="list-style-type: none">● a definition and three examples of the integrated use of local forested lands● a comparison of integrated land use and multiple land use principles● presentation of a plan for the integrated use of local forested area. Plan to address:<ul style="list-style-type: none">– the needs of at least four different users– strategies for compromise among users	30
	<ul style="list-style-type: none">● a summary statement on the goals of integrated resource management● preparation of a flowchart that outlines the basic components and processes of integrated resource management. The flowchart will address establishment of a planning team, the setting of goals and objectives, public involvement and an approval process	40

MODULE FOR212: USERS IN THE FOREST (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to improve basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> a comparison of two or more forest management plans (e.g., forest protection, harvest planning, wildlife management) with respect to the components and processes of integrated resource management evident in each <p><i>Assessment Tools (to be developed)</i> <i>Hardisty Creek Land Management Plan, Appendix 2.6</i> <i>Mystic Mountain, Appendix 2.7</i> <i>Possum Creek Valley Management Plans, Appendix 2.8</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning ethics managing resources teamwork, leadership and service. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Forest Uses	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify and describe major types of forest use; e.g., <ul style="list-style-type: none"> industrial recreational wildlife habitat water, air and soil quality research specific uses and multiple demands placed upon forested land; e.g., <ul style="list-style-type: none"> wood fibre production wildlife management grazing and range management watershed oil, gas and mining recreation protected areas 	This module lends itself to group study rather than independent study. Prior credit in at least three other modules in Forestry will establish sufficient background knowledge.

MODULE FOR212: USERS IN THE FOREST (continued)

Concept	Specific Learner Expectations	Notes
Forest Uses (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● explain why forests can and should serve many purposes ● cite examples of the multiple use of Alberta's forests; e.g., <ul style="list-style-type: none"> - using different parts of the forest for different purposes - using the same area of the forest to obtain more than one benefit. 	
Integrated Land Use	<ul style="list-style-type: none"> ● demonstrate how integrated land use involves using a common area of forested land for two or more purposes; e.g., <ul style="list-style-type: none"> - wood fibre - range - wildlife - recreation - mining ● cite examples of the integrated use of local forested lands ● compare principles of integrated land use with principles of multiple use management ● develop a plan for the integrated use of a local forested area; e.g., <ul style="list-style-type: none"> - conduct research - generate alternatives - agree to a workable solution. 	<p>Contact a Land Use Officer (Alberta Land and Forest Services) for research materials.</p> <p>Role-playing.</p>
Integrated Resource Management	<ul style="list-style-type: none"> ● explain the function of Integrated Resource Planning (IRP) in establishing policy and guidelines for managing forested land ● identify and describe the basic components of IRP; e.g., <ul style="list-style-type: none"> - establishing a planning team - setting goals and objectives - soliciting public involvement - obtaining approval for the plan ● prepare a flow chart that outlines relationships among the components of IRP ● research two or more forest management plans having different goals, and identify components of IRP that are present in each; e.g., <ul style="list-style-type: none"> - forest protection - access management - harvest planning - range management - wildlife management. 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> ● Activity 5.1-Forest Perspectives ● Activity 5.2- Decisions for Change ● Activity 5.5- Integrated Resource Management.

MODULE CURRICULUM AND ASSESSMENT STANDARDS

ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Forestry.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

Module FOR301:	Issues in Forestry	F.3
Module FOR306:	Measuring the Forest III	F.7
Module FOR307:	The Forest Marketplace	F.11
Module FOR308:	Forest Technology Applications	F.15
Module FOR309:	Advanced Forest Ecology	F.19
Module FOR311:	Silviculture: Growing the Forest	F.23
Module FOR312:	Stewardship: Balancing Needs	F.27

MODULE FOR301: ISSUES IN FORESTRY**Level:** Advanced**Theme:** Social and Cultural Perspectives**Prerequisite:** None**Module Parameters:** Access to government, industry and community resources

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> identify social, economic and environmental perspectives associated with current issues in forest management explain how issues and trends involving Canada's forests may be similar to those in other parts of the world demonstrate individual and shared actions that foster the conservation and management of forested regions 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> a list of alternatives and consequences associated with five issues in forest management. Alternatives and consequences to address social, economic and environmental perspectives related to each issue a critique of one newspaper/magazine article or video documentary regarding an issue in forest management. Critique to address: <ul style="list-style-type: none"> range of viewpoints/biases evident quality of research recommended course of action research on an international forest issue. Research to include: <ul style="list-style-type: none"> explanation of the issue, including the stakeholders involved and their respective points of view positive and negative impacts on the forest resource and society suggested strategies and actions a comparison of one international forest issue with a similar forest issue in Canada a summary of the goals and accomplishments of one environmental conservation group participation in debate of a current issue in forest management <p><i>Assessment Tools (to be developed)</i> <i>Debate, Appendix 3.1</i></p>	<p>20</p> <p>30</p> <p>50</p>

MODULE FOR301: ISSUES IN FORESTRY (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to refine basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> through group consensus building, the development and implementation of a course of action for dealing with a forest issue. The course of action will reflect: <ul style="list-style-type: none"> potential for individual action potential for shared action potential for leadership roles <p><i>Assessment Tools (to be developed)</i> <i>Establishing Group Consensus, Appendix 3.2</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> ethics managing resources demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Issues Involve Alternatives	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe past and present trends in the consumptive and non-consumptive use of forests analyze differing points of view regarding how and to what degree Canada's forests should be used identify positive and negative effects of forest industry development on people, industry and the environment assess the pros and cons of different forest harvesting practices; e.g., <ul style="list-style-type: none"> clearcutting selective harvesting research issues related to the expansion and management of Alberta's forest industry; e.g., <ul style="list-style-type: none"> access management herbicide use in timber management old growth management maintenance of biodiversity 	<p>Gather appropriate resource materials prior to beginning the module.</p> <p>Discuss issues from a variety of perspectives (e.g., social, economic, environmental).</p> <p>Discuss different perspectives regarding how and to what degree Canada's forests should be used.</p> <p>Analyze the pros and cons regarding three different forest harvest practices.</p>

MODULE FOR301: ISSUES IN FORESTRY (continued)

Concept	Specific Learner Expectations	Notes
Issues Involve Alternatives (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe ways in which different forest stakeholders make use of the judicial, legislative and regulatory systems in working toward their objectives. 	Identify issues related to the expansion of forest management in Alberta.
Global Issues and Trends	<ul style="list-style-type: none"> compare issues involving Canada's forests with similar issues in other parts of the world; e.g., <ul style="list-style-type: none"> land use expansion of the forest industry forest renewal processes management of old growth forests climate change and forest ecosystems extensive versus intensive management assess global impacts of the recreational and commercial use of forests; e.g., <ul style="list-style-type: none"> social and cultural economic environmental infer the long-range effects of the sustainable use of forests in Canada and other parts of the world. 	Research a forest issue in another country. Compare to the Canadian situation.
Individual and Shared Actions	<ul style="list-style-type: none"> compare and contrast different philosophies, ethics and alternatives regarding the forest resource and how best to ensure its health and sustainability assess the goals and objectives of one or more forest conservation or preservation groups debate a global issue regarding the consumptive and/or non-consumptive use of forests; e.g., <ul style="list-style-type: none"> conduct research develop a position participate in debate develop a plan for the use of a forested region; e.g., <ul style="list-style-type: none"> conduct research generate alternatives agree to a plan that meets an acceptable level of needs initiate responsible and ethical actions in relation to the forest and its many resources; e.g., <ul style="list-style-type: none"> individual actions shared actions leadership roles. 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> Activity 3.6—An Urban Wilderness at School Activity 5.1—Forest Values Activity 5.3—Forest Perspectives. <p>Emphasis on empowerment.</p>

MODULE FOR306: MEASURING THE FOREST III**Level: Advanced****Theme: Technology and Applications****Prerequisite: Measuring the Forest II (FOR206)****Module Parameters: Access to forest inventory technology and forest survey data**

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">● explain the applications of forest survey data in resource management	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">● at least three applications of timber cruise data in resource management● at least five applications of non-fibre data in resource management● the interpretation of forest survey data. The student will:<ul style="list-style-type: none">– consider bias, error and other limitations in the sample data– extrapolate the data to estimate forest populations– suggest applications of the data in forest management– consider modifications to sample design that may increase accuracy of the survey	60
<ul style="list-style-type: none">● research the role of technology in current forest inventory practices	<ul style="list-style-type: none">● the results of research on applications of technology in data collection; manipulation and/or storage. Research to address aerial photography, satellite imagery and computer-based mapping systems● an explanation of the goals and techniques of ground truthing● a written/verbal presentation on a current forest inventory research project. Presentation to address goals and objectives, purpose, duration, costs, human resources, equipment requirements, participating agencies and/or groups, and data handling techniques	30

MODULE FOR306: MEASURING THE FOREST III (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> ● examine career opportunities in forest measurement 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> ● the identification of at least three career paths in forest measurement ● the results of research on one career in forest management. Research to address: <ul style="list-style-type: none"> - job description/working conditions - entry requirements/competencies - educational/training opportunities - wage and security of employment relative to other fields - positive and negative aspects of the job - opportunity for advancement and/or self-employment <p><i>Assessment Tools (to be developed)</i> <i>Forest Survey Tally Sheet, Appendix 3.3</i> <i>Cruise Tally Sheet, Appendix 3.4</i> <i>Single Tree Volume Tables, Appendix 3.5</i></p>	10
<ul style="list-style-type: none"> ● demonstrate effort to refine basic competencies. 	<ul style="list-style-type: none"> ● observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> - being innovative - managing resources - teamwork, leadership and service - demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Data Interpretation	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● explain applications of timber cruise data in resource management; e.g., <ul style="list-style-type: none"> - estimating total fibre volume - projecting future forest growth - planning harvest operations ● explain applications of non-fibre data in resource management; e.g., <ul style="list-style-type: none"> - monitoring water and soil quality - determining potential for agriculture/recreation - monitoring wildlife population densities and trends - planning conservation practices 	<p>Contact resource persons from:</p> <ul style="list-style-type: none"> ● Canadian Forestry Service ● Alberta Land and Forest Services. <p>Perform mathematical calculations to determine timber volumes.</p> <p>Obtain sample data from local government/industry.</p>

MODULE FOR306: MEASURING THE FOREST III (continued)

Concept	Specific Learner Expectations	Notes
Data Interpretation (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● interpret a set of sample forest survey data; e.g., <ul style="list-style-type: none"> – consider bias, error and other limitations in the sample data – extrapolate the data to estimate forest populations – suggest applications of data in resource management – consider modification to sample design that may increase accuracy of the survey. 	Use paper and pencil OR computer programs to interpret data.
Role of Technology	<ul style="list-style-type: none"> ● research applications of technology in gathering and storing data about the forest resource; e.g., <ul style="list-style-type: none"> – aerial photography – satellite imagery – computer-based mapping systems ● explain the importance of ground truthing in verifying data gathered through remote sensing ● make predictions regarding forest inventory technologies and practices in the future ● outline the objectives of a current forest inventory research project; e.g., <ul style="list-style-type: none"> – an initiative of Forestry Canada – an Alberta Research Council project. 	<p>Expose students to various technologies through field studies.</p> <p>Consider future uses of computers and advances in GIS.</p> <p>Investigate potential applications of Global Positioning Systems (GPS).</p>
Career Paths	<ul style="list-style-type: none"> ● outline career paths and the range of occupational opportunities in forest measurement ● present the results of research on one or more career paths in forest measurement; e.g., <ul style="list-style-type: none"> – nature of the work – number of workers/employment trends – entry requirements/competencies – education/training opportunities – opportunity for advancement. 	<p>Review National and provincial Occupational Profiles (NOC and POP).</p> <p>Interview persons involved in conducting forest inventories.</p> <p>Work experience.</p> <p>Job shadowing.</p>

MODULE FOR307: THE FOREST MARKETPLACE

Level: Advanced

Theme: Technology and Applications

Prerequisite/

Corequisite: Harvesting and Forest Products (FOR207; Recommended)

Module Parameters: Access to forest products and forest service industry

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">describe market-based products/services and extra-market values derived from Canada's forests	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">the identification of 20 market-based products and services derived from Alberta's forests	20
<ul style="list-style-type: none">research the processing of fibre and non-fibre forest products in Canada and Alberta	<ul style="list-style-type: none">the development of flowcharts that depict the sequence of steps (from standing tree to finished product) involved in producing three forest productsa report on one forest product or service that involves application for recent developments in milling/pulping technology (e.g., cattle food, methane gas, artificial vanilla, new medicines)	30
<ul style="list-style-type: none">analyze marketing systems and market trends for forest products	<ul style="list-style-type: none">the identification of at least five economic, environmental and social factors that influence local and global demands for forest products and servicesan estimation of Canada's forest product market share in North America, the Pacific Rim, Europe and two other selected regionsdescriptive accounts of two scenarios where global market opportunities have been filled through product diversification and/or specializationa multimedia presentation of a plan for launching a new forest product or service. Plan to address:<ul style="list-style-type: none">market research regarding present and future consumer needsidentification of a target marketproduct/service developmentstrategies for marketing the product/service	50

MODULE FOR307: THE FOREST MARKETPLACE (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to refine basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning managing resources communication. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Products and Services	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify market-based products and services derived from Alberta's forests; e.g., <ul style="list-style-type: none"> primary wood products wood-fabricated materials wood pulp and paper products chemical products trapping, fishing and hunting guiding and outfitting tourism and recreational pursuits identify psychological benefits and extra-market values derived from Alberta's forests; e.g., <ul style="list-style-type: none"> ecological values aesthetic and spiritual values bequest value for future generations analyze trends in the consumptive and non-consumptive use of forests in Canada and Alberta; e.g., <ul style="list-style-type: none"> recreation trapping logging oil and gas development. 	<p>Contact the Alberta Forest Products Association for current resources and information.</p> <p>See <i>Alberta's Focus on Forests</i> (Activity 4.2- Products From Canada's Forests).</p> <p>Identify major industries that require wood.</p> <p>Identify common products derived from a particular tree species.</p> <p>Identify a range of forest products and services that could be derived from a selected site.</p>

MODULE FOR307: THE FOREST MARKETPLACE (continued)

Concept	Specific Learner Expectations	Notes
Processing	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● classify and sequence the steps that are involved in producing a fibre commodity; e.g., <ul style="list-style-type: none"> – harvest and transportation – processing techniques – grading, packing and storage ● identify materials and services that are required at each stage in the production of a fibre commodity; e.g., <ul style="list-style-type: none"> – human and natural resources – energy and technologies – inspection and regulation ● describe recent developments in milling and pulping technology and their impact on the forest industry; e.g., <ul style="list-style-type: none"> – fibre utilization – environmental stewardship ● identify new and emerging products and services derived from Alberta's forests; e.g., <ul style="list-style-type: none"> – cattle food – methane gas – random use of forest amenities. 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> ● Activity 4.4–From Pulp to Paper and Back Again ● Activity 4.5–Pulp and Paper: The Technology–Environment Connection. <p>Draw posters that depict what happens to a tree from stump to consumer.</p>
Marketing Systems and Trends	<ul style="list-style-type: none"> ● determine the nature and extent of Canada's market share in North America, the Pacific Rim, Europe and other locations ● describe systems used to market Canada's forest products and services at local, national and international levels ● identify social, economic and environmental factors that influence consumer trends and market demands for forest products and services ● assess the impact of developing technologies on Canada's fibre and non-fibre forest products; e.g., <ul style="list-style-type: none"> – efficiency of production processes – improved utilization – focus on value-added and knowledge intensive commodities ● identify market opportunities that arise from product diversification and specialization, international trade and participation in a global economy ● formulate a plan for identifying new market opportunities, developing a forest product, and managing the venture. 	<p>Marketing modules in the Agriculture strand and Management and Marketing strand offer additional instructional strategies.</p> <p>Visit a sawmill and wood-product distributor to discover traditional and new uses of wood.</p> <p>Prepare plans for Christmas tree production and marketing.</p>

MODULE FOR308: FOREST TECHNOLOGY APPLICATIONS**Level: Advanced****Theme: Technology and Application****Prerequisite: None****Module Parameters: Access to government and industry resources**

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">describe different types of forest research being conducted in Canada and Alberta	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">the identification of at least six major types of forest research that are being conducted in Canada and Albertaa detailed review of one research plan for the enhanced utilization and/or management of forests in Canada. Review to address:<ul style="list-style-type: none">goals and objectives of the planeconomic, political, scientific and related factorsmethodologies and strategiesparticipating agencies and/or groupsoutcomes and types/kinds of data obtainedlimitations of the plan	30
<ul style="list-style-type: none">give examples of past, present and emerging technologies used in the forest industry	<ul style="list-style-type: none">descriptive accounts of three current and/or emerging technologies used in any of the following areas of the forest industry:<ul style="list-style-type: none">greenhouse and nursery operationssilvicultureforest harvestwood production and utilizationbiotechnologyreflection on the advantages and disadvantages of recent technology designed to enhance utilization and/or management of forests. Students to address economic, environmental and social perspectives	20
<ul style="list-style-type: none">research career requirements, opportunities and trends within the forestry sector	<ul style="list-style-type: none">identification of at least six career clusters in forestry-related areas, and the range of occupational opportunities available within each	50

MODULE FOR308: FOREST TECHNOLOGY APPLICATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to refine basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> the results of research on one career cluster in a forestry-related area. Research to include: <ul style="list-style-type: none"> job description/working conditions entry requirements/competencies educational/training opportunities opportunity for advancement, self-employment and/or entrepreneurship predictions regarding future career opportunities within forestry-related areas, and the education/training that may be required to gain employment and advance in related fields observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning communication teamwork, leadership and service <p><i>Assessment Tools</i> <i>Observational Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Research	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify and describe different types of forest research that are being conducted in Canada and Alberta; e.g., <ul style="list-style-type: none"> silviculture harvesting systems forest products forest protection wildlife inventories ecological studies integrated resource management 	Contact Northern Forestry Centre (Canadian Forestry Services) for current resource materials and information.

MODULE FOR308: FOREST TECHNOLOGY APPLICATIONS (continued)

Concept	Specific Learner Expectations	Notes
Research (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● compare the goals and priorities of local agencies whose mandate is to conduct research related to forestry and forest ecosystems; e.g., <ul style="list-style-type: none"> - individuals - corporations - colleges and universities - government agencies ● explain the role of the Alberta Forest Research Advisory Council in coordinating forest research activities in Alberta ● describe applications of data banks and information systems in making forest management decisions ● identify major components of a research plan for the enhanced utilization and/or management of forests; e.g., <ul style="list-style-type: none"> - goals and objectives of the plan - economic, political, scientific and related factors - methodologies and strategies - outcomes and types/kinds of data obtained - limitations of the plan, or information that may be lacking or incomplete. 	
Technologies	<ul style="list-style-type: none"> ● describe past and present applications of technology in the forest industry; e.g., <ul style="list-style-type: none"> - greenhouse and nursery operations - silviculture - harvesting technologies - wood production and utilization - biotechnology ● describe emerging applications of technology in the forest industry; e.g., <ul style="list-style-type: none"> - pulping procedures - effluent treatment and pollution control ● assess the advantages and disadvantages of a recent technology designed to enhance our utilization and/or management of forests; e.g., <ul style="list-style-type: none"> - social - economic - environmental. 	

MODULE FOR308: FOREST TECHNOLOGY APPLICATIONS (continued)

Concept	Specific Learner Expectations	Notes
Career Trends	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● predict ways in which research, technology, social values and land use priorities may affect forest industries in the future ● predict future career clusters and occupational opportunities within the forestry sector, and the education/training that may be required to gain employment and advance in related fields ● research career clusters and the range of occupational opportunities available within the forestry sector; e.g., <ul style="list-style-type: none"> – forest inventory – forest biology/ecology – forest protection – forest harvest – forest products industry – forest management ● research one or more career paths in forestry; e.g., <ul style="list-style-type: none"> – job description/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship. 	<p>Review National and provincial Occupational Profiles (NOC and POP).</p> <p>Contact the "Career Hotline" (telephone 1-800-661-3753).</p> <p>Interview persons employed in the forestry sector.</p>

MODULE FOR309: ADVANCED FOREST ECOLOGY**Level:** Advanced**Theme:** Management and Conservation**Prerequisite:** Basic Forest Ecology (FOR109), Biology 20 (Recommended)**Module Parameters:** Science laboratory and forest environment

Students investigate interrelationships among soil, water, air, trees and the environment, and explain how forests change.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> analyze the effects of soil, air and water characteristics on forest ecosystems research factors that determine the ability of tree species and forest ecosystems to occur in particular environments explain the process of change in a forest environment 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> an explanation of the function of organic and inorganic components of forest soils, including micro- and macro-organisms, gases, minerals, organic matter and water demonstration of appropriate laboratory procedures in monitoring the effects of soil alkalinity, acidity, temperature, water quantity and water quality on plant growth the identification of four types of air pollutants that affect forest ecosystems inferences and case studies regarding the effects of local and global forests on climate, soil, water and wildlife descriptive accounts of the silvics of five common Alberta tree species, including climatic, soil and moisture requirements identification of three common Alberta forest associations, including the general structural characteristics and environments of each the identification of four living agents of change in a local forest environment (e.g., insects, disease, wildlife, humans) the identification of four non-living agents of change in a local forest environment (e.g., fire, flood, avalanche, wind) inferences regarding structural and/or behavioural adaptations of living organisms to particular changes in the forest environment two or more examples of primary and secondary succession in a local forest environment 	<p>40</p> <p>30</p> <p>30</p>

MODULE FOR309: ADVANCED FOREST ECOLOGY (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate effort to refine basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, emphasizing: <ul style="list-style-type: none"> managing learning communication demonstrating responsibility. <p><i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i></p>	No mark

Concept	Specific Learner Expectations	Notes
Forest Ecosystems	<p><i>The student should:</i></p> <ul style="list-style-type: none"> describe physical characteristics used to classify forest soils, and the effect of different soils on plant growth; e.g., <ul style="list-style-type: none"> texture porosity explain the function of organic and inorganic components of forest soils; e.g., <ul style="list-style-type: none"> micro- and macro-organisms gases and minerals organic matter water analyze the effects of soil acidity, alkalinity and temperature on the growth of trees and other forest plants describe indicators of water quantity and quality in the forest, and their effects on trees and other plants; e.g., <ul style="list-style-type: none"> surface water and ground water protozoans, phytoplankton and zooplankton gases, salts and other substances describe the effects of known air pollutants on forest ecosystems; e.g., <ul style="list-style-type: none"> ozone particulate matter oxides and nitrogen sulphur dioxide 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> Activity 1.4—How Forests Affect the Environment Activity 1.5—Biosphere. <p>Dig a soil pit.</p> <p>Use a soil test kit.</p> <p>Design and perform experiments that monitor the effects of soil composition, air quality and water quality on tree growth.</p>

MODULE FOR309: ADVANCED FOREST ECOLOGY (continued)

