

Vocational Training Program

5803

Masonry: Bricklaying

Training Sector

7

Buildings
and Public Works

Québec 



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Training Sector

7

Buildings
and Public Works

Formation professionnelle et technique
et formation continue

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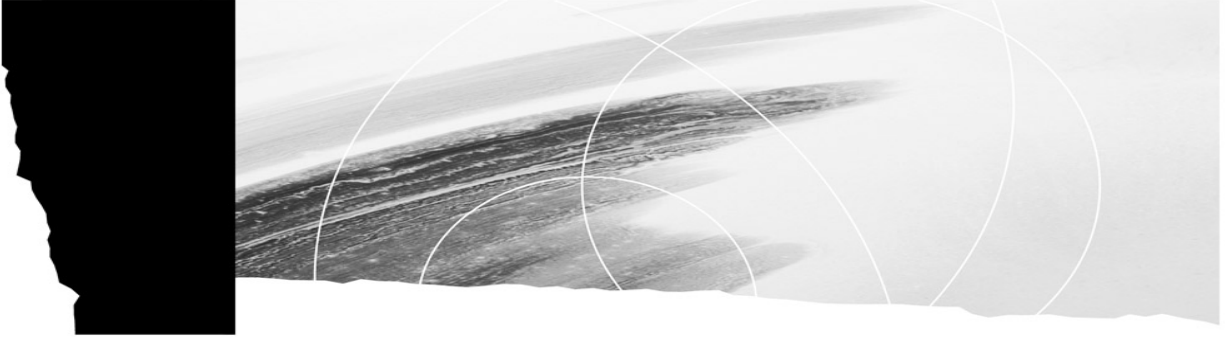
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5803

Masonry: Bricklaying

Year of approval: 2005

Certification:	Diploma of Vocational Studies
Number of credits:	60
Number of modules:	15
Total duration:	900 hours

To be admitted to the *Masonry: Bricklaying* program, students must meet one of the following conditions:

- Persons holding a Secondary School Diploma or its recognized equivalent are not subject to any additional admission requirements.

OR

- Persons who are at least 16 years of age on September 30 of the year in which their training is to begin must meet the following admission requirement: to have earned Secondary III credits in language of instruction, second language and mathematics, or to have been granted recognition of equivalent learning.

OR

- Persons who are at least 18 years of age must have the following functional prerequisites: the successful completion of the general development test and SPR 3, 4, 5, 6, or recognition of equivalent learning.

N.B. The requirement on the concurrency of general education courses and vocational training does not apply to this category.

Introduction to the Program

The vocational training curriculum, from which this program of study derives, is the responsibility of both the Ministère de l'Éducation, du Loisir et du Sport, which develops programs and their teaching guides, and the educational institutions, which implement the programs and the evaluation process. Programs of study include compulsory objectives and suggestions for competency-related knowledge, skills and attitudes.

Programs of study provide teachers with a frame of reference for planning teaching activities. They define the scope of teaching strategies by identifying the broad educational orientations to be favoured and the objectives to be attained. By successfully completing a program, students acquire not only the entry-level competencies required by the workplace in order to practise a trade or occupation, but also learning that provides them with a certain degree of versatility.

The duration of the program is 900 hours, which includes 690 hours spent on the specific competencies required to practise the trade and 210 hours on general, work-related competencies. The program of study is divided into 15 modules, which vary in length from 15 to 120 hours. The total hours allocated to the program include time devoted to evaluation for certification purposes and to remedial work.

Title of Module	Code	Module	Hours	Credits
The Trade and the Training Process	778 701	1	15	1
Health and Safety on Construction Sites	754 992	2	30	2
Mortars	778 712	3	30	2
Scaffolding	778 722	4	30	2
Laying Blocks and Bricks to the Line	778 738	5	120	8
Building Corners	778 746	6	90	6
Plans and Specifications	778 754	7	60	4
Simple Structures	778 766	8	90	6
Complex Structures	778 776	9	90	6
Introduction to Welding	778 783	10	45	3
Structures With Precast Masonry Units	778 793	11	45	3
Cutting and Laying Stone	778 806	12	90	6
Chimneys and Stove Bases	778 812	13	30	2
Introduction to Refractory Materials	778 821	14	15	1
Adapting to the Workplace	778 838	15	120	8

Glossary

Program

A vocational training program is a coherent set of competencies to be acquired. It is formulated in terms of objectives and divided up into modules for administrative purposes. It describes the learning expected of students in accordance with a given performance level. Published as an official pedagogical document, the program leads to the recognition of training qualifying students to practise a trade or occupation.

A vocational training program includes compulsory objectives and content. Although the educational institutions are responsible for learning and evaluation activities, the program presents suggestions for competency-related knowledge, skills, attitudes and perceptions that must be enriched or adapted according to the needs of students, and information regarding the certification of studies.¹

Program Goals

Program goals consist of the expected outcome at the end of training as well as a general description of a given trade or occupation. They also include the four general goals of vocational training.

Educational Aims

Educational aims are broad orientations to be favoured during training in order to help students acquire intellectual or motor skills, work habits or attitudes. Educational aims usually address important aspects of personal and vocational development that have not been explicitly included in the program goals or competencies. They help guide educational institutions in implementing the program.

Competency

A competency is the ability to act successfully and evolve in order to adequately perform work-related tasks or activities, based on an organized body of knowledge and skills from a variety of fields, perceptions, attitudes, etc.

Objectives

Objectives refer to the operational aspect of a competency to be acquired. They are expressed in terms of specific requirements and serve as the practical basis for teaching, learning and evaluation. Objectives are either behavioural or situational.

Objectives also provide indicators for learning, related knowledge, skills, attitudes and perceptions, and associated guidelines. These indicators are grouped according to elements of the competency (in the case of behavioural objectives), and according to phases of the learning context (in the case of situational objectives).

1. Behavioural Objective

A behavioural objective is a relatively closed objective that describes the actions and results expected of the student. Behavioural objectives consist of the following components:

- The *statement of the competency*, which is the result of the job analysis, the general goals of the program and other determinants.
- The *elements of the competency*, which correspond to essential details that are necessary in order to understand the competency and are expressed in terms of specific behaviours. They refer to the major steps involved in performing a task or the main components of the competency.

1. Specifications regarding certification complement the program of study, but are presented in another document. Evaluation criteria are prescriptive.

- The *achievement context*, which corresponds to the situation in which the competency is exercised at entry-level on the job market. The achievement context does not specify the context for learning or evaluation.
- The *performance criteria*, which define the requirements by which to judge the attainment of the competency. They may refer to each element of the competency, to several elements or to the competency as a whole. Those associated with a specific element correspond to the requirements for performing a task or activity; those associated with several elements indicate the expected level of performance or the overall quality of a product or service.

Evaluation is based on expected results.

