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# Carpentry Level I

## WORKPLACE PROGRAM GUIDE



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# Introduction

## Rationale

In the Graduation Program 2004, Trades and Technology is one of the eight Focus Areas that students explore in Planning 10 and the Graduation Portfolio. (For more information about the Graduation Program 2004, Focus Areas, Planning 10, and the Graduation Portfolio, see [www.bced.gov.bc.ca/graduation/grad2004.htm](http://www.bced.gov.bc.ca/graduation/grad2004.htm))

Accelerated Credit Enrolment in Industry Training (ACE IT) is an industry certification program for BC secondary school students. (See [www.itabc.ca/](http://www.itabc.ca/)) The program enables students to earn both graduation credits and credit for the first level of technical training associated with an Industry Training Program. High school students have an opportunity to gain a head start by earning their credential in one of the many trades or industry occupations that the Industry Training Authority (ITA) recognizes. An ACE IT Level 1 program complements the existing programs:

- Secondary School Apprenticeship (SSA), which provides opportunities to start the work-based component of an apprenticeship
- Career Preparation

Students can register in both programs and be well on their way toward a trades credential by the time they finish secondary school.

Level 1 technical training is the industry-standard credential that provides a standardized skill and knowledge set for a particular trade, so that post-secondary training providers and employers know what to expect from ACE IT graduates. This helps graduates make a smooth transition to either the workplace or an appropriate post-secondary program. The course credits obtained through an ACE IT program count toward graduation and the Level 1 credential. The ITA will record the Level 1 credential, which is recognized by post-secondary institutions in BC that offer further technical training in the related trade.

Industry training increases the relevance and practical application of the secondary school curriculum by linking directly with the world of work. It is important to note that this program guide contains the same learning competencies and content tasks that an adult apprentice would study in his or her first year of technical training in a college Level 1 program. ACE IT students write the same ITA Level 1 final exam as all other apprentices in the trade, and must achieve a minimum mark of 70 percent.

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## Goals for ACE IT Level 1 Technical Training

The goals of ACE IT include:

- providing students with a smooth transition from school to work
- enhancing students' existing trade-specific job-readiness skills, or providing opportunities for the development of new skills
- providing students with the opportunity to obtain a Level 1 technical training certification in a given trade
- helping prepare students to enter the world of work with the skills, attitudes, and sense of responsibility necessary to be successful

## Introduction to the Program Guide

Level 1 program guides in all the trades subjects define the knowledge, skills, and attitudes that will give students a solid foundation in the subject as a preparation for employment. The program guides set out what students are expected to know and be able to do, and contain the legally required content standards for students in BC secondary schools. The competencies discussed in this program guide are equivalent to learning outcomes found in other Ministry curriculum documents. Schools have the responsibility to ensure that students achieve all competencies in this guide; however, schools have flexibility in determining how delivery of the content can best take place in individual classrooms.

This guide uses the following terms in discussing student learning: lines, competencies, learning objectives, and learning tasks and content.

### 1. Lines

- Lines can be described as the overall sections or units required for a Level 1 program in any trade area.

### 2. Competencies

- Lines are then divided into competencies that are equivalent to a learning outcome and have specific learning tasks associated with them.

### 3. Learning Objectives

- Learning objectives are a concise summary of the learning to be achieved.

### 4. Learning Tasks and Content

- In each competency, the learning tasks and content constitute the theoretical and practical study and/or tasks to be completed.

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## Classroom Assessment

Teachers are encouraged to develop assessment methods that best represent student performance as they complete the program. For effective delivery of Level 1 competencies, a form or method of classroom criterion-referenced assessment and evaluation will be needed to track progress and measure student achievement. Such methods range from very broad criteria to very specific achievement specifications that indicate student progress against the standard.

Assessment evidence can be collected using a wide variety of methods, including

- observation and comment (written, oral, practical)
- student self-assessments and peer assessments
- quizzes and tests (written, oral, practical)
- samples of student work
- projects

Student evaluation is generated from information collected through school-level assessment activities. Teachers use their experience, insight, knowledge about learning, and experience with students, along with the specific criteria they establish, to make judgments about student performance in relation to the competency.

Some of the competencies require a specific demonstration of the learning outcomes, while others may require a demonstration of cognitive knowledge. Some of the learning resources available include written competency tests that teachers may wish to use.

## Safety Considerations

One of the fundamental requirements of the workplace is an understanding of safe work practices and procedures. This understanding is not limited to being a cognitive skill. Rather, it must be translated into actions and behaviours that students apply on a daily basis. This knowledge and experience will endure after their time in the classroom.

As students begin to experience a more complex environment with tools and equipment in which operational dangers are inherent, essential safety procedures must become second nature and be reinforced throughout students' time in a workshop or on a job site.

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Teachers will need to be highly aware of safety issues while students are involved in maintenance, repair, replacement, servicing, or production activities. Safe work practices and procedures include

- modelling correct procedures at all times
- teaching specific instructions on safe and correct use and handling of equipment and tools
- teaching clear and specific instruction on how to use, handle, and dispose of waste or hazardous materials and modelling these procedures in daily practice
- verifying that all equipment, tools, and utensils are in good repair and suitably arranged for effective and safe student use
- supervising students at all times and in a correct manner
- verifying that facilities provide adequate lighting for detailed work
- verifying that ventilation and air circulation are appropriate to the task
- clearly defining and teaching hazard and accident awareness and avoidance techniques in the work area
- teaching industry-specific safety standards and procedures (in accordance with WHMIS, the Workplace Hazardous Materials Information System)
- verifying that students can demonstrate knowledge and operational behaviours that indicate their understanding of the information in appropriate school-based activities
- establishing a safe learning environment by ensuring that working practices have safety as a priority while students complete their personal projects. This would include
  - establishing rules and routines
  - ensuring that students wear appropriate clothing and safety equipment
  - referencing WorkSafeBC; Workers' Compensation Board (WCB) standards, regulations, and procedures; and Occupational Health and Safety Regulation content
  - selecting pertinent tasks that reflect Level 1 learning objectives appropriate for the skills and abilities of the students
  - modelling safe work practices and attitudes, including the use of Safety STAR and similar programs

## Workplace Hazardous Materials Information System

WHMIS is implemented through coordinated and interlocking federal, provincial, and territorial legislation. The *Hazardous Products Act* (HPA) and the Controlled Products Regulations (CPR) require Canadian suppliers (including importers and distributors) to provide supplier labels and material safety data sheets (MSDSs) for controlled products that are sold or imported for use in Canadian workplaces.

Current industry WHMIS standards and practice must be embedded in instruction.

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## Employability Skills

Employability skills are generic skills that all students need to make a successful transition to the workplace. These skills complement technical workplace skills. The Conference Board of Canada organizes these skills into three categories: fundamental skills, personal management skills, and teamwork skills.

Fundamental skills form the basis for further skills development. They include communication skills such as reading and understanding information, as well as listening to others and sharing information. Information management, the application or use of numbers, and problem solving are other fundamental skills.

Personal management skills comprise positive attitudes and behaviours that determine student potential for growth. They include demonstration of responsibility, adaptability, continuous learning, and working safely in all situations.

Teamwork skills are required for students to contribute productively in any environment. Teamwork skills include working with others on projects and tasks.