Concept	Specific Learner Expectations	Notes
Forest Ecosystems (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> analyze the effects of a forest on the local environment; e.g., <ul style="list-style-type: none"> soil and water weather other wildlife infer the effects of forests worldwide on global climates. 	Measure/infer rates of transpiration and infer effects on weather and wildlife.
Forest Associations	<ul style="list-style-type: none"> explain that each tree species has unique site and climatic requirements that determine its ability to grow in particular environments research the general characteristics, life history, site and climatic requirements of several Alberta tree species; e.g., <ul style="list-style-type: none"> tree form growth patterns and life cycle soil moisture aspect and elevation describe the general structural characteristics and environments of some common forest associations in Alberta; e.g., <ul style="list-style-type: none"> soil moisture position on slope. 	<p>Field trip to classify growth sites.</p> <p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> Activity 2.4—Differences in Design Activity 3.1—A Lot Depends on Location. <p>Determine “most-likely site” to find particular tree species.</p>
Forest Change	<ul style="list-style-type: none"> identify living and non-living agents of change in a local forest environment infer structural and/or behavioural adaptations of living organisms to particular changes in the forest environment; e.g., <ul style="list-style-type: none"> adaptations to site conditions reproductive adaptations consider the impacts of specific environmental changes on a forest community; e.g., <ul style="list-style-type: none"> short-term consequences long-term consequences give examples of primary and secondary successional stages in a local forest environment describe Alberta's natural forest history; e.g., <ul style="list-style-type: none"> role of fire role of other agents. 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> Activity 1.6—Change in Forest Ecosystems Activity 3.5—Controlling Fire <p>Relate to forest associations.</p> <p>Example: aspen/spruce understory.</p> <p>Visit a mature forest and clear cut area. Differentiate between the two areas and make predictions regarding the areas in five years.</p>

MODULE FOR311: SILVICULTURE: GROWING THE FOREST**Level:** Advanced**Theme:** Management and Conservation**Prerequisite:** Basic Forest Ecology (FOR109; Recommended)**Module Parameters:** Demonstration forest

Students demonstrate knowledge of the techniques used in establishing, growing and harvesting tree crops.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none">describe silviculture and the silvics of Alberta tree species	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">preparing and presenting a report that describes:<ul style="list-style-type: none">major components of silviculture, including stand establishment, stand management and harvestthe silvics of five Alberta tree species. <i>Assessment Tool</i> <i>Presentations/Reports, FOR 311-1</i> <i>Sample Format: Silvics of a Tree Species, FOR311-2</i>	25
<ul style="list-style-type: none">demonstrate practices used to establish a stand of trees and manipulate growing conditions to favour particular species	<ul style="list-style-type: none">conducting laboratory and/or field investigations that demonstrate regeneration by:<ul style="list-style-type: none">natural methods, including natural seed supply and vegetative reproductionartificial methods, including direct seeding, bare-root and container seedlings. <i>Assessment Tool</i> <i>Lab Investigations, FOR311-3</i> <ul style="list-style-type: none">given access to a test bank on practices used to establish and manage a stand of trees, correctly responding to 20 out of 25 randomly selected test items. <i>Assessment Tool</i> <i>Sample Test Items: Stand Establishment and Management, FOR311-4</i>	65

MODULE FOR311: SILVICULTURE: GROWING THE FOREST (continued)

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> research growth/harvest relationships and appropriate methods of harvesting tree species demonstrate effort to develop basic competencies. 	<p><i>Assessment of student achievement will be based on:</i></p> <ul style="list-style-type: none"> safely observing and/or performing practical tasks used to establish and tend a stand of trees. Tasks to include: <ul style="list-style-type: none"> site preparation cone collection and seed extraction planting stock spacing, thinning, pruning, fertilizer use. <p><i>Assessment Tool</i> <i>Task Checklist: Stand Establishment and Tending, FOR311-5</i></p> <ul style="list-style-type: none"> given access to current publications on harvest methods (e.g., clearcutting, seed tree, shelterwood, selection) in Canada and other parts of the world, completing all components of a research project on the benefits and costs of different methods of harvest. <p><i>Assessment Tool</i> <i>Research Process, FOR311-6</i></p> <ul style="list-style-type: none"> given technical information regarding silvics of seven Alberta tree species, making recommendations regarding a suitable method of harvest for each species. <p><i>Assessment Tool</i> <i>Issue Analysis, FOR311-7</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the instructional period, with emphasis on: <ul style="list-style-type: none"> drawing conclusions from available information applying principles/theories to new situations allocating human and other resources assessing accomplishment and considering ways to improve performance following safe procedures and eliminating potential hazards. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

MODULE FOR311: SILVICULTURE: GROWING THE FOREST (continued)

Concept	Specific Learner Expectations	Notes
Regeneration and Stand Treatment	<p><i>The student should:</i></p> <ul style="list-style-type: none"> demonstrate methods of regeneration where seedlings are established by natural methods; e.g., <ul style="list-style-type: none"> naturally supplied seeds vegetative reproduction demonstrate methods of regeneration where seedlings are established by artificial methods; e.g., <ul style="list-style-type: none"> planting bare-root and container seedlings broadcasting seeds assess the pros and cons of natural and artificial methods of regeneration demonstrate techniques for site preparation and the care and planting of seeds and seedlings demonstrate intermediate stand tending techniques; e.g., <ul style="list-style-type: none"> cleaning sanitation thinning pruning fertilizing protecting identify safety practices and policies relevant to site preparation, tree planting and stand tending distinguish between intensive and extensive stand management practices. 	<p>Contact Alberta Land and Forest Services prior to module delivery for information regarding seedling availability, sites for tour and equipment availability.</p> <p>See <i>Alberta's Focus on Forests</i> (Activity 5.4–Reforestation: Forests or Tree Farms).</p> <p>Practical experiences in establishing a stand of trees and manipulating growing conditions to favour particular species.</p> <p>Potential exists for additional projects in seed collection and tree planting. May also be used as a school fundraiser.</p> <p>Grow container plants and apply different levels of fertilization.</p> <p>Compare nutrient requirements of young and mature stands.</p>
Cutting Methods	<ul style="list-style-type: none"> identify factors important in choosing a suitable method of harvest; e.g., <ul style="list-style-type: none"> growth characteristics intended utilization regeneration of species describe current applications of different methods of harvesting trees; e.g., <ul style="list-style-type: none"> clearcutting method seed tree method shelterwood method selection method assess the advantages and disadvantages of different methods of harvesting trees relate appropriate harvest methods to individual tree species. 	<p>See <i>Alberta's Focus on Forests</i> (Activity 4.6–Cutting Styles).</p> <p>Teacher Reference: <i>Timber Harvesting Guidelines</i> (Alberta Forest Service).</p> <p>Select three sites that possess different timber characteristics. Have students physically examine the sites to determine timber condition and harvesting considerations.</p>

MODULE FOR311: SILVICULTURE: GROWING THE FOREST (continued)

Concept	Specific Learner Expectations	Notes
Silviculture and Silvics	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● define silviculture as the science and art of growing and tending forest crops to obtain more and better benefits from forests including wood ● identify major components of silvicultural systems; e.g., <ul style="list-style-type: none"> – stand establishment – stand management – harvest and re-establishment ● explain that individual tree species have unique ecological requirements that determine suitable silvicultural practices ● compare and contrast the ecological requirements and silvics for two or more Alberta tree species ● describe one or more research programs designed to improve silvicultural practices; e.g., <ul style="list-style-type: none"> – genetic selection – geographic information systems – harvesting operations. 	Invite a professional forester to explain components of silviculture.

MODULE FOR312: STEWARDSHIP: BALANCING NEEDS**Level:** Advanced**Theme:** Management and Conservation**Prerequisite:** Users in the Forest (FOR212)**Module Parameters:** Access to government, industry and community resources

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

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions (Draft)	Weighting (%)
<i>The student will:</i> <ul style="list-style-type: none">describe basic forest management principlesestablish a plan for the sustainable development and integrated use of forested land	<i>Assessment of student achievement will be based on:</i> <ul style="list-style-type: none">definitions and Alberta examples of sustainable development, sustained yield, integrated land use and multiple use managementthe development and presentation of a plan for the sustainable development and integrated use of a forested region. Plan to include:<ul style="list-style-type: none">short- and long-term goals and objectivesconsideration of the views of relevant stakeholder groupsa process for public involvementproposed management standards and guidelinesa schedule of development activitiesa map that identifies boundaries, access, physical features, forest cover and other resources, existing and proposed developmentsa review of permits, licences and/or other legal agreements that may affect the plana strategy for monitoring use and resolving potential conflicts <i>Assessment Tools (to be developed)</i> <i>Hardisty Creek Land Management Plan, Appendix 3.6</i> <i>Mystic Mountain, Appendix 3.7</i> <i>Possum Creek Valley Management Plans, Appendix 3.8</i>	10 90
<ul style="list-style-type: none">demonstrate effort to refine basic competencies.	<ul style="list-style-type: none">observations of individual effort and interpersonal interaction during the instructional period, emphasizing:<ul style="list-style-type: none">being innovativeethicsteamwork, leadership and servicedemonstrating responsibility. <i>Assessment Tools</i> <i>Observation Checklist: Basic Competencies</i>	No mark

MODULE FOR312: STEWARDSHIP: BALANCING NEEDS (continued)

Concept	Specific Learner Expectations	Notes
Basic Principles	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● explain sustainable development and sustained yield within the context of Canada's forests ● compare principles of integrated land use with principles of multiple use management by citing examples of each within Alberta ● research local opportunities for consultation and public involvement in forest management decisions. 	A summative module requiring background knowledge of forestry—should be the last module studied in a sequence of Forestry modules.
Planning Process	<ul style="list-style-type: none"> ● establish short- and long-term goals for the management of forested land on an integrated basis; e.g., <ul style="list-style-type: none"> – recreation – forage – wildlife habitat – wood fibre – oil and gas ● identify scientific, economic and social factors to be addressed through the management plan; e.g., <ul style="list-style-type: none"> – the objectives of different stakeholders – relevant government acts and regulations – forest inventory requirements – the silvics of tree species and appropriate harvest methods – consumer trends and markets for forest products – potential applications of research and technology ● survey the views of different stakeholders in the forest and resolve conflicts that may arise; e.g., <ul style="list-style-type: none"> – recreational – environmental – aboriginal – industrial – agricultural ● incorporate consultation with other resource users and public involvement into the planning process ● identify alternative means of achieving the management goals, and select the preferred alternatives 	<p>See <i>Alberta's Focus on Forests</i>:</p> <ul style="list-style-type: none"> ● Activity 4.3–Forest Perspectives ● Activity 5.5–Integrated Resource Management <p>Have students interview a local landowner to determine long-range desires and plans for a forested region. Prepare written management plans consistent with the landowner's long-range goals. Compare with recommendations of a professional forester.</p>

MODULE FOR312: STEWARDSHIP: BALANCING NEEDS (continued)

Concept	Specific Learner Expectations	Notes
Planning Process (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> ● elaborate upon permits, licences or other legal agreements that may be required ● develop a set of actions and present the management plan; e.g., <ul style="list-style-type: none"> – a general description of the forested area – long-term management objectives – short-term management objectives – proposed management standards and guidelines – a schedule of short-term development activities ● prepare a map to accompany and elaborate upon the management plan; e.g., <ul style="list-style-type: none"> – boundaries of the forested area – forest cover and other resources within the area – physical features – history of past development – road access – proposed development activities ● describe techniques for monitoring the management plan to ensure that goals are being achieved. 	Specific management plans will vary, but need to address some common actions

Forestry

ASSESSMENT TOOLS

(Revised)

Draft, June 1995

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OBSERVATION CHECKLIST: BASIC COMPETENCIES

The following basic competencies (KSA) are integrated throughout the CTS program. A student's performance and growth should be assessed through observations involving the student, the teacher, peers and others. As the student progresses through the levels, he or she builds on competencies gained in earlier levels.

	Basic Competency	Stage 1	Stage 2	Stage 3
Personal Management	Managing Learning	<i>The student will:</i> <ul style="list-style-type: none"> be able to identify/locate appropriate reference/information sources identify and demonstrate a variety of learning skills and tools; e.g., learning styles/preferences and strategies such as notemaking, concept mapping, etc. 	<i>The student will:</i> <ul style="list-style-type: none"> apply a variety of learning styles/preferences to enhance ability to acquire new information recall and apply knowledge 	<i>The student will:</i> <ul style="list-style-type: none"> draw and defend conclusions from available information extract rules or principles apply rules and principles to new situations
	Being Innovative	<ul style="list-style-type: none"> recognize opportunities and problems specify goals and constraints generate alternatives consider risks evaluate and select best alternative 	<ul style="list-style-type: none"> think critically and act logically to evaluate situations, solve problems and make decisions 	<ul style="list-style-type: none"> combine ideas or information in new ways make connections between seemingly unrelated ideas prepare, validate and implement plans that reveal new possibilities
	Ethics	<ul style="list-style-type: none"> identify appropriate ethical behaviour 	<ul style="list-style-type: none"> demonstrate appropriate ethical behaviour 	<ul style="list-style-type: none"> encourage and support others to demonstrate ethical behaviour
	Managing Resources	<ul style="list-style-type: none"> allocate time effectively by selecting relevant, goal-related activities, ranking them in order of importance, allocating time, and preparing and following schedules. 	<ul style="list-style-type: none"> allocate materials and use facilities effectively by acquiring, storing, and distributing materials, supplies, parts, equipment, space, or final products in order to make best use of them. 	<ul style="list-style-type: none"> allocate human and other resources effectively by assessing knowledge and skills, distributing work and materials, evaluating performance and providing feedback.
Social Interaction	Communication	<ul style="list-style-type: none"> prepare and effectively present accurate, concise written, visual and oral reports 	<ul style="list-style-type: none"> communicate thoughts, feelings, and ideas to justify or challenge a position by encouraging, persuading, convincing or otherwise motivating individuals or groups 	<ul style="list-style-type: none"> negotiate effectively by working towards an agreement that may involve exchanging specific resources or resolving divergent interests
	Teamwork, Leadership and Service	<ul style="list-style-type: none"> participate as an effective member of a team by working cooperatively with others and contributing ideas, suggestions and effort recognize and respect peoples' diversity and individual differences 	<ul style="list-style-type: none"> serve clients and customers effectively by listening carefully to understand their needs and by providing as much assistance as possible to satisfy their expectations 	<ul style="list-style-type: none"> lead when appropriate, mobilizing the group for high performance
	Demonstrating Responsibility (Safety and Accountability)	<ul style="list-style-type: none"> demonstrate high standards in attendance and punctuality be trustworthy and honest in dealing with others follow safe procedures consistently and recognize and eliminate potential hazards. 	<ul style="list-style-type: none"> understand and evaluate the impact on self and the organization for breaking with organizational or societal values and regulations. 	<ul style="list-style-type: none"> work hard to excel at setting and meeting goals, doing tasks, setting high standards and paying attention to important details.

ASSESSMENT TOOLS

The following pages include background information and strategies for assessing student achievement, and the assessment tools that are listed in Sections D, E and F of this Guide.

This section of the Guide to Standards and Implementation has been designed to provide a common set of assessment tools that can be applied in each module in CTS throughout the province. The goal is to establish assessment standards that are fair and credible, and challenge junior and senior high school students as they proceed through the CTS program.

These tools will assist teachers throughout the province to more consistently assess student achievement. The purpose of expanding on the assessment standards is to:

- increase confidence among students, parents, business/industry and post-secondary that students can demonstrate the competencies specified in the modules they have completed
- encourage fairness and equity in how students' efforts are judged
- enable learners to focus effort on key learnings
- support teachers and community partners in planning and implementing CTS.

These tools are in draft form and are being validated between now and 1997 during the optional stage of CTS implementation.

Assessing Student Achievement in CTS

Assessing Student Achievement in Forestry (to be developed)

Assessment Tools Generic to CTS

Basic Competencies Reference Guide

Assessment Tools Generic to Forestry

FOR-LAB: Assessment Framework: Lab Investigations

FOR-RES: Assessment Framework: Research Process

FOR-PRE: Assessment Framework: Presentation/Reports

FOR-ISS: Assessment Framework: Issue Analysis

FOR-NEG: Assessment Framework: Negotiation and Debate

Assessment Tools Specific to Modules in Forestry

FOR102-1: Lab Investigations: Factors Affecting Plant Growth

FOR102-2: Presentations/Reports: Growth and Distribution of Forests

FOR102-3: Museum Conservation Rules for Leaf/Twig Collection

FOR104-1: Sample Tests Items: Woods Survival I

FOR104-2: Task Checklist: Woods Survival I

FOR104-3: Reflection Guide For Outdoor Experiences

FOR106-1: Presentations/Reports: Forest Surveys

FOR106-2: Task Checklist: Orienteering

FOR106-3: Task Checklist: Forest Measurement

FOR106-4: Task Checklist: Forest Survey

FOR109-1: Research Process: Forest Ecosystems
FOR109-2: Presentations/Reports: Structural Units of the Tree
FOR109-3: Lab Investigations: Tree Biology
FOR311-1: Presentations/Reports: Silvics of Alberta Trees
FOR311-2: Sample Format: Silvics of a Tree Species
FOR311-3: Lab Investigations: Natural and Artificial Methods of Regeneration
FOR311-4: Sample Testing Items: Stand Establishment and Management
FOR311-5: Task Checklist: Stand Establishment and Tending
FOR311-6: Research Process: Forest Harvest Methods
FOR311-7: Issue Analysis: Benefits and Costs of Different Harvest Methods

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, referenced in Sections D, E and F of this Guide, 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, etc.

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 tools included in this section 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%.

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. (Copies of this document have been forwarded to superintendents and senior high school principals.)

Components of Assessment Standards in CTS

The following components are included in each module:

- module learner expectations (shaded left column of the module) define the exit-level competencies students are expected to achieve to complete a module. Each MLE defines and describes critical behaviors that can be measured and observed. The student must meet the standard specified for ALL MLEs within a module to be successful. (*MLEs will not change until 1997 when minor adjustments may be made to update and clarify wording.*)

- suggested emphasis (right column of the module) provides a guideline for the relative significance of each MLE and can be used to organize for instruction. *(In draft until early 1997, revisions to selected modules will be distributed in June 1995 and 1996 with final revisions in June 1997.)*
- conditions and criteria (middle column of the module) set the framework for the assessment of student competency, specifying the minimum standard for performance and including a reference to assessment tools, where appropriate. *(In draft until early 1997, revisions to selected modules will be distributed in June 1995 and 1996 with final revisions in June 1997.)*

Conditions outline the specifications under which a student's competency can be judged. For example, the conditions could specify whether the assessment should be timed or not, or if the student should be allowed to access to support resources or references.

Criteria define the behaviors that a student must demonstrate to meet the designated standard. For example, the criteria could describe the various techniques that must be demonstrated when using a tool, and/or describe the minimum components of a project the student must complete.

Standard -The *standard* may be defined by (1) assessment tools, which are referenced in this section (or sometimes in approved learning resources) and/or (2) exemplars of student work (to be developed and distributed as "Reference Sets" in June 1997).

Assessment Tools included in this section of the Guide (e.g. checklists, rubrics/rating scales) tend to be of two types:

- tools generic to a strand or to the entire CTS program; e.g., a standard 4-point Project Assessment Scale / Rubric is used in all strands. Other generic tools being developed include assessing reports and

presentations and lab safety checklists. *(Names of these tools include the strand code (e.g., "INF" for Information Processing) and a code for the type of tool (e.g., "TDENT" for Text-Data Entry).)*

- tools specific to a module; e.g., assessment checklist for assessing a venture plan in Enterprise and Innovation or a checklist for sketching, drawing and modeling in Design Studies. *(Names of these tools include the module code; e.g., "INF101-1" indicating that it is the first module-specific tool used in Information Processing 101.)*
- Exemplars / Reference Sets : Selected examples of student work in print, audio, video and/or CD-ROM formats are scheduled to be available by June 1997. These exemplars will supplement the assessment tools and help teachers decide if a student's work is at standard, above standard, or not yet at standard.

Development and Validation Processes

The "Conditions and Criteria" and "Suggested Emphasis" columns and related assessment tools are being validated 1994-97, with extensive input from teachers, professional associations / contacts and post-secondary institutions. The goal is to prepare well-structured assessment standards and related assessment tools that:

- establish an appropriate level of challenge and rigor
- relate directly to the type of learning described in the curriculum standard
- are easy to understand
- efficient to implement
- can provide a consistent measure of what was expected to be measured.

BASIC COMPETENCIES REFERENCE GUIDE

The following basic competencies (KSA) are integrated throughout the CTS program. A student's performance and growth should be assessed through observations involving the student, the teacher, peers and others. As the student progresses through the levels, he or she builds on competencies gained in earlier levels.

	Basic Competency	Stage 1	Stage 2	Stage 3
P e r s o n a l M a n a g e m e n t	Managing Learning	<i>The student will:</i> <ul style="list-style-type: none"> ☐ be able to identify/locate appropriate reference/information sources ☐ identify and demonstrate a variety of learning skills and tools; e.g., learning styles/ preferences and strategies such as notemaking, concept mapping, etc. 	<i>The student will:</i> <ul style="list-style-type: none"> ☐ apply a variety of learning styles/preferences to enhance ability to acquire new information recall and apply knowledge 	<i>The student will:</i> <ul style="list-style-type: none"> ☐ draw and defend conclusions from available information ☐ extract rules or principles ☐ apply rules and principles to new situations
	Being Innovative	<ul style="list-style-type: none"> ☐ recognize opportunities and problems ☐ specify goals and constraints ☐ generate alternatives ☐ consider risks ☐ evaluate and select best alternative 	<ul style="list-style-type: none"> ☐ think critically and act logically to evaluate situations, solve problems and make decisions 	<ul style="list-style-type: none"> ☐ combine ideas or information in new ways ☐ make connections between seemingly unrelated ideas ☐ prepare, validate and implement plans that reveal new possibilities
	Ethics	<ul style="list-style-type: none"> ☐ identify appropriate ethical behaviour 	<ul style="list-style-type: none"> ☐ demonstrate appropriate ethical behaviour 	<ul style="list-style-type: none"> ☐ encourage and support others to demonstrate ethical behaviour
	Managing Resources	<ul style="list-style-type: none"> ☐ allocate time effectively by selecting relevant, goal-related activities, ranking them in order of importance, allocating time, and preparing and following schedules. 	<ul style="list-style-type: none"> ☐ allocate materials and use facilities effectively by acquiring, storing, and distributing materials, supplies, parts, equipment, space, or final products in order to make best use of them. 	<ul style="list-style-type: none"> ☐ allocate human and other resources effectively by assessing knowledge and skills, distributing work and materials, evaluating performance and providing feedback.
S o c i a l I n t e r a c t i o n s	Communication	<ul style="list-style-type: none"> ☐ prepare and effectively present accurate, concise written, visual and oral reports 	<ul style="list-style-type: none"> ☐ communicate thoughts, feelings, and ideas to justify or challenge a position by encouraging, persuading, convincing or otherwise motivating individuals or groups 	<ul style="list-style-type: none"> ☐ negotiate effectively by working towards an agreement that may involve exchanging specific resources or resolving divergent interests
	Teamwork, Leadership and Service	<ul style="list-style-type: none"> ☐ participate as an effective member of a team by working cooperatively with others and contributing ideas, suggestions and effort ☐ recognize and respect peoples' diversity and individual differences 	<ul style="list-style-type: none"> ☐ serve clients and customers effectively by listening carefully to understand their needs and by providing as much assistance as possible to satisfy their expectations 	<ul style="list-style-type: none"> ☐ lead when appropriate, mobilizing the group for high performance
	Demonstrating Responsibility (Safety and Accountability)	<ul style="list-style-type: none"> ☐ demonstrate high standards in attendance and punctuality ☐ be trustworthy and honest in dealing with others ☐ follow safe procedures consistently and recognize and eliminate potential hazards. 	<ul style="list-style-type: none"> ☐ understand and evaluate the impact on self and the organization for breaking with organizational or societal values and regulations. 	<ul style="list-style-type: none"> ☐ work hard to excel at setting and meeting goals, doing tasks, setting high standards and paying attention to important details.

