

## SECTION C: 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 this section for recommendations regarding the Energy and Mines strand, or the *Career & Technology Studies 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 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 other CTS strands. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 4) for more information on course names and course codes.

Module selection and sequencing should consider:

- prerequisite(s)
- supporting module(s) (other CTS modules that may enhance the learning opportunity if offered with the module)
- module parameters
  - 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 timetabling and instructional delivery, does not mandate the degree of flexibility a school or teacher will offer. The teacher and school will determine the degree of flexibility available to the student. Within the instructional plan established by the school, the student may:

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

#### Integrating Basic Competencies

The basic competencies relate to managing learning and resources, problem solving and innovation, communicating effectively, working with others and demonstrating responsibility are developed throughout the CTS program, and are within each module.

Assessment of student achievement on the basic competencies is integrated throughout the other module learner expectations. Refer to Section G (Assessment Tools) of this Guide for the description of student behaviours expected at each of the four developmental stages defined for the basic competencies.

Assessment of basic competencies could include input and reflection involving the student, teacher(s), peers and others. 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.

The basic competencies related to teamwork, service, safety and accountability should be emphasized in Energy and Mines modules at the intermediate and advanced levels where industry-based activities and projects would be appropriate.

### **Assessing Student Achievement**

Assessing student achievement 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 Section G (Assessment Tools) of this Guide for copies of the various tools (worksheets, checklists, sample questions, etc.).

A suggested emphasis for each module learner expectation has also been established. The suggested emphasis provides a guideline to help teachers determine time allocation and/or the appropriate emphasis for each MLE and student grade.

### **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 *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 12) for more information on how student achievement can be recognized and reported at the school and provincial levels.

### **Portfolios**

When planning for instruction and assessment, consider a portfolio as an excellent tool to provide evidence of a student's effort, progress and achievement. Portfolios will aid students in identifying skills and interest. They also provide the receiving teacher, employer and/or post-secondary institution proof of a student's accomplishments. The make-up and evaluation of

the portfolio should be a collaboratively agreed agreement between the student and teacher.

### **Resources**

A comprehensive resource base, including print, software and audio-visual, has been identified to support CTS strands. It is intended that these resources 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 (Learning Resource Guide) for the complete resource list including curriculum correlations and resource annotations. Additional sources refer to noncommercial or government agencies that offer resources that may be of assistance in this strand.

### **Sample Student Learning Guides**

In addition to the resources, Sample Student Learning Guides are available (refer to Section J of this Guide). 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 timelines?
- How will the final mark be calculated?

Sample Student Learning Guides have been developed for the following modules in Energy and Mines:

- Renewable Resources
- Conservation Challenge.

## PLANNING FOR ENERGY AND MINES

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

### Selecting Modules

The scope and sequence chart in Section B provides an overview of the Energy and Mines modules, indicating prerequisites and theme areas. Brief descriptions of the modules follow the scope and sequence chart in Section B.

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 ENM1010: Overview of Alberta Geology be a prerequisite/corequisite to all modules in the Energy and Mines strand.

### *Energy and Mines in Junior High*

The introductory level modules may be offered at the junior high level. As each school and community will vary in terms of available resources, it is important to consider potential education partners prior to selecting module sequences.

The number of modules will vary according to time available throughout Grades 7, 8 and 9. For example:

Time Available	Modules
25 hours	<b>Overview of Alberta Geology</b>
50 hours	<b>Overview of Alberta Geology Conservation Challenge</b>
75–100 hours	<i>add one or two of the following:</i> <b>Nonrenewable Resources Renewable Resources Consumer Products &amp; Services Fundamentals of Recycling</b>

Modules may be combined into courses and offered within a school year or over a span of a few years. Junior high students may not complete all the learner expectations in all the modules.

Where appropriate, junior high school students may also take intermediate level modules, particularly in the Technology and Applications theme.

### *Energy and Mines in Senior High*

All introductory, intermediate and advanced level modules may be offered to senior high students. Some sample courses, based on intermediate and advanced level modules and designed to be delivered to senior high school students, are outlined below.

Time Available	Modules
5 credits (no previous strand experience) with a focus on conventional energy/mineral development	<b>Overview of Alberta Geology Nonrenewable Resources Conventional Oil/Gas 1 &amp; 2 (or Metals/Nonmetals 1 &amp; 2) Supply &amp; Distribution</b>
3 credits (strong background from junior high school) with a focus on renewable energy development	<b>Renewable Energy Technology Sustainable Energy Energy Designs/Systems 1</b>
5–10 credits (foundation for workplace entry in technical/support positions involving exploration, recovery and production)	<b>Overview of Alberta Geology Managing Alberta Resources Environmental Safety Supply &amp; Distribution</b> <i>(and modules selected from the Technology and Applications theme)</i>
5–10 credits (foundation for entry into post-secondary programs in environmental management)	<b>Managing Alberta Resources Environmental Safety Energy &amp; the Environment Energy Designs/Systems 1 &amp; 2 Integrated Resource Management</b> <i>(and modules selected from the Technology and Applications theme)</i>

Modules could also be grouped into comprehensive courses that develop competencies relevant to career opportunities within a specific industry.