Employability skills are introduced in the Planning 10 course to all students. The Graduation Portfolio includes an organizer that reinforces the importance of employability skills. The competencies in this program guide provide students with the opportunity to develop a variety of the skills that are essential for employment in today's economy. Further information about employability skills can be found at [www.conferenceboard.ca/education/learning-tools/default.htm](http://www.conferenceboard.ca/education/learning-tools/default.htm)

It is important that teachers embed employability skills within their curriculum delivery.

## Considerations for ACE IT Program Delivery

This section of the program guide contains additional information to help educators develop their school practices and plan their program delivery to meet the needs of the students and the requirements of the ITA.

Included in this section is information about

- addressing local labour market information and needs
- facilities, equipment, and resources
- program delivery options
- partnerships
- teacher qualifications
- ITA assessment exam
- suggested timeframe
- work-based training



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## Addressing Local Labour Market Information and Needs

In B.C. there are currently more than 150 recognized trades and industry career choices. What these occupations have in common is that they require specialized skills, involve working with your hands as well as your head, and most training is done both in school or college and balanced with on-the-job learning.

Trades and industry occupations are vital to the economy, and make excellent sense as a career choice. Many people are attracted to careers in trades because they let them use a hands-on ability or because they allow them to work in an environment that they enjoy.

For students, Labour Market Information (LMI) gives clear details about specific occupations. This includes the nature of work, main duties, working conditions and wages, employment prospects, and education and training requirements. Usually this information addresses local, regional, and national work opportunities and trends.

For teachers, schools, and districts developing ACE IT programs, it is important to know the demand for specific occupations before training students. A trade that is in demand in one region may not be in demand in another part of the province. Local industry associations are a good source for obtaining information at the local or regional level. Program planners can research BC labour market information on the following government website: [www.aved.gov.bc.ca/labourmarketinfo/cppa.htm](http://www.aved.gov.bc.ca/labourmarketinfo/cppa.htm)

## Facilities, Equipment, and Resources

To deliver these programs in BC schools, training sites must provide the required facilities, equipment, and resources. These facilities, equipment, and resources must be addressed to adequately support the programs.

The requirements include

- safe facility and healthy working environment
- appropriate quality and quantity of tools, equipment, supplies, materials, and safety equipment for effective instruction
- appropriately selected learning resources (Note, if a school is partnered with a post-secondary training provider, consultation is advised to ensure continuity or sequential use of learning resources.)

Additional information about tool and equipment requirements for program delivery is provided in the ITA Program Outlines and the National Occupation Analysis (NOA) available on the Red Seal website: [www.red-seal.ca/Site/trades/analist\\_e.htm](http://www.red-seal.ca/Site/trades/analist_e.htm)

Program-specific information can be found on the appropriate NOA lists, such as:

[www.red-seal.ca/Site/english/pdf/Carpenter\\_2005.pdf](http://www.red-seal.ca/Site/english/pdf/Carpenter_2005.pdf)

[www.red-seal.ca/Site/english/pdf/Automotive\\_Service\\_Technician\\_2005.pdf](http://www.red-seal.ca/Site/english/pdf/Automotive_Service_Technician_2005.pdf)

[www.red-seal.ca/Site/english/pdf/Cook\\_2003.pdf](http://www.red-seal.ca/Site/english/pdf/Cook_2003.pdf)

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## ACE IT Program Delivery

For districts to offer these programs as ACE IT-funded programs, districts must submit an ACE IT application to ITA and receive approval for their program. The ACE IT application process is described on the ITA website: [www.itabc.ca](http://www.itabc.ca)

A key ACE IT program goal is that school districts/board authorities develop and maintain active partnerships with both industry and post-secondary institutions that have experience in delivering the relevant industry training program.

The outcomes of the ACE IT pilot projects demonstrated that these two factors are critical to ensuring quality programs that result in relevant skills and knowledge, and in smooth transitions for students to the workplace.

### Partnership Delivery Model

Program development and delivery takes place in a cooperative partnership between school districts/board authorities and a post-secondary institution.

In the partnership delivery model, classes can be taught at the school and/or the college in a delivery ratio on which the partners agree.

### ITA Designated Training Status Provider

Schools can deliver ACE IT programs by applying to become an ITA designated training provider. In this model, a school would deliver the ACE IT program without the support of a post-secondary partner. Such a school, however, must become an ITA designated training provider by meeting the standards for overall program design, facilities, tools and equipment, supplies and materials, assessment, and teacher/instructor qualifications. This designated status is established by an ITA team that reports its findings and makes a recommendation to the ITA. ITA is currently developing this model.

### Teacher/Instructor Qualifications

Under the partnership model, the school district/board authority and post-secondary institution partner jointly determine teacher qualifications. Under the ITA designated training provider model, instructor qualifications and experience must be suitable for the program and level of technical training.

### ITA Assessment

Assessment involves both practice and theory. Schools delivering an ACE IT program will be provided a school report to complete for each student and submit to ITA.

The classroom instructor determines practical assessment methods, which may consist of student demonstrations of the appropriate competencies.

Standardized Level 1 assessment examinations are currently in development and will be available by January 2007. These standardized ITA Level 1 examinations will replace any existing Level 1 examinations.

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## Suggested Courses for Carpentry Level I

The Ministry has designated three primary courses for schools to deliver the Level 1 Carpentry program:

- Carpentry Level 1 12A
- Carpentry Level 1 12B
- Carpentry Level 1 12C

The course codes to be used are CARP 12A, CARP 12B, and CARP 12C. Each of these is a 4-credit course. In addition to these three primary ACE IT courses, schools may also use the existing Ministry Carpentry and Joinery 11 and 12 courses if students require additional time to complete the Level 1 Carpentry program.

## Work-Based Training

Work-based training is an integral part of an industry training program. Under the ACE IT delivery model, it is strongly recommended that students engage in either SSA or Work Experience 12.

School districts/board authorities offering ACE IT programs become the sponsor for the ACE IT student.

## Lines, Competencies and Suggested Timeframe

<b>Line B</b> Use Safe Work Practices	9%	<b>Line C</b> Interpret Drawings and Specifications	17%
1 Describe Shop and Site Safety Practices		1 Describe Construction Drawings	
2 Describe Personal Safety Practices			
3 Describe Workplace Hazardous Materials			
4 Describe Personal Injury Protection			
5 Describe Fire Safety Procedures			
<b>Line D</b> Identify Materials	6%	<b>Line E</b> Use Hand Tools	10%
1 Describe Wood Characteristics		1 Describe General Safety Rules for Using Hand Tools	
2 Select Framing Lumber		2 Use and Maintain Measuring and Layout Tools	
3 Identify Manufactured Structural Components		3 Use and Maintain Cutting, Boring and Aligning Tools	
4 Identify Fasteners and Hardware Used in Frame Construction		4 Use and Maintain Fastening Tools	
<b>Line F</b> Use Portable Power Tools	6%	<b>Line G</b> Use Shop Equipment	3%
1 Use and Maintain Portable Power Tools		1 Use and Maintain a Table Saw	
2 Use and Maintain Powder-Actuated Tools		2 Use and Maintain a Radial Arm Saw	
<b>Line J</b> Use Site Layout		<b>Line K</b> Build Concrete Formwork	16%
1 Layout Building Locations		2 Build Footing and Wall Forms	
<b>Line L</b> Frame Residential Housing	30%		
1 Describe Wood Frame Construction			
2 Build Foundations and Floors			
3 Build Walls and Partitions			
4 Build Gable Roofs with Ceiling Joists			
5 Build Hip Roofs			
6 Build Straight Stairs			