ASSESSMENT FRAMEWORK: LAB INVESTIGATIONS

FOR-LAB

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student is able to:</i></p> <p>Management</p> <ul style="list-style-type: none"> • prepare self for task • organize and work in an orderly manner • carry out instructions accurately • use time effectively <p>Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members <p>Use of Equipment and Materials</p> <ul style="list-style-type: none"> • select and use appropriate equipment/materials • follow safe procedures/techniques • weigh and measure accurately • return clean equipment/materials to storage areas <p>Investigative Techniques</p> <ul style="list-style-type: none"> • gather and apply information from at least one source • make predictions that can be tested • set up and conduct experiments to test a prediction • distinguish between manipulated/responding variables • obtain results that can be used to determine if some aspect of the prediction is accurate • summarize important experimental outcomes 	<p><i>The student is able to:</i></p> <p>Management</p> <ul style="list-style-type: none"> • prepare self for task • organize and work in an orderly manner • interpret and carry out instructions accurately • plan and use time effectively • adhere to routine procedures <p>Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members • negotiate solutions to problems <p>Use of Equipment and Materials</p> <ul style="list-style-type: none"> • select and use appropriate equipment/materials • model safe procedures/techniques • weigh and measure accurately • practice proper sanitation procedures • minimize waste of materials • advise of potential hazards and necessary repairs <p>Investigative Techniques</p> <ul style="list-style-type: none"> • gather and apply information from a variety of sources • make predictions that can be tested • plan, set up & conduct experiments to test a prediction • identify and explain manipulated/responding variables • obtain accurate results that confirm/reject the prediction • summarize and apply experimental outcomes 	<p><i>The student is able to:</i></p> <p>Management</p> <ul style="list-style-type: none"> • prepare self for task • organize and work in an orderly manner • interpret and carry out instructions accurately • plan and use time effectively in a logical sequence • display leadership in adhering to routine procedures • attempt to solve problems prior to requesting help <p>Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members • negotiate with sensitivity solutions to problems • display effective communication skills <p>Use of Equipment and Materials</p> <ul style="list-style-type: none"> • independently select and use equipment/ materials • demonstrate concern for safe procedures/techniques • weigh and measure accurately and efficiently • practice proper sanitation procedures • minimize waste of materials • anticipate potential hazards and emergency response <p>Investigative Techniques</p> <ul style="list-style-type: none"> • use relevant information to explain observations • make predictions that can be tested • plan, set up & conduct experiments to test a prediction • analyze relationships among manipulated/responding variables • obtain accurate results that confirm/reject prediction and answer related questions • summarize, apply and evaluate experimental outcomes

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set goals and follow instructions accurately • adhere to established timelines • respond to directed questions and follow necessary steps to find answers • use time effectively <p>Information Gathering and Processing</p> <ul style="list-style-type: none"> • access basic in-school/community information sources • use one or more information-gathering techniques • interpret and organize information in a logical sequence • record information accurately using correct technical terms • distinguish between fact and fiction/opinion/theory • respond to feedback when current approach is not working <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members <p>Information Sharing</p> <ul style="list-style-type: none"> • demonstrate effective use of one or more communication media <i>e.g., written, oral, audio-visual</i> • communicate information in a logical sequence • use correct grammatical convention and technical terms • cite 3 or more basic information sources 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set goals and establish steps to achieve them • create and adhere to useful timelines • use personal initiative to formulate questions and find answers • plan and use time effectively <p>Information Gathering and Processing</p> <ul style="list-style-type: none"> • access a range of relevant in-school/community resources • use a range of information-gathering techniques • interpret, organize and combine information into a logical sequence • record information accurately with appropriate supporting detail and using correct technical terms • determine accuracy/currency/reliability of information sources • gather and respond to feedback regarding approach to the task <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members • negotiate solutions to problems <p>Information Sharing</p> <ul style="list-style-type: none"> • demonstrate effective use of two or more communication media <i>e.g., written, oral, audio-visual</i> • communicate ideas in a logical sequence with sufficient supporting detail • maintain acceptable grammatical and technical standards • cite 5 or more relevant information sources 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set clear goals and establish steps to achieve them • create and adhere to detailed timelines • use personal initiative to formulate questions and find answers • plan and use time effectively, prioritizing tasks on a consistent basis <p>Information Gathering and Processing</p> <ul style="list-style-type: none"> • access a range of relevant information sources and recognize when additional information is required • demonstrate resourcefulness in collecting data • interpret, organize and combine information in creative and thoughtful ways • record information accurately with appropriate supporting detail and using correct technical terms • recognize underlying bias/assumptions/values in information sources • assess and refine approach to the task and project status based on feedback and reflection <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> • cooperate with group members • share work appropriately among group members • negotiate with sensitivity solutions to problems • display effective communication and leadership skills <p>Information Sharing</p> <ul style="list-style-type: none"> • demonstrate effective use of a variety of communication media <i>e.g., written, oral, audio-visual</i> • communicate thoughts/feelings/ideas clearly to justify or challenge a position • maintain acceptable grammatical and technical standards • give evidence of adequate information gathering by citing 7 or more relevant information sources

ASSESSMENT FRAMEWORK: PRESENTATIONS/REPORTS

FOR-PRE

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set goals and follow instructions accurately • respond to directed questions and follow necessary steps to find answers • access basic in-school/community information sources • interpret and organize information into a logical sequence • record information accurately using correct technical terms • use time effectively <p>Presentation</p> <ul style="list-style-type: none"> • demonstrate effective use of at least one medium of communication e.g., <u>Written</u>: spelling, punctuation, grammar, basic format <u>Oral</u>: voice projection, body language <u>Audio-Visual</u>: techniques, tools • use correct grammatical convention and technical terms through proof-reading/editing • provide an introduction that describes the purpose of the project • communicate information in a logical sequence • state a conclusion based on a summary of facts • provide a reference list of 3 or more basic information sources 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set goals and describe steps to achieve them • use personal initiative to formulate questions and find answers • access a range of relevant in-school/community resources • interpret, organize and combine information into a logical sequence • record information accurately with appropriate supporting detail and using correct technical terms • plan and use time effectively • gather and respond to feedback regarding approach to task and project status <p>Presentation</p> <ul style="list-style-type: none"> • demonstrate effective use of at least two communication media e.g., <u>Written</u>: spelling, punctuation, grammar, format (formal/informal) <u>Oral</u>: voice projection, body language, appearance <u>Audio-Visual</u>: techniques, tools, clarity • maintain acceptable grammatical and technical standards through proof-reading and editing • provide an introduction that describes the purpose and scope of the project • communicate ideas into a logical sequence with sufficient supporting detail • state a conclusion by synthesizing the information gathered • provide a reference list that includes 5 or more relevant information sources 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> • set goals and describe steps to achieve them • use personal initiative to formulate questions and find answers • access a range of relevant information sources and recognize when additional information is required • interpret, organize and combine information in creative and thoughtful ways • record information accurately using appropriate technical terms and supporting detail • plan and use time effectively, prioritizing tasks on a consistent basis • assess and refine approach to task and project status based on feedback and reflection <p>Presentation</p> <ul style="list-style-type: none"> • demonstrate effective use of a variety of communication media e.g., <u>Written</u>: spelling, punctuation, grammar, format (formal/informal, technical/literary) <u>Oral</u>: voice projection, body language, appearance, enthusiasm, evidence of prior practice <u>Audio-Visual</u>: techniques, tools, clarity, speed and pacing • maintain acceptable grammatical and technical standards through proof-reading and editing • provide an introduction that describes the purpose and scope of the project • communicate thoughts/feelings/ideas clearly to justify or challenge a position • state a conclusion by analyzing and synthesizing the information gathered • give evidence of adequate research through a reference list including 7 or more relevant information sources

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree pose an important question regarding the issue access basic in-school/community information sources regarding the issue use one or more information-gathering techniques <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> clarify different points of view regarding the issue <i>e.g., social, economic, environmental,</i> state a position on the issue and logical reasons for adopting that position state an opposing position on the issue and logical reasons for adopting that position identify sources of conflict among different positions distinguish between fact and fiction/opinion/theory <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> share work appropriately among group members respect the views of others <p>Evaluating Choices/Making Decisions</p> <ul style="list-style-type: none"> identify useful alternatives regarding the issue establish criteria for assessing each alternative <i>e.g., social, economic, environmental</i> select an appropriate alternative based on established criteria reflect on strengths/weaknesses of decisions by considering consequences communicate information in a logical sequence to justify choices/decisions made 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree, explaining areas of disagreement pose one or more thoughtful questions regarding the issue access a range of relevant in-school/community resources use a range of information-gathering techniques <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> categorize different points of view regarding the issue <i>e.g., cultural, ethical, economic, environmental, health-related</i> state a position on the issue and logical reasons for adopting that position state two or more opposing positions on the issue and logical reasons for adopting each position describe interrelationships among different perspectives/points of view determine accuracy/currency/reliability of information and ideas <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> share work appropriately among group members respect and consider the views of others negotiate solutions to problems <p>Evaluating Choices/Making Decisions</p> <ul style="list-style-type: none"> identify important and appropriate alternatives regarding the issue establish knowledge- and value-based criteria for assessing each alternative <i>e.g., social, economic, environmental</i> select an appropriate alternative by showing differences among choices assess strengths/weaknesses of decisions by considering consequences communicate ideas in a logical sequence with supporting detail to justify choices/decisions made 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree, explaining specific causes of disagreement pose thoughtful questions regarding the issue access a range of relevant information sources and recognize when additional information is required demonstrate resourcefulness in collecting data <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> categorize different points of view regarding the issue <i>e.g., cultural, ethical, economic, environmental, health-related, scientific, political</i> state a position on the issue and insightful reasons for adopting that position state three or more opposing positions on the issue and thoughtful reasons for adopting each position analyze interrelationships among different perspectives/points of view recognize underlying bias/assumptions/values in information and ideas <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> share work appropriately among group members respect and consider the views of others negotiate with sensitivity solutions to problems <p>Evaluating Choices/Making Decisions</p> <ul style="list-style-type: none"> describe in detail important and appropriate alternatives regarding the issue establish knowledge- and value-based criteria for assessing each alternative <i>e.g., social, economic, environmental</i> select an appropriate and useful alternative by showing differences among choices assess strengths/weaknesses of decisions by considering consequences and implications communicate thoughts/feelings/ideas clearly to justify choices/decisions made

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree pose an important question regarding the issue access basic in-school/community information sources regarding the issue use one or more information-gathering techniques <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> state a position on the issue and logical reasons for adopting that position explain why the issue is important by presenting examples of possible consequences clarify different points of view regarding the issue <i>e.g., social, economic, environmental</i> distinguish between fact and fiction/opinion/theory <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> work with a range of peer members share information/opinions/suggestions through group discussion listen to and respect the views of others <p>Negotiating and Debating</p> <ul style="list-style-type: none"> present a convincing argument in logical sequence supporting a position adopted on the issue provide a relevant response to opposing arguments speak clearly so the argument can be understood establish a shared understanding of key alternatives and consequences relevant to the issue 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree, explaining areas of disagreement pose one or more thoughtful questions regarding the issue access a range of relevant in-school/community resources use a range of information-gathering techniques <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> state a position on the issue and logical reasons for adopting that position explain why the issue is important by presenting examples of possible consequences categorize different points of view regarding the issue <i>e.g., cultural, ethical, economic, environmental, health-related</i> determine accuracy/currency/reliability of information and ideas <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> work with a range of peer members share information/opinions/suggestions, maintaining a balance between speaking and listening listen to and respect the views of others, requesting clarification as necessary from other group members <p>Negotiating and Debating</p> <ul style="list-style-type: none"> present a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance provide a relevant and convincing response to opposing arguments speak clearly without hesitation so the argument can be understood negotiate a shared agreement on preferred alternatives relevant to the issue 	<p><i>The student is able to:</i></p> <p>Preparation and Planning</p> <ul style="list-style-type: none"> accurately describe an issue on which people disagree, explaining specific causes of disagreement pose thoughtful questions regarding the issue access a range of relevant information sources and recognize when additional information is required demonstrate resourcefulness in collecting data <p>Analyzing Perspectives</p> <ul style="list-style-type: none"> state a position on the issue and insightful reasons for adopting that position explain why the issue is important by presenting examples of possible consequences and implications categorize different points of view regarding the issue <i>e.g., cultural, ethical, economic, environmental, health-related, scientific, political</i> recognize underlying bias/assumptions/values in information and ideas <p>Collaboration and Teamwork</p> <ul style="list-style-type: none"> work with a wide range of peer members share information/opinions/suggestions, maintaining a balance between speaking and listening listen to and respect the views of others, requesting clarification as necessary from other group members <p>Negotiating and Debating</p> <ul style="list-style-type: none"> present a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance and backing each with sound evidence provide a relevant and convincing rebuttal to opposing arguments speak clearly without hesitation so the argument can be understood by all listeners negotiate a shared agreement on preferred alternatives by resolving divergent points of view

TASK	Student	Teacher
Management	4	4
	3	3
	2	N/
	1	A
	0	0
Teamwork	4	4
	3	3
	2	N/
	1	A
	0	0
Use of Equipment and Materials	4	4
	3	3
	2	N/
	1	A
	0	0
Investigative Techniques	4	4
	3	3
	2	N/
	1	A
	0	0

TASK CHECKLIST*The student is able to:***Management**

- ☐ prepare self for task
- ☐ organize and work in an orderly manner
- ☐ carry out instructions accurately
- ☐ use time effectively

Teamwork

- ☐ cooperate with group members
- ☐ share work appropriately among group members

Use of Equipment and Materials

- ☐ select and use appropriate equipment/materials
- ☐ follow safe procedures/techniques
- ☐ weigh and measure accurately
- ☐ return clean equipment/materials to storage areas

Investigative Techniques

- ☐ gather and apply information from at least one source
- ☐ make predictions that can be tested regarding factors affecting plant growth; e.g.:
 - temperature
 - moisture
 - soil characteristics
- ☐ set up and conduct experiments to test predictions
- ☐ distinguish between manipulated/responding variables
- ☐ obtain results that can be used to determine if some aspect of the prediction is accurate
- ☐ summarize important experimental outcomes regarding factors affecting plant growth
- ☐ apply experimental results in explaining the distribution of forests in Alberta

Rating Scale:

- 4 Met project/task objectives by independently selecting and implementing the most appropriate course of action. Problems were solved in effective and creative ways. Quality and productivity exceed standards.
- 3 Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
- 2 Met project/task objectives with limited assistance in planning, solving problems and selecting and using resources/processes. Only minor errors/deficiencies are noted. Quality and productivity meet standards, but are occasionally inconsistent.
- 1 Completed task as directed, demonstrating rudimentary skills/competence by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

TEACHER/STUDENT REFLECTION**STANDARD IS 1 IN EACH APPLICABLE TASK**

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Presenting/Reporting	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

- 4 Met project/task objectives by independently selecting and implementing the most appropriate course of action. Problems were solved in effective and creative ways. Quality and productivity exceed standards.
- 3 Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
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- 1 Completed task as directed, demonstrating rudimentary skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK**TASK CHECKLIST***The student is able to:***Preparation and Planning**

- ☐ set goals and follow instructions accurately
- ☐ respond to directed questions and follow necessary steps to find answers
- ☐ access basic in-school/community information sources
- ☐ interpret and organize information into a logical sequence
- ☐ record information accurately using correct technical terms
- ☐ use time effectively

Content

- ☐ explain ways in which climatic factors affect the growth of trees; e.g.:
 - temperature
 - moisture
- ☐ explain ways in which land form factors affect the growth of trees; e.g.:
 - topography
 - soil characteristics
- ☐ integrate information about climatic and land form factors to explain species distribution within forest regions

Content (continued)

- ☐ suggest at least five reasons for the distribution of trees within a natural region of Alberta or Canada

☐ _____

☐ _____

☐ _____

Presenting/Reporting

- ☐ demonstrate effective use of one or more communication media:
e.g., *Written: spelling, punctuation, grammar*
basic format

Oral: voice projection, body language
Audio-Visual: techniques, tools

- ☐ use correct grammatical convention and technical terms through proof-reading/editing
- ☐ provide an introduction that describes the purpose of the project
- ☐ communicate information in a logical sequence
- ☐ state a conclusion based on a summary of facts
- ☐ provide a reference list of three or more basic information sources.

TEACHER/STUDENT REFLECTION

ASSESSMENT CRITERIA	RATING SCALE		
	0	1	2
Each specimen in the collection to be assessed according to the following criteria:			3
1. Completeness <ul style="list-style-type: none"> specimen must include typical <u>needles/leaves, twig and terminal bud</u> cone, fruit or seed to be included where feasible minimum size of specimen is 15 cm in length 	Atypical foliage No twig or bud No cone or fruit	No twig or bud Sample too small No cone or fruit	All components present Size above minimum Cone/fruit included
2. Pressing: <ul style="list-style-type: none"> specimen to be flattened so that the undersides of some needles/leaves face upward no folding or bending of tissue to be evident 	Foliage not flat Underside of foliage not visible Substantial folding of tissue	Foliage flat Underside of foliage not visible Significant folding of tissue	Foliage flat Underside of some foliage faces upward All tissue laying flat
3. Mounting: <ul style="list-style-type: none"> dried specimens are attached to Bristol board with white glue or Gum Arabic conifers may be placed in Ryker mounts specimen must occupy central position on mounting sheet (or in Ryker mount) orientation vertical or at 45° to vertical (terminal bud to top) 	Scotch tape Horizontal or downward orientation Smears evident	White glue Horizontal or downward orientation Minor smears or excess glue	White glue Vertical or upward orientation Sheet clear of smears, excess glue
4. Labelling: <ul style="list-style-type: none"> family name scientific name common name geographic location where collected habitat name of collector date of collection 	Incomplete information Incorrect sequence for more than 2 items	Habitat or location missing 1-2 items out of sequence	Complete information Correct sequence
5. Identification: <ul style="list-style-type: none"> must include common name, as well as species, genus and family names 	More than 2 categories incorrect (family, genus, species, common name)	2 of 4 categories wrong	Correct to species

STANDARD IS 2 FOR EACH SPECIMEN IN THE COLLECTION

SAMPLE TEST ITEMS: WOODS SURVIVAL I

FOR104-1

MULTIPLE CHOICE:

- Bob's toes are numb after spending all day outdoors at -25°C. He gets in his truck and takes off his boots. All his toes are white and hard. Bob should:
 - turn the heater on high and stick his toes in the hot air
 - ☒ let his feet warm up slowly
 - rub snow on the affected area
 - pour the hot coffee from his thermos over his toes to warm them up quickly.
- To avoid frostbite one should:
 - always wear a face mask
 - don't go out when colder than -26°C
 - ☒ evaluate the weather and dress accordingly
 - always dress for -40°C weather.
- If you were wet and started to panic in the woods, the best way to deal with the fear is:
 - run very fast for 10 minutes because physical activity removes fear
 - ☒ force yourself to sit down and think about the situation calmly
 - let the panic happen and deal with the situation after
 - none of the other choices
- If you were planting trees in a hot open cutover with no shade, you should:
 - drink a litre of water once every 3 hours and wear a hat
 - drink a little water every 20 minutes or so and not wear a hat
 - ☒ drink a litre of water once every 3 hours and not wear a hat
 - drink a little water every 20 minutes or so and wear a hat.
- On a cold late fall day with a stiff wind blowing, your partner falls into a river. He goes through some rapids and is in the river for 5 minutes before you drag him out. You should:
 - tell him to walk with you and let the wind dry him off
 - ☒ build a fire to dry him off
 - make him take off his clothes, build a fire and warm him up
 - have him continue working, it will take his mind off his wet clothes.

WRITTEN RESPONSE:

- Describe "hypothermia" and list three factors that cause it.

Descriptive Criteria: shivering, loss of coordination, loss of awareness, slowing down, withdrawal (personality change), speech difficulty

Causes: fatigue, exhaustion, hypohydration, inappropriate dress, injury

- Survival may depend on the person as well as the situation. List eight personality requirements of survival.
- Survival may depend on personality as well as the nature of the danger, weather, terrain, or emergency. Whether fear will lead to panic or act as a spur to greater sharpness, or whether fatigue will overcome or leave a person able to take the necessary action to survive, depend on the person as well as the situation. Qualities in people that are important to survival are:
- can make up one's mind
 - can improvise
 - can live in solitude
 - can adapt to new situations
 - can remain calm and collected
 - can hope for the best but prepare for the worst
 - has patience
 - can accept hardship
 - can understand the other person.

- You are in an outdoor survival situation with no contact for outside assistance. What procedure would you use to obtain your food and water requirements in a:
 - mid-winter forested area
 - summer forested area
 - summer area above the timberline.

WRITTEN RESPONSE (continued):

4. Describe strategies that may be effective in coping with pain in survival situations.

Pain is Nature's way of making you pay attention to something that is wrong with you. But Nature also has ways of holding off pain if you are too busy doing something else to pay attention to the injury right then. Pain may go unnoticed if your mind is occupied with plans for survival. On the other hand, once given in to, pain will weaken the drive to survive. Pain can get the best of you if you let it, even if it isn't serious or prolonged. A special effort must be made to keep hopes up and to keep working

5. How does fatigue work to lessen a person's chances of survival? Describe strategies for minimizing fatigue in outdoor situations.

Even a very moderate amount of fatigue can materially reduce mental ability. Fatigue can make you careless -- it becomes increasingly easy to adopt the feeling of just not caring. This is one of the biggest dangers in survival. The confused notion that fatigue and energy expenditure are directly related may be responsible for many deaths in survival situations. Certainly there is a real danger of over-exertion, but fatigue may actually be due to hopelessness, lack of a goal, dissatisfaction, frustration or boredom. Fatigue may represent an escape from a situation that has become too difficult. If you recognize the dangers of a situation, you can often summon the strength to go on.

6. Boredom and loneliness are two often unexpected challenges in survival situations. Describe strategies for coping with these challenges.

Boredom and loneliness are two of the toughest enemies of survival. They are dangerous mainly because they are unexpected. When nothing happens, when something is expected and doesn't come off, when you must stay still, quiet and alone, these feelings creep up on you.