2. Situational Objective

A situational objective is a relatively open-ended objective that outlines the major phases of a learning situation in which a student is placed. It allows for output and results to vary from one student to another. Situational objectives consist of the following five components:

- The *statement of the competency*, which is the result of the job analysis, the general goals of the program and other determinants.
- The *elements of the competency*, which outline the essential aspects of the competency and ensure a better understanding of the expected outcome.
- The *learning context*, which provides a broad outline of the learning situation designed to help the students develop the required competency. It is normally divided into three phases of learning:
 - information
 - participation
 - synthesis
- The *instructional guidelines*, which provide guidelines and means to ensure that learning takes place and that the context in which it occurs is always the same. These guidelines may include general principles or specific procedures.
- The *participation criteria*, which describe requirements the students must fulfill when participating in the learning activities. They focus on how the students take part in the activities rather than on the results obtained. Participation criteria are normally provided for each phase of the learning context.

Evaluation is based on the student's participation in the activities suggested in the learning context.

Competency-Related Knowledge, Skills, Attitudes and Perceptions

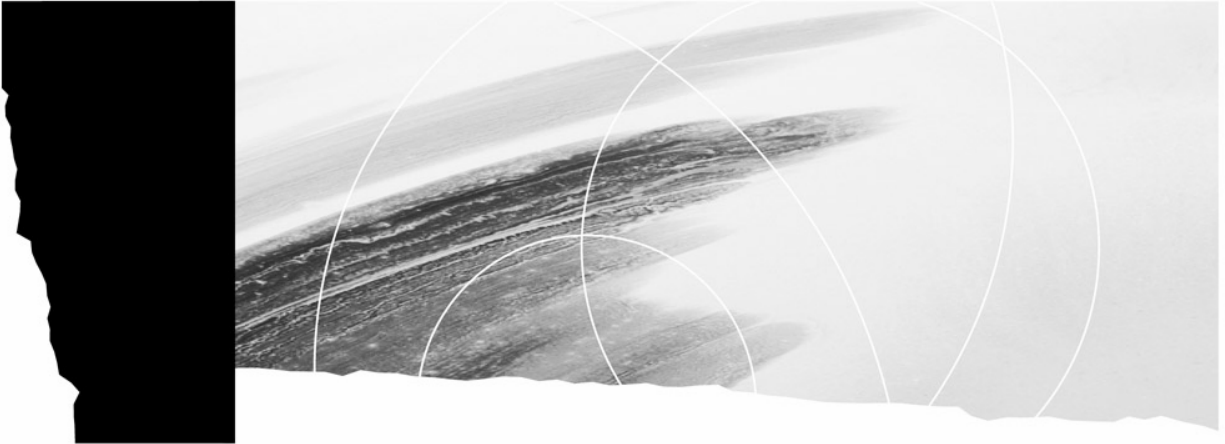
Competency-related knowledge, skills, attitudes and perceptions define the essential and important learning that the student must acquire in order to apply and continue to develop the competency. They correspond to activities in the job market and are accompanied by guidelines that provide information on the field of application, the level of complexity or content related to training. The knowledge, skills, attitudes and perceptions and the related guidelines are not prescriptive.

Module

A module is a component of a program of study comprising a prescriptive objective and suggestions for competency-related knowledge, skills, attitudes and perceptions.

Credit

A credit is a unit used for expressing quantitatively the value of the modules in a program of study. One credit corresponds to 15 hours of training. Students must accumulate a set number of credits to obtain a diploma or attestation.



Part I

Program Goals

Educational Aims

**Program Competencies and
Grid of Competencies**

Harmonization

Program Goals

The *Masonry: Bricklaying* program prepares students to practise the trade of bricklayer-mason.

The program is designed to train bricklayer-masons to work in various sectors of activity primarily related to the construction industry, such as the residential, institutional and commercial sectors as well as civil engineering and public roads. These sectors are governed by the *Act respecting labour relations, vocational training and manpower management in the construction industry* (R.S.Q., c. R-20), which is administered by the Commission de la construction du Québec.

Bricklayer-masons perform various tasks, such as estimating quantities of materials required to prepare the work area, installing lines vertical to angles to ensure plumbness, and installing horizontal lines used as guides for ensuring that the structure is aligned and flat. Once this preparatory work has been done, they spread the mortar using a trowel to bond the various masonry units (e.g. bricks, concrete blocks and stones). The units are arranged in various bond patterns as specified in the plans and specifications. In order to comply with the plans and specifications and ensure the quality of the structure, some cuts will be made using a hammer, a chisel or certain equipment, such as a masonry saw and guillotine, when precision and neatness are required.

When building walls, bricklayer-masons must insert different accessories designed to support loads, prevent water infiltration and reinforce the structure. Joints will be finished in different ways depending on the structure's exposure to the natural elements. For the most part, scaffolding is erected to make these tasks safer to carry out.

Some bricklayer-masons may specialize in refractory materials. Building restoration also requires specialized knowledge and techniques.

The program goals of the *Masonry: Bricklaying* program are based on the general goals of vocational training. These goals are:

- To help students develop effectiveness in the practice of a trade or occupation, that is:
 - to teach students to perform roles, functions, tasks and activities associated with the trade or occupation upon entry into the job market
 - to prepare students to progress satisfactorily on the job (which implies having the technical and technological knowledge and skills in such areas as communication, problem solving, decision making, ethics, health and safety)
- To help students integrate into the work force, that is:
 - to familiarize students with the job market in general and the context surrounding the trade or occupation they have chosen
 - to familiarize students with their rights and responsibilities as workers
- To foster students' personal development and acquisition of occupational knowledge, skills, perceptions and attitudes, that is:
 - to help students develop their autonomy and ability to learn, and acquire effective work methods
 - to help students understand the principles underlying the techniques and the technology used in the trade or occupation
 - to help students develop self-expression, creativity, initiative and entrepreneurial spirit
 - to help students adopt the attitudes required to successfully practise the trade or occupation, and instill in them a sense of responsibility and a concern for excellence
- To promote job mobility, that is:
 - to help students develop positive attitudes toward change
 - to help students develop the means to manage their careers by familiarizing them with entrepreneurship

Educational Aims

The aim of the *Masonry: Bricklaying* program is to help students develop attitudes and behaviours that are deemed essential to the practice of the trade:

- To increase manual dexterity.
- To develop a sense of observation and a concern for detail in order to work with more precision.
- To develop a desire to excel and the motivation to produce more and better work.
- To become accustomed to adopting correct postures.
- To acquire the skills and attitudes required to produce clean work.

Program Competencies and Grid of Competencies

List of Competencies

- Determine their suitability for the trade and the training process.
- Prevent risks related to health, safety and physical well-being on construction sites.
- Prepare and spread mortars.
- Erect scaffolding.
- Lay blocks and bricks to the line.
- Build corners with blocks and bricks.
- Interpret plans and specifications.
- Build and repair simple blockwork and brickwork.
- Build complex structures with masonry units.
- Make simple welds and cut metals.
- Build and repair structures with precast masonry units.
- Cut and lay natural and artificial stones.
- Build and repair chimneys and stove bases.
- Become familiar with the work and techniques related to refractory materials.
- Adapt to the work environment in masonry and bricklaying.

