

MECHANICS

SECTION J: SAMPLE STUDENT LEARNING GUIDES

The following pages provide background information, strategies and a template for developing student learning guides. Also included at the end of this section are several sample student learning guides for Mechanics.

A student learning guide provides information and direction to help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher.

Many excellent student learning guides (SLGs) are available for use and/or are in the process of being developed. While Alberta Education provides a development template accompanied by some samples, most student learning guide development is being done by individuals and organizations across the province (e.g., school jurisdictions, specialist councils, post-secondary organizations). Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 11) for further information regarding student learning guide developers and sources.

Note: A student learning guide is not a self-contained learning package (e.g., Distance Learning Module), such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

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BACKGROUND INFORMATION

A Student Learning Guide (SLG) is a presentation of information and direction that will help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher. A SLG is not a self-contained learning package such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

Each SLG is based on curriculum and assessment standards as defined for a particular CTS module. Curriculum and assessment standards are defined in this document through:

- module and specific learner expectations (Sections D, E and F)
- assessment criteria and conditions (Sections D, E and F)
- assessment tools (Section G).

The SLG is written with the student in mind and makes sense to the student in the context of his or her CTS program. SLGs are designed to guide students through modules under the direction of the teacher. They can be used to guide:

- an entire class
- a small groups of students
- individual students.

In some instances, the Student Learning Guide may also be used as teacher lesson plans. When using SLGs as teacher lesson plans, it should be noted that they tend to be:

- learner-centred (versus teacher-directed)
- activity-based (versus lecture-based)
- resource-based (versus textbook-based).

Components of a Student Learning Guide

The student learning guide format, as developed by Alberta Education, typically has *seven* components as described below.

1. *Why Take This Module?*

This section provides a brief rationale for the work the student will do, and also establishes a context for learning (i.e., in relation to the strand, a life pursuit, a specific industry, etc.).

2. *What Do You Need To Know Before You Start?*

In this section, prerequisite knowledge, skills and attitudes considered necessary for success in the module are identified. Prerequisites may include other modules from within the strand or from related CTS strands, as well as generic knowledge and skills (e.g., safety competencies, the ability to measure/write/draw, prior knowledge of basic information relevant to the area of study).

3. *What Will You Know And Be Able To Do When You Finish?*

This information must parallel and reflect the curriculum and assessment standards as defined for the module. You may find it desirable to rewrite these standards in less formal language for student use.

4. *When Should Your Work Be Done?*

This section provides a timeline that will guide the student in planning their work. The timeline will need to reflect your program and be specific to the assignments you give your students. You may wish to include a time management chart, a list of all assignments to be completed, and instructions to the student regarding the use of a daily planner (i.e., agenda book) to organize their work.

5. *How Will Your Mark For This Module Be Determined?*

This section will interpret the assessment criteria and conditions, assessment standards, assessment tools and suggested emphasis as defined for the module within the context of the projects/tasks completed. Accepted grading practices will then be used to determine a percentage grade for the module—a mark not less than 50% for successful completion. (**Note:** A module is

“successfully completed” when the student can demonstrate ALL of the exit-level competencies or MLEs defined for the module.)

6. *Which Resources May You Use?*

Resources considered appropriate for completing the module and learning activities are identified in this section of the guide. The resources may be available through the Learning Resources Distributing Centre (LRDC) and/or through other agencies. Some SLGs may reference a single resource, while others may reference a range of resources. Resources may include those identified in the Learning Resource Guide (Section I) as well as other sources of information considered appropriate.

7. *Activities/Worksheets*

This section provides student-centred and activity-based projects and assignments that support the module learner expectations. When appropriately aligned with curriculum and assessment standards, successful completion of the projects and assignments will also indicate successful completion of the module.

Strategies for Developing Student Learning Guides

Prior to commencing the development of a student learning guide, teachers are advised to obtain:

- the relevant Guide to Standards and Implementation
- the student learning guide template.

Information communicated to the student in the SLG must parallel and reflect the curriculum and assessment standards as defined for the module. Therefore, critical elements of the Guide to Standards and Implementation that need to be addressed throughout the SLG include:

- module and specific learner expectations
- assessment criteria and conditions
- assessment standards
- assessment tools.

Additional ideas and activities will need to be incorporated into the student learning guide. These can be obtained by:

- reflecting on projects and assignments you have used in delivering programs in the past
- identifying human and physical resources available within the school and community
- networking and exchanging ideas (including SLGs) with other teachers
- reviewing the range of resources (e.g., print, media, software) identified in the Learning Resource Guide (Section I) for a particular module/strand.

