SECTION C: PLANNING FOR INSTRUCTION

The Mechanics curriculum framework helps ensure that students do not repeat content. Schools and teachers have maximum flexibility to design programs based on the needs and interests of their students and circumstances in the school and community. The levels framework will challenge secondary students to keep learning and will provide new and exciting opportunities at each level.

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 must consider the module parameters, which define:

- prerequisite and corequisites (entry-level competencies)
- instructional qualifications, if specialized. When student are engaging modules that include tasks performed on road-licenced vehicles, tasks such as brakes, steering and suspension require supervision by a journeyman. Students seeking articulation with trade apprenticeship must be taught/supervised by someone with journeyman status
- 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 safety, service teamwork and accountability should be emphasized in Mechanics modules, particularly at the advanced level where industry-based activities and projects would be appropriate.

Although no mark would be assigned to the student's performance in the designated basic competencies, observations 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 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 Standards 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 collaborative agreement between the student and teacher.

Resources

A comprehensive resource base, including print, software and audio-visual has been identified to support the Mechanics strand. 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 Resources 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 Mechanics:

- Modes & Mechanisms
- Vehicle Detailing.

PLANNING FOR MECHANICS

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

Safety

In Career and Technology Studies, health and safety are given a high priority. Teachers of the Mechanics program should make every effort to provide a safe environment for students. Teachers should also have knowledge of safety hazards in the program and how best to minimize, health and safety problems.

In Mechanics, when students perform tasks on road-licenced vehicles pertaining to brakes steering and suspension, the students must be supervised by a journeyman technician. These tasks can be performed on shop units when the instructional qualifications cannot be met. For specific safety concerns refer to module specific learner expectations relating to safety.

Related Legislation

The Mechanics strand delivers many of the competencies that exist in the following Alberta compulsory trade areas: Auto Body Technician, Automotive Service Technician Heavy Equipment Technician, Motorcycle Mechanic and in the optional trade area of Agriculture Mechanics.

The *Alberta Apprenticeship and Industry Training Act* provides detailed explanations regarding the delivery of apprenticeship programs in Alberta. The Act specifically addresses who can or cannot work in compulsory and optional trade areas. It states: *A person shall not work in a compulsory or optional trade area unless that person:*

a. holds a trade certificate
b. is an apprentice in the specified trade
c. is authorized under Section 23 to work or perform one or more tasks in the trade
d. is a student in a student work training program in that trade.

In addition, a person who does not hold a trade certificate in an optional certificated trade area may work in or perform one or more tasks, activities or functions if the employer is satisfied that the person possesses the skill and knowledge in the trade as would be expected from one who would be in possession of a trade certificate.

It should be noted that the Act spells out the ratio of journeyman to apprentices, which is a minimum of one apprentice to each journeyman employed. This ruling applies to Registered Apprentice Program students during off-campus learnings.

Instructional Qualifications

Responsibility for instructional planning and delivery of courses in Mechanics will be assumed by Alberta certified teachers having expertise in classroom and mechanic/technician experience. See specific modules for detailed information regarding instructional qualifications. It should also be noted that portions of modules requiring special instructional qualifications can also be delivered through off-campus learnings. Or, module learner outcomes may be accomplished using shop units at which time no journeyman instructional qualifications would be required.

Selecting Modules

The scope and sequence chart in Section B provides an overview of the Mechanics modules, indicating theme areas. Brief descriptions of the modules are 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.

Mechanics for Junior High School Students

The introductory level modules may be offered in part on in whole at the junior high level. As available resources in each school and community will vary, it is important to assess potential support networks prior to selecting module sequences.

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

Time Available	Modules
8 – 25 hours	**Modes & Mechanisms**
50 hours	**Engine Fundamentals** **Mechanical Systems**
75 – 100 hours	*add one or two of the following:* **Vehicle Service & Care** **Electrical Fundamentals** **Structures & Materials** **Metal Forming & Finishing**

Where appropriate, junior high school students may also take intermediate level modules, particularly in the Vehicle Design and Ownership theme.

Modules may be combined into courses and offered within a school year or over a span of a few years.