Grid of Competencies

The grid of competencies shows the relationship between general competencies, which correspond to work-related activities, and specific competencies, which are required to practise the particular trade, as well as the major steps in the work process.

The general competencies appear on the horizontal axis and the specific competencies, on the vertical axis. The symbol (Δ) indicates a correlation between a specific competency and a step in the work process. The symbol ($\bigcirc$) indicates a correlation between a general and a specific competency. Shaded symbols indicate that these relationships have been taken into account in the formulation of objectives related to specific competencies.

The logic used in constructing the grid influences the course sequence. Generally speaking, this sequence follows a logical progression in terms of the complexity of the learning involved and the development of the students' autonomy. The vertical axis presents the specific competencies in the order in which they should be acquired. The modules on the horizontal axis should be taught in relation to those on the vertical axis. This means that some modules are prerequisite to others, while other modules are taught concurrently.

GRID OF COMPETENCIES

SPECIFIC COMPETENCIES				GENERAL COMPETENCIES						WORK PROCESS				
	Competency Number	Type of Objective	Duration (in hours)	Determine their suitability for the trade and the training process	Prevent risks related to health, safety and physical well-being on construction sites	Prepare and spread mortars	Erect scaffolding	Interpret plans and specifications	Make simple welds and cut metals	Carry out the work prior to the installation	Prepare the adhesives	Install the materials and units	Strike the joints	Clean
Competency Number				1	2	3	4	7	10					
Type of Objective				S	S	B	B	B	B					
Duration (in hours)				15	30	30	30	60	45					
Lay blocks and bricks to the line	5	B	120	○	●	●	○	○		▲	▲	▲	▲	▲
Build corners with blocks and bricks	6	B	90	○	●	●	○	○	○	▲	▲	▲	▲	△
Build and repair simple blockwork and brickwork	8	B	90	○	●	●	●	●	○	▲	△	▲	▲	▲
Build complex structures with masonry units	9	B	90	○	●	●	○	●	○	▲	△	▲	▲	△
Build and repair structures with precast masonry units	11	B	45	○	●	●	○	●	●	▲	△	▲	▲	△
Cut and lay natural and artificial stones	12	B	90	○	●	●	○	○	○	▲	△	▲	▲	△
Build and repair chimneys and stove bases	13	B	30	○	●	●	○	○	○	▲	△	▲	▲	△
Become familiar with the work and techniques related to refractory materials	14	S	15	○	●	○	○	○		△	△	△	△	△
Adapt to the work environment in masonry and bricklaying	15	S	120	○	●	●	●	●	○	▲	▲	▲	▲	▲

Harmonization

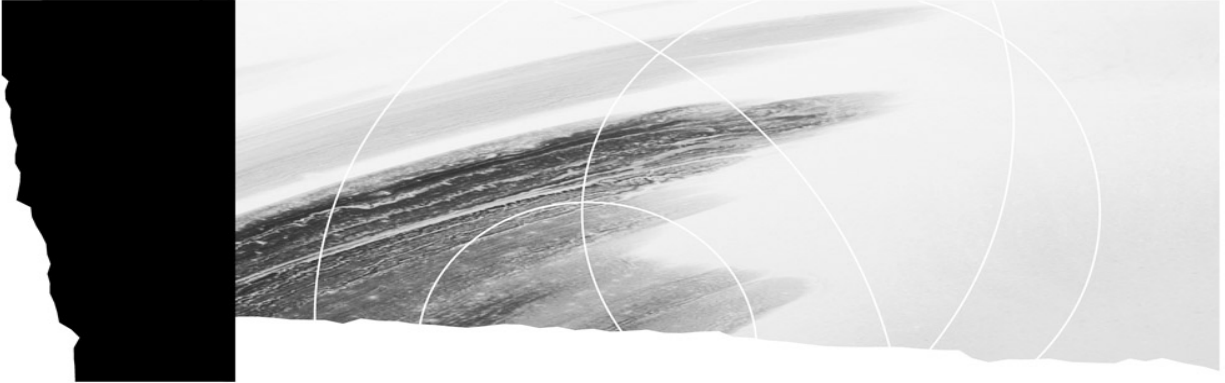
The Ministère de l'Éducation, du Loisir et du Sport harmonizes its vocational and technical programs by establishing similarities and continuity between secondary- and college-level programs within a particular sector or between sectors in order to avoid overlap in program offerings, to recognize prior learning and to optimize the students' progress.

Harmonization establishes consistency between training programs and is especially important in ensuring that the tasks of a trade or occupation are clearly identified and described. Harmonization makes it possible to identify tasks requiring competencies that are common to more than one program. Even if there are no common competencies, training programs are still harmonized.

Harmonization is said to be “inter-level” when it focuses on training programs at different levels, “intra-level” when it focuses on programs within the same educational level, and “inter-sector” when carried out between programs in various sectors.

An important aspect of harmonization is that it allows the common features of competencies to be identified and updated as needed. Common competencies are those that are shared by more than one program; once acquired in one program, they can be recognized as having been acquired in another. Competencies with exactly the same statement and elements are said to be identical. Common competencies that are not identical but have enough similarities to be of equal value are said to be equivalent.

The *Masonry: Bricklaying* program does not share any competencies with other programs at this time.



Part II

Objectives

Module 1 Duration 15 hours

Situational Objective

Statement of the Competency

To determine their suitability for the trade and the training process.

Elements of the Competency

- Become familiar with the nature of the occupation.
- Understand the training process.
- Confirm their career choice.

Learning Context

Information Phase

- Learning about the job market in masonry and bricklaying: work environments (types of companies, products, etc.), job prospects, wages, opportunities for advancement or transfer, selection of candidates (through field trips, interviews, written material, etc.).
- Learning about the nature and requirements of the job (tasks, working conditions, evaluation criteria, rights and responsibilities of workers, etc.), through field trips, interviews, written material, etc.
- Learning about the role and the services offered by organizations working in the construction field (CCQ, ASP Construction, CSST, Conseil conjoint [FTQ and CPQMC], CSN, CSQ, CSD, APCHQ, ACQ, AEMQ, etc.).
- During a group discussion, presenting the information gathered and discussing the students' views on the trade: advantages, disadvantages and requirements.

Participation Phase

- Discussing the skills, aptitudes and knowledge required to practise the trade.
- Learning about the training plan: program of study, training process, evaluation methods and certification of studies.
- Discussing the training program and how it relates to the work of a bricklayer-mason.
- Discussing the students' initial reactions to the trade and the training program.

Evaluation Phase

- Producing a report in which the students:
 - describe their preferences, aptitudes and interests with respect to the trade
 - assess their career choice by comparing the different aspects and requirements of the trade with their own preferences, aptitudes and interests

Instructional Guidelines

- Encourage all the students to engage in discussions and to express themselves.
- Motivate the students to take part in the suggested activities.
- Help the students to acquire an accurate perception of the trade.
- Organize field trips to construction sites that are typical of work environments in masonry and bricklaying, preferably while they are in operation.
- Make available all pertinent documentation (information on the trade, training programs, guides, etc.).
- Organize meetings with trade specialists.