7. Describe strategies for coping with cold, thirst and hunger in survival situations.

PLANNING, ASSEMBLING AND TRANSPORTING GEAR	OUTDOOR TOOLS AND EQUIPMENT	OUTDOOR TOOLS AND EQUIPMENT (continued)
<p><i>The student is able to:</i></p> <p>☐ prepare a 3-day camping menu for self that addresses:</p> <ul style="list-style-type: none"> ☐ expected caloric output ☐ all food groups included in <i>Canada's Food Guide</i> ☐ concerns related to food spoilage ☐ provisions for emergency 	<p><i>The student is able to:</i></p> <p>☐ follow safe procedures for the use of knives:</p> <ul style="list-style-type: none"> ☐ ensure good condition prior to use ☐ demonstrate safe use/appropriate care ☐ follow safe procedures for storing and carrying ☐ use correct sharpening techniques 	<p><i>The student is able to:</i></p> <p>☐ follow safe procedures for the use of lanterns:</p> <ul style="list-style-type: none"> ☐ ensure sufficient fuel/air intake ☐ remove extra fuel from area before lighting ☐ allow spilled fuel to evaporate prior to lighting ☐ follow correct lighting procedures ☐ place lit lantern in safe location
<p>☐ assemble and pack gear for a trip in an appropriate manner:</p> <ul style="list-style-type: none"> ☐ address weight restrictions ☐ make efficient use of space ☐ pack food to prevent spoilage and minimize odour 	<p>☐ follow safe procedures for the use of axes:</p> <ul style="list-style-type: none"> ☐ ensure good condition prior to use ☐ demonstrate safe use/appropriate care ☐ follow safe procedures for storing and carrying ☐ use correct sharpening techniques 	<p>☐ follow safe procedures for the use of stoves:</p> <ul style="list-style-type: none"> ☐ ensure sufficient fuel/air intake and adequate ventilation ☐ remove extra fuel from area prior to lighting ☐ allow any spilled fuel to evaporate prior to lighting ☐ follow correct lighting procedures ☐ follow correct shut-down/post-use procedures
<p>☐ safely transport gear by human conveyance (e.g., backpack, sled) a minimum distance of 3 kilometres</p>	<p>☐ follow safe procedures for the use of saws:</p> <ul style="list-style-type: none"> ☐ ensure good condition prior to use ☐ demonstrate safe use/appropriate care ☐ follow safe procedures for storing and carrying ☐ use correct sharpening techniques 	<p>☐</p>
<p>☐</p>	<p>☐ follow safe procedures for the use of shovels:</p> <ul style="list-style-type: none"> ☐ ensure good condition prior to use ☐ demonstrate safe use/appropriate care ☐ follow safe procedures for storing and carrying ☐ use correct sharpening techniques 	<p>☐</p>

OUTDOOR FIRES
<i>The student is able to:</i>
☐ check the location and supply of extinguishing materials
☐ use natural materials (e.g., rocks) to control fire spread
☐ remove vegetation matter from base of fire
☐ take wind into consideration when choosing fire location
☐ establish a structure/method for supporting cooking utensils
☐ start the fire using fine fuels (e.g., grass, twigs) rather than gas
☐ construct a fire of appropriate size, using only drift wood or dead fall for fuel
☐ ensure fire is completely extinguished when finished
☐

CONSTRUCTING OUTDOOR SHELTERS (continued)
☐ select an appropriate location for shelter, considering water, fire and signaling needs
☐ select a location protected from wind, and away from dead or single trees
☐ demonstrate two or more basic shelter-building techniques that involve the use of materials and/or natural structures available in the outdoors; e.g.: ☐ fallen tree shelter ☐ lean-to shelter ☐ snow cave shelter
☐ construct shelter demonstrating least possible impact on the environment
☐ demonstrate appropriate use of tools, equipment and safety devices
☐

HYGIENE AND SANITATION (continued)
☐ establish methods of disposing of waste water and garbage
☐
☐

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 - 1 Completed task as directed, demonstrating rudimentary skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.
 - 0 Not yet completed task, major deficiencies and/or errors are evident.
- N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE**TASK AREA**

CONSTRUCTING OUTDOOR SHELTERS
<i>The student is able to:</i>
☐ identify type of shelter that will best protect from the elements

HYGIENE AND SANITATION
<i>The student is able to:</i>
☐ plan for potable water supply
☐ demonstrate appropriate water purification techniques
☐ explain appropriate location and construction of latrines

REFLECTION GUIDE FOR OUTDOOR EXPERIENCES

FOR104-3

JOURNAL ENTRY: DATE:	#1		#2		#3		#4		#5	
	Student	Teacher	Student	Teacher	Student	Teacher	Student	Teacher	Student	Teacher
Individual/Group Preparedness	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Cooperation and Teamwork	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Responsibility and Safety	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Environmental Ethics	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
TOTAL:										

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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK

TASK CHECKLIST

The student is able to:

Individual/Group Preparedness

- ☐ set goals and follow instructions accurately
- ☐ adhere to established timelines
- ☐ identify/assemble outdoor gear appropriate to the task
- ☐ use time effectively

Cooperation and Teamwork

- ☐ work with a range of peer members
- ☐ share work appropriately among group members
- ☐ consider the ideas/suggestions of others

Responsibility and Safety

- ☐ select and use appropriate equipment/materials
- ☐ follow safe procedures/techniques
- ☐ anticipate and advise of potential hazards
- ☐ practise proper sanitation procedures

Environmental Ethics

- ☐ use environmentally friendly materials
- ☐ pick up garbage and carry everything out that is carried in
- ☐ avoid ecologically sensitive areas
- ☐ demonstrate techniques for protecting water supply

PRESENTATIONS/REPORTS: FOREST SURVEYS

FOR106-1

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Presenting/Reporting	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
- Met project/task objectives with limited assistance in planning; solving problems and selecting and using resources/processes. Only minor errors/deficiencies are noted. Quality and productivity meet standards, but are occasionally inconsistent.
- Completed task as directed, demonstrating rudimentary skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK

TASK CHECKLIST

The student is able to:

Preparation and Planning

- ☐ set goals and follow instructions accurately
- ☐ respond to directed questions and follow necessary steps to find answers
- ☐ access basic in-school/community information sources
- ☐ interpret and organize information into a logical sequence
- ☐ record information accurately using correct technical terms
- ☐ use time effectively

Content

- ☐ suggest reasons for conducting a forest survey, e.g.:
 - types of information gathered
 - questions that are answered
- ☐ distinguish between forest samples and forest populations, and provide examples of each
- ☐ describe basic techniques used to sample a forested area, e.g.:
 - layout of sample plots
 - data collection techniques

Content (continued)

- ☐ explain applications of the clinometer, increment borer and diameter tape in data collection
- ☐ explain how sample data may be used to estimate fibre volumes and other non-fibre forest resources
- ☐ provide a glossary of terms relevant to conducting a forest survey

Presenting/Reporting

- ☐ demonstrate effective use of one or more communication media
- e.g., Written: spelling, punctuation, grammar basic format*
- Oral: voice projection, body language*
- Audio-Visual: techniques, tools*

- ☐ use correct grammatical convention and technical terms through proof-reading/editing
- ☐ provide an introduction that describes the purpose of the project
- ☐ communicate information in a logical sequence
- ☐ state a conclusion based on a summary of facts
- ☐ provide a reference list of three or more basic information sources.

TEACHER/STUDENT REFLECTION

TASK CHECKLIST: ORIENTEERING

FOR106-2

ALLOCATING TIME AND MATERIALS	
<i>The student is able to:</i>	
☐ follow a schedule of activities for each orienteering task	
☐ select and use appropriate equipment and materials	
☐ use appropriate safety devices; e.g.: ☐ suitable clothing ☐ protective eye wear ☐ hard hat	
☐ recognize potential hazards and take steps to eliminate/avoid them	
☐ critically examine task performance, identifying strengths and areas that need improvement	

BASIC COMPASS AND MEASUREMENT SKILLS	
<i>The student is able to:</i>	
☐ orient a map using a compass: ☐ place compass on map with edge along desired line of travel ☐ rotate the capsule until the "N" on the compass dial points to true north on the map ☐ check to ensure that north-south lines are parallel with the map's meridians ☐ read the bearing at top of the compass	

BASIC COMPASS AND MEASUREMENT SKILLS (continued)	
<i>The student is able to:</i>	
☐ establish and follow a bearing using a compass: ☐ set the compass for the desired bearing of travel ☐ hold the compass level and turn body until north end of the needle aligns with 0 degrees (compass north) ☐ walk in direction of bearing, citing landmarks and checking course	
☐ perform a closed traverse, error in closure no greater than 5% of perimeter distance: ☐ start at 0 degrees and walk 10 metres. Place stick in ground at this point ☐ add 90 degrees onto compass, setting it at 90 degrees. Align north end of needle with 90 degrees. Walk 10 metres in this direction using a measuring chain as guide. Place stick in ground at this point ☐ add 90 degrees onto compass, setting it at 180 degrees. Align north end of needle with 180 degrees. Walk 10 metres in this direction. Place stick in ground at this point ☐ add 90 degrees onto compass, setting it at 270 degrees. Align north end of needle with 270 degrees. Walk 10 metres in this direction. Return to within one metre of starting point	

Rating Scale:

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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK AREA

--

ALLOCATING TIME AND MATERIALS
<p><i>The student is able to:</i></p> <p>☐ follow a schedule of activities for each orienteering task</p> <p>☐ select and safely use appropriate equipment and materials</p> <p>☐ use appropriate safety devices; e.g.: ☐ suitable clothing ☐ protective eye wear ☐ hard hat</p> <p>☐ recognize potential hazards and take steps to eliminate/avoid them</p>

BASIC FOREST MEASUREMENT (continued)
<p>☐ measure the height of 10 trees, accurate to within 5% on at least 8 trees, using a clinometer</p> <p>☐ measure 15 metres from the base of the tree</p> <p>☐ use clinometer to determine elevation at this point in relation to base of the tree</p> <p>☐ aim clinometer at top of tree and read height in metres</p> <p>☐ adjust tree height to compensate for elevation in relation to base of the tree</p> <p>☐ measure the age of 10 trees, accurate to within 5% on at least 8 trees, using an increment borer</p> <p>☐ attach boring bit to outer casing of increment borer</p> <p>☐ move the boring bit into at least the centre of the tree at breast height by turning clockwise</p> <p>☐ insert the core sampler into the boring bit and give the borer one complete counter clockwise turn</p> <p>☐ slide the extracting tool gently between the core and borer and carefully withdraw both core and tool</p> <p>☐ determine tree age by counting rings on the core</p> <p>☐ place core sample back into the tree and seal boring hole</p> <p>☐ remove accumulations of resin and dirt from increment borer</p> <p>☐</p>

BASIC FOREST MEASUREMENT
<p><i>The student is able to:</i></p> <p>☐ measure horizontal distances up to 25 metres, accurate to within 5% ☐ using pacing techniques ☐ using a forester's chain</p> <p>☐ measure the diameter of 10 trees at approximately 1.5 metres above ground level, each accurate to within 5%, using a diameter tape ☐ place sharp end of tape in tree at breast height ☐ wrap tape around tree and determine tree circumference ☐ accurately read/calculate tree diameter at breast height (DBH)</p> <p>☐</p>

TABULATING AND PRESENTING RESULTS
<p><i>The student is able to:</i></p> <p>☐ make accurate observations and inferences regarding tree measurements</p> <p>☐ record data accurately and systematically (e.g., use a dot-dash tally)</p> <p>☐ consider limitations and generalizability of the results of measurement</p> <p>☐ reflect on procedures/ outcomes/task performance and suggest refinements</p>

Rating Scale:

- 4 Met task objectives by independently selecting and implementing the most appropriate course of action. Problems were solved in effective and creative ways. Quality and productivity exceed standards.
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- N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK AREA

TASK CHECKLIST: FOREST SURVEY

FOR106-4

ALLOCATING TIME AND MATERIALS	
<i>The student is able to:</i>	<p>☐ follow a schedule of activities for conducting a forest survey</p> <p>☐ select and safely use appropriate equipment and materials</p> <p>☐ use appropriate safety devices; e.g.: ☐ suitable clothing ☐ protective eye wear ☐ hard hat</p> <p>☐ recognize potential hazards and take steps to eliminate/avoid them</p>

CONDUCTING THE FOREST SURVEY	
<i>The student is able to:</i>	<p>☐ establish boundaries for a 100 square metre sample forest plot</p> <p>☐ subdivide the plot into a number of subplots by extending string lines across the plot between two sides</p> <p>☐ measure tree diameter by species, each accurate to within 5%, for all trees in the plot larger than 9.1 cm DBH</p> <p>☐ record data regarding tree diameter, by species, using grid system and charts</p> <p>☐ measure the height and age of 10 of the tallest trees in the plot, accurate to within 5% on at least 8 trees</p>

CONDUCTING THE FOREST SURVEY (continued)	
<i>The student is able to:</i>	<p>☐ record data regarding tree height and age, by species, using grid system and charts</p> <p>☐ calculate fibre volume by species on a per hectare basis using sample plot data</p> <p>☐</p>

INTERPRETING SURVEY RESULTS	
<i>The student is able to:</i>	<p>☐ demonstrate an understanding of problems encountered in conducting a forest survey</p> <p>☐ record data accurately and systematically</p> <p>☐ interpret sample data to make inferences regarding tree populations and fibre volume</p> <p>☐ consider limitations of sampling techniques and survey results</p> <p>☐ critically examine procedures/outcomes/task performance and suggest refinements</p> <p>☐</p>

Rating Scale:

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N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK AREA

--

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Information Gathering and Processing	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Collaboration and Teamwork	4	4
	3	3
	2	N/
	1	A
	0	0
Information Sharing	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- 1 Completed task as directed, demonstrating rudimentary skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

TASK CHECKLIST

Content (continued)

- ☐ explain the role of trees within a local forest ecosystem; e.g.:

- exchange of gases
- water cycle
- nutrient cycling (macro nutrients)
- wildlife habitat
- soil conservation
- energy flow

- ☐ analyze food relationships among living organisms within a local forest environment; e.g.:

- role of producers, consumers and decomposers
- food chains and webs

- ☐ describe the distribution of dominant species within a local forest environment on the basis of habitat requirements; e.g.:

- common tree species
- flowering plants of the understory
- common mammals and birds

Collaboration and Teamwork

- ☐ cooperate with group members
- ☐ share work appropriately among group members

Information Sharing

- ☐ demonstrate effective use of one or more communication media: e.g., written, oral, audio-visual
- ☐ communicate information in a logical sequence
- ☐ use correct grammatical convention and technical terms
- ☐ cite three or more basic information sources

The student is able to:

Preparation and Planning

- ☐ set goals and follow instructions accurately
- ☐ adhere to established timelines
- ☐ respond to directed questions and follow necessary steps to find answers
- ☐ use time effectively

Information Gathering and Processing

- ☐ access basic school/community information sources
- ☐ use one or more information-gathering techniques
- ☐ interpret and organize information in a logical sequence
- ☐ record information accurately using correct technical terms
- ☐ distinguish between fact and fiction/opinion/theory
- ☐ respond to feedback when current approach is not working

Content

- ☐ identify living and nonliving elements within a local forest ecosystem; e.g.:

- soil characteristics
- land form
- climate
- flora and fauna
- soil organisms

- ☐ describe interrelationships among at least three living and three nonliving elements within a local forest environment; e.g.:

- relationship of soil, air, water characteristics to plant growth
- interactions and dependencies among living organisms

TEACHER/STUDENT REFLECTION

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Presenting/Reporting	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

- 4 Met project/task objectives by independently selecting and implementing the most appropriate course of action. Problems were solved in effective and creative ways. Quality and productivity exceed standards.
- 3 Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 1 IN EACH APPLICABLE TASK**TASK CHECKLIST***The student is able to:***Preparation and Planning**

- ☐ set goals and follow instructions accurately
- ☐ respond to directed questions and follow necessary steps to find answers
- ☐ access basic in-school/community information sources
- ☐ interpret and organize information into a logical sequence
- ☐ record information accurately using correct technical terms
- ☐ use time effectively

Content

- ☐ explain vital life processes performed by trees and other forest plants; e.g.:
 - nutrient uptake and transportation
 - photosynthesis
 - respiration and transpiration
 - reproduction
 - phenology (leaf flushings, leaf fall, flowering and cone production)

Content (continued)

- ☐ provide labelled diagrams of major tree parts; e.g.:
 - root
 - trunk/stem
 - branch/twig
 - leaf
 - flower
- ☐ describe the function of major tree parts in performing vital life processes
- ☐ describe interrelationships among tree structures, their functions, and vital life processes that are performed
- ☐ describe major stages in the life cycle of a native tree
- ☐ describe the role of trees in the water cycle

Presenting/Reporting

- ☐ demonstrate effective use of one or more communication media:

e.g., Written: *spelling, punctuation, grammar basic format*

Oral: *voice projection, body language*

Audio-Visual: *techniques, tools*

- ☐ use correct grammatical convention and technical terms through proof-reading/editing
- ☐ provide an introduction that describes the purpose of the project
- ☐ communicate information in a logical sequence
- ☐ state a conclusion based on a summary of facts
- ☐ provide a reference list of three or more basic information sources.

TEACHER/STUDENT REFLECTION

TASK	Student	Teacher
Management	4	4
	3	3
	2	N/
	1	A
	0	0
Teamwork	4	4
	3	3
	2	N/
	1	A
	0	0
Use of Equipment and Materials	4	4
	3	3
	2	N/
	1	A
	0	0
Investigative Techniques	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

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TASK CHECKLIST

The student is able to:

Investigative Techniques

- ☐ gather and apply information from at least one source
- ☐ make predictions that can be tested regarding at least three vital life processes performed by trees; e.g.:
 - nutrient uptake and transportation
 - photosynthesis
 - respiration
 - transpiration
 - reproduction
 - phenology
- ☐ set up and conduct experiments to test predictions
- ☐ distinguish between manipulated/responding variables
- ☐ obtain results that can be used to determine if some aspect of the prediction is accurate
- ☐ summarize important experimental outcomes, relating structural units of the tree to their function in performing life processes

Management

- ☐ prepare self for task
- ☐ organize and work in an orderly manner
- ☐ carry out instructions accurately
- ☐ use time effectively

Teamwork

- ☐ cooperate with group members
- ☐ share work appropriately among group members

Use of Equipment and Materials

- ☐ select and use appropriate equipment/materials
- ☐ follow safe procedures/techniques
- ☐ weigh and measure accurately
- ☐ return clean equipment/materials to storage areas

TEACHER/STUDENT REFLECTION

STANDARD IS 1 IN EACH APPLICABLE TASK

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Presenting/Reporting	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 3 IN EACH APPLICABLE TASK

TASK CHECKLIST	
<i>The student is able to:</i>	
Preparation and Planning	
☐ set goals and describe steps to achieve them	
☐ use personal initiative to formulate questions and find answers	
☐ access a range of relevant information sources and recognize when additional information is required	
☐ interpret, organize and combine information in creative and thoughtful ways	
☐ record information accurately using appropriate technical terms and supporting detail	
☐ plan and use time effectively, prioritizing tasks on a consistent basis	
☐ assess and refine approach to task and project status based on feedback and reflection	
Content	
☐ provide a comprehensive definition of silviculture and its role in forestry	
☐ identify and explain major components of silvicultural systems, including:	
- stand establishment	
- stand management	
- harvest and cutting methods	
☐ explain how individual tree species have unique ecological requirements that determine suitable silvicultural practices	
☐ describe and compare the silvics of at least five Alberta tree species with respect to:	
- growth characteristics	
- reproduction	
- habitat requirements (e.g., soil, water, temperature)	

Content (continued)

- ☐ describe one or more research programs designed to improve silvicultural practices; e.g.:
- biotechnology
- application of information technology
- cultural/operational applications
- ☐ provide a glossary of terms (at least 20) relevant to silviculture

Presenting/Reporting

- ☐ demonstrate effective use of a variety of communication media:

e.g., Spelling: spelling, punctuation, grammar, format (formal/informal, technical/literary)

Oral: voice projection, body language, appearance, enthusiasm, evidence of prior practice

Audio-Visual: techniques, tools, clarity, speed and pacing

- ☐ maintain acceptable grammatical and technical standards through proof-reading and editing
- ☐ provide an introduction that describes the purpose and scope of the project
- ☐ communicate thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ state a conclusion by analyzing and synthesizing the information gathered
- ☐ give evidence of adequate research through a reference list including seven or more relevant information sources

TEACHER/STUDENT REFLECTION

A. TREE NAME

1. Common: _____

2. Botanical: _____

B. GROWTH FORM

C. HABITAT REQUIREMENTS

1. Climate: _____

2. Soils and Topography: _____

3. Associated Trees and Shrubs: _____

DISTRIBUTION

(as outlined on map of Canada)

D. LIFE HISTORY

1. Reproduction and Early Growth:

(a) Flowering and Fruiting

(b) Seedling Development

(c) Vegetative Reproduction (if applicable)

2. Sapling to Maturity:

(a) Growth and Yield

(b) Reaction to Competition

(c) Major Enemies

GROWTH FORM
(as sketched or outlined)

TASK	Student	Teacher
Management	4 3 2 1 0	4 3 2 N/ A 1 0
Teamwork	4 3 2 1 0	4 3 2 N/ A 1 0
Use of Equipment and Materials	4 3 2 1 0	4 3 2 N/ A 1 0
Investigative Techniques	4 3 2 1 0	4 3 2 N/ A 1 0

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- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 3 IN EACH APPLICABLE TASK**TASK CHECKLIST****The student is able to:****Management**

- ☐ prepare self for task
- ☐ organize and work in an orderly manner
- ☐ interpret and carry out instructions accurately
- ☐ plan and use time effectively in a logical sequence
- ☐ display leadership in adhering to routine procedures
- ☐ attempt to solve problems prior to requesting help

Teamwork

- ☐ cooperate with group members
- ☐ share work appropriately among group members
- ☐ negotiate with sensitivity solutions to problems
- ☐ display effective communication skills

Use of Equipment and Materials

- ☐ independently select and use equipment/ materials
- ☐ demonstrate concern for safe procedures/techniques
- ☐ weigh and measure accurately and efficiently
- ☐ practise proper sanitation procedures
- ☐ minimize waste of materials
- ☐ anticipate potential hazards and emergency response

Investigative Techniques

- ☐ use relevant information to explain observations regarding natural regeneration; e.g.:
 - seed supply
 - vegetative reproduction
- ☐ use relevant information to explain observations regarding artificial regeneration; e.g.:
 - direct seeding
 - bare-root/container seedlings
- ☐ make predictions that can be tested regarding one or more methods of regeneration
- ☐ plan, set up & conduct experiments to test a prediction
- ☐ analyze relationships among manipulated/responding variables
- ☐ obtain accurate results that confirm/reject prediction and answer related questions
- ☐ summarize, apply and evaluate observations and experimental outcomes; e.g.:
 - for species with wind-disseminated seed, assess height and/or age of seedlings as a function of distance from edge of cutblock
 - for species with slash-borne cones, assess whether adequate seed is available per unit area
 - for direct seeding, is sufficient seed being broadcast to insure block stocking?
 - for bare root/container planting, are sufficient seedlings being planted to insure a fully stocked stand?

TEACHER/STUDENT REFLECTION

TREE IMPROVEMENT

1. Explain major objectives of a tree improvement program.
2. Identify factors to consider in choosing a natural seed production area.
3. Cite advantages and disadvantages of clonal and seedling seed orchards.
4. Describe methods of increasing seed production in a seed production area.

CONE COLLECTION

1. Identify major factors influencing seed production in conifers.
2. Large cone crops in pine occur if climatic conditions are favourable. What stages of flower and cone development are the most critical? What kind of climatic conditions favour each of these stages?
3. Identify reasons for conducting a cone crop survey.
4. Describe methods of collecting cones from natural forest stands.
5. Seed testing is carried out for a number of parameters. Identify and explain three of them.
6. Identify and explain one physical test conducted to determine the viability of seed.

SITE PREPARATION

1. Provide reasons for ensuring adequate site preparation.
2. Describe mechanical methods of site preparation.
3. Explain advantages of a brush rake over an angled dozer blade in scarification operations.
4. Identify two functions of a drag type scarifier.
5. Identify types of mechanical scarification equipment that are commonly used in addition to those listed above.