### Organizing for Learning

A “learn by doing” approach is recommended for the Energy and Mines strand. Essentially, the teacher’s role becomes 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.

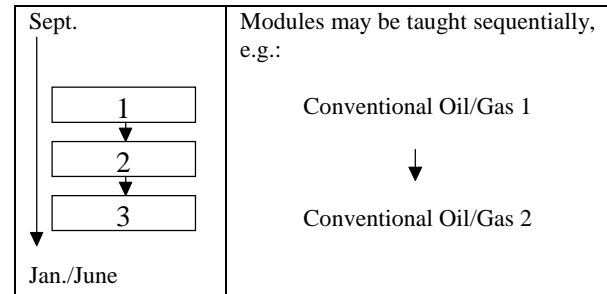
The community has a key role in education and can be an effective partner in the learning process. The use of community members and resources should be integrated into course planning. Business, industry, post-secondary and government agencies offer a wide range of services and resources, as do local 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.

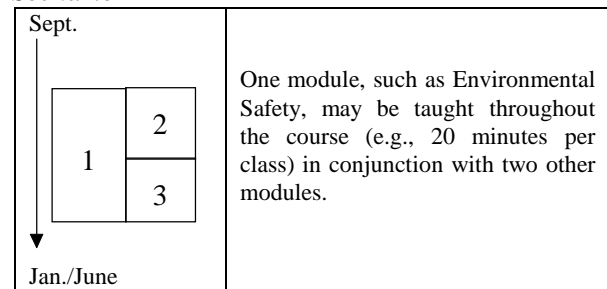
Before selecting modules, teachers should check the module parameters outlined in each module (see Sections D, E and F of this Guide).

Modules can be delivered sequentially, concurrently or combined. For example, although the modules from the Technology and Applications theme are sequential, they can be combined with modules from the Social and Cultural Perspectives theme or the Management and Conservation theme.

#### Scenario A

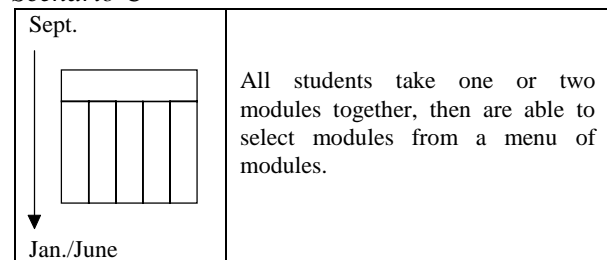


#### Scenario B

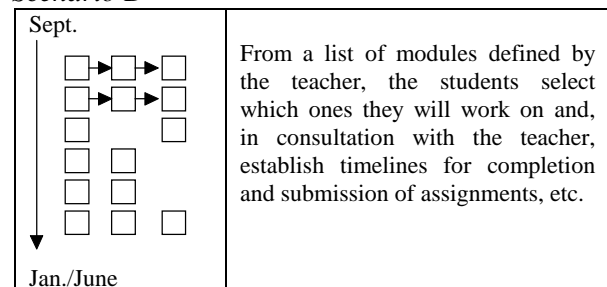


Teachers can also allow students to progress at a rate that is personally challenging; e.g.:

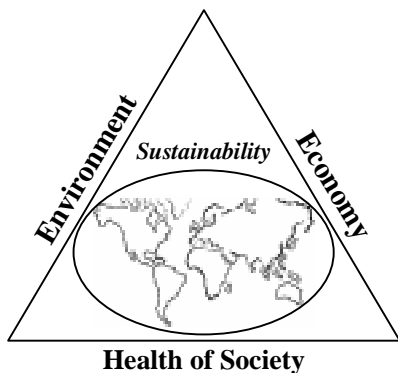
#### Scenario C



#### Scenario D



Plans for learning must address social, environmental and economic perspectives related to sustainable resource development and provide opportunities for students to become involved in learning experiences that reflect a broad understanding of related issues and alternatives. Presentations of course content that reflect a singular or narrow view of social, economic or environmental concerns are not consistent with learner expectations and must be avoided.



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, interviews and job shadowing will acquaint students with the many technical and professional careers associated with the energy and mineral industries.

### **Instructional Qualifications**

Responsibility for instructional planning and assessment of courses in Energy and Mines will be assumed by Alberta certified teachers. A background in science, social studies and/or relevant industry (e.g., resource exploration, recovery or production) will be an asset to those who provide instruction in Energy and Mines modules, particularly at the intermediate and advanced levels. Teachers may find it desirable to access sources of instructional support available from industry, professional associations and consultants, and relevant government agencies (e.g., Alberta Energy).

To ensure compliance with safety and industry standards, some modules may recommend that components of instruction be provided by person(s) having additional credentials granted by business, industry, government or community organizations. Refer to Section D, E or F of this Guide for further information regarding additional instructor qualifications for modules in Energy and Mines.