Participation Criteria

Information Phase

- Gather information on most of the topics to be covered.
- Appropriately express their views of the trade at a group meeting, comparing them with the information they have gathered.

Participation Phase

- Give their opinions on some of the requirements that they will have to meet in order to practise the trade.
- Carefully examine the literature provided.
- Relate the contents of the training program to the requirements of the trade.

Synthesis Phase

- Write a report that:
 - sums up their preferences, interests and aptitudes with respect to the trade
 - explains in detail how they arrived at their career choice

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the learning context, the elements of the competency related to each phase as well as the instructional guidelines.

Information Phase

- | | |
|--|---|
| • Situate the competency with respect to the trade and the program. | Reason for the competency
Importance of initial training and ongoing training |
| • Be receptive to information relating to the trade and the training process. | Conditions indicative of being receptive: visual attention, auditory attention, favourable atmosphere, interest, concentration, and physical and psychological well-being |
| • Be concerned with sharing their perception of the trade with other persons in the group. | Advantages of communicating their point of view and listening to that of others |
| • Determine a method of taking notes and presenting the information they have gathered. | Note-taking method, rules of presentation and organization of report |

Participation Phase

- | | |
|---|--|
| • Define the terms “skill,” “aptitude,” “attitude” and “knowledge.” | Simple definitions:
– skill: ability to reproduce a behaviour
– aptitude: natural disposition
– attitude: possibility of reacting positively or negatively to situations
– knowledge: idea, concept, comprehension |
| • Distinguish between the competency-based approach and the traditional approach. | Main characteristics of the competency-based approach as compared with the traditional approach: pedagogy, evaluation, organization, etc. |

Synthesis Phase

- | | |
|---|---|
| • Determine the elements to include in a personal assessment and a presentation report. | Elements to include:
summary of preferences, aptitudes, interests, values and personal qualities; strengths and limitations; links between personal characteristics and the requirements and characteristics of practising the trade |
|---|---|

Situational Objective

Statement of the Competency

Prevent risks related to health, safety and physical well-being on construction sites.

Elements of the Competency

- Develop a responsible attitude toward health and safety risks.
- Be aware of the importance of complying with standards and regulations pertaining to occupational health and safety.
- Recognize a dangerous situation or a risky behaviour and the applicable preventive measures.

Learning Context

Information Phase

- Learning about the risks inherent in construction sites.
- Learning about the standards and regulations pertaining to health and safety on construction sites.
- Learning about the measures to take in the event of an emergency.
- Reflecting on the importance of acquiring the competency related to occupational health and safety.

Participation Phase

- Experimenting with situations that require risk prevention and elimination of dangers with respect to the environment, installations, equipment and machinery, materials and tools, energy sources, etc.
- Participating in activities allowing them to recognize risks related to transporting loads and to restrictive work postures.
- Participating in activities that allow them to recognize the symbols and signs related to risk prevention (dangerous products, road work, transportation of hazardous materials, etc.).
- Comparing the risky behaviours observed on a construction site and identifying the main principles underlying safe behaviour.

Evaluation Phase

- Producing a report in which they:
 - summarize their newly acquired knowledge and skills
 - assess their attitude toward occupational health and safety
 - list the objectives and steps to take to improve themselves

Instructional Guidelines

- Provide the required sources of information.
- Invite, as applicable, resource persons specialized in certain aspects of occupational health and safety.
- Optimally use audiovisual materials.
- Extensively use scenarios representative of the real work situation on construction sites.
- Prevent any dangerous actions that the students could take during simulation activities.
- Encourage all students to participate during discussions.
- Guide the students' self-evaluation by providing them with appropriate tools (e.g. questionnaire) to help them analyze their experience and set objectives.

Participation Criteria

Information Phase

- Consult the sources of information made available to them.
- Describe the advantages of complying with standards and regulations relating to health and safety.

Participation Phase

- Participate conscientiously in the suggested activities.
- State the principles of safe behaviour.
- List the risks related to construction sites as well as applicable preventive measures.

Synthesis Phase

- Produce a report in which they:
 - summarize their newly acquired knowledge and skills
 - assess their attitude toward occupational health and safety
 - list the objectives and steps to take to protect their health, safety and physical well-being, as well as that of others, on a construction site

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the learning context, the elements of the competency related to each phase as well as the instructional guidelines.

Information Phase

- Be receptive to information on health and safety on construction sites.
- Recognize the most common risks related to health, safety and physical well-being on construction sites.
- Recognize the sources of information relating to health and safety on construction sites and find information in them.
- Identify the advantages of complying with health and safety standards and rules.

Roles and responsibilities in matters relating to health and safety on construction sites
Legislative framework governing occupational health and safety

Prevention of illness and accidents

Participation Phase

- Associate the risks inherent in construction sites and the trade with applicable preventive measures.

Risks inherent in the site itself and in the practice of the trade
Preventive measures to apply according to the risk
Systems for identifying hazardous materials

Behavioural Objective

Statement of the Competency

Prepare and spread mortars.

Achievement Context

- Given an order
- Using a mixer
- For bricks and blocks
- Given manufacturers' instructions
- For all mortars and bonding agents with the exception of refractory mortars and refractory bonding agents

Elements of the Competency

Performance Criteria

1. Mix the mortar.

- Quantity of water required for optimal mixing
- Observance of standards in effect
- Correct mixing technique (manual or mechanical)

2. Spread the mortar.

- Functional layout of work area
- Correct technique (blocks and bricks)
- Smooth, precise handling of trowel

3. Clean the tools and equipment.

- Order and cleanliness of the work area

For the competency as a whole:

- Proper use of tools and equipment
- Observance of health and safety rules
- Economical use of materials

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Mix the mortar.

- Prepare the ingredients of the mortars.

CSA standard—A179-95

Different types of mortars, properties, composition, cost, use and main manufacturers

Measuring of ingredients: establishment of a measurement standard (e.g. volume representing one cubic foot)

Proportions to respect for different types of mortar: bonding agent, sand and water

- Assess the workability of the mortar.

Bonding agents (lime and cement): types, characteristics and properties
 Sand: type, origin, composition, grading, and quality criteria
 Water: quality criteria
 Mortar admixtures: colouring dyes, water repellent, set retardant and set accelerator

- Distinguish between manual and mechanical mixing methods.

Manual mixing:
 - equipment: shovel, hoe and mortar pan
 - sequence in which ingredients are mixed
 - adjustment of consistency
 Mechanical mixing:
 - equipment: mixer, shovel and mortar pan
 - sequence in which ingredients are mixed
 - adjustment of consistency
 - variations in sound of the mixer

2. Spread the mortar.

- Prepare the work area.

Rules for arranging the mortarboard in the work area

- Apply the technique for spreading mortar on blocks.

Handling of trowel for separating, scooping, shaking and spreading the mortar

- Apply the technique for spreading mortar on bricks.

Handling of trowel for separating, scooping, rolling and spreading the mortar

3. Clean the tools and equipment.

- Show concern for order and cleanliness.