SEEDING

1. Identify factors that determine the timing of a successful direct seeding operation.
2. What is the recommended time of year for carrying out a conifer seeding operation in Alberta? Give reasons for conducting conifer seeding operations at this time.
3. Seeding operations in Alberta have at times failed. Identify factors that may influence the success rate of seeding operations.
4. Identify biological advantages of spot seeding over broadcast seeding.

CONTAINER PLANTING

1. Explain requirements of a successful container system.
2. Describe desirable physical characteristics of container seedlings.
3. Explain advantages of growing seedlings in containers rather than as bare root stock in a nursery.
4. One of the critical elements in survival of a tree seedling is to maintain a favourable water balance. What is meant by the water balance? How can a tree seedling maintain a favourable water balance?

PRUNING (continued)

6. Why is it important when pruning large diameter limbs (i.e., over 4 cm in diameter) that the initial cut be made 10 to 15 cm away from the bole of the tree?
7. Explain why hand pruning saws have curved blades and teeth pointing back toward the handle.
8. Why is it important when pruning to make a clean cut that is flush with the bole?

FERTILIZATION

1. Explain the process of organic matter decomposition on the forest floor.
2. Identify and explain important principles of fertilizer application.
3. Explain ways in which wood quality in a forest stand is altered as a result of fertilizer application.
4. Why should fertilizer high in phosphorous be used at the time of planting?
5. One example of a mixed fertilizer is 10-52-10. Explain what these numbers mean. What purpose would this fertilizer be most suited to?
6. Suggest fertilizers appropriate to three different stages of forest growth.
e.g., seedling establishment
after crown closure
10 to 15 years before harvest

INTERMEDIATE STAND TREATMENTS

1. Define and give examples of intermediate stand treatments.
2. What is the major objective of release cutting? Identify the predominant growth stage(s) for trees that are released.
3. Describe methods of undertaking a liberation cut in a stand. Identify advantages and disadvantages of each method.

PRUNING

1. Identify and explain three stages of natural pruning. Briefly describe factors that may affect each stage.
2. Identify and describe three objectives of artificial pruning.
3. Explain potential hazards that may result from the excessive pruning of spruce trees.
4. What minimum live crown ratio should be attained when pruning?
5. Cite reasons for pruning conifers in the late winter or early spring.

SITE PREPARATION	
<i>The student is able to:</i>	
☐ list 6 or more objectives of site preparation	
☐ explain techniques and applications of mechanical site preparation; e.g.:	
☐ scalping ☐ trenching ☐ plowing mixing ☐ mounding	
☐ identify and describe common types of equipment used in mechanical site preparation; e.g.:	
☐ blade ☐ plow ☐ drag scarifier ☐ disc trencher ☐ spot scarifier ☐ moulder/inverter	
☐ demonstrate techniques and applications of manual and motor manual site preparation	
☐ explain applications of fire and herbicides in site preparation	
☐ identify geographic areas not suited to site preparation and explain why	
☐ assess 3 or more site preparation methods relative to site location	

CONE COLLECTION AND SEED EXTRACTION	
<i>The student is able to:</i>	
☐ identify and describe common methods of cone collection; e.g.:	
☐ squirrel caches ☐ felling and picking ☐ aerial collection	
☐ identify appropriate equipment and safe techniques for one or more methods of cone collection	
☐ describe handling, tagging and temporary storage procedures for collected cones	
☐ demonstrate seed extraction and seed cleaning techniques	
☐ conduct one or more seed tests; e.g.:	
☐ purity ☐ weight ☐ germination ☐ moisture content ☐ viability	
☐ describe methods of seed storage	
☐	

DIRECT SEEDING	
<i>The student is able to:</i>	
☐ describe characteristics of a favourable seed bed; e.g.:	
☐ physical nature of the forest floor ☐ kind and amount of vegetation	
☐ describe techniques and applications of direct seeding; e.g.:	
☐ broadcast seeding ☐ spot seeding	
☐ identify and describe common types of equipment used in direct seeding	
☐ outline steps that can be taken to enhance success with direct seeding; e.g.:	
☐ timing the seeding operation ☐ preparing the seed bed ☐ managing seed quality and quantity ☐ controlling seed predators	
☐	
☐	

TASK CHECKLIST: STAND ESTABLISHMENT AND TENDING

FOR311-5

PLANTING STOCK	SPACING AND THINNING	PRUNING AND SANITATION
<p><i>The student is able to:</i></p> <p>☐ demonstrate correct techniques for the care and handling of bare root and container stock; e.g.:</p> <ul style="list-style-type: none"> ☐ physical handling ☐ temperature control ☐ moisture/humidity control <p>☐ demonstrate three or more hand planting methods; e.g.:</p> <ul style="list-style-type: none"> ☐ L-slit method ☐ mattock method ☐ planting bar method ☐ wedge method <p>☐ identify and describe common hand planting tools and equipment; e.g.:</p> <ul style="list-style-type: none"> ☐ planting spade ☐ dibble ☐ planting bar ☐ pottiputki ☐ mattock <p>☐ demonstrate correct planting technique; e.g.:</p> <ul style="list-style-type: none"> ☐ cleans out planting spot before making hole ☐ keeps roots of planting stock moist at all times, taking plants out of planting bag one at a time ☐ makes hole large and deep enough to ensure proper placement of roots ☐ plants firmly in ground to correct depth and within 30% of vertical ☐ closes hole from bottom to top, packing soil firmly against roots to prevent air pockets ☐ performs final check by gently tugging on plant 	<p><i>The student is able to:</i></p> <p>☐ identify optimum spacing and stocking rates for one or more species of seedlings</p> <p>☐ describe generally accepted "rules of thumb" for scheduling spacing and thinning treatments of crop trees</p> <p>☐ describe applications of 3 or more thinning treatments; e.g.:</p> <ul style="list-style-type: none"> ☐ juvenile spacing ☐ sanitation spacing ☐ conifer release ☐ commercial thinning <p>☐ establish criteria for identifying trees to keep and trees to cut in a forest stand</p> <p>☐ inspect crop trees for damage, e.g.:</p> <ul style="list-style-type: none"> ☐ broken stems ☐ saw knicks ☐ broken leaders ☐ stripped limbs <p>☐ select dominant and codominant trees to be saved as crop trees in a forest stand</p> <p>☐ describe 2 or more thinning treatments; e.g.:</p> <ul style="list-style-type: none"> ☐ cutting with brush saws/chain saws ☐ girdling ☐ hand pulling ☐ use of herbicides 	<p><i>The student is able to:</i></p> <p>☐ identify reasons for artificial pruning</p> <p>☐ describe factors that determine the timing of pruning operations</p> <p>☐ identify criteria for selecting crop trees to be pruned; e.g.:</p> <ul style="list-style-type: none"> ☐ species characteristics ☐ growth rate ☐ number, size and age of trees <p>☐ demonstrate correct pruning technique; e.g.:</p> <ul style="list-style-type: none"> ☐ live crown ratio greater than 40% ☐ proper pruning height ☐ branch cuts flush with bole <p>☐ identify and describe common pruning tools and equipment; e.g.:</p> <ul style="list-style-type: none"> ☐ hand and pole saws ☐ axes, brushhooks and hatchets ☐ chisels and pulling knives ☐ machines <p>☐ inspect residuals in a forest stand for:</p> <ul style="list-style-type: none"> ☐ signs of damage ☐ quality of stems <p>☐ verify that slash in a forest stand is bucked to lay flat on the ground</p>

Rating Scale:

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- 3 Met task objectives independently, selecting and using materials/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
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- 1 Completed task as directed, demonstrating rudimentary skills/competence by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

**STANDARD IS 3 IN EACH
APPLICABLE AREA**

TEACHER/STUDENT REFLECTION

RESEARCH PROCESS: FOREST HARVEST METHODS

FOR311-6

TASK	Student	Teacher
Planning and Presentation	4	4
	3	3
	2	N/
	1	A
	0	0
Information Gathering and Processing	4	4
	3	3
	2	N/
	1	A
	0	0
Content	4	4
	3	3
	2	N/
	1	A
	0	0
Collaboration and Teamwork	4	4
	3	3
	2	N/
	1	A
	0	0
Information Sharing	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- 3 Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
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- 1 Completed task as directed, demonstrating rudimentary skills/competence by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

TASK CHECKLIST

<i>The student is able to:</i>	Content (continued) ☐ provide a descriptive account of the seed tree system of forest harvest ☐ assess advantages and disadvantages of the seed tree system of forest harvest ☐ provide a descriptive account of the shelterwood system of forest harvest ☐ assess advantages and disadvantages of the shelterwood system of forest harvest ☐ provide a descriptive account of the selection system of forest harvest ☐ assess advantages and disadvantages of the selection system of forest harvest ☐ explain modifications to harvest systems that accommodate local site conditions and management objectives; e.g.: - clearcutting with reserves - forest ecosystem networks - single-tree selection
Preparation and Planning ☐ set clear goals and establish steps to achieve them ☐ create and adhere to detailed timelines ☐ use personal initiative to formulate questions and find answers ☐ plan and use time effectively, prioritizing tasks on a consistent basis	Collaboration and Teamwork ☐ cooperate with group members ☐ share work appropriately among group members ☐ negotiate with sensitivity solutions to problems ☐ display effective communication and leadership skills.
Information Gathering and Processing ☐ access a range of relevant information sources and recognize when additional information is required ☐ demonstrate resourcefulness in collecting data ☐ interpret, organize and combine information in creative and thoughtful ways ☐ record information accurately with appropriate supporting detail and using correct technical terms ☐ recognize underlying bias/assumptions/values in information sources ☐ assess and refine approach to the task and project status based on feedback and reflection	Information Sharing ☐ demonstrate effective use of a variety of communication media: e.g., written, oral, audio-visual ☐ communicate thoughts/feelings/ideas clearly to justify or challenge a position ☐ maintain acceptable grammatical and technical standards ☐ give evidence of adequate information gathering by citing seven or more relevant information sources
Content ☐ explain factors relevant to choosing a suitable method of harvest: - silvics of tree species - intended utilization - impact on wildlife and watershed - impact on other stakeholder groups ☐ provide a descriptive account of the clearcutting system of forest harvest ☐ assess the advantages and disadvantages of the clearcutting system of forest harvest	Collaboration and Teamwork ☐ cooperate with group members ☐ share work appropriately among group members ☐ negotiate with sensitivity solutions to problems ☐ display effective communication and leadership skills.

TEACHER/STUDENT REFLECTION

STANDARD IS 3 IN EACH APPLICABLE TASK

ISSUE ANALYSIS: BENEFITS AND COSTS OF DIFFERENT HARVEST METHODS

FOR311-7

TASK	Student	Teacher
Preparation and Planning	4	4
	3	3
	2	N/
	1	A
	0	0
Analyzing Perspectives	4	4
	3	3
	2	N/
	1	A
	0	0
Collaboration and Teamwork	4	4
	3	3
	2	N/
	1	A
	0	0
Evaluating Choices and Making Decisions	4	4
	3	3
	2	N/
	1	A
	0	0

Rating Scale:

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- 3 Met project/task objectives independently, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet the standard.
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- 1 Completed task as directed, demonstrating rudimentary skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.
- 0 Not yet completed task, major deficiencies and/or errors are evident.

N/A Not Applicable

STANDARD IS 3 IN EACH APPLICABLE TASK

TASK CHECKLIST

The student is able to:

Preparation and Planning

- ☐ accurately describe forest harvest issues on which people disagree, explaining specific causes of disagreement
- ☐ pose thoughtful questions regarding each issue
- ☐ access a range of relevant information sources and recognize when additional information is required
- ☐ demonstrate resourcefulness in collecting data

Analyzing Perspectives

- ☐ categorize different points of view regarding each forest harvest issue *e.g., cultural, ethical, economic, environmental, health-related, scientific, political*
- ☐ state a position on a forest harvest issue and insightful reasons for adopting that position
- ☐ state three or more opposing positions on the issue and thoughtful reasons for adopting each position
- ☐ analyze interrelationships among different perspectives/points of view
- ☐ recognize underlying bias/assumptions/values in information and ideas

Collaboration and Teamwork

- ☐ share work appropriately among group members
- ☐ respect and consider the views of others
- ☐ negotiate with sensitivity solutions to forest harvest problems

Evaluating Choices/Making Decisions

- ☐ describe in detail important alternatives regarding the harvest of seven Alberta tree species; *e.g.:*
 - clearcutting system
 - seed tree system
 - shelterwood system
 - selection system
- ☐ establish knowledge- and value-based criteria for assessing each alternative: *e.g., social, economic, environmental*
- ☐ consider modifications to harvest systems in order to consider other possibilities/choices
- ☐ select appropriate and useful harvest alternatives by showing differences among choices
- ☐ assess strengths/weaknesses of different harvest choices by considering consequences and implications
- ☐ make recommendations regarding a suitable harvest method for each of seven Alberta tree species

TEACHER/STUDENT REFLECTION

LINKAGES/TRANSITIONS

WITH OTHER CTS STRANDS

The Forestry strand provides opportunities for students to develop competencies in one or more forestry-related areas, including:

- personal and/or recreational use
- silviculture
- forest inventory
- forest harvest
- forest products
- forest management.

Each area of emphasis links with competencies that are developed in other CTS strands. To facilitate and strengthen these linkages, CTS courses may be designed by combining Forestry modules with modules from other CTS strands (e.g., Agriculture, Community Health, Energy and Mines, Legal Studies, Management and Marketing, Mechanics, Tourism Studies, Wildlife). Specific linkages between Forestry and other CTS strands will be determined by course emphasis and area of industry specialization.

The Career Transitions strand of CTS provides project, research and practicum modules that may be combined with modules in Forestry to increase the opportunity for students to develop expertise and refine their competencies. For example, a silviculture or forest inventory project may require more than the 25, 50 or 75 hours available through modules by that name. In these cases project, research and/or practicum modules from the Career Transitions strand can be accessed so as to provide sufficient time for completion of learning and the task.

Sample courses in Forestry that involve linkages with other CTS strands are provided in charts in the following charts.

LINKAGES—JUNIOR HIGH SCHOOL FORESTRY

Course Emphasis	Forestry Modules	Mechanics Modules	Wildlife Modules	Tourism Studies Modules
Forest Ecology (75 hours)	Why Forestry?		Natural History of Alberta Wildlife	
	Basic Forest Ecology			
Forest Inventory (100 hours)	Why Forestry?		Measuring the Value of Wildlife	
	Mapping and Aerial Photography			
	Measuring the Forest I			
Logging and Timber Utilization (125 hours)	Why Forestry?	Engine Fundamentals		
	Forest Regions of Canada	Mechanical Systems		
	Harvesting and Forest Products			
Personal and Recreational (150 hours)	Why Forestry?		Fishing and the Aquatic Environment	Tourism Attractions Sector
	Mapping and Aerial Photography			
	Woods Survival I			
	Woods Survival II			

LINKAGES—SENIOR HIGH SCHOOL FORESTRY

Course Emphasis	Forestry Modules	Wildlife Modules	Tourism Studies Modules	Career Transitions Modules
Personal and Recreational (3 credits)	Making a Difference in Forestry		Adventure and Ecotourism	
Prerequisite: Woods Survival I	Woods Survival II			
Silviculture (5 credits)	Basic Forest Ecology			Project 2A
Prerequisite: None	Advanced Forest Ecology			
	Silviculture: Growing the Forest			
	Forest Technology Applications			
Harvest and Forest Products (5 credits)	Managing Alberta's Forested Lands			Project 2A
Prerequisite: Measuring the Forest I & II	Harvesting and Forest Products			
	The Forest Marketplace			
	Measuring the Forest III			
Environmental Stewardship (3 credits)	Making a Difference in Forestry	Issues in Wildlife I		Project 2A
Prerequisite: None				

LINKAGES—SENIOR HIGH SCHOOL FORESTRY (continued)

Course Emphasis	Forestry Modules	Wildlife Modules	Tourism Studies Modules	Career Transitions Modules
Forest Management (5 credits)	Issues in Forestry	Interactions of Wildlife and Society		Project 2A
Prerequisite: None	Users in the Forest			
	Stewardship: Balancing Needs			

WITH OTHER SECONDARY PROGRAMS

The Forestry strand has many links with the junior and senior high Science programs, and provides opportunities for students to extend and apply scientific knowledge and skills in practical ways.

Some modules in the Forestry strand link with topics developed in the junior high Environmental and Outdoor Education Program. A detailed correlation of the Forestry strand to Environmental and Outdoor Education 7, 8 and 9 can be found in the chart in this section of this Guide.

TO THE WORKPLACE

Intermediate and advanced modules are designed to develop knowledge, skills and attitudes that provide transitions to occupations in forestry-related areas. Some career sectors welcome individuals who have basic skills and are prepared to learn through further training from the employer.

Information from the National Occupational Classification (NOC) and provincial Occupational Profiles (POP) regarding occupations in forestry-related areas that can be accessed upon completion of high school is provided in this section of this Guide.

TO RELATED POST-SECONDARY PROGRAMS

Advanced level modules will assist students to make plans regarding further studies in forestry at post-secondary levels. The Forestry modules provide desirable background and skills for entry into related programs at public and private colleges, technical institutes, universities and vocational colleges in Alberta.

An outline of post-secondary institutions in Alberta currently offering programs in forestry-related areas is provided in chart form in this section of this Guide.

CREDENTIALLING

Students may earn credentials recognized in the workplace and/or post-secondary institutions by demonstrating specified competencies within the CTS curriculum. The Forestry strand provides opportunities for students to develop competencies consistent with:

- National Occupational Standards for Outdoor Guide
- Alberta Conservation and Hunter Education Program
- Alberta Fishing Education Program
- Pesticide Applicator/Dispenser Certificate Courses.

In addition, formal agreements have been established with Olds College for the recognition of CTS competencies developed in soils management (see Agriculture strand).

Further information regarding credentials, requirements and contacts is provided in chart form in this section of this guide.

FORESTRY

Course Comparison for Environmental and Outdoor Education 7, 8 and 9

	Why Forestry?	Forest Regions Of Canada	Woods Survival I	Mapping & Aerial Photography	Measuring The Forest I	Basic Forest Ecology	Forests Forever I	Making A Difference In Forestry	Managing Alberta's Forested Lands	Woods Survival II	Measuring The Forest II	Harvesting & Forest Products	Forests Forever II	Users In The Forest	Issues In Forestry	Measuring the Forest III	The Forest Marketplace	Forest Technology Applications	Advanced Forest Ecology	Silviculture: Growing The Forest	Stewardship: Balancing Needs
OUTDOOR CORE																					
regard for self, others and the environment			X	X	X					X	X					X					
trip preparation and safety			X							X											
safe and comfortable outdoor living skills			X							X											
applying information for safe route planning			X	X						X											
environmentally responsible outdoor activities			X		X					X	X					X				X	
physical fitness for outdoor activities																					
PERSONAL AND GROUP DEVELOPMENT																					
respect and appreciation for self and others	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
setting realistic goals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
personal communication skills	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
relationship of individuals to groups	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
group process skills	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ENVIRONMENTAL CORE																					
diversity of environments and life forms	X	X				X													X		
interactions within environments	X	X				X													X	X	
natural and human changes to the environment	X					X	X						X		X				X		
air, water and soil cycles	X					X													X	X	
the sun as the primary energy source on Earth						X													X		

FORESTRY

Course Comparison for Environmental and Outdoor Education 7, 8 and 9

	Why Forestry?	Forest Regions Of Canada	Woods Survival I	Mapping & Aerial Photography	Measuring The Forest I	Basic Forest Ecology	Forests Forever I	Making A Difference In Forestry	Managing Alberta's Forested Lands	Woods Survival II	Measuring The Forest II	Harvesting & Forest Products	Forests Forever II	Users In The Forest	Issues In Forestry	Measuring the Forest III	The Forest Marketplace	Forest Technology Applications	Advanced Forest Ecology	Silviculture: Growing The Forest	Stewardship: Balancing Needs
OUTDOOR EXPEDITIONS																					
skill and judgement in outdoor expeditions			X	X	X					X	X					X				X	
positive self-concept and regard for others			X							X											
group problem solving and group living skills			X							X											
regard for environments and responsible outdoor judgment			X	X	X					X	X					X				X	
ENVIRONMENTAL INVESTIGATIONS																					
environmental investigation skills		X				X													X	X	
strategies for responding to environmental concerns							X	X					X		X						X
COMMITMENT TO ACTION																					
outdoor recreation as part of healthy lifestyle			X							X											
appreciation of environments through respectful use	X		X				X	X		X			X		X						X
responsible use of local and global environments	X		X				X	X		X			X		X						X
plans to make personal growth a lifelong process								X							X						

Summary of Post-Secondary Programs *

V	Varies
11	One-year transfer
2t	Two-year transfer
w	weeks
m	months
y	years

Bachelor's Degree
Master's Degree
Doctoral Degree
Certificate (1 year)
Diploma (2 years)

Forestry /H.8
(Interim 1994)

Summary of Post-Secondary Programs *

CODES:

B Bachelor's Degree
M Master's Degree
PhD Doctoral Degree
C Certificate (1 year or less)
D Diploma (2 years)

V Varies
11 One-year transfer
21 Two-year transfer
w weeks
m months
y years

	PUBLIC COLLEGES	APPRENTICESHIP TRADE	PRIVATE COLLEGES	TECH. INST.	UNIVERSITIES	VOCATION COLLEGES
RECREATION, PHYSICAL EDUCATION Leisure, Tourism & Society/ Recreation Administration/Leisure (degree programs with various specializations) Physical Education (degree programs with various specializations) Recreation, Leadership & Management/Leisure Services (certificate and diploma programs with various specializations)	Fairview College					
	Grane Prairie Regional College					
	Grant MacEwan Community College					
	Keyano College					
	Lakeland College					
	Lethbridge Community College					
	Medicine Hat College					
	Mount Royal College					
	Olds College					
	Red Deer College					

Potential opportunities for transition into the Workplace/Post-Secondary Programs

Occupation Profile	NOC/POP	A	B	C	D
Arborist	POP			√	√
Biochemist	POP				√
Biologist and Related Scientists	NOC				√
Botanist	POP				√
Chemist	NOC				√
Chainsaw and Skidder Operator	NOC	√			
Environmental Auditor	POP				√
Environmental Education Specialist	POP				√
Environmental Engineer	POP				√
Forest Technologist	BOTH			√	
Forester/Forestry Scientist	POP				√
Forestry Professional	NOC				√
Forestry Worker	POP			√	
Hazardous Waste Management Technican	POP			√	
Hydrologist	POP				√
Inspector in Public and Environmental Health and Occupational Health and Safety	NOC			√	√
Interpretive Naturalist	POP			√	√
Labourer in Wood, Pulp and Paper Processing	NOC	√			
Land Surveyor	POP				√
Land Use/Community Planner (Urban, Regional, Park)	POP				√
Logging and Forestry Labourer	NOC	√			
Logging Machinery Operator	BOTH	√			
Lumber Graders and Other Wood Processing Inspector and Grader	NOC	√			
Other Wood Processing Machine Operator	NOC	√			
Paper Converting Machine Operator	NOC	√			
Papermaking and Coating Control Operator	NOC	√			
Papermaking and Finishing Machine Operator	NOC	√			
Pollution Control Technician	POP			√	
Pulp Mill Machine Operator	NOC	√		√	
Pulping Control Officers	NOC	√		√	
Primary Production Manager (except Agriculture)	NOC				√
Sawmill Machine Operator	NOC	√			
Silviculture and Forestry Worker	NOC	√		√	
Supervisor, Forest Products Processing	NOC	√		√	
Supervisor, Logging and Forestry	NOC	√		√	
Utilities Manager	NOC			√	√

The numbers in the above chart represent the total number of both the National Occupational Classification (NOC) and the provincial Occupational Profiles (POP) that require:

A: High School Education
B: Apprenticeship

C: College or Vocational Education
D: University

CREDENTIALLING OPPORTUNITIES IN FORESTRY-RELATED AREAS

Credentialling Program	CTS LINKAGES		Credentialling Agency
	Strand	Module	
Alberta Conservation And Hunter Education Program	Wildlife	Regulated Hunting and Game Management I Regulated Hunting and Game Management II	Alberta Environmental Protection, Fish and Wildlife Services Telephone: 944-0313 or 297-6423
Alberta Fishing Education Program	Wildlife	Fishing and the Aquatic Environment	Alberta Environmental Protection, Fish and Wildlife Services Telephone: 944-0313 or 297-6423
Alberta Tourism Industry Standards <ul style="list-style-type: none"> • Outdoor Guide • Freshwater Angling Guide • Hunting Guide 	Forestry	Woods Survival I Woods Survival II	Alberta Tourism Education Council Telephone: 1-800-265-1283
Canadian Firearms Safety Course	Career Transitions	Practicum Modules	Alberta Justice, Chief Provincial Firearms Office Telephone: 427-0437
Emergency First Aid	Community Health	Emergency Care I Emergency Care II	St. John Ambulance Telephone: 452-6565
Standard First Aid	Community Health	Emergency Care I Emergency Care II	St. John Ambulance Telephone: 452-6565
Wilderness First Aid/Basic Rescue	Career Transitions	Practicum Modules	Canadian Red Cross Telephone: 423-2680

CAREER & TECHNOLOGY STUDIES

FORESTRY

LEARNING RESOURCE GUIDE

INTERIM 1994
(SEPTEMBER 1994 - SEPTEMBER 1997)

MAY 1995

Alberta

EDUCATION
CURRICULUM STANDARDS BRANCH

Comments and suggestions are welcome and should be directed to:

Career and Technology Studies Unit
Alberta Education
Curriculum Standards Branch
11160 Jasper Avenue
Edmonton, AB
T5K 0L2
Telephone: 422-4872
Fax: 422-5129

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INTRODUCTION

CTS AND THE RESOURCE-BASED CLASSROOM

Career and Technology Studies (CTS) encourages teachers to establish a resource-based classroom, where a variety of appropriate, up-to-date print and non-print resources are available. Learning resources identified for CTS strands include print, software, interactive videos, manipulatives, student learning guides and tutorials.