Mechanics for Senior High School Students

Following are a few examples of module groupings into sample courses:

3 credits (no previous strand experience) with a focus on vehicle ownership	**Vehicle Service & Care** **Vehicle Detailing** **Vehicle Maintenance** **Buying & Selling Vehicles** **Vehicle Value Appraisal**
3 credits (strong background from junior high school) with a focus on the automobile	**Electrical Fundamentals** **Ride & Control Systems** **Structures & Materials** **Vehicle Maintenance**
5 – 10 credits (foundation for workplace/ post-secondary entry in technical/ support positions involving motor vehicles	**Lubrication & Cooling** **Fuel & Exhaust Systems** **Ignition Systems** **Electrical Components** **Braking Systems** **Drive Trains** **Transmissions/Transaxles** **Suspension Systems** **Steering Systems** **Engine Diagnosis**
5 – 10 credits (foundation for entry into post-secondary programs in Autobody)	**Metal Forming & Finishing** **Surface Preparation 1** **Metal Repair & Finishing** **Surface Preparation 2** **Refinishing 1** **Touch-up & Finishing** **Body Repair Estimation** **Damage Analysis** **Damage Repair 1** **Damage Repair 2** **Refinishing 2**

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

Organizing for Learning

A "learn by doing" approach is recommended for the Mechanics 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 course planning. Business, industry and government agencies offer a wide range of services and resources, as do local clubs, service groups and

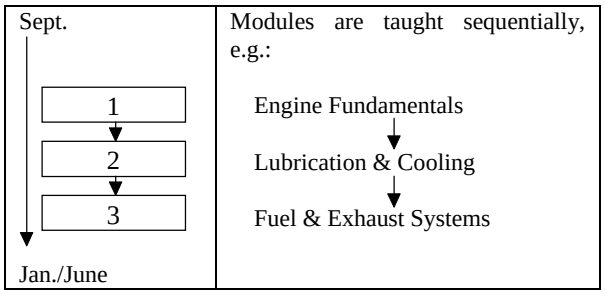
institutions. When planning for the use of community resources, teachers should ensure that related presentations and/or activities:

- 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.

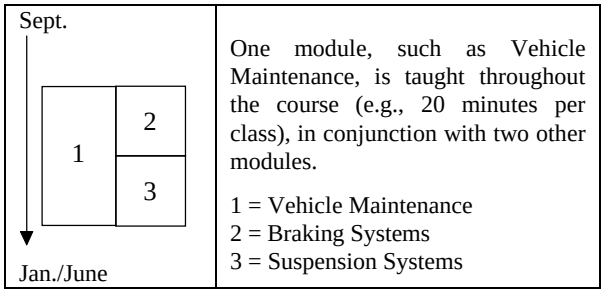
Prior to selecting modules, teachers should check the module parameters outlined in each module (see Sections D, E and F of this Guide). These module parameters, in addition to identifying prerequisite or corequisite modules, assist in identifying community partners and resources when required.

Modules can be delivered sequentially, concurrently or combined. For example, if an instructional block of safety is desired, the safety aspects of several modules could be combined.

Scenario A

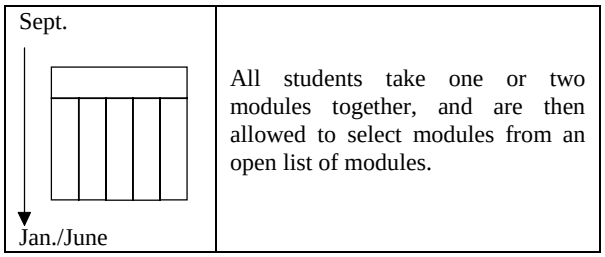


Scenario B

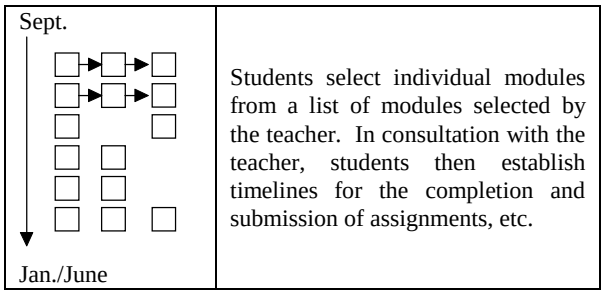


Teachers can also allow students to progress at a rate that is personally challenging.

Scenario C



Scenario D



Plans for instruction must address social, economic and environmental perspectives related to resource development. 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 mechanics 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 mechanics field.

Addressing Safety in Off-campus Excursions

Field excursions are recommended and should be an important part of teaching and learning throughout the Mechanics 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 and observed 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 site to which the trip is being conducted, and the identification of potential hazards and risks
- determination of 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 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 judgement throughout the course of an off-campus excursion. 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 and observation distance, including speed of travel, rest stops, distance travelled and maintaining safe distance for observations
- 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 on the site, including machinery and equipment.

Identifying Linkages

Section H of this Guide describes linkages within CTS strands.

Note that project modules from the Career Transitions strand may be combined with modules from Mechanics to provide increased opportunity for students to develop expertise and refine their competencies. For example, students who have completed Engine Fundamentals (MEC1040) may need to add to their background experience prior to taking the advanced level engine reconditioning modules. In situations like this, students could be asked to do a project module related to engines to enhance their competencies. Project 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

To assist students in making smooth transitions, consideration should be given to the development of a portfolio which would facilitate a prior learning assessment.

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.