Link with educational aim 5
 Cleaning method
 Protection of tools and equipment (mixer, mortarboard, wheelbarrow, etc.)

For the competency as a whole:

- Situate the competency with respect to the trade.
- Show concern for working safely.

Links with other competencies
 Reason for the competency

Concern for their safety and that of others
 Safety equipment (glasses, boots and hard hat)
 Precautions to take when using a mixer (electricity, ventilation, protection of skin and eyes)

Scaffolding	Code: 778 722
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Module 4 Duration 30 hours

Behavioural Objective

Statement of the Competency

Erect scaffolding.

Achievement Context

- Given specific information
- Reaching a height of at least 4 m
- Reaching a length of at least 6 m
- Using standard scaffolding sections

Elements of the Competency

Performance Criteria

- | | |
|--|--|
| 1. Install the base plates. | <ul style="list-style-type: none"> • Appropriate installation of sole plates: level support, solid plates |
| 2. Assemble and erect the scaffolding sections. | <ul style="list-style-type: none"> • Appropriate work method • Alignment and levelling of scaffolding frames • Centring of planks |
| 3. Install the safety equipment and accessories. | <ul style="list-style-type: none"> • Compliance with safety code • Solid anchors and structure |
| 4. Install the means of access. | <ul style="list-style-type: none"> • Compliance with safety code |
| 5. Dismantle the scaffolding. | <ul style="list-style-type: none"> • Appropriate work method • Appropriate cleaning of sections • Appropriate storage of parts |

For the competency as a whole:

- Observance of safety rules
- Stability of scaffolding
- Proper installation of safety equipment

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

- | | |
|--|---|
| 1. Install the base plates. <ul style="list-style-type: none"> • Distinguish the main parts of scaffolding. | Types of scaffolding: tubular, swing stages, overhang, hydraulic platform
Parts of the scaffolding: frames, ladders, bracings, pins, wheels, jacks, platforms, guardrails, stirrups and brackets |
|--|---|

Scaffolding		Code:	778 722
- Plan the steps to be taken when erecting scaffolding. - Level the ground under the base plates.	- Determination of the quality of the ground - Familiarization with the work site - Determination of scaffold height - Rules for assembling sections - Methods with or without jacks		
2. Assemble and erect the scaffolding sections.			
- Align and level the scaffolding frames. - Transport and install planks.	- Methods with or without a level - Methods of transporting and installing planks		
3. Install safety equipment and accessories.			
Select the safety equipment and accessories according to the type of potential risks related to various situations.	- Review of sections of the safety code - Safety straps - Safety harness - Anchors - Banana clips - Guardrails		
4. Install the means of access.			
Determine the means of access to the scaffolding.	Review of sections of the safety code regarding ramps, ladders and stairs		
5. Dismantle the scaffolding.			
- Determine the dismantling procedure. - Transport and store the scaffold components.	- According to equipment available - According to height - Method of transporting and storing that will protect the scaffold components, their safety and the safety of others		
<i>For the competency as a whole:</i>			
- Situate the competency with respect to the trade. - Show concern for safety when working with scaffolding. - Show concern for working in an orderly and methodical manner.	- Links with other competencies - Reason for the competency - Safety code rules regarding working with heights (<i>Safety Code for the construction industry</i>, Division III, Construction Sites, ss 3.5 to 3.9) - Main risks of accidents related to erecting and dismantling scaffolding - Link with educational aim 5 - Importance of order when erecting and dismantling scaffolding		

Module 5 Duration 120 hours

Behavioural Objective**Statement of the Competency**

Lay blocks and bricks to the line.

Achievement Context

- Given verbal or written information
- Using different bond patterns
- Finishing of concave joints
- Using standard blocks and bricks

Elements of the Competency**Performance Criteria**

1. Prepare the work area and the materials.

- Proper handling of materials
- Functional layout of work area

2. Determine the width of the joints.

- Correct line layout technique
- Correct technique for gauging joint thickness

3. Cut the materials.

- Precise dimensions
- Correct techniques
- Clean cuts

4. Prepare the mortar.

- Correct consistency
- Correct proportions of ingredients for type of mortar required
- Correct mixing technique

5. Lay the blocks.

- Proper installation of the horizontal mason's line
- Proper handling of mason's line
- Correct spreading of mortar
- Precise adjustment of blocks (levelness, plumbness and alignment)
- Safe, efficient handling of blocks
- Joint thickness in conformity with gauging calculations
- Observance of requested bond pattern

6. Lay the bricks.

- Proper installation of the mason's line
- Proper handling of mason's line
- Correct spreading of mortar
- Precise adjustment of bricks (levelness, plumbness and alignment)
- Safe, efficient handling of bricks
- Joint thickness in conformity with gauging calculations
- Observance of the requested bond pattern

- | | |
|---|---|
| 7. Joint the bricks and blocks. | <ul style="list-style-type: none"> • Correct techniques for making concave joints • Appropriate choice of tools • Uniform profile |
| 8. Clean the work and tidy the work area. | <ul style="list-style-type: none"> • Appropriate choice of cleaning method • Safe use of products • Appropriate storage and cleaning of tools and tidying of work area |

For the competency as a whole:

- Proper use of instruments and tools
- Accurate measurements and calculations
- Proper use of measuring instruments
- Observance of safety rules
- Clean work

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the work area and the materials.

- Describe the materials commonly used in masonry work.

Main materials: blocks and bricks
 Different compositions: clay, calcite and concrete
 Different styles: CSR, metric modular, Québec, Ontario, Jumbo, etc.
 Absorption rate of materials

- Handle materials.

Manual and mechanical handling methods
 Quantity of blocks and bricks per pallet

- Organize the work area.

Layout of materials and mortarboard
 Link with educational aim 4

2. Determine the width of the joints.

- Use measuring tapes.

Measuring tapes: for bricks, blocks, line layout and gauging

3. Cut the materials.

- Transpose measurements onto the units. Marking out techniques
Concern for precision
Link with educational aim 2
- Apply cutting techniques using tools. Tools: hammer and chisel
Angle of impact
Auditory detection of fragility of unit
Wearing of safety glasses
- Apply cutting techniques using equipment. Equipment: saw and guillotine
Stabilization of unit during the cutting
Wearing of safety glasses

4. Prepare the mortar.

- Prepare the ingredients of the mortar. Review
See Module 3.
- Apply the mechanical mixing technique. Review
See Module 3.

5. Lay the blocks.

- Apply the techniques for spreading mortar on blocks. Review
See Module 3.
- Install a line. Choice of type of line
Size of line
Installation of line on wood wedges
Safe handling of line
- Handle the blocks during the laying process. Ergonomic movements
Butting of units
Laying of blocks to the line
Link with educational aim 4

6. Lay the bricks.

- Apply techniques for spreading mortar on bricks. Review
See Module 3.
- Install a line. Choice of type of line
Size of line
Installation of line on wood wedges
Safe handling of line
- Handle the bricks during the laying process. Ergonomic movements
Butting of units
Laying of bricks to the line
Link with educational aim 4

7. Joint the bricks and blocks.

- Choose the type of joint in accordance with the wall's exposure to the natural elements.