The resource-based classroom approach accommodates a variety of instructional strategies and teaching styles, and supports individual or small group planning. It provides students with opportunities to interact with a wide range of information sources in a variety of learning situations. Students in CTS are encouraged to take an active role in managing their own learning. Ready access to a strong resource base enables students to learn to screen and use information appropriately, to solve problems, to meet specific classroom and learning needs, and to develop competency in reading, writing, speaking, listening and viewing.

PURPOSE AND ORGANIZATION OF THIS DOCUMENT

The purpose of this document is to help teachers identify a variety of resources to meet their needs and those of the students taking the new Forestry curriculum. It is hoped that this practical guide to resources will help teachers develop a useful, accessible resource centre that will encourage students to become independent, creative thinkers.

This document is organized as follows:

- Authorized Resources:
 - basic learning resources
 - support learning resources
 - teaching resources
- Other Resources
- Additional Sources.

Some resources in the guide have been authorized for use in some or all of the CTS strands, e.g., the 11 video Career and Technology Studies series produced by ACCESS Network. Full information is provided in the appropriate section of this resource guide.

Each resource in the guide provides bibliographic information, an annotation where appropriate, and a correlation to the Forestry modules. The distributor code for each entry will facilitate ordering resources. It is recommended that teachers preview all resources before purchasing, or purchase one copy for their reference and additional copies as required.

Distributor Code	Resources		Levels/Mod. No.			1 = Introductory 2 = Intermediate 3 = Advanced Indicates module number
			1	2	3	
ATEC	Author	Title	101	201	301	
	Bibliographic Information					
	Annotation					

Distributor
Code - see
Distributor
Directory

HOW TO ORDER

Most authorized resources are available from the Learning Resources Distributing Centre (LRDC) at:

12360 - 142 Street
Edmonton, AB
T5L 4X9
Telephone: 427-2767
Fax: 422-9750

Purchase order numbers have been provided (where possible) for resources available through the LRDC. The section on Additional Sources lists a variety of other places to find information related to this strand. In addition, at the back of this document is a Distributor Directory, which contains the name and address of each publisher/distributor referred to in the resource list. Note that in some cases a resource may be published by one company but distributed through another.

The information contained is as complete and accurate as possible.

RESOURCE POLICY

For further information on resource policy and definitions, refer to the *Student Learning Resources Policy* and *Teaching Resources Policy* or contact:

Learning Resources Unit
Curriculum Standards Branch
Alberta Education
5th Floor, Devonian Building, East Tower
11160 Jasper Avenue
Edmonton, AB
T5K 0L2
Telephone: 422-4872
Fax: 422-5129

AUTHORIZED RESOURCES

BASIC LEARNING RESOURCES

The following basic learning resources have been authorized by Alberta Education for use in the Forestry curriculum. These resources address the majority of the learner expectations in one or more modules and/or levels. A curriculum correlation appears in the right-hand column.

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<i>Global Environment, The.</i> Steven Sterling and Sue Lyle. Mississauga, ON: Copp Clark Pitman, 1991. LRDC PO#275538-13. This text addresses a broad range of environmental issues within a global context. Issues are examined through a variety of stimulating activities, including case studies, discussion and role-playing.	109 110	203 210	301
LRDC	<i>Investigating Terrestrial Ecosystems.</i> William A. Andrews. Scarborough, ON: Prentice-Hall Canada Inc., 1986. LRDC PO#275174-01. This student textbook focuses attention on the ecology of our planet and more specifically terrestrial ecosystems. The content is intended to assist students to identify and resolve environmental issues. The textbook investigates basic concepts of terrestrial ecosystems and examines specific biomes. Each chapter includes student-centered activities, case studies and suggestions for field studies.	101 102 109		309
LRDC	<i>Native Trees of Canada.</i> (8th edition.) R.C. Hosie. Markham, ON: Fitzhenry and Whiteside Limited, 1990. LRDC PO#275265-01. This reference book serves as a guide to the history of Canadian forests and more than 140 species of trees in Canada. The book provides detailed notes and illustrations on the habitat, size, shape, leaves, bark and wood for every Canadian tree species. A glossary and identification key are included.	102 104	204	309
LRDC	<i>Which Future? Investigating World Environmental Issues.</i> Don Harris and Chris Dolan. Mississauga, ON: Copp Clark Pitman, 1992. LRDC PO#275520-13. This text deals with a variety of environmental issues and cites examples from many parts of the world. Topics covered include food and population, land degradation, forest clearing, pollution and alternative energy sources.	110	203 210 212	301 312

SUPPORT LEARNING RESOURCES

The following support learning resources are authorized by Alberta Education to assist in addressing some of the learner expectations of a module or components of modules.

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<i>Birders of a Feather</i> . Vancouver, BC: T.H.A. Media Distributors Ltd., 1993. Videotape. LRDC PO#276528-13. This video deals with the ecotourism dilemma in Beaverhill Lake, Mount Verde and Point Pellee. The positive and negative effects that ecotourism brings to human and natural communities are vividly portrayed.	109	203	301
		110	210	309
ACC	<i>Boreal Forest Issues</i> . Edmonton, AB: Friends of the Environmental Education Society of Alberta (FEESA), 1993. Videotape. This 59-minute video explains the characteristics of Alberta's boreal forests, outlines the nature of forest use in society today, and examines strategies used in forest management. Issues surrounding the use of our boreal forests are analyzed from both economic and environmental perspectives. The need for responsible decision making in forestry-related areas is emphasized throughout the video.	101	201	301
		102	203	309
		109	210	312
		110	212	
ACC	<i>Career and Technology Studies: Key Concepts</i> . Edmonton, AB: ACCESS Network. Series of videos and utilization guides relevant to all CTS strands. Series consists of <i>Anatomy of a Plan</i> , <i>Creativity</i> , <i>Electronic Communication</i> , <i>The Ethics Jungle</i> , <i>Go Figure</i> , <i>Innovation</i> , <i>Making Ethical Decisions</i> , <i>Portfolios</i> , <i>Professionalism</i> , <i>Project Planning</i> , <i>Responsibility</i> and <i>Technical Writing</i> .	all	all	all
LRDC	<i>Forest is in Our Hands, The</i> . Edmonton, AB: Caterpillar Incorporated, 1991. Videotape. LRDC PO#276164-01. This video explores the need to make informed decisions regarding our use of forests and other natural resources. Information is presented in three parts: "Tending the Forest" (describes the science of silviculture); "Sharing the Forest" (explores the concept of multiple-use management); and "Sustaining the Forest" (examines the crucial area of decision making). Viewers are reminded that there are at least two sides to every issue. A print component entitled "Forest Facts: The Forest is in our Hands" is available in booklet format.		212	301 311 312
SSC	<i>From the Mountains to the Sea - A Journey in Environmental Citizenship</i> . Ottawa, ON: Environment Canada, 1992. Booklet. This student booklet provides a brief directory of various "eco" activities that can be implemented in the community, home and/or school.		203	301

Support Learning Resources (Cont'd.)

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<i>Importance of Wildlife to Canadians in 1987, The: Trends in Participation in Wildlife-Related Activities, 1981 to 2006.</i> F. L. Fillion, et al. Ottawa, ON: Environment Canada, Canadian Wildlife Service, 1988. Booklet. LRDC PO#276578-01. This booklet addresses the consumptive and non-consumptive use of wildlife. The booklet provides factual content that would be useful for individual student research and investigation.	101	201	301
		106	206	306
		109		
		110		
LRDC	<i>Identification Guide to the Trees of Canada.</i> Jean Lauriault. Markham, ON: Fitzhenry and Whiteside Limited, 1989. Reference book. LRDC PO#276297-01. This reference guide identifies native trees of Canada. The book provides a distribution map for each species and detailed information about its leaves and fruit. The book also identifies some common ornamentals not native to Canada. Additional information is provided about the origin of names for tree species, the economic importance of trees, tree diseases, tree toxicity and the medical properties of trees. The book suggests some interesting activities related to the study of trees, including tips on how to start a leaf collection.	102	204	309
		104		
LRDC	<i>Nature's Legacy: A Southwestern Safari.</i> Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1995. Videotape. Examines the wildlife of southwestern Alberta. Most of the region's shorebirds, prairie birds and raptors are shown. Some mammals are also examined. The emphasis is on identification and appreciation.			
LRDC	<i>New Leaf: Real Sustainability for the Boreal Forest.</i> A. Karen Baitgailis and Barbara Allard. Western Canada Wilderness Committee, 1993. Videotape. This video proposes a plan for Alberta's boreal forest. Current forestry mega projects are shown to be unsustainable, both environmentally and economically. The video provides a model for integrated, small scale, labour intensive economic development for northern Alberta that includes nature tourism, horse and machine selective logging, small sawmills, value-added wood products manufacturing and clean pulp mills. The focus in this video is supportive of environmental concerns taking precedence over economic development. Teachers should be prepared to provide a balance in perspective.		212	301 312
LRDC	<i>One-Minute Readings: Issues in Science, Technology and Society.</i> R.F. Brinckerhoff, et al. Don Mills, ON: Addison-Wesley Publishing Company, 1992. Student book (LRDC PO#105628-25). This book contains readings and questions related to issues in science, technology and society. Applications of science are raising difficult questions and are creating problems that cannot be answered. The book is intended to give students practice in making the kinds of decisions they will experience in life. Students need a knowledge of science to find the best possible answers.			301

Support Learning Resources (Cont'd.)

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<p><i>Personal Equipment.</i> N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet. LRDC PO#139677-10.</p> <p>This booklet examines the role of personal equipment (its selection and use) in safe and comfortable outdoor experiences. Topics addressed include temperature regulation, essential equipment for various situations, selection of quality equipment, sources of equipment, care and maintenance of equipment, packing equipment and safety considerations.</p>	104	204	
LRDC	<p><i>Place For Wildlife, A: A Way Is No Longer There.</i> Edmonton, AB: ACCESS Network, 1990. Videotape and print. LRDC PO#276156-01.</p> <p>This video was produced with the goal of increasing public understanding of pressures facing Canadian wildlife; in particular, the continuing loss of habitat. The program features "A Way Is No Longer There", an original song about the common fate of wildlife and humans in our changing environment. A utilization guide in print format is available to teachers.</p>	109	203	301 309
LRDC	<p><i>Science Show, The: Forests.</i> Francois St. Laurent. Montreal, PQ: The Multi Media Group of Canada, 1990. Videotape.</p> <p>This video explains photosynthesis and how the ecological system works. The video illustrates how forests contribute to the health of the biosphere, and discusses the threats endangering the world's forests.</p>	109 110	210	301
LRDC	<p><i>Science Show, The: Forests #2.</i> Francois St. Laurent. Montreal, PQ: The Multi Media Group of Canada, 1990. Videotape.</p> <p>This video explains why some forests are in danger. It examines the science of genetics and how it is being utilized by North American foresters. The video investigates the forestry industry in Canada and how it deals with fire and pests.</p>	110	210	301 311
LRDC	<p><i>Science Show, The: Three Environmental Concerns.</i> Francois St. Laurent. Montreal, PQ: The Multi Media Group of Canada, 1991. Videotape.</p> <p>This video explores the possible effects of electromagnetic waves, noise and radiation on living things. Conclusive evidence regarding the effects of these sources of pollution on ecosystems is not available. Nevertheless, the video examines related scientific principles and emerging societal issues.</p>	109 110	203 210	301
LRDC	<p><i>Shelters.</i> N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet. LRDC PO#139685-10.</p> <p>This booklet develops knowledge of planned and emergency shelters essential to outdoor experiences. Topics addressed include site selection, summer and winter constructed shelters, tents, bivouac sacks, improvised and permanent shelters.</p>	104	204	

Support Learning Resources (Cont'd.)

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<i>Singing In The Rain Forest (Warblers)</i> . Vancouver, BC: T.H.A. Media Distributors Ltd. 1993. Videotape. This video describes the plight of many North American (Boreal) songbirds. Warblers are the main focus of attention. It provides a good overview of the bird's life cycle and migratory patterns. The video should be viewed with the understanding that many factors have attributed to the warblers' population decline (e.g., forest fires, urban expansion, agriculture).	109	203	301
		110	210	309
LRDC	<i>This Living World: The Forest</i> . Edmonton, AB: Recreation, Parks and Wildlife Foundation, 1992. Videotape. The video present a historical perspective on the development of forests and the forest industry in Canada. Because forests provide a home for wildlife and serve many uses for human, it is necessary to protect and conserve them.	101	203	301
		109 110	210	
LRDC	<i>This Living World: Wildlife Habitat</i> . Edmonton, AB: Recreation, Parks and Wildlife Foundation, 1992. Videotape. This video informs viewers of the importance of "habitat" for living things. Interviews provide insight on issues concerning wildlife and its habitat (e.g., the need for ecological literacy, how habitat affects quality of life, the worldwide disappearance of natural habitats).	101	203	301
		109 110	210	
LRDC	<i>Trees</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1992. Booklet. LRDC PO#276560-01. This booklet provides a variety of environmental investigations that are suited to the classroom and school yard. The investigations involve students in hands-on and participatory learning situations.	102	203	
		104 109 110	204	
AFA	<i>Woodlot Management Information Series</i> . Edmonton, AB: Alberta Forestry Association, 1993. Brochures. This resource includes a series of 10 rochures that explain aspects of woodlot management in clear statements that use non-technical vocabulary. The series includes Taking Inventory of Your Forest Resources; Forests, Fish & Wildlife; Preparing a Management Plan; Business Plans for Woodlots; Logging & Selling Your Timber; Environmental Protection; Reforesting Your Woodlot; Practising Agroforestry in the Prairies; Add Value to Your Forest Products; and Woodlot Management to Diversify Farm Income.	101	203	301
		110	206	307
			207	311
			210 212	312

TEACHING RESOURCES

The following teaching resources are authorized by Alberta Education to assist teachers in the instructional process.

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<p><i>Alberta's Focus on Forests.</i> Edmonton, AB: Alberta Forestry Association, 1993. LRDC PO#276495-01.</p> <p>This guidebook for teachers focuses attention on the nature of forests and forest management in Alberta. Lessons outlined in the manual incorporate activity-based learning, cooperative learning and critical/creative thinking skills. Materials have been organized around five themes which include Adaptations For Life (forest ecology), The Forest Tree, Conditions Affecting Growth, Forest Resources and Technologies, and Forest Management For All.</p>	101	207	307
		102	210	309
		105		
		106		
		109		
		110		
LRDC	<p><i>Ecology Studies of Lakes in Alberta.</i> Edmonton, AB: Alberta Environment, 1988.</p> <p>This print package deals with the ecology of freshwater environments. The unit of study discusses human impact on lake environments and involves students in the methods and technology employed to study lakes. Workshops on how to use the materials are provided by Alberta Environment.</p>	109	203	301
		110	206	309
			210	
LRDC	<p><i>Global Warming: An Environmental Citizenship Primer.</i> Christine Hogan, et al. Ottawa, ON: Environment Canada, 1993. Booklet.</p> <p>This instructor source book provides information about climate change, the greenhouse effect, human activities contributing to the greenhouse effect, current scientific initiatives, potential impacts (especially on Canada), and strategies for personal response to the issue. This book will assist the teacher to develop learning projects and programs that address global warming.</p>		203	301
			210	309
LRDC	<p><i>Managing The Forest: Support Materials for a Secondary School Course in Intensive Forest Management.</i> Don Jacques. Vancouver, BC: The University of British Columbia, Western Education Development Group, 1985. Teacher resource manual.</p> <p>This resource manual provides ideas and activities to support a high school forestry course. The book is not a course in itself, but places activities in a developmental sequence so that teachers may use it as a guide to develop and present a variety of forestry concepts.</p>	105	206	306
		106	207	307
			212	308
				311
				312

Teaching Resources (Cont'd.)

Distributor Code	Resources	Level/Module No.		
		1	2	3
SSC	<p><i>Nature of Canada, The: A Primer on Spaces and Species.</i> Ottawa, ON: Environment Canada, 1993. Booklet.</p> <p>This resource is designed to provide information that will help Canadians make environmentally responsible decisions. It provides short information anecdotes, maps and charts, and questions and answers designed to promote critical thinking. The resource includes activities that can be initiated in the classroom or community. The book is one of a series of Environmental Citizenship Primers.</p>	101 109 110	201	301 309 312
LRDC	<p><i>National Occupational Standards For the Canadian Tourism Industry: Outdoor Guide.</i> Tourism Industry Association of Canada. Edmonton, AB: Alberta Tourism Education Council, 1991. Teacher booklet.</p> <p>This document contains competency standards that the tourism industry deems necessary for effective performance in the occupation of Outdoor Guide. The standards establish a base from which certification programs can be developed.</p>	104	204	
LRDC	<p><i>Northern Bushcraft.</i> (Expanded edition.) Mors Kochanski. Edmonton, AB: Lone Pine Publishing Company, 1988. Student book. LRDC PO#112409-04.</p> <p>This book provides practical information for everyday living in the northern forest. It discusses basic existence skills that allow survival in challenging situations. Topics such as firecraft, axecraft, knifecraft, sawcraft, rope work and shelter are discussed.</p>	104	204	
LRDC	<p><i>One-Minute Readings: Issues in Science, Technology and Society.</i> R.F. Brinckerhoff, et al. Don Mills, ON: Addison-Wesley Publishing Company, 1992. Teacher's Manual. LRDC PO#105636-25.</p> <p>This book contains readings and questions related to issues in science, technology and society. Applications of science are raising difficult questions and are creating problems that cannot be answered. The book is intended to give students practice in making the kinds of decisions they will experience in life. Students need a knowledge of science to find the best possible answers.</p>			301

Teaching Resources (Cont'd.)