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**Line B: Use Safe Work Practices**  
**Competency: B - 1 Describe Shop and Site Safety Practices**

**B-1**

**Learning Objectives:**

1. The learner will be able to describe the safe work practices used in a wood working shop and on a construction site.

**Learning Tasks**

1. Identify legislation that is applicable to the carpentry trade and to construction projects

**Content**

- Place of employment
- Harmful substances
- Health hazards and work environment controls
- Personal protective equipment
- Powder-actuated tools
- Electrical systems
- Ladders
- Scaffolds, swing stages and miscellaneous stages
- Construction procedures
- Excavation
- Demolition
- Rigging
- Woodworking machinery and processing

2. Describe general safety rules

- Safety gear
- Condition of tools
- Guards and barriers
- Operating hazardous equipment
- Using hazardous materials and harmful substances
- Flammable, explosion, and electrical hazards
- Grounding of tools and equipment
- Lockout procedures
- Housekeeping
- Using compressed air
- Sound and light signals
- Entering confined spaces

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**Line B: Use Safe Work Practices**  
**Competency: B - 2 Describe Personal Safety Practices**

**B-2**

**Learning Objectives:**

1. The learner will be able to explain the concepts of personal safety awareness and practices.

**Learning Tasks**

1. Describe safety rules for conduct, legal responsibilities affecting yourself, and assessment and penalty costs affecting employers

**Content**

- Personal safety rules
- Responsibilities affecting you and others
- WCB assessment and penalty costs affecting employers

2. List safety gear and work clothing a carpenter requires

- Personal apparel
- Hand protection
- Leg and foot protection
- Headgear
- Eye protection
- Ear protection
- Lung protection

3. Describe safety gear, clothing and precautions for various weather conditions

- Hypothermia
- Hypothermia
- Dehydration
- Sunstroke
- Slippery surfaces
- High wind

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**Line B: Use Safe Work Practices**  
**Competency: B - 3 Describe Workplace Hazardous Materials**

**B-3**

**Learning Objectives:**

1. The learner will be able to choose work strategies to minimize the exposure to and risks associated with hazardous materials found in the workplace.
2. The learner will be able to find the MSDS sheet that corresponds to each material and list two safety concerns that are specific to each material.

**Learning Tasks**

1. Describe the application of WHMIS legislation  
\*What's WHMIS?
2. Describe health hazards of building materials

**Content**

- MSDS
- Symbols
  
- Wood preservatives
- Dusts
- Air borne fibers
- Heavy metals
- Off gassing

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**Line B: Use Safe Work Practices**  
**Competency: B - 4 Describe Personal Injury Protection**

**B-4**

**Learning Objectives:**

1. The learner will be able to describe the stresses on the body caused by physical work.
2. The learner will be able to list the hazards associated with working in confined spaces.
3. The learner will be able to list the specifications for fall protection as outlined by the WCB OHS.

**Learning Tasks**

1. Lift and move objects safely

**Content**

- Rules for lifting and moving objects
- Procedures for lifting objects
- Plywood
- Planks and beams
- Steel pipe
- Ladders
- Wheelbarrows
- Shoveling
- Barrels and drums
- Small pails
- Boxes

2. Describe fall protection systems

- Fall protection systems
- Guardrails
- Fall restraint systems
- Fall arrest
- Rope grabs and shock-limiting devices
- Using safety harness, lanyard, and lifeline
- Safety equipment inspection
- Safety monitor
- Control zone



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**Line B: Use Safe Work Practices**  
**Competency: B - 5 Describe Fire Safety Procedures**

**B-5**

**Learning Objectives:**

1. The learner will be able to explain the theory of fires and how to put them out using modern extinguishing equipment.

**Learning Tasks**

**Content**

- |   |   |
|---|---|
| 1. List the three components that must be present before a fire can occur   | <ul style="list-style-type: none"><li>• Fuel</li><li>• Heat</li><li>• Oxygen</li></ul>  |
| 2. Identify Class A, B, C and D fires and state the type of extinguisher used to put out each                                   | <ul style="list-style-type: none"><li>• First response</li><li>• Class of fire</li><li>• Types of extinguishers</li><li>• Class A fire (wood, paper, textiles, etc)</li><li>• Class B fires (oil, paints, petroleum based substances)</li><li>• Class C fires (electrical)</li><li>• Class D fires (combustible metals including magnesium, titanium, zirconium, sodium, and potassium)</li><li>• A, B, and C fire extinguishers</li><li>• Welding blanket</li><li>• Emergency fire blanket</li></ul> |
| 3. State the fire safety precautions to be observed while working near, handling, or storing flammable substances and equipment | <ul style="list-style-type: none"><li>• Flammable liquids, gases, and related equipment</li><li>• Electrical wiring and equipment</li><li>• Combustible materials</li></ul>   |
| 4. Describe flash point and ignition temperatures for flammable liquids   | <ul style="list-style-type: none"><li>• Solvent flammability</li><li>• Flash points</li></ul>   |
| 5. Describe the use of fire extinguishers   | <ul style="list-style-type: none"><li>• Activating</li><li>• Aiming</li><li>• Sweeping motion</li></ul>   |

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**Line C: Interpret Drawings and Specifications**  
**Competency: C - 1 Describe Construction Drawings**

**C-1**

**Learning Objectives:**

1. The learner will be able to interpret specific views of a given set of construction drawings.
2. The learner will be able to recall and recognize items in construction drawings.

**Learning Tasks**

1. Describe the different types and uses of drawings

**Content**

- Views
  - Orthographic
  - Isometric
  - Oblique
  - Perspective
- Types of drawings
  - Architectural
  - Structural
  - Mechanical
  - Electrical
  - Shop
  - As-built
  - Landscape

2. Describe the alphabet of lines, symbols and abbreviations used in drawings

- Lines
- Symbols
- Abbreviations

3. Describe the scales used in drawings

- Architect's scale
- Metric scale
- Engineer's scale

4. Describe the use of the parts of architectural drawings

- Plot plan
- Foundation plan
- Floor plan
- Elevation
- Sections
- Details

5. Describe the drafting tools and materials used for drawing plans

- Drafting board
- Drafting table
- T square
- Set squares
- Scales
- Drawing pencils
- Templates
- Compasses
- Dusting cloth or brush
- Drawing paper
- Tracing paper
- Drafting or masking tape

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**Line D: Identify Materials**  
**Competency: D - 1 Describe Wood Characteristics**

**D-1**

**Learning Objectives:**

1. The learner will be able to list the characteristics of wood.
2. The learner will be able to identify the structure of wood.
3. The learner will be able to identify seven species of softwood.
4. The learner will be able to list common wood defects.