Copyright law must also be adhered to when preparing a SLG. Further information and guidelines regarding copyright law can be obtained by referring to the:

- *Copyright Act*
- *Copyright* and the *Can Copy Agreement*.

A final task in developing a student learning guide involves validating the level of difficulty/ challenge/rigour established, and making adjustments as considered appropriate.

A template for developing student learning guides, also available on the Internet, is provided in this section (see “Student Learning Guide Template,” pages J.5–10). Several sample student learning guides are also provided in this section (see “Sample Student Learning Guides,” starting on page J.11).

CAREER & TECHNOLOGY STUDIES



SAMPLE STUDENT LEARNING GUIDE TEMPLATE

WHY TAKE THIS MODULE?



WHAT DO YOU NEED TO KNOW BEFORE YOU START?



WHAT

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

-
-
-
-
-
-
-
-

WHEN

SHOULD YOUR WORK BE DONE?



HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
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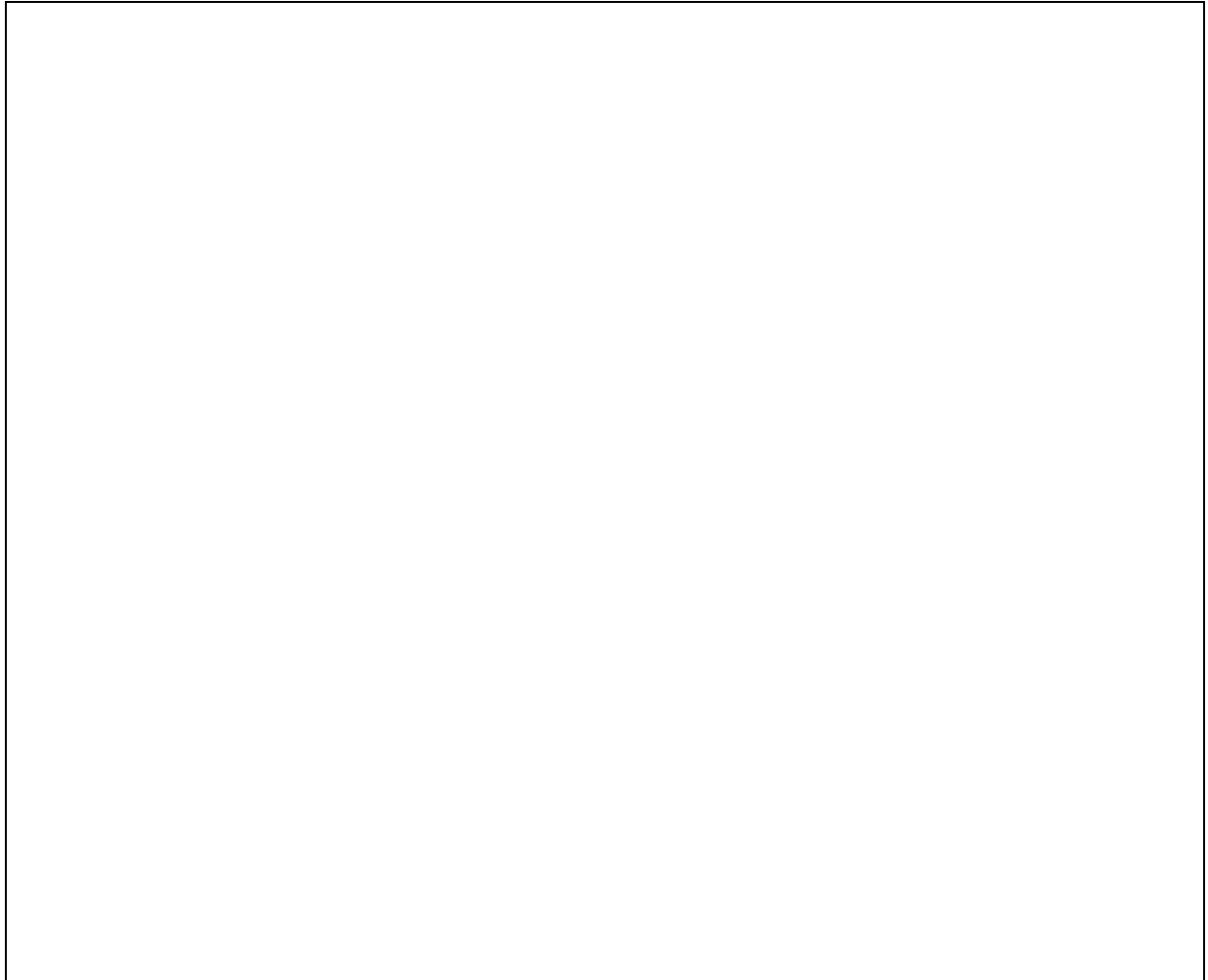


WHICH RESOURCES MAY YOU USE?