Distributor Code	Resources	Level/Module No.		
		1	2	3
LRDC	<p><i>Orienteering, Level I.</i> R. Robertson. Calgary, AB: Calgary Board of Education, 1982. Booklet. LRDC PO#138950-10.</p> <p>This booklet is designed to develop locomotor skills, map skills and space/time skills as they relate to orienteering. By using a variety of maps, the student's ability to "find his/her way" is developed. Activities for rural and urban geographical areas have been included.</p>	104 105	204	
LRDC	<p><i>Orienteering, Level II.</i> R. Robertson. Calgary, AB: Calgary Board of Education, 1980. Booklet. LRDC PO#139669-10.</p> <p>This booklet is designed to add the use of a compass to the fundamental orienteering skills of map reading, map making and map orientation. Activities address physical fitness and skills, knowledge and understanding, social skills, attitudes and appreciation. The material has been prepared for junior and senior high school students.</p>	104 105	204	
SSC	<p><i>Primer on Environmental Citizenship, A.</i> Ottawa, ON: Environment Canada, 1993.</p> <p>This resource is designed to provide information that will help Canadians make environmentally responsible decisions. It provides short informational anecdotes, maps and charts, and questions/answers designed to provide critical thinking. The resource includes information on ecological processes, relationships of human societies with the environment, and key environmental issues that Canadians face today. The book is one of a series of Environmental Citizenship Primers.</p>	101 109	201	301 309 312
LRDC	<p><i>Project Wild Activity Guide.</i> Ottawa, ON: Canadian Wildlife Federation, 1993. Book.</p> <p>This book provides a collection on interdisciplinary environmental education materials and activities that emphasize wildlife conservation and environmental stewardship. Activities are indexed by topic, grade, subject, and skill, and foster responsible behaviour and constructive actions concerning wildlife and the environment.</p>	101 109 110	201 210 212	301 309 312
LRDC	<p><i>Trip Planning.</i> N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1984. Booklet. LRDC PO#139693-10.</p> <p>This booklet outlines essential steps in planning successful outdoor education experiences. Planning should be based on an understanding of the potential hazards in the wilderness environment. The isolation factor of an outdoor trip shows the need for knowledge of emergency response, first aid and evacuation procedures. The booklet provides basic knowledge for the safety and enjoyment of outdoor experiences.</p>	104	204	

Teaching Resources (Cont'd.)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
AFA	<i>Woodlot Management Guide for the Prairie Provinces. Farm Woodlot Association of Saskatchewan. Edmonton, AB: Alberta Forestry Association, 1993.</i> This guide in binder format provides an introduction to forestry and a general overview of woodlot Management. The guide is divided into four sections covering woodlot assessments, multiple land use, products and marketss and woodlot management. Information provided is intended to help landowners understand their woodlots and develop appropriate goals for land use.	101	203	301
		110	206	307
			207	311
			210	312
			212	

FORESTRY RESOURCES

THEME CODE:

- A. Social & Cultural Perspectives
- B. Technology & Applications
- C. Management & Conservation

FORMAT CODE:

p - Print
v - Video
s - Software

STATUS CODE:

B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:

1 - Introductory
2 - Intermediate
3 - Advanced

[illegible]

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Managing the Forest: Support Materials for a Secondary School Course in Intensive in Intensive Forest Management The Nature of Canada: A Primer on Spaces and Species Northern Bushcraft Orienteering, Level I Orienteering, Level II A Primer on Environmental Citizenship National Occupational Standards: Outdoor Guide Project Wild: Secondary Activity Guide Trip Planning The Alberta Clean Air Act The Alberta Clean Water Act Alberta Timber Harvest Planning and Operating Ground Rules Alberta's Forests Alberta's Managed Forests Alberta's Public Land and Resources - Planning For the Future Alberta's Threatened Wildlife Series	p	T	S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														</

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LEVEL																									
THEME																									
Why Forestry?	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3
Forest Regions Of Canada	A	A	A																						
Woods Survival I	A	A	B																						
Mapping & Aerial Photography																									
Measuring The Forest I																									
Basic Forest Ecology																									
Forests Forever I																									
Making A Difference In Forestry																									
Managing Alberta's Forested Lands																									
Woods Survival II																									
Measuring The Forest II																									
Harvesting & Forest Products																									
Forests Forever II																									
Users In The Forest																									
Issues In Forestry																									
Measuring the Forest III																									
The Forest Marketplace																									
Forest Technology Applications																									
Advanced Forest Ecology																									
Silviculture: Growing The Forest																									
Stewardship: Balancing Needs																									

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LEVEL THEME	Junior/Senior High																							
	Formal	Status	Why Forestry?	Forest Regions Of Canada	Woods Survival I	Mapping & Aerial Photography	Measuring The Forest I	Basic Forest Ecology	Forests Forever I	Making A Difference In Forestry	Managing Alberta's Forested Lands	Woods Survival II	Measuring The Forest II	Harvesting & Forest Products	Forests Forever II	Users In The Forest	Issues In Forestry	Measuring the Forest III	The Forest Marketplace	Forest Technology Applications	Advanced Forest Ecology	Silviculture: Growing The Forest	Stewardship: Balancing Needs	
	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	
	A	A	A	B	C	C	A	A	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C	
Hinterland Who's Who Series									X		X				X									
How Green Is Your School																	X							
Human Environments								X	X		X	X												
Industrial Land Disturbance and Reclamation in Forest Areas										X					X	X							X	
JFW Green Tree Trailblazer Leader Manual							X					X										X		
Kananaskis County Environmental Education Teaching Activity Guide							X	X				X												
Key Issues Relating to the Alberta Forest Industry										X					X	X							X	
Land Conservation Education Program								X	X		X				X		X				X			
Mammals of the Northern Rockies																								
Managing Your Woodland: A Non-Forester's Guide to Small-Scale Forestry in British Columbia							X	X					X	X		X			X			X	X	
Native Trees of Alberta							X	X																
Natural Regions of Alberta: Poster Series							X	X																
Navigation																								
Nutrition							X					X												
Occupational Profiles																								
Pesticide Education Program								X	X						X						X	X		
Reforestation in Alberta														X								X		
Resource Road Planning Guidelines										X					X	X							X	

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[illegible]

OTHER RESOURCES

These titles are provided as a service only to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of the resources. However, the responsibility to evaluate these resources prior to selection rests with the user, in accordance with any existing local policy.

Distributor Code	Other Resources
EPPC	<i>Alberta Timber Harvest Planning and Operating Ground Rules.</i> Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Book.
ECA	<i>Alberta's Clean Air Act.</i> Edmonton, AB: Environment Council of Alberta, 1985. Booklet.
ECA	<i>Alberta's Clean Water Act.</i> Edmonton, AB: Environment Council of Alberta, 1985. Booklet.
EPPC	<i>Alberta's Forests.</i> Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1988.
EPPC	<i>Alberta's Managed Forests.</i> Edmonton: Alberta, AB Forest Service. Book.
EPPC	<i>Alberta's Public Land and Resources - Planning for the Future.</i> Edmonton, AB: Alberta Forestry, Lands and Wildlife. Book.
EPPC	<i>Alberta's Threatened Wildlife Series.</i> Edmonton, AB: Alberta Environmental Protection. Factsheet Series.
LPP	<i>Animal Tracks of Western Canada.</i> Joanne Barwise. Edmonton, AB: Lone Pine Publishing, 1989. Book.
SSC	<i>Benefits of Wildlife, The.</i> Ottawa, Canada: Canadian Wildlife Service, 1990. Booklet.
SSC	<i>Canada's Eight Forest Regions.</i> Ottawa, ON: Environment Canada, Forestry Service, 1974. Pamphlet.
FOCA	<i>Canada's Forest Heritage.</i> Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada, 1986. Book.
PIAD	<i>Canadian Environmental Education Catalogue, The.</i> Drayton Valley, AB: Pembina Institute for Appropriate Development, 1991. Catalogue.
CBE	<i>Canoe Tripping.</i> N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.
CBE	<i>Canoeing.</i> B. Hans, et al. Calgary, AB: Calgary Board of Education, 1980. Booklet.

Other Resources (Cont'd.)

Distributor Code	Other Resources
ENED	<i>Caring For the Land Teaching Kit</i> (Grades 7-9). Edmonton, AB: Alberta Environmental Protection, Education Branch, 1993. Teacher's guide and student material.
NDM	<i>Ecology of a Temperate Ancient Rain Forest</i> . Survival/Anglia. Eugene, OR: New Dimension Media. 1991. Videotape.
EPPC	<i>Ecoregions of Alberta</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1992. Book.
SSC	<i>Endangered Species in Canada</i> . Ottawa, ON: Canadian Wildlife Service, 1990. Brochure.
SSC	<i>Fact Sheet: The Forest Tent Caterpillar</i> . Ottawa, ON: Canadian Forestry Service, 1975. Pamphlet.
CPPA	<i>Farming Canada's Forests: Forest Management and Silviculture</i> . Montreal, PQ: Canadian Pulp and Paper Association. Booklet.
LRDC	<i>Fifty More Things You Can Do To Save The Earth</i> . Earthworks Group. Berkeley, CA: Andrews and McMeel, 1989.
LRDC	<i>Fifty Simple Things Kids Can Do To Save The Earth</i> . John Javna. Berkeley, CA: Andrews and McMeel, 1990. Book.
CBE	<i>Fires & Stoves</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.
EPPC	<i>First Harvest, The</i> . Edmonton, AB: Alberta Energy and Natural Resources. Pamphlet.
ENED	<i>Focus On Series (Acidic Deposition, Air Quality, Environment, Greenhouse Effect, Land Reclamation, Ozone Depletion, Pesticides, Pollution, Recycling, Water Conservation)</i> . Edmonton, AB: Alberta Environmental Protection, Education Branch. Booklets.
DEEF	<i>Forest, The: Understanding It, Using It, Keeping It</i> . Don Harris and Wendy Pobjoy. Charlottetown, PEI: Department of Energy and Forestry, 1991. Guidebook.
AFPA	<i>Forest Care: Codes of Practice</i> . Edmonton, AB: Alberta Forest Products Association. 1994. Pamphlet.
FOCA	<i>Forest Explorers, The</i> . Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada. Booklet.

Other Resources (Cont'd.)

Distributor Code	Other Resources
EPPC	<i>Forest Land Use Zones</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.
EPPC	<i>Forest Landscape Management Guidelines for Alberta</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Book.
AFPA	<i>Forest Line</i> . Edmonton, AB: Alberta Forest Products Association. Quarterly newsletter.
SSC	<i>Forest Regions of Canada</i> . J.S. Rowe. Ottawa, ON: Canadian Forestry Service, Supply and Services Canada. 1977. Student text.
AFA	<i>Forest Resources Directory</i> . Edmonton, AB: Alberta Forestry Association, 1993. Directory.
OFA	<i>Forestry Manual For Ontario Secondary School Teachers</i> , A. G.R. Morrison. Ottawa, ON: The Ontario Forestry Association, 1990. Guidebook.
CFA	<i>Forestry on the Hill (Series: Clearcutting, Biodiversity and Monocultures, Herbicides, Forest Wildfires)</i> . Ottawa, ON: Canadian Forestry Association. 1991-1993. Booklets.
EPPC	<i>Forests and Water</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1985. Pamphlet.
EPPC	<i>Forests For The Future: Pine Ridge Forest Nursery</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Pamphlet.
EPPC	<i>Framework for Alberta's Special Places, A (Natural Regions Report No. 1)</i> . Edmonton, AB: Alberta Parks Service. Booklet.
CBE	<i>Freshwater Ecosystems</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1992. Booklet.
CPPA	<i>From Watershed to Watermark</i> . Montreal, PQ: Canadian Pulp and Paper Association, 1987. Booklet.
EPPC	<i>Genetics and Tree Improvement: Better Forests for the Future</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1983. Booklet.
EPPC	<i>Grazing in the Green Area</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1984. Pamphlet.
PBC	<i>Green Future: How To Make A World of Difference</i> . Lorraine Johnson. Markham, ON: Penguin Books, 1990. Textbook.

Other Resources (Cont'd.)

Distributor Code	Other Resources
ACC	<i>Green Guide, The (Series I and II)</i> . Edmonton, AB: ACCESS Network, 1991. Videotapes.
EPPC	<i>Green Tree Trailblazer Leader Manual</i> . Edmonton, AB: Alberta Provincial Advisory Council, Junior Forest Warden Association, 1992. Book.
EPPC	<i>Growing Opportunity, A: Alberta's Forest Resources</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife. Booklet.
SSC	<i>Hinterland Who's Who (Series)</i> . Ottawa, ON: Canadian Wildlife Service. Monographs.
OCV	<i>How Green Is Your School?</i> Don E. McAllister. Ottawa, ON: Ocean Voice, 1991. Booklet.
CBE	<i>Human Environments</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1993. Teacher Resource Manual.
EPPC	<i>Industrial Land Disturbance and Reclamation in Forestry Areas</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1992. Pamphlet.
CBE	<i>Kananaskis Country Environmental Education Teaching Activity Guide: Earth Science</i> . R. Lengsfeld, et al. Calgary, AB: Calgary Board of Education, 1987. Guidebook.
AFPA	<i>Key Issues Relating to the Alberta Forest Industry</i> . Edmonton, AB: Alberta Forest Products Association, 1992. Pamphlet.
ENED	<i>Land Conservation Education Program</i> . Edmonton, AB: Alberta Environmental Protection, Education Branch. Teacher's guide and student materials.
FHW	<i>Mammals of the Northern Rockies</i> . Tom J. Ulrich. Missoula, MT: Mountain Press Publishing Company, 1990. Book.
FOCA	<i>Managing Your Woodland: A Non-Forester's Guide To Small-Scale Forestry in British Columbia</i> . Canadian Forestry Service. Ottawa, ON: Forestry Canada, 1988. Book.
EPPC	<i>Native Trees of Alberta</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.
EPPC	<i>Natural Regions of Alberta: Poster Series</i> . Edmonton, AB: Alberta Environmental Protection, 1990. Posters and manual.
CBE	<i>Navigation</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.

Other Resources (Cont'd.)

Distributor Code	Other Resources
CBE	<i>Nutrition</i> . N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.
EPPC	<i>Occupational Profile: (Forest Technologist, Forester/Forestry Scientist, Heavy Duty Equipment Operator, Logging and Forestry Workers)</i> . Edmonton, AB: Alberta Career Development and Employment. Pamphlet.
AFPA	<i>Our Growing Resource: Alberta's Forest Industry....Meeting Global Challenges</i> . Edmonton, AB: Alberta Forest Products Association, 1992. Booklet.
ENED	<i>Pesticide Education Program</i> . Edmonton, AB: Alberta Environmental Protection, Education Branch. Teacher's guide and student materials.
CTV	<i>Perils of Pulp</i> . Toronto, ON: CTV Television Network Ltd., 1992. Videotape.
EPPC	<i>Reforestation in Alberta</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife. Booklet.
EPPC	<i>Resource Road Planning Guidelines</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1985. Book.
EPPC	<i>Spruce Budworm Management</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife Forest Service, 1992. Pamphlet.
FOCA	<i>Sustainable Forests: A Canadian Commitment</i> . Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada. 1992. Book.
EPPC	<i>Timber Harvesting</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1983. Pamphlet.
EPPC	<i>Timber Harvesting and the Environment</i> . Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.
EPPC	<i>Timber Quota Policy</i> . Edmonton, AB: Alberta Energy and Natural Resources, 1984. Book.
LPP	<i>Trees and Shrubs of Alberta</i> . Kathleen Wilkinson. Edmonton, AB: Lone Pine Publishing, 1990. Book.

Other Resources (Cont'd.)

Distributor Code	Other Resources
ENED	<i>Water In Alberta: The Living Flow.</i> Edmonton, AB: Alberta Environmental Protection, Education Branch, 1993. Teacher resource kit.
ENED	<i>Water Quality Questions: The Nature and Importance of Water Quality Variables in Alberta.</i> Edmonton, AB: Alberta Environmental Protection, Education Branch, 1990. Teacher guide and student booklet.
SSC	<i>What We Can Do For Our Environment: Hundreds of Things To Do Now.</i> (4th edition.) Hull, PQ: Environment Canada, Minister of Supply and Services, 1991. Booklet.

ADDITIONAL SOURCES

Available to Forestry teachers, both locally and provincially, are many resources that can be used to enhance Career and Technology Studies courses. These resources can be accessed through the community, government agencies, resource centres and organizations. Some of these sources, e.g., government departments, undergo frequent name and/or telephone number changes. Please check your telephone directory or an appropriate government directory.

The following is a partial list of sources to consider:

TEACHER-LIBRARIANS

Planned and purposeful use of library resources helps students grow in their ability to gather, process and share information. Research activities require access to an adequate quantity and variety of appropriate, up-to-date print and non-print resources from the school library, other libraries, the community and additional sources. Some techniques to consider are:

- planning together
- establishing specific objectives
- integrating research skills into planning.

Cooperation between the teacher-librarian and the subject area teacher in the development of effectively planned resource-based research activities ensures that students are taught the research skills as well as the subject content.

Also see *Focus on Research: A Guide to Developing Student's Research Skills* referenced in the Alberta Education Resources section.

ALBERTA EDUCATION SOURCES

The following monographs are available for purchase from:

Learning Resources Distributing Centre
12360 142 Street
Edmonton, AB
T5L 4X9
Telephone: 427-2767
Fax: 422-9750

Please consult the "Support Documents" section or the "Legal, Service and Information Publications" section in the *Buyers Guide* for ordering information and costs.

Developmental Framework Documents

- *The Emerging Student: Relationships Among the Cognitive, Social and Physical Domains of Development*, 1991

This document looks at the whole child, or student, as a productive learner, integrating all the domains of development: cognitive, social and physical. It emphasizes the need for providing balanced curriculum and instruction.

- *Students' Interactions Developmental Framework: The Social Sphere*, 1988

This document focuses on the student as a social being. It looks at the student's affective or emotional growth and examines moral development. These three domains make up the social sphere.

- *Students' Physical Growth: Developmental Framework Physical Dimension*, 1988

This document examines children's normal physical growth in three areas: perceptual, structural and motor development. In none of these areas is the child's growth in a single continuous curve throughout the first two decades of life. Physical growth is characterized by periods of rapid growth and periods of slower growth. Consequently, differences and changes in growth patterns may affect the timing of certain learning processes.

- *Students' Thinking: Developmental Framework Cognitive Domain*, 1987

This document explores children's cognitive development from infancy to adolescence. The Piagetian stages of pre-operational, concrete operational and formal operational thinking are explained. Suggestions for improving the learning process are also presented.

Others

- *Focus on Research: A Guide to Developing Students' Research Skills*, 1990

This document outlines a resource-based research model that helps students manage information efficiently and effectively, and in this process, to gain skills that are transferable to all school and work situations. This model provides a developmental approach to teaching students how to do research.

- *Teaching Thinking: Enhancing Learning*, 1990

Principles and guidelines for cultivating thinking, ECS to Grade 12, have been developed in this resource. It offers a definition of thinking, describes nine basic principles on which the suggested practices are based, and discusses possible procedures for implementation in schools and classrooms.

OTHER GOVERNMENT SOURCES

ACCESS Network

ACCESS Network offers a variety of resource and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS Network audio and video library tapes copied.

ACCESS Network publishes a listing of audio and video cassettes as well as a comprehensive programming schedule.

Of particular interest are the Career and Technology Studies videos that are available with teacher-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 listed and accompanying support material can be obtained from:

ACCESS Network

3720 76 Avenue

Edmonton, AB

T5B 2N6

Telephone: 440-7777 (in Edmonton)

1-800-352-8293

(outside Edmonton)

Agriculture Canada

Communications Branch

Ottawa, ON

K1A 0C7

Telephone: (819) 994-0246

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

Alberta Advanced Education and Career Development

Information Development and Marketing

9th Floor, City Centre Building

10155 102 Street

Edmonton, AB

T5J 4L5

Telephone: 422-1794

Fax: 422-5126

Career Information Catalogue Update, 1994

The Career Planner

Children Challenges Choice

Entrepreneur: A Big Word for Small Business

Rural Women as Business Entrepreneurs

Positive Works

Skills are your Passport.

Videos on career planning and entrepreneurial topics are available through the library of this department. Call 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**
Print Media Branch
7000 113 Street
Edmonton, AB
T6H 5T6
Telephone: 427-2121
Fax: 427-2861

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

Broadcast Media Branch
7000 113 Street
Edmonton, AB
T6H 5T6
Telephone: 427-2127
Fax: 427-2861

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

Alberta Economic Development and Tourism
(formerly Alberta Economic Development and Trade)
Strategic Planning and Research
9th Floor, Sterling Place
9940 106 Street
Edmonton, AB
T5K 2P6
Telephone: 422-9494
Fax: 422-5922

Financing a Small Business
Marketing a Small Business
Starting a Small Business.

Alberta Environmental Protection
Education Branch
12th Floor, 9820 106 Street
Edmonton, AB
T5K 2J6
Telephone: 427-6310
Fax: 427-2512

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.)

Alberta Environmental Protection
Land and Forest Services
9920 108 Street
10th Floor, Bramalea Building
Edmonton, AB
T5K 2M4
Telephone: 427-3551
Fax: 427-0292

Junior Forest Wardens Program.

Alberta Environmental Protection
Fish and Wildlife Services
9920 108 Street
Edmonton, AB
T5K 2M4
Telephone: 944-0313

Or

200 Sloan Square
5920 1A Street SW
Calgary, AB
T2H 0G3
Telephone: 297-6423
Fax: 297-2843

Project Wild
Alberta Conservation and Hunter Education
Program
Alberta Fishing Education Program.

Alberta Environmental Protection
Alberta Parks Service Division
8th Floor, Standard Life Centre
10405 Jasper Avenue
Edmonton, AB
T5J 3N4
Telephone: 427-6781
Fax: 427-5980

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

Canadian Firearms Safety Course.

Alberta Labour
9940 - 106 Street
Edmonton, AB
T5K 2N2
Telephone: 427-8848

Offices are also in Calgary, Camrose, Edson, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, Red Deer and Vermillion.

Alberta Tourism Education Council (ATEC)
12th Floor, Sterling Place
9940 - 106 Street
Edmonton, AB
T5K 2N2
Telephone: 422-0781
Fax: 422-3069

Employment Standards Code (Teacher resource package).

Alberta Tree Nursery and Horticulture Centre
R.R. #6
Edmonton, AB
T5B 4K3
Telephone: 422-1789
Fax: 427-6096

Energy Conservation and Renewable Energy

Western Regional Office
200 Grandin Park Plaza
22 Winston Churchill Avenue
St. Albert, AB
T8N 1B4

Or

Regional Communications
355, 200 4 Avenue SE
Calgary, AB
T2G 4X3

Environment Canada
Inquiry Centre
1st Floor, 10 Wellington Street
Hull, Quebec
K1A 0H3
Telephone: (819) 997-2800
Fax: (613) 953-2225

Or

Environment Canada
Canadian Wildlife Service
Communications Directorate
Western and Northern Region
200, 4999 98 Avenue
Edmonton, AB
T6B 2X3
Telephone: 951-8720
Fax: 495-2615

Or

Environment Canada
Canadian Parks Service
Room 552, 220 4 Avenue SE
Calgary, AB
T2P 3H8
Telephone: 292-4401

Environmental Council of Alberta
400, 9925 109 Street
Edmonton, AB
T5K 2J8
Telephone: 427-5792
Fax: 427-0388

Forestry Canada
351 St. Joseph Boulevard
Hull, Quebec
K1A 1G5
Telephone: (819) 997-1107

Or

5320 122 Street
Edmonton, AB
T6H 3S5
Telephone:

Industry and Science Canada
Consumer Affairs
10225 -100 Avenue
Edmonton, AB
T5J 0A1
Telephone: 495-2485
Fax: 495-6451

Or

301, 510 12 Avenue SW
Calgary, AB
T2R 0H3
Telephone: 292-5604
Fax: 292-6175

National Film Board of Canada (NFB)

The NFB has numerous films and videotapes that may be suitable for Forestry. For a listing of NFB films and videotapes indexed by title, subject and director, or for rental or purchase of NFB films and videotapes, call 1-800-267-7710 (toll-free).

Educational Marketing Officers in Calgary and Edmonton are available, province wide, for workshops, conferences, professional development days and similar activities. For northern Alberta and the Northwest Territories, the Educational Marketing Officer can be reached at 495-3012 (fax, 4956412). For southern Alberta, contact the Educational Marketing Officer at 292-5411 (fax, 292-5458).

ACCESS Network and some school boards have acquired duplication rights to some NFB videotapes. Please consult the relevant catalogues in your school or school district.