**Learning Tasks**

**Content**

- |   |  |
|---|--|
| 1. Identify general characteristics and advantages of wood                  | <ul style="list-style-type: none"><li>• Renewable resource</li><li>• Strong</li><li>• Light in weight</li><li>• Cuts easily</li><li>• Resists corrosive materials</li><li>• Reusable</li></ul>   |
| 2. Describe parts of a tree and identify the structural composition of wood | <ul style="list-style-type: none"><li>• Structure</li><li>• Growth</li><li>• Outer bark</li><li>• Inner bark</li><li>• Cambium layer</li><li>• Sap wood</li><li>• Heartwood</li><li>• Pith</li><li>• Rays</li><li>• Growth rings</li><li>• Cellulose</li><li>• Lignin</li><li>• Wood cells</li></ul> |
| 3. Identify softwood species and characteristics                            | <ul style="list-style-type: none"><li>• Douglas fir</li><li>• Fir</li><li>• Larch</li><li>• Hemlock</li><li>• Spruce</li><li>• Pine</li><li>• Cedar</li></ul>  |
| 4. Describe common defects in wood  | <ul style="list-style-type: none"><li>• Warp</li><li>• Compression wood</li><li>• Mechanical defects</li><li>• Split, check, shake</li><li>• Knots</li><li>• Wane</li><li>• Pitch, streaks, stained wood</li><li>• Decay</li><li>• Insect damage</li><li>• Manufacturing imperfections</li></ul>     |

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**Line D: Identify Materials**  
**Competency: D - 2 Select Framing Lumber**

**D-2**

**Learning Objectives:**

1. The learner will be able to select appropriate framing materials for a given use.

**Learning Tasks**

**Content**

- |   |   |
|---|---|
| 1. Identify standard sizes and grades of framing lumber | <ul style="list-style-type: none"><li>• Grading</li><li>• Board lumber</li><li>• Light framing</li><li>• Joists and planks</li><li>• Beams and stringers</li><li>• Posts and timbers</li><li>• Decking</li><li>• Siding</li><li>• Softwood lumber grades</li><li>• Density</li><li>• Moisture content</li><li>• Surfaced green</li><li>• Surfaced dry</li></ul> |
| 2. Describe lumber production                           | <ul style="list-style-type: none"><li>• Sawing</li><li>• Drying</li><li>• Planing</li></ul>   |
| 3. Calculate quantities and costs of framing lumber     | <ul style="list-style-type: none"><li>• Board measure</li><li>• Linear measure</li><li>• Costs</li><li>• Percentages</li></ul>  |
| 4. Describe panel type sheathing                        | <ul style="list-style-type: none"><li>• Veneers</li><li>• Cross-banding</li><li>• Cores</li><li>• Glues</li><li>• Softwood plywood grades</li><li>• Plywood veneers and cores</li><li>• Faces and backs and cores</li><li>• Standard sizes and thicknesses</li></ul>  |
| 5. Store framing materials properly                     | <ul style="list-style-type: none"><li>• Handling lumber</li><li>• Stacking lumber<ul style="list-style-type: none"><li>– Dunnage</li><li>– Stickers</li></ul></li><li>• Protecting material</li><li>• Sheathing material</li></ul>  |

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**Line D: Identify Materials**

**Competency: D - 3 Identify Manufactured Structural Components**

**D-3**

**Learning Objectives:**

1. The learner will be able to explain how engineered building materials are used in building construction.

**Learning Tasks**

1. Identify and describe engineered beams

**Content**

- Glue Laminated
- Laminated Veneer Lumber
- Laminated Strand Lumber
- Parallel Strand Lumber
- Structural steel

2. Identify and describe engineered floor systems

- I Joist systems
- Open web joists

3. Identify and describe engineered roof truss systems

- Truss types
- Fink
- Howe
- King post
- Scissor

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**Line D: Identify Materials**

**Competency: D - 4 Identify Fasteners and Hardware Used in Frame Construction**

**D-4**

**Learning Objectives:**

1. The learner will be able to identify fasteners and hardware used in wood frame construction.

**Learning Tasks**

1. Identify fasteners used in frame construction

**Content**

- Pneumatic fasteners
- Panel adhesive
- Common nails
- Galvanized nails
- Ardox nails
- Hanger nails
- P.C. Box nails
- Hanger nails

2. Identify framing hardware and indicate its use

- Joist hangers
- Framing anchors
- Structural angle and hold downs
- Cross bridging

---

**Line E: Use Hand Tools**

**Competency: E - 1 Describe General Safety Rules for Using Hand Tools**

**E-1**

**Learning Objectives:**

1. The learner will be able to describe how to use hand tools safely.

**Learning Tasks**

1. Describe basic rules for the safe use of hand tools

**Content**

- Work area
- Work environment
- Use proper tool
- Wear protective clothing
- Wear safety gear
- Inspect tools

---

**Line E: Use Hand Tools**

**Competency: E - 2 Use and Maintain Measuring and Layout Tools**

**E-2**

**Learning Objectives:**

1. The learner will be able to use measuring and layout tools.
2. The learner will be able to demonstrate the safe use of measuring and layout tools to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |   |   |
|---|---|
| 1. Describe the safe use and maintenance of measuring tools         | <ul style="list-style-type: none"><li>• Imperial system</li><li>• Metric system</li><li>• Pocket tape</li><li>• Steel tape</li><li>• Caliper rule</li><li>• Bench rule</li><li>• Maintaining measuring tools</li></ul>  |
| 2. Describe the use and maintenance of layout tools                 | <ul style="list-style-type: none"><li>• Pencils</li><li>• Straight lines</li><li>• Straight edge</li><li>• Chalk line</li><li>• Layout line</li><li>• Marking gauges</li><li>• Mortise gauge</li><li>• Butt gauge</li><li>• Scriber</li><li>• Trammel points (beam compass)</li></ul>   |
| 3. Describe the use and maintenance of types of squares             | <ul style="list-style-type: none"><li>• Rafter and framing square</li><li>• Frederickson metric rafter and framing square</li><li>• Stanley metric rafter and framing square</li><li>• Imperial rafter and framing square</li><li>• Speed squares</li><li>• Try square</li><li>• Combination square</li><li>• Sliding T bevel</li><li>• Angle divider</li></ul> |
| 4. Describe the use and maintenance of levelling and plumbing tools | <ul style="list-style-type: none"><li>• Hand level</li><li>• Torpedo level</li><li>• Line level</li><li>• Plumb bob</li></ul>   |



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**Line E: Use Hand Tools**

**Competency: E - 3 Use and Maintain Cutting, Boring and Aligning Tools**

**E-3**

**Learning Objectives:**

1. The learner will be able to describe the safe use and maintenance of cutting, boring and aligning tools.
2. The learner will be able to demonstrate the safe use of cutting, boring and aligning tools to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |   |   |
|---|---|
| 1. Describe the types and uses of handsaws  | <ul style="list-style-type: none"><li>• Cross cut</li><li>• Rip</li><li>• Back</li><li>• Mitre</li><li>• Dovetail</li><li>• Compass and keyhole</li><li>• Coping</li><li>• Hacksaw</li></ul>  |
| 2. Describe the types, the use and the maintenance of planes  | <ul style="list-style-type: none"><li>• Jack plane</li><li>• Smooth plane</li><li>• Block plane</li><li>• Maintaining planes</li></ul>  |
| 3. Describe the parts of a plane, the adjustments, the proper use, and the sharpening procedures        | <ul style="list-style-type: none"><li>• Depth adjustment</li><li>• Lateral adjustment</li><li>• Throat and mouth adjustment</li><li>• Plane iron blade and plane iron cap adjustments</li><li>• Lever cap adjustments</li><li>• Using a plane</li><li>• Sharpening the plane iron blade</li></ul> |
| 4. Describe the use and maintenance of chisels  | <ul style="list-style-type: none"><li>• Blade type</li><li>• Handle type</li><li>• Butt chisels</li><li>• Using chisels</li><li>• Sharpening</li><li>• Maintenance</li></ul>  |
| 5. Describe the use of axes, hatchets and knives and the procedures for sharpening and maintaining them | <ul style="list-style-type: none"><li>• Hand axe</li><li>• Hatchet</li><li>• Lathing hatchet</li><li>• Shingling hatchet</li><li>• Marking and utility knives</li><li>• Putty knives</li><li>• Maintaining axes and hatchets</li><li>• Sharpening axes and hatchets</li></ul>                     |