<ul style="list-style-type: none">••••••

ACTIVITIES/WORKSHEETS



CAREER & TECHNOLOGY STUDIES

MECHANICS

SAMPLE STUDENT LEARNING GUIDE

MEC1010 Modes & Mechanisms

MEC1010 Modes & Mechanisms

WHY TAKE THIS MODULE?



- To learn and apply the design process
- To be creative and build a model of a transport vehicle
- To apply marketing and advertising skills during your sales campaign
- To learn about aerodynamics in all types of vehicles
- To test and evaluate your vehicle
- To use and compile a portfolio.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, an understanding of the design process will be an asset. An ability to follow safe lab procedures and safety regulations and to work cooperatively with others will ensure success.



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

Upon completion of this module, you will be able to:

- demonstrate safe use of tools, and follow established lab procedures
- list and describe operating systems and structures common to all modes of transportation
- research, design, build and test a concept vehicle
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

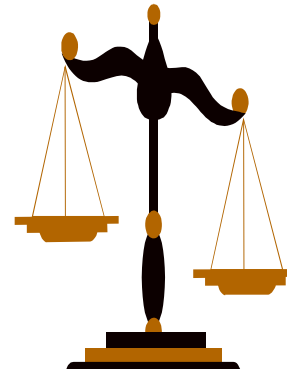


MECHANICS

MEC1010 Modes & Mechanisms

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	EMPHASIS
<p>You must first demonstrate all of the competencies required for this module.</p> <p>When you have done this, your mark for the module will be determined as follows:</p>	
<ul style="list-style-type: none">• Research of a particular vehicle	10%
<ul style="list-style-type: none">• Sketches and working drawing	20%
<ul style="list-style-type: none">• Advertising campaign posters	10%
<ul style="list-style-type: none">• Vehicle construction and performance	40%
<ul style="list-style-type: none">• Safe use of tools and machines	10%
<ul style="list-style-type: none">• Evaluation (self & teacher)	10%



WHICH RESOURCES MAY YOU USE?



- Technology Learning Wheel (1) Aerodynamics (2) Solar (3) Wind (4) Aerospace (5) Mag. Lev.
- Hacker, *Living with Technology*
- Browning, *Design and Technology*
- Gradwell, *Technology Shaping Our World*
- Science Directions 7 (Unit 3) 8 (Unit 2) & 9 (Unit 4)

ACTIVITIES/WORKSHEETS

STATEMENT OF A PROBLEM: Following the Design/Problem-Solving Process you will design and construct a model of a transportation vehicle using a simple power source, common materials and tools.

You will show marketing skills by designing a poster that promotes your vehicle.

RESEARCH: Using your science textbooks and the references provided, complete the following in your portfolio:

1. Describe the forces that are to be overcome when a vehicle moves:
 - on land
 - in water
 - in air
 - in space.

2. Determine what techniques can be used to:
 - start and stop a vehicle
 - speed up and slow down a vehicle
 - control the direction of a vehicle
 - give a vehicle stability.

3. Demonstrate and/or describe how energy can be used to produce motion in a:
 - spring
 - elastic
 - CO₂ capsule
 - electromagnetic device.

ALTERNATIVE SOLUTIONS: Brainstorm and sketch three thumbnail drawings of your transportation vehicle and place into your portfolio.

Note: Remember your vehicle could be a land, air or water vehicle.

FINAL SOLUTION: Use drawing instruments to produce an orthographic drawing that shows the top and side of your concept vehicle. Place this drawing in your portfolio.

CONSTRUCTION: Choose the appropriate materials to construct a prototype by considering their:

- workability
- strength
- weight
- cost.

Safely construct the vehicle according to the specifications and working drawings.

Apply a finish to the vehicle to:

- enhance its appearance
- increase its performance
- increase its longevity.

MECHANICS

MEC1010 Modes & Mechanisms

EVALUATION: Test the vehicle individually or in competition with others in relation to:

– its speed in metres per second

$$\text{(Speed = } \frac{\text{Distance}}{\text{Time}})$$

– load in grams.

PRESENTATION: During construction there may be some down time owing to the absence of machinery. You may design your advertising and marketing poster, which will be used for the final presentation of your transportation vehicle. The poster will be designed by you but it must include the following information:

1. The name of your vehicle
2. A colour drawing of the vehicle
3. Promotional information and any relevant data.

BE CREATIVE

CAREER & TECHNOLOGY STUDIES

MECHANICS

SAMPLE STUDENT LEARNING GUIDE

MEC2010 Vehicle Detailing

WHY TAKE THIS MODULE?