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

Calgary Public Library
Films and Recordings Department
616 Macleod Trail SE
Calgary, AB
T2G 2M2
Telephone: 260-2781
Fax: 292-5458

Resource Centres

Urban Resource Centres

Calgary Board of Education
Supervisor, Education Media
3610 9 Street SE
Calgary, AB
T2G 3C5
Telephone: 294-8540
Fax: 287-9739

Calgary Separate School Board
Supervisor, Instructional Materials
1000 - 5 Avenue SW
Calgary, AB
T2P 4T9
Telephone: 246-6663
Fax: 249-3054

County of Strathcona

Director, Learning Resource Service
2001 Sherwood Drive
Sherwood Park, AB
T8A 3W7

Edmonton Public School Board

Learning Resource Consultant
Centre for Education
One Kingsway Avenue
Edmonton, AB
T5H 4G9
Telephone: 429-8320
Fax: 429-8318

Lakeland School District No. 5460

Area Superintendent
Postal Bag 1001
6005 50 Avenue
Bonnyville, AB
T9N 2L4
Telephone: 826-3145
Fax: 826-4600

Medicine Hat School District No. 76

IMC Manager
601 1 Avenue SW
Medicine Hat, AB
T1A 4Y7
Telephone: 526-1323
Fax: 529-5339

Red Deer Public School Board

Coordinator of Instruction
4747 53 Street
Red Deer, AB
T4N 2E6
Telephone: 343-1405
Fax: 347-8190

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

Regional Resource Centres

Zone I

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

Zone II and III

Central Alberta Media Services (CAMS)
Film Supervisor
182 Sioux Road
Sherwood Park, AB
T8A 3K5
Telephone: 464-5540
Fax: 467-5469

Zone IV

Alberta Central Regional Education Services (ACRES)
Operations Manager
County of Lacombe
Parkland Regional Library Building
56 Avenue and 53 Street Corner
Box 3220
Lacombe, AB
T0C 1S0
Telephone: 782-5730
Fax: 782-5831

Zone V

South Central Alberta Resource Centre (SCARC)
c/o County of Wheatland
435 B Hwy #1
Strathmore, AB
T1P 1J4
Telephone: 934-5028
Fax: 934-4889

Zone VI

Southern Alberta Learning Resource Centre (SALRC)
Film Supervisor
Provincial Government Administration Building
120, 909 Third Avenue North
Box 845
Lethbridge, AB
T1J 3Z8
Telephone: 320-7807
Fax: 320-7817

Statistics Canada
Regional Office
8th Floor, Park Square
10001 Bellamy Hill
Edmonton, AB
T5J 3B6
Telephone: 495-3023
Fax: 495-5318

PROFESSIONAL ASSOCIATIONS

Alberta Teachers' Association
Specialist Council
Environmental and Outdoor Education
Barnett House
11010 142 Street
Edmonton, AB
T5N 2R1

Association of Canada Land Surveyors
Box 5378
Station F
Ottawa, ON
K2C 3J1

Alberta Land Surveyors Association
14403 115 Avenue
Edmonton, AB
T5M 3B8

Alberta Logging Association
10916 97 Avenue
Grande Prairie, AB
T8V 3J8

Alberta Registered Professional Foresters Association
55, 9912 106 Street
Edmonton, AB
T5K 1C5

Canadian Association of Plant Physiologists
c/o Department of Botany
University of Guelph
Guelph, ON
N1G 2W1

Canadian Botanical Association
Agriculture Canada
Biosystems Research Centre
Saunders Building, CDF
Ottawa, ON
K1A 0C6

Canadian Society of Environmental Biologists
Box 962 Postal Station F
Toronto, ON
M4Y 2N9

Industrial Vegetation Management Association of Alberta
9205 37 Avenue
Edmonton, AB
T6E 5K9

INDUSTRY ORGANIZATIONS

Alberta Forest Products Association
11710 Kingsway Avenue
Edmonton, AB
T5G 0X5
Telephone: 452-2841
Fax: 455-0505

Canadian Forest Products Ltd.
Postal Bag 100
Grande Prairie, AB
T8V 3A3
Telephone: 538-7711
Fax: 538-7800

Spray Lake Sawmills (1980) Ltd.
P.O. Box 100
Cochrane, AB
T0L 0W0
Telephone: 932-2234
Fax: 932-6675

Weldwood of Canada Limited
760 Switzer Drive
Hinton, AB
T7V 1V7
Telephone: 865-2251
Fax: 865-8129

Weyerhaeuser Canada Ltd.
P.O. Bag 1020
Grande Prairie, AB
T8V 3A9
Telephone: 539-8500
Fax: 539-8597

Blue Ridge Lumber (1981) Ltd.
1200, 10707 100 Avenue
Edmonton, AB
T5J 3M1
Telephone: 423-7560
Fax: 423-7550

Alberta-Pacific Forest Industries Inc.
Box 8000
Boyle, AB
T0A 0M0
Telephone: 525-8000
Fax: 525-3300

Daishowa-Marubeni International Ltd.
P.O. Box 4400
Peace River, AB
T8S 1V7
Telephone: 624-7000
Fax: 624-7054

Millar Western Pulp Ltd.
P.O. Box 279
Edmonton, AB
T5J 2J2
Telephone: 486-2444
Fax: 489-0512

Alberta Newsprint Company Ltd.
P.O. Bag 9000
Whitecourt, AB
T7S 1P9
Telephone: 778-7000
Fax: 778-7070

Canadian Pulp and Paper Association
23rd Floor, Sun Life Building
1155 Metcalfe Street
Montreal, Quebec
H3B 2X9
Telephone: (514) 866-6621

Alberta Special Waste Management Corp.
610, 10909 Jasper Avenue
Edmonton, AB
T5J 3L9
Telephone: 422-5029 or
1-800-272-8873
Fax: 428-9627

ENVIRONMENTAL FACILITIES

The following is a partial list of facilities that provide hands-on experience for student in aspects of resource management and environmental education. Contact should be made directly with the facility to obtain details of what is offered to school groups or students.

Alberta Forest Service Museum
Forest Technology School
1176 Switzer Drive
Hinton, AB
T0E 1B0
Telephone: 865-8211

Alberta Tree Nursery and Horticulture Centre
RR #6
17507 Fort Road
Edmonton, AB
T5B 4K3
Telephone: 422-1789 (in Edmonton)
198-5272 (toll-free through any
government R.I.T.E. Operator)

Alford Lake Conservation Education Centre
c/o Fish and Wildlife Division
Box 369
Caroline, AB
T0M 0M0
Telephone: 722-2423

Bennett Environmental Education Centre
Edmonton Public Schools
9703 94 Street
Edmonton, AB
T6C 3W1
Telephone: 468-1439

Calgary Zoo
Botanical Gardens and Prehistoric Park
P.O. Box 3036, Station "B"
Calgary, AB
T2M 4R8
Telephone: 265-9310

Crowsnest Portable Camp
c/o Fish and Wildlife Division
200 Sloane Square
5920 1A Street SW
Calgary, AB
T2H 0G3
Telephone: 297-7639

Devonian Botanic Garden
University of Alberta
Edmonton, AB
T6G 2E1
Telephone: 987-3054

Energieum
(Energy Resources Conservation Board)
640 5 Avenue SW
Calgary, AB
T2P 3G4
Telephone: 297-4293

Environmental Resource Centre
10511 Saskatchewan Drive
Edmonton, AB
T6E 4S1
Telephone: 433-4808

Fort Calgary Preservation Society
P.O. Box 2100, Station "M", #106
Calgary, AB
T2P 2M5
Telephone: 290-1875

Ft. McMurray Oil Sands Interpretive Centre
515 MacKenzie Blvd.
Ft. McMurray, AB
T9H 4X3
Telephone: 743-7167

Glenbow Museum
130 9 Avenue SE
Calgary, AB
T2G 0P3
Telephone: 264-8300

John Janzen Nature Centre
P.O. Box 2359
Edmonton, AB
T5J 2R7
Telephone: 434-7446

Kananaskis Field Station
Coordinator of School Programs
Bio Sciences 186
University of Calgary
2500 University Drive NW
Calgary, AB
T2N 1N4
Telephone: 220-5355
Fax: 673-3671

McKinnon Flats Resource Education Centre
c/o Fish and Wildlife Division
200 Sloane Square
5920 1A Street SW
Calgary, AB
T2H 0G3
Telephone: 297-7639

Narrow Lake Conservation Education Centre
c/o Fish and Wildlife Division
Provincial Building
Athabasca, AB
T0B 0B0
Telephone: 675-9137

OTHER AGENCIES

Alberta Debate and Speech Association
202, 17308 108 Avenue
Edmonton, AB
T5X 3Y8
Telephone: 484-7929
Fax: 484-2710

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

Alberta Foundation for Economic Education
901, 10179 105 Street
Edmonton, AB
T5J 1E2
Telephone: 421-9331
Fax: 426-2987

The Chartered Banks and Canada's Economy
Labour in the Canadian Economy (teacher resource)
Retail Marketing in Canada
Using Money Wisely.

Canadian Co-operative Association
400, 275 Bank Street
Ottawa, ON
K2P 2L6

Cooperative Entrepreneurship: A Case Study in Worker Ownership

Canadian Foundation for Economic Education
501, 2 St. Clair Avenue West
Toronto, ON
M4V 1L5
Telephone: (416) 968-2236
Fax: (416) 968-0488

Entrepreneurship: A Primer for Canadians (teacher resource)

Labour Market: Teacher's Resource Package (teacher resource)

Money and Youth

Women in the Work Force.

Canadian Wildlife Federation
1673 Carling Avenue
Ottawa, ON
K2A 3Z1
Telephone: (613) 725-2191
Fax: (613) 725-2902

Canadian Parks and Wilderness Society
160 Bloor Street East
Suite 1150
Toronto, ON
M4W 1B9
Telephone: (416) 972-0868

The Conference Board of Canada
255 Smyth Road
Ottawa, ON
K1H 8M7
Telephone: (613) 526-3280
Fax: (613) 526-4857

Economic Forecast: Provincial Outlook (research reports, personalized information services).

Ducks Unlimited Canada
1190 Waverly Street
Winnipeg, Manitoba
R3T 2E2

FEESA

320, 9939 Jasper Avenue
Edmonton, AB
T5J 2X5
Telephone: 421-1497
Fax: 425-4506

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.

Harmony Foundation of Canada

P.O. Box 4016, Station C
Ottawa, ON
K1Y 4P2
Telephone: (613)230-7353

Junior Achievement of Northern Alberta

(Alberta north of Lacombe, and NWT)
161, 10700 104 Avenue
Edmonton, AB
T5J 4S2
Telephone: 482-1421
Fax: 428-1031

Junior Achievement of Southern Alberta

(Lacombe and south)
739 10 Avenue SW
Calgary, AB
T2R 0B3
Telephone: 263-2545
Fax: 261-6988

Materials are available only where Junior Achievement has identified community business consultants and provided inservice.

Kananaskis Country

Coordinator of Environmental Education
Box 280
Canmore, AB
T0L 0M0
Telephone: 678-5508
Fax:

The Pembina Institute for Appropriate Development

P.O. Box 7558
Drayton Valley, AB
T0E 0M0
Telephone: 542-6272
Fax: 542-6464

The Canadian Environmental Education Catalogue.

Rural Education and Development Association

14815 119 Avenue
Edmonton, AB
T5L 2N9
Telephone: 451-5959
Fax: 452-5385

List of speakers for schools

Several modules on cooperatives and entrepreneurship

Teacher resource package on cooperatives.

The SEEDS Foundation

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

DISTRIBUTOR DIRECTORY

The entries in the distributor directory are arranged alphabetically by code.

CODE	Distributor/Address	Telephone/Fax
ACC	ACCESS Network 3270 76 Avenue Edmonton, AB T5B 2N9	(403) 440-777 1-800-252-9363
AFA	Alberta Forestry Association 101 Alberta Block 10526 Jasper Avenue Edmonton, AB T5J 1Z7	(403) 428-7582 Fax: (403) 428-7557
AFPA	Alberta Forest Products Association 200, 11738 Kingsway Avenue Edmonton, AB T5G 0X5	(403) 452-2841 Fax: (403) 455-0505
CBE	Calgary Board of Education Education Centre Building 515 Macleod Trail SE Calgary, AB T2G 2L9	(403) 294-8211 Fax: (403) 294-8336
CFA	Canadian Forestry Association 203, 185 Somerset Street West Ottawa, ON K2P 0J2	(613) 232-1815 Fax: (613) 232-4210
CPPA	Canadian Pulp and paper Association 23rd Floor, Sun Life Building 1155 Metcalfe Street Montreal, PQ H3B 2X9	(514) 866-6621
CTV	CTV Program and Archive Sales 42 Charles Street East Toronto, ON M4Y 1T5	(416) 928-6096
DEEF	Prince Edward Island Department of Energy and Forestry Forestry Branch P.O. Box 2000 Charlottetown, Prince Edward Island C1A 7N8	(902) 368-4700 Fax: (902) 368-5544

CODE	Distributor/Address	Telephone/Fax
ECA	Environment Council of Alberta 8th Floor, Weber Centre 5555 Calgary Trail South Edmonton, AB T6H 5P9	427-5792
ENED	Alberta Environmental Protection, Education Branch 12th Floor, 9820 106 Street Edmonton, AB T5K 2J6	(403) 427-6310
EPPC	Environmental Protection Publications Centre 14th Floor, Oxbridge Place 9820 106 Street Edmonton, AB T5K 2J6	(403) 427-6132
FHW	Fitzhenry and Whiteside See LRDC Buyers Guide for information	
FOCA	Forestry Canada Place Vincent Massey 351 St. Joseph Boulevard Hull, PQ K1A 1G5	(819) 997-1107 Fax: (819) 953-7048
KPB	Key Porter Books Ltd. 2775 Matheson Boulevard East Mississauga, ON L4W 4P7	(416) 238-0709 Fax: (416) 625-8008
LPP	Lone Pine Publishing 206, 10426 81 Avenue Edmonton, AB T6E 1X5	(403) 433-9333 1-800-661-9017 Fax: (403) 433-9646
LRDC	Learning Resources Distributing Centre 12360 142 Street Edmonton, AB T5L 4X9	(403) 427-2767
NDM	New Dimension Media 85803 Lorane Highway Eugene, OR USA 97405	(503) 484-7125 Fax: (503) 484-5267

CODE	Distributor/Address	Telephone/Fax
OCV	Ocean Voice 2883 Otterson Drive Ottawa, ON K1V 7B2	(613) 996-9915
OFA	Ontario Forestry Association 502, 150 Consumers Road Willowdale, ON M2J 1P9	(416) 493-4565
PBC	Penguin Books 1220 Nicholson Road Hewmarket, ON L3Y 7V1	(905) 836-6730
PIAD	Pembina Institute for Appropriate Development Box 7558 Drayton Valley, AB T0E 0M0	(403) 542-6272 Fax: (403) 542-6464
SSC	Canada Communications Group Place du Portage Phase 3 16A1 IL Laurier Street Hull, PQ K1A 0S5	(819) 956-4802

CAREER & TECHNOLOGY STUDIES

FORESTRY

SAMPLE STUDENT LEARNING GUIDES

INTERIM 1994

Forest Regions of Canada (FOR102). J.1

Woods Survival I (FOR104) J.5

Basic Forest Ecology (FOR109) J.9

Alberta

EDUCATION

CURRICULUM STANDARDS BRANCH

MAY 1994

CABLE TV TECHNICAL STUDIES

Volume 1

1970-1971

1970-1971

1970-1971

TAKE THIS MODULE?

- ☑ A fundamental requirement for anyone working in the forest is to be able to identify the types of vegetation present. This often gives clues as to the location and climate of the area. FOR102 is an introduction to dendrology, the study of trees. This is a module for students interested in being able to identify local tree species and to explain the reasons for the locations of the forest regions of Canada and Alberta.
- ☑ This course should be taken in the late spring or early in the fall to make it much easier to identify trees, by their leaves rather than the bare twigs in winter.

DO YOU NEED TO KNOW BEFORE YOU START?

- Locate and describe the geographic regions of Canada
- Use and understand maps
- Know the Scientific Method of Inquiry

WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

- ☒ Identify factors that enhance the development of forests and determine the distribution of living organisms within forest regions.
- ☒ Describe relationships between climatic factors and the growth of trees.
- ☒ Describe relationships between land forms and the distribution of forests.
- ☒ Suggest reasons for the distribution of trees in natural regions in Canada and Alberta.
- ☒ Locate and describe the eight forest regions of Canada.
- ☒ Read, interpret and create visual representations or species distribution in Canada and Alberta.
- ☒ Identify common trees and other plants that grow specific regions of Canada and Alberta.
- ☒ Prepare a display of details that help to identify local trees, shrubs and non-woody plants.

SHOULD YOUR WORK BE DONE?

WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
☒ Moisture Lab	10%
☒ Test on Factors	10%
☒ Forest Region Maps (Canada) (Alberta)	25%
☒ Leaf Collection	15%
	40%

WHICH RESOURCES MAY YOU USE?

- ☒ Trees and Shrubs of Alberta
- ☒ Native Trees of Canada
- ☒ Flora of Alberta
- ☒ Visions
- ☒ Guide to Common Native Trees and Shrubs of Alberta

Assignments:

1. Research and prepare a detailed list of factors that act independently and together to determine the type of forest on a given area. These factors should include information on climate, soil, landforms and topography, and the interactions between the three.
2. Using the Scientific Method develop a hypothesis that tests plant growth rates against moisture availability. Write up the experiment, conduct it, and interpret the data collected. Remember to practise safe laboratory habits.

3. Forest Regions of Canada

- on a large sheet of paper (min. 11x17) pencil in the boundaries of this country. Add the provincial boundaries
- pencil in the forest regions
- make sure your map is neat and clearly understandable. It must have a key, scale, north arrow and legend
- on the next page is a sample sheet you can use to fill in information on each forest region
- repeat the above list for Alberta and its forest regions.

4. Leaf collection

Collect and prepared for formal presentation the leaves (twigs if winter) of five grasses (omit in winter), five local shrubs, willow, aspen, balsam poplar, white birch, jack pine, lodgepole pine, white and black spruce, larch and balsam fir. The species list may be altered by your teacher to fit local conditions.

TAKE THIS MODULE?

- ☑ This is a two-part module that will teach you safe and enjoyable skills and attitudes that will aid you in working and/or recreationing in the forest environment.
- ☑ This module will introduce you to the physical demands faced by a person travelling in the forest and provide structure and direction to learn from these experiences.
- ☑ It is recommended that this module be taken in conjunction with Woodmanship II (FOR203) and that you do this module in the spring (April-May).
- ☑ Remember that when in the forest the attitude of Minimal Impact interaction should direct all your activities.

DO YOU NEED TO KNOW BEFORE YOU START?

- Standard St. John's Ambulance First Aid course.
- You should have the attitude that you want to experience the forest environment first hand, in a positive fashion. If you are not interested you may find the field activities distasteful or even dangerous.

WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

- ☒ Identify, assess, avoid and/or respond to physical hazards that may be imposed by the forest environment
- ☒ Identify, assess, avoid and/or respond to physiological and psychological factors often associated with outdoor experiences in the forest
- ☒ List and explain necessary steps to take in emergency and survival situations in the forest
- ☒ Select appropriate personal and group gear for outdoor forest activities
- ☒ Demonstrate safe use and appropriate care of outdoor handtools, including knives, axes and saws
- ☒ Demonstrate safe procedures for building and using outdoor fires
- ☒ Explain techniques used to plan, pack, carry and prepare foods during outdoor forest expeditions
- ☒ Explain techniques required for maintaining hygiene during outdoor forest expeditions
- ☒ Plan and conduct safe outdoor expeditions in the forest
- ☒ Use different modes of travel to participate in a variety of forest activities
- ☒ Acquire and apply minimal impact skills while participating in outdoor forest expeditions

SHOULD YOUR WORK BE DONE?

WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
☒ Hazardous list and test	5%
☒ Adverse conditions (discussion)	5%
☒ Shelter construction	20%
☒ Fire construction	10%
☒ Pack and walk	30%
☒ Water management	10%
☒ Tool use	20%

RESOURCES MAY YOU USE?

- ☒ The Common Sense and Medical Guide and Outdoor Reference.
- ☒ Wilderness Survival
- ☒ Wilderness Survival Handbook
- ☒ Finding Your Way in the Outdoors
- ☒ Two in One Survival Library
- ☒ Local Forest Station and it's employees

- Prepare a list of possible hazards one may encounter in the natural environment, and on a test explain in detail several of the hazards.
- Explain why one must always be prepared for adverse conditions in the forest i.e.;
 - having adequate and sufficient food
 - having adequate and sufficient water
 - adequate and sufficient first aid equipment
- Demonstrate the proper construction of a quinze, or lean-to if there isn't enough snow in the area.
- correctly build, use and contain a small campfire, making sure you address all safety precautions
- prepare a list of equipment, food, and clothing required for a three day hiking trip. Assemble the list and walk all of it with a minimum of three km without removing the pack.

- Explain and demonstrate proper water management i.e.;
 - drinking water
 - disposal of waste water
 - proper latrine location
- Demonstrate the following skills;
 - correct axe and knife carrying
 - correct axe and knife use
 - correct axe and knife maintenance

TAKE THIS MODULE?

- ☑ Being able to work with living things means you have to understand how things work. The easiest way is to look at the component parts of a system. Therefore, in this module you will look at several parts of the forest. These include tree structure, biotic and abiotic factors of the forest ecosystem, and the role of the tree in the forest.
- ☑ Remember you must practise safe work habits in anything you do, especially lab or outdoor activities. If you are not sure how to do something, ask someone in a position of authority for instructions first.

DO YOU NEED TO KNOW BEFORE YOU START?

- Use the Scientific Method of Inquiry.
- Know the lab safety measures and procedures of your school.
- Access a copy of Investigating Terrestrial Ecosystems
- Have access to a laboratory.

WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

- ☒ Identify living and non-living elements within a local forest ecosystem.
- ☒ Describe the interrelatedness of elements within a local forest environment.
- ☒ Explain the role of trees within a local forest ecosystem.
- ☒ Analyze food relationships among living organisms within a local forest ecosystem.
- ☒ Analyze food relationships among living organisms within a local forest environment.
- ☒ Compare the ecological niches of selected plant and animal species native to Alberta.
- ☒ Explain the vital life processes performed by trees and other forest plants.
- ☒ Describe structural units and component parts of the tree, and their function in performing vital life processes.
- ☒ Infer interrelationships among tree structures, their functions and vital life processes that are performed.
- ☒ Illustrate the approximate range of one or more tree species throughout North America.

SHOULD YOUR WORK BE DONE?

WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
☒ Tree Biology:	
Activity 1.6	10%
Activity 3.2	10%
Tree Drawing	10%
Test	20%
☒ Forest Ecosystems	
Activity 2.8	10%
Food Web	20%
Test	20%

RESOURCES MAY YOU USE?

- ☒ *Alberta Parks and Recreation: Learning Resources Manual* (Alberta Government)
- ☒ *Investigating Terrestrial Ecosystems*
- ☒ *Field and Laboratory Methods for General Ecology*
- ☒ *Managing Your Wood Lot* (Canadian Forest Service)
- ☒ *Seeing the Forest Among the Trees*
- ☒ *Ecology*
- ☒ *Biology*

Section 1: Tree Biology

- Activity 1.6 on page 11 in *Investigating Terrestrial Ecosystems*.
- Activity 3.7 on page 47 in *Investigating Terrestrial Ecosystems*.
- On a large sheet of paper, draw a cross-section of a tree (top to bottom) that shows all components. Label each component. Then, on a separate sheet of paper (one for each component; see page 5) explain the importance of each structure as well as the process's it carries out. List the percentage by weight and volume that each structure makes up of the tree total; e.g., the leaves make up 1% of the tree's weight and 1.7% of its volume. As well, explain what would happen to the tree if the specific structure had its function impaired or destroyed.

- Completed a written test that will examine you on the structural components of trees, and the function of these components

Section 2: Forest Ecosystems

- Read chapters 1, 2 and 3 in *Investigating Terrestrial Ecosystems*.
- Activity 2.8 on page 33 of *Investigating Terrestrial Ecosystems*.
- Visit a forested area and prepare an extensive food web of the area. Plan this trip with your teacher. Make sure you address all aspects of safety. Plan two trip dates so that if the weather is bad on the first you can go on the second. Once at the area collect data on:
 - types of animals present. Determine numbers/area
 look for: scat
 tracks
 bones
 actual sightings
 - types of grass/shrubs/fungi and mosses present
 determine numbers/area
 - types and numbers/area of trees present
 - types and numbers of insects present
 - soil quality (use the soil test kits from Sudbury Co.).

Return to classroom with the data. On a large sheet of paper draw a food web using the data you collected. Explain the connections that your food web shows. Prepare it for presentation (make it look good) and hand it in with your field notes.

- Write a test on the material presented in the three chapters and observed on the field trip.

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