

CONSTRUCTION TECHNOLOGIES

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 Construction Technologies.

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

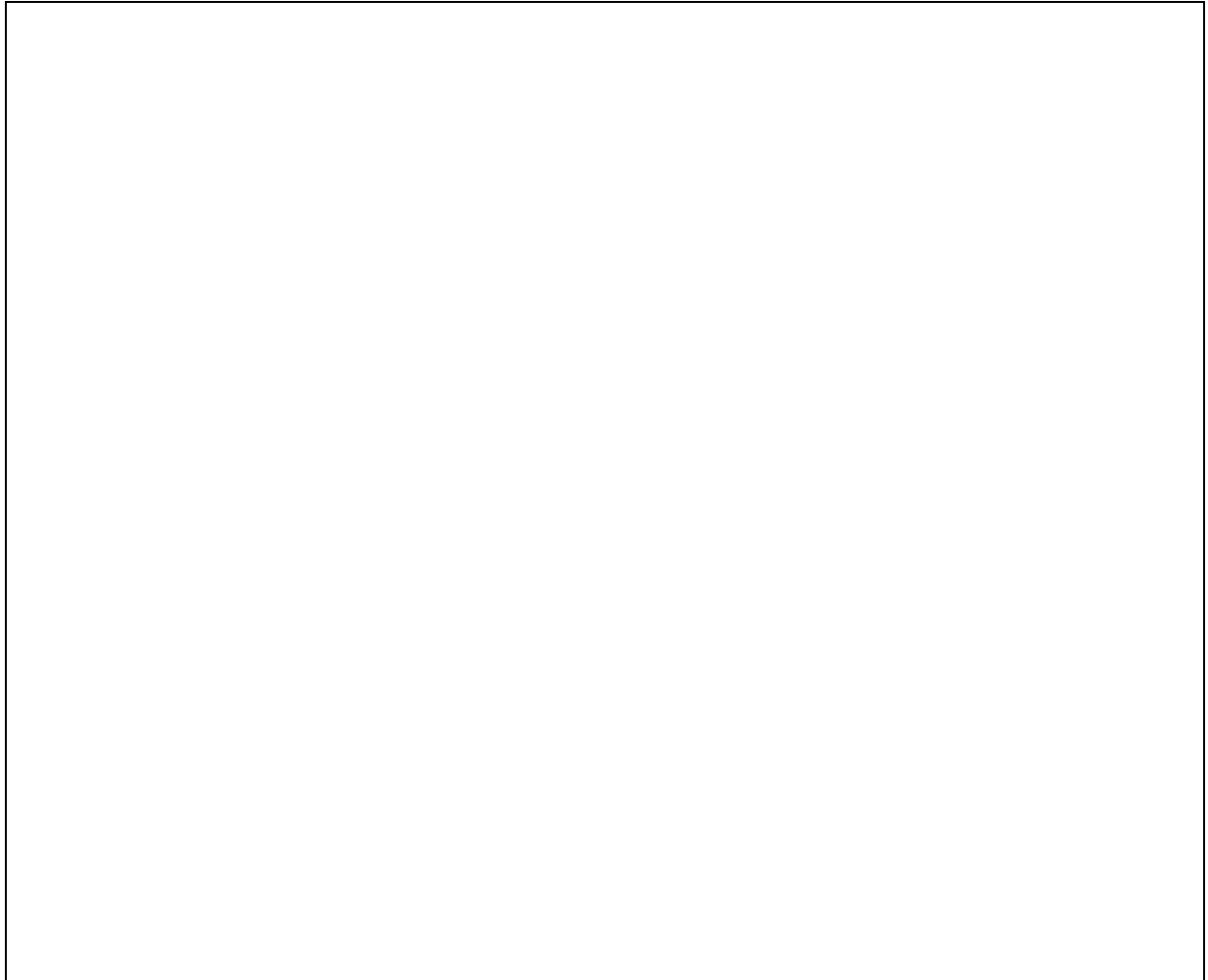


WHICH RESOURCES MAY YOU USE?



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

ACTIVITIES/WORKSHEETS



CAREER & TECHNOLOGY STUDIES

CONSTRUCTION TECHNOLOGIES

SAMPLE STUDENT LEARNING GUIDE

CON1010 Basic Tools & Materials

WHY TAKE THIS MODULE?



Ever since the beginning of the Stone Age, people have used technology to build needed artifacts and structures.