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6. Describe the use and maintenance of drills and boring tools

- Bit braces
- Twist bits
- Auger bits

7. Describe the use of bars

- Wrecking (gooseneck) bar
- Crowbar (pry or long)
- Lining bar
- L stripping bar
- Wonder bar
- Cat's paw
- Renovator's bar
- Nail (staple) puller

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**Line E: Use Hand Tools**  
**Competency: E - 4 Use and Maintain Fastening Tools**

**E-4**

**Learning Objectives:**

1. The learner will be able to safely use and maintain of fastening tools.
2. The learner will be able to demonstrate the safe use of fastening tools to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |   |   |
|---|---|
| 1. Describe the use and maintenance of hammers            | <ul style="list-style-type: none"><li>• Types of hammers<ul style="list-style-type: none"><li>– Curved claw</li><li>– Straight claw</li><li>– Sledge</li><li>– Soft faced</li></ul></li><li>• Rules for use</li></ul>   |
| 2. Describe the use and maintenance of screwdrivers       | <ul style="list-style-type: none"><li>• Types of screwdrivers</li><li>• Robertson</li><li>• Phillips</li><li>• Stubby and offset</li><li>• Maintenance</li></ul>  |
| 3. Describe the use and maintenance of pliers and cutters | <ul style="list-style-type: none"><li>• Combination slip-joint pliers</li><li>• Interlocking slip-joint pliers</li><li>• Needle-nose pliers</li><li>• Diagonal (side cutting) pliers</li><li>• End-cutting pliers</li><li>• Lineman's pliers</li><li>• Locking pliers</li></ul> |
| 4. Describe the use and maintenance of wrenches           | <ul style="list-style-type: none"><li>• Open-end wrench</li><li>• Box-end wrench</li><li>• Combination wrench</li><li>• Adjustable wrench</li><li>• Socket wrench</li><li>• Hexagon key wrench</li><li>• Pipe wrench</li></ul>  |

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**Line F: Use Portable Power Tools**  
**Competency: F - 1 Use and Maintain Portable Power Tools**

**F-1**

**Learning Objectives:**

1. The learner will be able to use and maintain portable power tools.
2. The learner will be able to demonstrate the safe use of portable power tools to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Describe the safe use and maintenance of portable electric power tools
2. Describe the operation, maintenance and safe use of portable circular saws
3. Describe the operation, maintenance and use of portable electric drills and screwdrivers
4. Describe the safe use and maintenance of portable air systems
5. Describe the operation and use of air powered nailers and staplers

**Content**

- Power supply
  - Grounding
  - Condition of equipment
  - Guards in place
  - Operating rules
  - Wear eye protection
  - Feed work or tool smoothly
  - Turn off tools when finished
  - Storage of tools
- 
- Size and types
  - Parts
  - Adjustments
  - Safe Operation
  - Blade types
- 
- Size and speeds
  - Variable speed types
  - Types of chucks
  - Maintenance of drill
  - Types of screwdrivers (screw guns)
  - Types of chucks and clutch systems
  - Maintenance of screwdriver
- 
- Components of air systems
  - Filters and regulators
  - Lubricators
  - Hose and connectors
  - Maintenance of system
- 
- Types of nailers and staplers
  - Loading nailers and staplers
  - Safe operation
  - WCB Rules and Regulations
  - Adjusting depth of drive
  - Cordless nailers
  - Safety precautions
  - Maintenance of tools

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6. Describe the operation, maintenance and use of sabre saws and reciprocating saws

- Types of saws
- Types of blades
- Safe operation
- Maintenance of saws

7. Describe the safe use and maintenance of battery-powered tools

- Tools available
- Amperage
- Safety precautions
- Battery maintenance and charging

**F-1**

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**Line F: Use Portable Power Tools**  
**Competency: F - 2 Use and Maintain Powder-Actuated Tools**

**F-2**

**Learning Objectives:**

1. The learner will be able to use and maintain powder-actuated tools.
2. The learner will be able to demonstrate the safe use and maintenance of powder-actuated tools to a skill level that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |  |   |
|--|---|
| 1. Describe safety rules for using powder-actuated tools                           | <ul style="list-style-type: none"><li>• Types of tools</li><li>• Safe operation</li><li>• Safety precautions</li><li>• WCB Rules and Regulations</li><li>• Wear eye, ear and foot protection</li><li>• Storage of cartridges and tools</li></ul>                                  |
| 2. Describe the velocities of powder-actuated tools and the methods of propulsions | <ul style="list-style-type: none"><li>• Low velocity</li><li>• Medium velocity</li><li>• High velocity</li><li>• Methods of propulsion<ul style="list-style-type: none"><li>– Impact</li><li>– Contact</li><li>– Co-acting</li></ul></li><li>• Safety features of tools</li></ul> |
| 3. Identify types of cartridges and the coding system                              | <ul style="list-style-type: none"><li>• Power levels</li><li>• Case types</li><li>• Firing methods</li><li>• Colour coding</li></ul>  |
| 4. Identify types of fasteners   | <ul style="list-style-type: none"><li>• Types of fasteners</li><li>• Headed pins</li><li>• Threaded studs</li><li>• Eyelets</li><li>• Knurled fasteners</li></ul>   |
| 5. State the rules for fastening with powder-actuated tools                        | <ul style="list-style-type: none"><li>• Holding action</li><li>• Concrete</li><li>• Placement of fasteners for concrete</li><li>• Spalling</li><li>• Structural steel</li><li>• Placement of fasteners for steel</li></ul>  |

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**Line G: Use Shop Equipment**  
**Competency: G - 1 Use and Maintain a Table Saw**

**G-1**

**Learning Objectives:**

1. The learner will be able to use and maintain a table saw.
2. The learner will be able to demonstrate the safe use of a table saw to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |  |  |
|--|--|
| 1. Identify the components of a table saw and state the function of each | <ul style="list-style-type: none"><li>• Table top</li><li>• Fence</li><li>• Mitre gauge</li><li>• Control switch</li><li>• Tilt controls</li><li>• Blade height controls</li><li>• Saw guard</li><li>• Anti-kickback features</li><li>• Cabinet base</li></ul>                     |
| 2. Describe operations performed with a table saw                        | <ul style="list-style-type: none"><li>• Ripping</li><li>• Cross cutting</li><li>• Mitre cuts</li><li>• Bevel cuts</li><li>• Rabbits</li><li>• Ploughs</li><li>• Dado cuts</li></ul>  |
| 3. Identify saw blades and dado cutters                                  | <ul style="list-style-type: none"><li>• Sharpening</li><li>• Cross cut blades</li><li>• Ripping blades</li><li>• Combination blades</li><li>• Dado sets</li><li>• Adjustable dado head</li></ul>   |
| 4. List safety rules for operating a table saw                           | <ul style="list-style-type: none"><li>• Safety rules</li><li>• Type of blade</li><li>• Table top, fence and guides</li><li>• Materials to be cut</li><li>• Protective equipment</li><li>• Housekeeping</li></ul>   |
| 5. Describe the basic maintenance and adjustment of a table saw          | <ul style="list-style-type: none"><li>• Blade orientation</li><li>• Perpendicular stop</li><li>• Blade tilt to 45 degrees</li><li>• Fence parallel to blade</li><li>• Adjust mitre gauge</li><li>• Clean and lubricate parts</li><li>• Check electrical wiring and belts</li></ul> |