In some instances it may be desirable to have other qualified individuals in the community work with the teacher to deliver modules (or parts thereof) where additional instructor qualifications are recommended.

### **Sensitive Issues**

Some Energy and Mines modules contain topics of a sensitive nature. Teachers will need to be respectful of family and community values in selecting appropriate modules for courses in Energy and Mines.

For example, issues regarding the role of renewable and nonrenewable resources in sustainable energy development (e.g., ENM3050, ENM3100) may be sensitive in some communities. Emphasis should be placed on a “process” for conflict analysis and not on particular positions that may be expressed. In addition, modules that focus attention on personal and shared actions for environmental stewardship (e.g., ENM1100, ENM3010) must be dealt with in a sensitive manner.

For further clarification of provincial policy on sensitive issues, refer to Alberta Education’s Policy on Controversial Issues (*Alberta Education Policy Manual*, 1996). Teachers and administrators should also review jurisdictional policies related to sensitive issues.

### **Health, Safety and Related Legislation**

Facilities used to support an Energy and Mines program must ensure a safe learning/working environment. Students must be aware of federal, provincial and local regulations governing the tasks they perform, and establish appropriate personal

and environmental health and safety procedures in modules that involve:

- the use of specialized hand/power equipment
- the handling and storage of hazardous materials
- outdoor trips and field-based investigation.

Students must understand immediate and potential hazards associated with the tasks they perform, and the possible impact of these hazards on self, others and the environment.

Of particular significance from the perspective of health and safety are modules that support the development of technical knowledge and skills relevant to resource exploration, recovery, production and processing (e.g., ENM1020, ENM1060, ENM2020, ENM2030, ENM2040, ENM2050, ENM2060, ENM2070, ENM3020, ENM3030, ENM3040, ENM3050, ENM3060, ENM3070). Practical components of these modules may be delivered through off-campus education. Consultation with the worksite supervisor will be necessary to ensure relevant health and safety standards are maintained.

For additional information on health and safety standards, refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 13) and the *Off-Campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education).

### **Addressing Safety in Off-Campus Excursions**

Outdoor trips and field-based investigations are recommended and should be an important part of teaching and learning throughout the Energy and Mines strand. Safety must be a prime consideration in planning off-campus learning experiences. Both teachers and students should engage in activities commensurate with 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 an important part of any off-campus learning experience. 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 as required
- a review of laws and regulations relevant to the learning site and activities that will be undertaken
- assessment of the learning site in terms of potential hazards and risks that may be present
- group size and the level of supervision that will be required (i.e., supervisor/student ratio)
- a briefing of parents, school administrators, government/industry authorities or others who should be informed regarding itineraries, participants and emergency response plans
- pre-trip logistics, including transportation, equipment, facility and departure date/time considerations
- student preparation, including the development of background knowledge/experience and training in specific skill areas.

### ***On-Site Risk Management***

Safety and risk management involves exercising situation-specific judgement throughout the course of off-campus learning. Judgement is the product of experience, and may include recognizing factors such as dangers imposed by equipment, 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
- maintaining a safe distance for observations

- group control, including position of leader, 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 machinery and equipment, terrain, flora and fauna
- subjective hazard recognition in the field, including level of group energy and level of cooperation.

### ***Emergency Response***

If students have been well prepared for field-based learning experiences 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 consideration of:

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

### **Identifying Linkages**

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

In particular, teachers should be aware of the linkages of Energy and Mines with the junior and senior high science programs, and with environmental components in the junior high Environmental and Outdoor Education Program. The Energy and Mines strand is designed to reinforce, extend and apply related learnings in these courses. Collaborative planning at the school level will ensure meaningful learning experiences through effective integration of these courses.

The Career Transitions strand of CTS provides project, practicum, safety and leadership modules that may be combined with modules in Energy and Mines to increase opportunity for students to

develop expertise, refine their competencies and/or obtain credentials.

### ***Using “Project” Modules***

Students may use one or more of the 10 project modules to expand learning beyond the competencies outlined in particular Energy and Mines modules. For example, a study of conventional oil and gas production may require more than the 25, 50 or 75 hours available through modules by that name. In these instances, project modules from the Career Transitions strand may be accessed so as to provide sufficient time for completion of learning and the task. For each project module, the teacher and student establish specific learning outcomes, assessment criteria, resources and timelines.

### ***Using “Practicum” Modules***

Students may use one or more of the four practicum modules to extend the competencies developed in particular Energy and Mines module(s) in order to attain a recognized credential offered by an agency external to the school. For example, students who plan to work in the petroleum industry may wish to access practicum modules from the Career Transitions strand in order to obtain a “Hydrogen Sulphide Alive” certificate. Practicum modules must be supervised by both a qualified teacher and an experienced professional authorized to supervise trainees for the credential.

Project and practicum modules are **not** designed to be offered as distinct courses and should **not** be used to extend Work Experience 15, 25 and 35 courses.

### **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
- related post-secondary programs or other avenues for further learning.