This module will:

- introduce you to common tools and materials
- help you understand the basic techniques used in building and manufacturing
- experience the satisfaction of constructing a lasting object.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, ability to read and follow directions and willingness to work with others in a safe manner will ensure your success.



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

Upon completion of this module you will be able to:

- identify and describe the safe use of basic hand tools
- identify and compare the properties of common materials used in construction and fabrication activities
- apply construction/fabrication processes and skills to produce a product
- 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.

Be sure to review the work to be completed in this module with your teacher and allot your time so that you will be able to finish within the suggested time frame.



CONSTRUCTION TECHNOLOGIES

CON1010 Basic Materials & Tools

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
<p>You must first demonstrate all of the competencies required for this module.</p> <p>When you have done this, your percentage mark for the module will be determined as follows:</p> <ul style="list-style-type: none">• Tool Identification and Use Test (Hand Tools, CON1010-2)• Report on the Properties of Building Materials (Material Identification, CON1010-3)• Project Work (Project Assessment (CONPRO))	<p>15%</p> <p>15%</p> <p>70%</p>



WHICH RESOURCES MAY YOU USE?



- *Production Technology*. Stanley A. Komacek, 1993.
- *Technology Shaping Our World*. John Gradwell, 1993.
- *Design and Technology*. Colin Caborn, et. al., 1989.

ACTIVITIES/WORKSHEETS

1. Technological System

1.1 People create technological systems to help solve problems. A system often includes these parts: input, process output and feedback. Select a simple household item and identify what:

- input information and resources were required to make the product
- processes were used to manufacture the product
- were the intended and unintended outcomes
- feedback the manufacturer might need to know to improve the product and the production process

1.2 Explain the difference between an open and a closed technological system.

2. Properties of Materials

2.1 Designers and builders make choices about what materials they are going to use based on availability of the material, its cost and properties. Identify the cost and availability of five materials commonly used in building structures and products

2.2 Properties of materials tell how a material can be expected to perform during and after construction/fabrication. Identify a simple test that can be used to determine:

- a mechanical property
- a material's reaction to heat
- how chemicals affect the material
- its optical qualities
- its electrical and magnetic properties.

3. Tool and Equipment Identification

As you work with technology, you will need to select the correct hand and power tools, and use these tools in a safe manner.

3.1 Identify and describe the use of two or more tools that can be used safely to:

- measure
- mark a surface
- cut through a material
- smooth a material
- form a material
- hold a material
- install a fastener
- apply a finish.

CONSTRUCTION TECHNOLOGIES

CON1010 Basic Materials & Tools

4. Construction and Fabrication Process

4.1 Complete the following activities in consultation with your teacher:

- Choose a simple artifact or structure that can be made from common building materials
- Locate a set of plans and a set of procedures that will help you build the product
- Identify and locate the appropriate materials and tools that are required to make the project.

4.2 The purpose of this activity is to design and build a matching set of structures, One structure will be built using Imperial measurements and the other using SI units of measurement. When you are finished constructing these structures you will be asked the following questions:

- Which system of measurement was easier to use?
- Which system achieved the greatest accuracy?
- What design features did you build into your plan to add strength to your structure?

Structures to consider constructing are a set of:

- book ends
- shelf brackets
- “c” clamps.

Evaluation

Your marks for these activities will be based on:

- how well you plan and manage your project
- the work skills you develop and apply
- your project work
- presentation of your project

CAREER & TECHNOLOGY STUDIES

CONSTRUCTION TECHNOLOGIES

SAMPLE STUDENT LEARNING GUIDE

CON2010 Site Preparation

WHY TAKE THIS MODULE?



Extra care and attention must be given to the proper location and excavation of a building site. By taking this module you will be able to:

- interpret a site plan
- prepare an application for a building permit
- survey a building site
- prepare a site for construction.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: CON1070: Building Construction

In addition, to successfully complete this module you will need print reading skills, a knowledge of geometry, and be able to measure and calculate accurately.



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

Upon completion of this module you will be able to:

- identify and describe typical building site layout and excavation processes
- complete an application for a building permit
- apply site preparation skills to assist in the location of building site lines and features
- 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.

Review the work to be completed in this module and allocate your time accordingly.



CONSTRUCTION TECHNOLOGIES

CON2010 Site Preparation

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate all of the competencies required for this module.	
When you have done this, your percentage mark for the module will be determined as follows:	
<ul style="list-style-type: none">• Research on-site layout and excavation procedures (Preparing a Building Site, CON2010-1)	15%
<ul style="list-style-type: none">• Preparation of a building permit	15%
<ul style="list-style-type: none">• Building site layout activities (Building Site Layout, CON2010-2)	60%
	10%



WHICH RESOURCES MAY YOU USE?



- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al, 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter A. Mann, 1989.

ACTIVITIES/WORKSHEETS

1. Prepare a Building Permit

1.1 Before starting construction, a sample building permit must be obtained:

- Explain the purpose of building permit
- List the information that is required to complete an application for a permit

1.2 Given a set of drawings, prepare an application for a building permit in your locality

1.3 Once a permit has been given, identify the types and number of inspections that must be carried out as the construction progresses.

2. Site Survey

A typical site plan shows the location of a building on a lot. It is the responsibility of the surveyor to relate the existing features of the lot. The finished elevation and other features are the responsibility of the architect or designer.

2.1 Given a site plan, assist in the:

- measurement and location of lot boundaries
- location of all setbacks
- setting out of the exact location of the building
- location of the batterboards

2.2 Determine the amount of soil that is to be excavated from the building site.

3. Site Preparation

3.1 A builder's level or transit is often used to level a building site:

- identify the parts of a builder's level
- describe the procedure used to level a site

3.2 It is important that building features are level and square to one another:

- describe a system of laying out right angles and checking for overall squareness
- check the level and location of all survey stakes.

CAREER & TECHNOLOGY STUDIES

CONSTRUCTION TECHNOLOGIES

SAMPLE STUDENT LEARNING GUIDE

CON3040 Stair Construction

WHY TAKE THIS MODULE?



Constructing a set of stairs seems difficult but with a little study and work it can be easily accomplished. By taking this module, you will be able to:

- build and gain confidence in your carpentry skills
- use mathematics to help solve a construction problem
- acquire a skill that can be used in daily living or in the workplace.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: CON1070: Building Construction

In addition, to be successful in this module you will need to understand basic geometry, layout procedures and demonstrate the safe use of hand and power tools.



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

Upon completion of this module you will be able to:

- identify and describe different stair types, component parts and construction techniques
- interpret building code regulations pertaining to residential stair design
- design, lay out and construct a straight flight of stairs
- 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.



CONSTRUCTION TECHNOLOGIES

CON3040 Stair Construction

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate all of the competencies required for this module.	
When you have done this, your percentage mark for the module will be determined as follows:	
<ul style="list-style-type: none">• Research on stair types and construction techniques (Stair Construction, CON3040-1)	15%
<ul style="list-style-type: none">• Interpretation of building codes and stair design	15%
<ul style="list-style-type: none">• Practical activities (Activity Assessment, CON3040-2)	70%



WHICH RESOURCES MAY YOU USE?



- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al., 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter Mann, 1989.

ACTIVITIES/WORKSHEETS

1. Stair Design

The basic function of a set of stairs is to provide access to different floors or surface levels. Some stairs, like a set of basement stairs, are designed for function only, while others in living areas are used to add style and character to the space.

- 1.1 Identify and describe the types of stairs that are commonly used in residential construction.
- 1.2 Explain the difference between a housed stringer and a carriage stringer, and identify the advantages and disadvantages of each type of stringer.
- 1.3 In relation to these basic types of stringers, explain how the vertical spaces between treads can be filled in and nosing features added.

2. Stair Code

- 2.1 Name the parts of a typical straight flight stair layout and identify, according to local code requirements, the:
 - appropriate stair angle, tread run and rise for a given application
 - minimum stairwell opening and headroom
- 2.2 Identify the parts of typical balustrade and the codes related to their construction.

3. Stair Design and Construction

Use the following specification to design and build a model set of stairs

Total Rise:	340 mm
Total Run:	360 mm
Stair Width	400 mm
Tread & Stringer Thickness	15 mm
Riser Thickness	12 mm
Nosing	15 mm

- 3.1 Having the riser as close to 80 mm as possible, calculate:
 - The number of risers @ mm
 - The number of runs @ mm
- 3.2 Using a 1:2 scale, draw an orthographic projection of the calculated stairs, showing dimensions and labeling all parts
- 3.3 Do a material and cost estimate for the model stairs
- 3.4 Submit your calculation, drawings and estimate to your teacher
- 3.5 Construct the model according to your project plan.

CONSTRUCTION TECHNOLOGIES

CON3040 Stair Construction

Evaluation Criteria

- Planning and management skills
- Construction techniques
- Use of equipment and materials
- Teamwork