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**Line G: Use Shop Equipment**  
**Competency: G - 2 Use and Maintain a Radial Arm Saw**

**G-2**

**Learning Objectives:**

1. The learner will be able to use and maintain a radial arm saw.
2. The learner will be able to demonstrate the safe use of a radial arm saw to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Identify the parts of a radial-arm saw
2. Describe operations performed with a radial-arm saw
3. Describe safety rules for operating a radial-arm saw
4. Describe the basic maintenance of a radial-arm saw

**Content**

- Radial arm
  - Elevating handle
  - Mitre clamp and pointer
  - Yoke clamp
  - Rip lock
  - Bevel clamp and pointer
  - Safety and blade guards
  - Anti-kickback fingers
  - Control switches
  - Table top and fence
- 
- Cross-cutting
  - Ripping
  - Mitre and bevel cuts
  - Dado cuts
- 
- Check adjustments
  - Wear eye protection
  - Hold stock firmly
  - Control feed or saw
  - Rip against blade rotation
  - Use long push-stick for ripping
  - Disconnect power when changing blades
- 
- Set table height and plane
  - Set arm lock
  - Set mitre pointer
  - Set yoke locating pin
  - Set bevel locating pin
  - Cleaning and lubricating



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**Line J: Use Site Layout**  
**Competency: J - 1 Layout Building Locations**

**J-1**

**Learning Objectives:**

1. The learner will be able to describe the layout of buildings.
2. The learner will be able to demonstrate how to locate a building on a given site to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

- |  |   |
|--|---|
| 1. Identify legal descriptions on survey plans and describe how to locate the correct property from survey or plot plans | <ul style="list-style-type: none"><li>• Legal descriptions</li><li>• Survey plans</li></ul>   |
| 2. State the purpose of survey markers   | <ul style="list-style-type: none"><li>• Iron pin</li><li>• Lead plug</li><li>• Survey point</li><li>• Hub</li><li>• Corner stake</li><li>• Witness stake</li><li>• Benchmark</li><li>• Datum point</li></ul>                  |
| 3. Describe excavation and grading procedures  | <ul style="list-style-type: none"><li>• Clearing the site</li><li>• Excavate</li><li>• Cut and fill</li><li>• Contour lines</li><li>• Grades</li><li>• Grade line and grade stakes</li><li>• Estimating excavations</li></ul> |
| 4. Describe the methods for squaring corners   | <ul style="list-style-type: none"><li>• Measuring diagonals</li><li>• 3-4-5 Method</li></ul>  |
| 5. Describe the location and installation of batter boards   | <ul style="list-style-type: none"><li>• Location</li><li>• Construction</li></ul>   |
| 6. Describe line setting on batter boards  | <ul style="list-style-type: none"><li>• Locating lines</li><li>• Tying lines</li><li>• Plumbing down from lines</li></ul>   |

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**Line K: Build Concrete Formwork**  
**Competency: K - 2 Build Footing and Wall Forms**

**K-2**

**Learning Objectives:**

1. The learner will be able to describe the construction of footing and wall forms.
2. The learner will be able to construct footing and wall forms to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Describe the use of footing forms and methods for their construction

**Content**

- Footing forms
  - Simple
  - Ladder-type
- Wall footings
  - Level
  - Stepped
- Column footings

2. Describe methods used to place anchor bolts and reinforcing dowels

- Types of anchor bolts
- Position of bolts
- Templates
- Dowels
- Location of dowels

3. Describe the use of wall forms and methods for their construction

- Built-in-place forms
- Strap tie forms
- Easy-strip forms
- Snap tie forms
- Form panels
- Form ties (wedges)
- Walers
- Bracing
- Corner construction
- Bulkheads and door bucks
- Corbels
- Pilasters

4. Describe installation methods for window and door bucks, blockouts, levelling strips and bulkheads

- Types of bucks
- Keys
- Blockouts
- Bulkheads
- Leveling strips

5. Describe the calculation of materials for footing and wall forms

- Contact area
- Sheathing
- Studs
- Walers
- Ties
- Wedges
- Braces

---

**Line L: Frame Residential Housing**  
**Competency: L - 1 Describe Wood Frame Construction**

**L-1**

**Learning Objectives:**

1. The learner will be able to describe types of wood frame construction.

**Learning Tasks**

1. Identify framing systems

**Content**

- Platform or Western frame construction
- Balloon frame construction
- Post beam and plank construction

2. Identify roof styles

- Flat
- Shed
- Gable
- Hip
- Intersecting
- Mansard
- Gambrel

3. Identify framing members

- Floors and ceilings
- Walls and partitions
- Roofs
- Bracing and blocking
- Sheathing

4. Describe the terms used in platform frame construction

- Structural terms
  - Foundation
  - Camber
  - Cantilever
  - Wall types
  - Breaking joints
- Architectural terms
  - Cornice
  - Dormers
  - Eaves
  - Gable
  - Soffit
  - Parapet
- Spaces
  - Air spaces
  - Attic
  - Crawl spaces
  - Rough openings

---

**Line L: Frame Residential Housing**  
**Competency: L - 2 Build Foundations and Floors**

**L-2**

**Learning Objectives:**

1. The learner will be able to describe the construction of building foundations and floors.
2. The learner will be able to demonstrate the construction of building foundations and floors to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

**Content**

1. Installing sill plates \*Sill plate anchorage
  - Damp-proofing material
  - Straightening sill plates
  - Installing before concrete
  - Cast-in-place joists
  
2. Installation of columns, beams, and pony walls
  - Types and sizes of columns
  - Column footings and anchorage
  - Types and sizes of beams
    - Solid wood beams
    - Built-up beams
    - LVL beams
    - PSL beams
    - Glue laminated beams
    - Steel beams
  - Calculating post and beam sizes
  - Installing posts and beams
  - Pony wall construction
  - Pony wall stud sizes and spacing
  
3. Installing floor joists
  - Types of joists
    - Dimension lumber
    - Manufactured joists (plywood and laminated veneers)
  - Calculating joist sizes
  - Nailing requirements
  - Placement of joists
    - Floor openings
    - Non-bearing wall support
    - Load bearing wall support
  - Joists supported by steel beams
  - Installation of joists
  
4. Installation of bridging
  - Types of bridging
    - Cross
    - Solid blocking
    - Strapping
  - Layout of angles and length for cross bridging
  - Installation of bridging

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5. Installation of floor sheathing

- Types of sheathing
  - Plywood
  - T & G plywood
  - Panel products
  - Solid lumber (ship lap)
- Nailing requirements
- Installation of sheathing

6. Calculate floor framing materials

- Manufactured beams
- Built-up beams
- Spanning joists
- Rim joists
- Blocking and bridging
- Hangers
- Thickness requirements
- Area and sheet size
- Waste allowance
- Fasteners and adhesives

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**Line L: Frame Residential Housing**  
**Competency: L - 3 Build Walls and Partitions**

**L-3**

**Learning Objectives:**

1. The learner will be able to describe the construction of wood frame walls.
2. The learner will be able to demonstrate the construction of wood frame walls to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Construction of exterior walls