Types of joints: concave, flush, weathered, raked, beveled, struck and "V"

- Use the tools appropriate for the type of joint chosen.

Association of tools with the type of joint: round jointer, round nose trowel, flat jointer, rectangular jointer and raker

8. Clean the work and tidy the work area.

- Choose the method in accordance with the surface of the units.
- Move and store excess units.

Without cleaner
Types of brushes and pieces of burlap or carpet

Handling methods
Storage of elements and cleaning of debris

For the competency as a whole:

- Situate the competency with respect to the trade.
- Apply safety rules.
- Show concern for working with precision.
- Show concern for producing aesthetic work.
- Show concern for order and cleanliness in their work.
- Show concern for the economical use of materials.
- Adapt to the requirements for practising the trade.

Links with other competencies
Reason for the competency
Safety code

Wearing of safety glasses
Correct work postures
Observance of rules for using tools and equipment

Link with educational aim 2

Link with educational aim 3

Link with educational aim 5

Link with educational aim 3

Link with educational aim 1

Module 6 Duration 90 hours

Behavioural Objective**Statement of the Competency**

Build corners with blocks and bricks.

Achievement Context

- Using different bond patterns
- With standard blocks and bricks
- Using different joint profiles
- At 90-degree angles
- For interior and exterior corners

Elements of the Competency**Performance Criteria**

1. Prepare the work area and the materials.

- Proper handling of materials
- Functional layout of work area

2. Determine the width of the joints.

- Correct line layout technique
- Correct technique for gauging joint thickness
- Observance of required dimensions

3. Prepare the mortar.

- Correct consistency
- Correct proportions of ingredients for type of mortar required
- Correct mixing technique

4. Build corners with blocks.

- Logical sequence of work steps
- Correct spreading of mortar
- Correct technique for butting blocks
- Precise adjustment of blocks (levelness, plumbness and alignment)
- Proper squareness
- Joint thickness in conformity with gauging and layout calculations

5. Build corners with bricks.

- Logical sequence of work steps
- Correct spreading of mortar
- Correct technique for butting bricks
- Precise adjustment of bricks (levelness, plumbness and alignment)
- Proper squareness
- Joint thickness in conformity with gauging and layout calculations

6. Joint the bricks and blocks.

- Correct techniques depending on the type of joints

For the competency as a whole:

- Proper use of instruments and tools
- Accurate measurements
- Observance of safety rules
- Clean work

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the work area and the materials.

- | | |
|---|-------------------------|
| • Describe the materials commonly used in masonry work. | Review
See Module 5. |
| • Handle materials. | Review
See Module 5. |
| • Organize the work area. | Review
See Module 5. |

2. Determine the width of the joints.

- | | |
|--|--|
| • Use measuring tapes for the gauging. | Measuring tapes: metric tape, modular spacing tape and CSR brick spacing tape
Principles for making a gauging rod |
|--|--|

3. Prepare the mortar.

- | | |
|--|-------------------------|
| • Prepare the ingredients of the mortar. | Review
See Module 3. |
| • Apply the mechanical mixing technique. | Review
See Module 3. |

4. Build corners with blocks.

- | | |
|---|---|
| • Arrange the blocks in accordance with the bond pattern. | Centred running bond
Stacked running bond |
| • Handle the blocks during the laying process. | Ergonomic movements
Butting of units
Building of interior and exterior corner
Inspection (levelness, plumbness and alignment)
Link with educational aim 4 |
| • Square a corner built with blocks. | Use of level, square and Pythagorean theorem |

5. Build corners with bricks.

- Arrange the bricks in accordance with the bond pattern.
Centred running bond
Staggered running bond
Stacked running bond (sandwich)
- Handle the bricks during the laying process.
Ergonomic movements
Butting of units
Building of interior and exterior corner
Inspection (levelness, plumbness and alignment)
Link with educational aim 4
- Square a corner built with bricks.
In accordance with building alignment or with use of square or Pythagorean theorem

6. Joint the bricks and blocks.

- Choose the type of joint in accordance with the wall's exposure to the natural elements.
Review
See Module 5.
- Use the tools appropriate for the type of joint chosen.
Review
See Module 5.

For the competency as a whole:

- Situate the competency with respect to the trade.
Links with other competencies
Reason for the competency
Safety code
- Apply safety rules.
Work postures
Rules for using tools and equipment
- Show concern for working with precision.
Link with educational aim 2
- Show concern for producing aesthetic work.
Link with educational aim 3
- Show concern for order and cleanliness in their work.
Link with educational aim 5
- Adapt to the requirements for practising the trade.
Link with educational aim 1

Module 7 Duration 60 hours

Behavioural Objective**Statement of the Competency**

Interpret plans and specifications.

Achievement Context

- Given plans for residential and commercial construction
- Given plans for exterior and interior structures

Elements of the Competency**Performance Criteria**

- | | |
|---|---|
| 1. Interpret the conventions and symbols commonly used in the construction field. | <ul style="list-style-type: none"> • Accurate association of symbols and conventions with their definition • Accurate transposition of plan dimensions onto a structure |
| 2. Look for information in the different types of views. | <ul style="list-style-type: none"> • Appropriate selection of types of views in accordance with the information required • Exact location of information required in the different types of views |
| 3. Look for information in construction specifications. | <ul style="list-style-type: none"> • Accurate, thorough identification of the information required |
| 4. Estimate the quantities of materials required. | <ul style="list-style-type: none"> • Approximate calculation of masonry units and mortar ingredients • Determination of acceptable percentage of waste |

For the competency as a whole:

- Accurate interpretation of data

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

- | | |
|---|--|
| 1. Interpret the conventions and symbols commonly used in the construction field. | |
| <ul style="list-style-type: none"> • Recognize the main symbols in construction plans. | Symbols: materials, architecture, electricity and plumbing/heating |
| <ul style="list-style-type: none"> • Recognize the conventions used in construction plans. | Lines
Hatches
Scales
Views
Dimensions |

• Transpose information from a plan onto a construction site.	Transposition of plan dimensions to a real situation
2. Look for information in the different types of views.	
• Select the type of view in accordance with the information required.	Views: elevation, plan, section and detail
• Locate the same component in various views.	All the components comprising a structure (windows, stairs, doors, beams, etc.)
• Distinguish between the different types of plans used to illustrate structures.	Architectural plan Structural plan Mechanical plan Electrical plan Workshop plan
3. Look for information in construction specifications.	
• Associate components of the plan with the construction specifications.	Organization of specifications Types of materials and hardware accessories Replacement materials and accessories Performance of work
4. Estimate the quantities of materials required.	
• Calculate the quantity of masonry units required for different types of structures.	Square foot calculation method Percentage of waste Ratios related to units
• Calculate the quantities of mortar components required for different types of structures.	Proportions Sand Bonding agent
• Show concern for the economical use of materials.	Link with educational aim 3
<i>For the competency as a whole:</i>	
• Situate the competency with respect to the trade.	Links with other competencies Reason for the competency Safety code
• Adapt to the requirements for practising the trade.	Link with educational aim 1

Module 8 Duration 90 hours

Behavioural Objective**Statement of the Competency**

Build and repair simple blockwork and brickwork.