- Today's modern vehicles reflect the many different attitudes and values of their owners. Through colour and graphic enhancement owners are able to express their personal satisfaction and pride in their vehicle. In this module, you will experience and become knowledgeable in the methods used to enhance exterior surfaces and engine compartments.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, to work successfully in this module you should be able to:

- use basic hand tools and power drills in a safe manner
- follow instructions as given by product manufactures
- work patiently and use time effectively.



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

Upon completion of this module you will be able to:

- state personal and environmental hazards associated with the use of cleaning and waxing agents
- identify and describe materials available to enhance the appearance of a vehicle
- demonstrate correct cleaning and treatment of engine parts and exterior finishes, including paint, glass, vinyl and rubber surfaces
- install a trim or accessory part according to standard practice
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

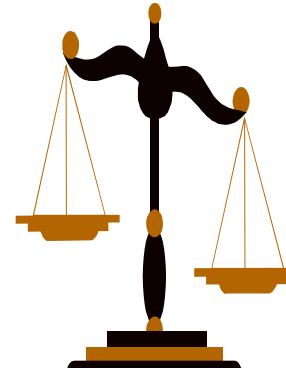
Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.



HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	EMPHASIS
<p>You must first demonstrate all of the competencies required for this module.</p> <p>When you have done this, your mark for the module will be determined as follows:</p> <ul style="list-style-type: none">• Safe use of materials and tools• Identification of products best suited for the work to be done• Knowledge of trim options and methods of application and fastening• Project completion: exterior clean and wax, trim repair, installation, engine beautification.	<p>10%</p> <p>10%</p> <p>10%</p> <p>70%</p>



WHICH RESOURCES MAY YOU USE?



- Basic set of hand tools, hand drill and bits and specialty trim removal tools as required
- Trim products: pin striping, decals, molding, spray paint and any student-purchased accessory to be installed
- Assortment of degreasers, cleaners, waxes and related application products and tools
- Engine spray paint and miscellaneous hardware (as required).

ACTIVITIES/WORKSHEETS

Activity 1

Challenge: Identify painted and trim surface flaws and follow methods described by product manufacturer to correct and enhance the appearance using degreasers, waxes and possibly trim paint.

Limitations: Vehicles must be in reasonably good shape, where products used will be effective in meeting the expectations.

Expectations:

- A complete vehicle cleaning, using suitable products and procedures. This is to be followed by minor surface flaw corrections, e.g., light sanding or touch-up with spot paint.
- Wax and polish surfaces using methods described by product manufacturers. Include chrome, rubber, vinyl and other trim.
- Glass cleaning using appropriate product.

Resources: Catalogues from local auto supply stores, e.g., Canadian Tire, UAP Service/product manual from Meguiars product line.

Activity 2

Challenge: Remove and/or replace trim parts using appropriate tools and methods. This may include installation of a new trim part and an examination of three or four methods of fastening trim (e.g., clips, two-way tape, blind nuts, etc.).

Limitations: Vehicle type or budget in the case of new trim parts.

Expectations:

- Use appropriate tools to remove window and side trim as applicable and replace.
- Install an accessory trim part such as side molding, mud flaps, running boards or other as desired.
- Apply pin striping and/or decaling to enhance the appearance of the vehicle. Repeat.

Resources:

- Auto supply dealers and supply catalogs
- *Autobody Repair and Refinishing*, Hogg (1988): Fasteners
- Product installation manuals when available.

MEC2010 Vehicle Detailing

Activity 3

Challenge: To clean and paint, for visual enhancement, the engine compartment of a vehicle.

Limitations: Vehicle should be in need of work where the end product is indeed enhancing and visually rewarding.

Expectations:

- Safely use degreaser and cleaners to clean the engine compartment, avoiding damage to electrical and other related systems.
- Follow safety instructions provided in repainting of the engine and adjacent surfaces to produce a like-new appearance, and generally clean up the area by grouping or realigning wires and hoses.
- Service the hinges, latch and hood anti-vibration bumpers.
- Optional: Install owner-purchased accessories used for visual enhancement, e.g., chrome or wire/hose coverings.
- Service battery terminals and battery.

Resources:

- Auto service manual, engine cleaning
- Peterson publication(s) Engine Beautification

Other Suggested Activities

1. Visit two local auto accessory stores to examine the cost of parts desired and their availability.
2. Visit a local auto dismantler to examine variations in trim, design and fastening. Also examine the value in used parts that are available. Remove and purchase desired trim or parts required for a repair.
3. Career exploration: Visit a professional trim application service centre or arrange for a professional trim applicator to visit the class.