**Content**

- Building Code requirements for exterior wall framing
- Wall stud sizes and spacings
- Nailing requirements
- Intersection and corner construction
- Door and window openings
- Lintel sizes
- Plate layout
- Assembly procedures
- Squaring and truing walls

2. Sheathing and erecting exterior walls

- Building Code requirements for sheathing
- Types of sheathing
  - Plywood
  - Panel products
  - Lumber sheathing
- Nailing requirements
- Erecting walls
- Truing and bracing walls

3. Construction of interior walls

- Building Code requirements for interior partitions
- Sizes and spacing of studs
- Wall openings
- Lintel sizes
- Staggered stud construction
- Fire stops and other backing

4. Calculate wall framing materials

- Number of plates
- Total length of plates
- Quick stud calculation
- Detailed stud calculation
- Sheathing surface area
- Sheet size
- Waste allowance
- Fastener calculations

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**Line L: Frame Residential Housing**  
**Competency: L - 4 Build Gable Roofs with Ceiling Joists**

**L-4**

**Learning Objectives:**

1. The learner will be able to describe the construction of gable roofs.
2. The learner will be able to demonstrate the construction of gable roofs to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Describe methods for framing ceilings

**Content**

- British Columbia Building Code requirements for ceiling joists
- Types of joists
  - Dimension lumber
  - Manufactured joists (plywood and laminated veneers)
- Sizes and spacing of ceiling joists
- Calculating joist sizes
- Nailing requirements
- Openings
- Placement of joists
- ceiling openings
- Installation of joists

2. Describe gable roof components

- Roof terms
  - Roof span
  - Rafter span
  - Run
  - Rise
  - Projection
  - Overhang
- Common rafter
  - Bird's mouth
  - Seat cut
  - Plumb cut
  - Line length
  - Working points
  - True length
  - Tail cuts
- Roof joists
- Ceiling joists
- Collar ties
- Purlins
- Pony or knee walls
- Gable studs
- Outriggers
- Lookouts
- Ledgers
- Fascias and barge boards

- 
- |  |  |
|--|--|
| 3. Lay out roof members                                | <ul style="list-style-type: none"><li>• British Columbia Building Code requirements for roof members</li><li>• Snow loads</li><li>• Rafter span and sizes</li><li>• Rafter calculations</li><li>• Rafter tables</li><li>• Rafter layout</li><li>• Rafter locations</li><li>• Nailing requirements</li><li>• Calculation and layout of collar ties</li><li>• Calculation and layout of gable studs</li><li>• Calculation and layout of outriggers</li></ul> |
| 4. Describe the procedure for assembling a gable roof  | <ul style="list-style-type: none"><li>• Common rafters</li><li>• Ridge board</li><li>• Collar ties</li><li>• Bracing</li><li>• Gable ends</li></ul>  |
| 5. Identify roof sheathing requirements                | <ul style="list-style-type: none"><li>• British Columbia Building Code requirements for sheathing</li><li>• Types of sheathing<ul style="list-style-type: none"><li>– Plywood</li><li>– Panel products</li><li>– Lumber sheathing</li></ul></li><li>• Nailing requirements</li><li>• Spaced sheathing</li><li>• Eave protection</li></ul>  |
| 6. Describe residential roof truss erection procedures | <ul style="list-style-type: none"><li>• Layout of trusses</li><li>• Safety requirements</li><li>• Handling and placing trusses</li><li>• Fastening trusses</li><li>• Bracing requirements</li></ul>  |



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**Line L: Frame Residential Housing**  
**Competency: L - 5 Build Hip Roofs**

**L-5**

**Learning Objectives:**

1. The learner will be able to describe the construction of hip roofs.
2. The learner will be able to demonstrate the construction of hip roofs to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Describe construction methods for a hip roof

**Content**

- Terms
  - Hip rafter
  - Jack rafter
  - End common rafter
- Working points
- Cheek cuts

2. Describe the layout for hip rafters

- Ridge adjustments
- Line lengths
- Calculations for hip rafters
- Layout for hip rafters
- Dropping the hip

3. Describe the layout for jack rafters

- Line lengths
- Calculations for jack rafters
- Layout for jack rafters

4. Describe the procedure for framing a hip roof

- Layout of plate for hip roof
- Layout and cutting of all members for the hip roof
- Install common rafters and ridge
- Install end common rafters
- Install hip rafters
- Install jack rafters

5. Describe methods for laying out cuts for roof sheathing

- Face cuts
- Edge cuts

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**Line L: Frame Residential Housing**  
**Competency: L - 6 Build Straight Stairs**

**L-6**

**Learning Objectives:**

1. The learner will be able to describe the construction of straight stairs.
2. The learner will be able to demonstrate the construction of straight stairs to an accuracy that would be acceptable in the construction industry.

**Learning Tasks**

1. Identify types of stairs and stairwells

**Content**

- Stair terms
  - Flight
  - Total rise
  - Unit rise
  - Unit run
  - Nosing projection
  - Nosing line
- Open stairwells
- Closed stairwells
- Combination stairwells
- Types of stairs
  - Straight
  - Narrow “U”
  - Wide “U”
  - Long “L”
  - Wide “L”
  - Double “L”
  - Quarter turn

2. Identify parts of a stair and balustrade

- Stair parts
  - Treads
  - Risers
  - Stringers
  - Platforms
  - Landings
  - Nosings
- Balustrade or banister parts
  - Handrails
  - Balusters
  - Buttress caps
  - Fillets
  - Newel posts

- 
3. Identify Building Code requirements for stairs
    - Maximum and minimum rise
    - Maximum and minimum run
    - Headroom requirements
    - Stringer requirements
    - Handrail requirements
    - Width of stairway
    - Width and thickness of treads
  
  4. Calculate measurements for stair construction
    - Proportioning rules
    - Code requirements
    - Total rise
    - Unit rise and number of risers
    - Unit run and number of treads
    - Stairwell opening lengths
    - Length of stringers
  
  5. Construct stairs and stairwells
    - Framing methods
    - Stringer layout
      - Cut-out stringers
      - Semi-housed stringers
      - Mitred stringers
      - Housed stringers
    - Handrails

# Learning Resources

Although the following suggested list of learning resources do not have the Ministry title of ‘Recommended Status’, they have been provided as support for teachers in instruction, assessment, and delivery of the Level 1 Programs.

Teachers wishing to use these materials should preview and select those that are appropriate for use in their classroom and by their students.

As with all supplementary resources, local approval is required before use.

The majority of titles listed are currently used in post-secondary institutions to deliver Level 1 Trades Training. The student resources listed have been reviewed for their suitability by a team of qualified BC teachers. If a school is partnered with a post-secondary training provider, consultation is advised to ensure continuity or sequential use of learning resources.

Comprehensive resources support the majority of the competencies, and additional resources support one or more competencies. Teachers wishing to use these materials should preview and select those that are appropriate for use in their classroom and by their students.

The suggested titles, both comprehensive and additional, are not intended as an exhaustive or exclusive list, rather these materials represent a useful collection, relating to many of key elements of the Level 1 programs.