Achievement Context

- Given a work order
- Given drawings that include an elevation view and a plan view
- With 90-degree corners
- Making openings
- Using different bond patterns
- Using different joint profiles
- Using anchors
- Using scaffolding

Elements of the Competency**Performance Criteria**

- | | |
|--|---|
| 1. Prepare the materials and the work area. | <ul style="list-style-type: none"> • Appropriate estimate of the materials and accessories required (number of masonry units, quantity of mortar, etc.) • Accurate measurements • Functional layout of work area, scaffolding and mortarboards • Proper handling of materials |
| 2. Install the accessories (sills, lintels, etc.). | <ul style="list-style-type: none"> • Observance of installation standards |
| 3. Install the anchors and insulation. | <ul style="list-style-type: none"> • Number and placement of anchors in conformity with standards • Correct technique for installing anchors • Proper installation of rigid insulation inside walls and masonry cavities |
| 4. Install the masonry units. | <ul style="list-style-type: none"> • Safe use of scaffolding • Proper angles and dimensions • Proper installation of horizontal and vertical mason's lines • Proper installation of masonry units • Proper use and installation of masonry accessories (flashing and weep holes, reinforcement rods and various materials) • Precise adjustment of masonry units (levelness, plumbness, alignment and flatness) |
| 5. Joint the bricks and blocks. | <ul style="list-style-type: none"> • Uniform profile • Correct determination of when to smooth joints • Proper compression of joint |

- | | |
|--|--|
| 6. Replace one or more masonry units. | <ul style="list-style-type: none"> • Proper preparation of surfaces • Proper choice of replacement units • Joints consistent with existing structure |
| 7. Repoint deteriorated joints. | <ul style="list-style-type: none"> • Proper preparation of surfaces • Proper choice of mortar • Proper spreading of mortar • Joints consistent with existing structure |
| 8. Cut out an opening in a masonry structure. | <ul style="list-style-type: none"> • Precise measurements • Proper finishing of walls of opening • Use of correct bond pattern • Joints consistent with existing structure |
| 9. Block up an opening in a masonry structure. | <ul style="list-style-type: none"> • Appropriate estimate of materials to be used (number of units, quantity of mortar, etc.) • Proper choice of units to be used • Use of correct bond pattern • Uniform joints • Flat surface |
| 10. Clean the work and the work area. | <ul style="list-style-type: none"> • Proper choice of cleaning method • Safe use of products • Proper maintenance of tools and equipment |

For the competency as a whole:

- Conformity with work order and plans
- Proper use of tools
- Solid construction
- Logical sequence of work steps
- Concern for the economical use of materials
- Observance of health and safety rules
- Clean structure

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

- | | |
|--|--|
| 1. Prepare the materials and the work area. | |
| <ul style="list-style-type: none"> • Determine the construction requirements related to different masonry structures. | Construction, repair or modification
Partial or complete work |
| <ul style="list-style-type: none"> • Estimate the materials required. | Review
See Module 7. |
| <ul style="list-style-type: none"> • Handle materials. | Review
See Module 5. |

• Organize the work area.	Review See Module 5.
• Erect scaffolding.	Review See Module 4.
2. Install the accessories (sills, lintels, etc.).	
• Determine the location of accessories.	Distinction between types of accessories (sills, lintels, weep holes, etc.) Type of accessories appropriate for the work to be done Application of standards related to the location of accessories
• Install flashing.	Methods of installing flashing Application of standards related to the installation of flashing Covering of the bearing surface Sealing of flashing joints
• Install weep holes and vents.	Methods of installing weep holes and vents Application of standards related to installing weep holes and vents Importance of location and spacing Clean installation
• Install sills.	Methods of installing sills Application of standards related to installing sills Size of the protrusion Importance of the drip edge Importance of the slope Length of the sill in relation to the opening
• Install lintels.	Methods of installing lintels Application of standards related to installing lintels Point of support Size of the lintel in relation to the scope (reference to the <i>National Building Code</i>)
3. Install the anchors and insulation.	
• Determine the positioning of anchors.	Distinction between categories of anchors (blocks, bricks and stones) Type of anchor depending on the back wall Application of standards related to the positioning of anchors
• Insert an anchor.	Application of standards related to the installation of anchors Method of manually inserting anchors Spacing

Secure anchors using tools.	Techniques for securing anchors Application of standards related to installing anchors Selection of tools appropriate for the anchors (drill, sealant gun, screwdriver, etc.)
Install polypropylene insulation.	Installation methods: with glue, with anchors, and a combination Cutting tools: knife and handsaw
Install mineral wool insulation.	Installation methods: with glue, with anchors, and a combination Cutting tools: knife and handsaw
4. Install the masonry units.	
Lay blocks and bricks.	Review See Module 5.
Build corners with blocks and bricks.	Review See Module 6.
Gauge and lay out masonry structures.	More complex situations for gauging and laying out structures
Establish quality interpersonal contacts.	Importance of establishing interpersonal contacts with colleagues, superiors and clients
5. Joint the bricks and blocks.	
Choose the type of joint in accordance with the wall's exposure to the natural elements.	Review See Module 5.
Apply techniques for jointing bricks and blocks.	Review See Modules 5 and 6.
6. Replace one or more masonry units.	
Determine the surface to be replaced.	Consideration of existing layout Establishment of the structure's perimeter Choice of replacement units
Use of hand or power tools to replace masonry units.	Hand tools (sledgehammer and mortise chisel) Power tools (saw and grinder)
Show concern for the economical use of materials.	Link with educational aim 3

7. Repoint deteriorated joints.

- Prepare a surface for the repointing of joints.
 - Cutting out of joints
 - Cleaning of joints
 - Dampening of surface
 - Use of tools (grinder, mortise chisel, etc.)
- Prepare mortars in accordance with the structure to repair.
 - Choice of type of mortar in accordance with the units to joint
 - Determination of the consistency of the mortar in accordance with the repair technique used
 - Review
 - See Module 3.
- Use tools to fill the joints.
 - Tools (round nose trowel and pointing trowel)
 - Degrees of joint compression
 - Quality of the structure (cleanliness, conformity, aesthetic appearance and uniform joints)

8. Cut out an opening in a masonry structure.

- Determine the surface to be cut out.
 - Taking of measurements
 - In accordance with existing bond pattern
- Install the jambs within the opening.
 - Quality of the structure (bond pattern, plumbness and flatness)

9. Block up an opening in a masonry structure.

- Cut out the joints of jamb elements (tooththing).
 - Top-to-bottom procedure
 - Choice of tools (hammer, mortise chisel and grinder)
- Apply the technique for laying the last units.
 - Spreading technique
 - Handling of unit when laying it
 - Quality of the work (bond pattern, plumbness, flatness and uniform joints)

10. Clean the work and the work area.

- Choose the cleaning products.
 - Different types of products in accordance with units to be cleaned (acids, detergents, etc.)
 - Safe use of products
- Apply a dry cleaning method.
 - Use of a nylon brush or piece of carpet, depending on the finish of the units

- Distinguish between water-based and detergent-based cleaning methods.