Suggested Learning Resources Spring 2006	Carpentry Level I									
	Competencies									
Comprehensive Resources	B	C	D	E	F	G	J	K	L	
<i>Carpentry</i> , 4th Ed (Vogt)		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Carpenter: First Period: Package: Alberta Complete Set</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Carpentry: Year 1 Package: British Columbia</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional Resources – Print and Media										
<i>Building Trades Blueprint Reading</i> (Strinholm)		✓								
<i>British Columbia Building Code</i>		✓	✓	✓	✓	✓	✓			✓
<i>Canadian Wood-Frame House Construction</i> . Rev. ed. 2005. Canada Mortgage and Housing Corporation (CMHC)			✓					✓	✓	✓
<i>Concrete Formwork</i> , 3rd ed. (Koel)								✓		✓

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**Carpentry, 4th Ed  
(Vogt)**

**COMPREHENSIVE**

This updated hard cover text of 860 pages uses a highly visual and colourful approach to content delivery for a number of carpentry competencies. It is a very comprehensive resource. This is a required text for some colleges in BC.

The book contains step-by-step procedures for residential wood-frame building construction. It is organized into four main sections and subdivided into units and chapters. There is a high level of detailed information in the text and it is written in an accessible way, supported by detailed photographs and isometric illustrations. There are few pages without text-related images which support the specific learning topic.

The text book is engaging and would appeal to students. The detailed glossary of very common industry terms is useful. Information is related to a U.S. workplace with most measures in Imperial, i.e. framing and rough openings. Most of the construction process information is transferable and relevant to the Canadian workplace.

The chapters conclude with multiple-choice review questions directly related to the preceding text.

The accompanying Instructors Resource Guide is a b/w book containing lesson plans, unit objectives, references to PowerPoint slides which are available in Carpentry 4th Ed e.resource / CD-ROM. This electronic resource highlights the key points for each chapter and is somewhat customizable. The answer keys to the questions in the workbook are found in this guide.

The accompanying student Workbook is b/w, contains tests for each chapter, practical math problems, and sentence completion activities.

There is a significant correlation to the Level 1 content, and much of the information can support students with their Level 1 module tests, although some content application ranges from Level 1 to Levels 2 through to Level 4.

Author: Floyd Vogt  
Product Type: Books  
ISBN: 1401870694  
Copyright: 2006

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**Carpenter: First Period: Package: Alberta Complete Set**

**COMPREHENSIVE**

This package is a comprehensive resource and contains 40 workbook learning guides. These student learning guides are designed for student binders.

The learning guides contain; learning objectives, theory, explanations, examples, construction practices and procedures, self-tests and answers.

Each of the learning guides has a number of illustrated in B/W graphics relevant to the topic.

This series addresses all the Level 1 competencies and learning outcomes and can be a primary student resource directly correlated to the Level 1 program outline.

Author: Province of Alberta  
Number of Pages: 2096  
QP Stock Number: 7850000008  
[www.publications.gov.bc.ca/pubdetail.aspx?nato=7850000008](http://www.publications.gov.bc.ca/pubdetail.aspx?nato=7850000008)  
Category: Carpenter (Alberta)

**Carpentry: Year 1 Package  
Province of British Columbia**

**COMPREHENSIVE**

This package is a comprehensive resource and contains three workbooks, spiral bound for use in student binders.

Each workbook is fully illustrated in B/W graphics, learning objectives, theory, explanations, examples, construction practices and procedures, self-tests and answers.

These workbooks address all the Level 1 competencies and learning outcomes and can be a primary student resource directly correlated to the Level 1 program outline.

Package includes:  
7960002804 Carpenter: Year 1 Part 1 (MN1944)  
7960002805 Carpenter: Year 1 Part 2 (MN1945)  
7960002806 Carpenter: Year 1 Intersession (MN1946)

Author: Province of British Columbia  
ISBN: 0-7719-1710-4  
Format: Soft Cover, 914 pages  
QP Stock Number: 7960000068  
[www.publications.gov.bc.ca/pubdetail.aspx?nato=7960000068](http://www.publications.gov.bc.ca/pubdetail.aspx?nato=7960000068)

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**Building Trades Blueprint Reading  
(Strinholm)**

**ADDITIONAL**

This book is referenced as a Level 1 required text by colleges in BC. This text specifically addresses the competencies in LINE C. **School instructors should note that the publication date is 1982.**

The text is a complete overview of construction plan and blue print reading from fundamentals through to advanced levels.

This book is a b/w soft cover with 180 pages containing illustrations, graphics, line drawings, fold-out architectural plans, drawing details, elevations, plot plans, flooring. A Canadian SI metric edition is available.

More advanced content addresses electrical, plumbing, heating AC, masonry, sheet metal, concrete and some welding markings. Some of the tests and self-tests can be readily used in program delivery.

The material in this text exceeds the requirements of the Level 1 program.

The appendices offer additional, SI metric references, mathematic exercises, geometry tasks and other industry related calculations and conversions. Some of the information is required to pass the Level 1 modules tests.

The glossary of industry terms is relevant to a variety of carpentry contexts.

Author: Ronald K. Strinholm  
Publisher: Pearson Education Canada  
ISBN: 0-7730-2900-1  
Copyright: 1982  
Format: Spiral bound, 180 pages

**British Columbia Building Code**

**ADDITIONAL**

The 1998 BC Building Code is available in an 8 1/2" X 11" loose-leaf version and the smaller 6" X 8 1/2" convenience version. This directly relates to essential British Columbia Building Standards and demonstrates the many professional architectural drafting representations.

An updated version of the "Guide to the Letters of Assurance" is included in the loose-leaf version; the new Water Conservation Plumbing Regulation is included in both versions. The 1998 BC Building Code includes plumbing requirements.

Crown Publications  
521 Fort Street  
Victoria BC V8V 1E7  
Phone: 250 386-4636 Fax: 250 386-0221  
Internet: [www.crownpub.bc.ca/](http://www.crownpub.bc.ca/)

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## Canadian Wood-Frame House Construction

ADDITIONAL

This is a two-colour, soft-cover 1/2 size book and is a thorough guide to all aspects of modern wood-frame house construction across Canada.

Explanations, operations and technical drawings are well produced and easily readable by students and they reference a range of construction situations from early stages of construction to interior completion. The information places the content of the national building code into plain language with good visual support as they apply to building situations and procedures.

The details of construction drawings are clearly explained and the language level is appropriate for the student audience. Units of measurement are given in Imperial with SI equivalents.

The appendices are very useful and include extensive references to lumber grade marks, span tables, and site built truss information.

A separate book *Glossary of Housing Terms* is available and has extensive coverage of industry standard terms, with materials and technology explanations in plain language.

Canada Mortgage and Housing Corporation (C.M.H.C.)  
and Government of CANADA

ISBN: 0-660-19535-6

Revised. Ed. 2005

CD-ROM is available

## Concrete Formwork. 3rd ed. (Print-Non-Fiction) (Koel, Leonard)

ADDITIONAL

This resource focuses on lines L & K in significant depth but instructors should be aware that much of the text is well beyond Level 1.

This soft cover book of 330 pages is extremely deep and covers major areas domestic, commercial and heavy duty projects. It has a highly visual layout and there are extensive b/w photographs of formwork within jobsites to illustrate the situational examples for student learning.

There are isometric sketches that demonstrate in detail the form assemblies. There are multiple-choice quizzes and tests at the end of chapters for the teacher to use for student assessment.

The applications in the text support the study and subsequently the safe production of formwork by students. There is a glossary of current industry terms.

Author: Koel, Leonard

Publisher: American Technical Pubs., Inc.

Copyright: 2005

Instructor's Guide ISBN: 0-8269-0708-3