Water-based cleaning:
 – low-pressure wash
 – wetting, brushing and rinsing

Detergent-based cleaning:
 – testing
 – water saturation
 – brush cleaning
 – rinsing

- Move the excess units.

Review
 See Module 5.

- Show concern for order and cleanliness in their work.

Link with educational aim 5

For the competency as a whole:

- Situate the competency with respect to the trade.
- Show concern for working safely.
- Show concern for working with precision.
- Show concern for producing aesthetic work.
- Adapt to the requirements for practising the trade.

Links with other competencies
 Reason for the competency
 Safety code

Health and safety risks
 Safety code
 Safe attitudes and behaviours

Link with educational aim 2

Link with educational aim 3

Link with educational aim 1

Module 9 Duration 90 hours

Behavioural Objective**Statement of the Competency**

Build complex structures with masonry units.

Achievement Context

- Using appropriate materials
- Using different joint profiles
- Using bricks, blocks or stones
- Building arches, decorative walls or quoins

Elements of the Competency**Performance Criteria**

- | | |
|---|--|
| 1. Prepare the work. | <ul style="list-style-type: none"> • Correct interpretation of drawing • Proper preparation of work area |
| 2. Install the arch forms. | Correct laying technique: levelness, plumbness, required height, stability |
| 3. Mark out the joints for arches and crowns. | <ul style="list-style-type: none"> • Accurate calculation for gauging crowns • Accurate gauging of crowns • Proper choice of marking out method |
| 4. Cut the masonry units. | <ul style="list-style-type: none"> • Appropriate choice of tools • Appropriate work method • Precise cutting |
| 5. Install the masonry units. | <ul style="list-style-type: none"> • Appropriate handling of units • Precise positioning of units |
| 6. Install the anchors. | <ul style="list-style-type: none"> • Proper positioning of anchors |
| 7. Finish the joints. | <ul style="list-style-type: none"> • Proper method of filling the joints • Mastery of technique for finishing joints |
| 8. Remove the arch form. | <ul style="list-style-type: none"> • Proper removal method |
| 9. Install the related materials in the masonry structures. | <ul style="list-style-type: none"> • Proper installation method |

For the competency as a whole:

- Proper position, levelling and alignment of units
- Efficient, safe use of masonry saw
- Aesthetic structure
- Concern for the economical use of materials
- Observance of health and safety rules

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the work.

- Determine the construction requirements related to different masonry structures.

Review
See Module 7.

2. Install the arch forms.

- Design the arch forms.

Different types of arch forms according to the type of arch and wall
Transmission of information used to make arch forms

- Install wedges.

Method of installing various types of wedges

- Stabilize an arch form.

Method of stabilizing an arch form

- Adapt to the requirements for practising the trade.

Link with educational aim 1

3. Mark out the joints for arches and crowns.

- Gauge a crown.

Method of calculating the spacing of joints
Method of marking out the crown

4. Cut the masonry units.

- Transpose measurements onto the units.

Review
See Module 5.
Marking out for oblique cutting
Marking out for the angle of abutment

- Use a masonry saw.

Safety precautions: inspection of blade, adjustment of the depth of the cut and firm hold of the unit in place
Wearing of personal protective equipment: glasses, earmuffs, gloves and apron
Handling of the unit on the saw

- Show concern for the economical use of materials.

Link with educational aim 3

5. Install the masonry units.

- Lay the voussoirs.

Butting of voussoirs
Positioning of voussoirs
Consideration of gauging
Plumbness and alignment of units

- Lay the bricks against the extrados.
 - Marking out method
 - Joint dimension
 - Layout
 - Levelness and alignment

- 6. Install the anchors.
 - Determine the positioning of the anchors.
 - Review
 - See Module 8.
 - Adapt to the requirements for practising the trade.
 - Link with educational aim 1

- 7. Finish the joints.
 - Show concern for working with precision.
 - Link with educational aim 2

- 8. Remove the arch form.
 - Remove a template.
 - Removal of wedges and supports
 - Removal of template
 - Finish the joints.
 - Mortaring of joints
 - Pointing

- 9. Install the related materials in the masonry structures.
 - Match the materials.
 - Different bond patterns
 - Different courses
 - Different colours
 - Projecting
 - Corbel

- For the competency as a whole:*
 - Situate the competency with respect to the trade.
 - Links with other competencies
 - Reason for the competency
 - Show concern for working safely.
 - Health and safety risks
 - Safety code
 - Safe attitudes and behaviours
 - Show concern for producing aesthetic work.
 - Link with educational aim 3
 - Show concern for order and cleanliness in their work.
 - Link with educational aim 5

Module 10 Duration 45 hours

Behavioural Objective**Statement of the Competency**

Make simple welds and cut metals.

Achievement Context

- Using mild steel
- Using a cutting torch
- Using an electric arc welding machine
- Using welding anchors and reinforcement rods
- Bending and cutting metal parts

Elements of the Competency**Performance Criteria**

1. Cut ferrous metals, using oxygen-cutting techniques.

- Proper preparation of work
- Proper connection of gas tank
- Proper connection of accessories
- Correct adjustment of length of flame
- Correct cutting technique
- Accurate cuts

2. Make electric arc welds.

- Proper cleaning of parts to be welded
- Proper adjustment of welding station
- Correct procedure
- Quality of the welding

3. Clean the work area.

- Order and cleanliness of the work area
- Proper cleaning of tips

For the competency as a whole:

- Efficient use of equipment
- Application of safety rules

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Cut ferrous metals, using oxygen-cutting techniques.

- Set up an oxygen-cutting station.

Procedure for setting up an oxygen-cutting station
Elements to consider during the setup: joints, solidity, no leaks

- Prepare the part.

Stabilization of the part
Marking out of cut
Safety of work area

• Adjust the flame.	Technique for adjusting a flame
2. Make electric arc welds.	
• Prepare a part to be welded.	Removal of traces of oxidation through sanding or wire brushing Positioning of part for assembly
• Prepare the welding station.	Connection of equipment Technique for adjusting current Selection of electrode
• Weld in the flat position.	Technique for flat welding
• Weld in the upward position.	Technique for upward welding
• Weld in the downward position.	Technique for downward welding
• Inspect a weld.	Elements to verify: evenness, no drippings or bubbles, solidity
3. Clean the work area.	
• Clean the tips.	Method of cleaning tips
• Show concern for order and cleanliness in their work.	Link with educational aim 5
<i>For the competency as a whole:</i>	
• Situate the competency with respect to the trade.	Links with other competencies Reason for the competency
• Show concern for working safely.	Health and safety risks Safety code Safe attitudes and behaviours
• Show concern for working with precision.	Link with educational aim 2

Module 11 Duration 45 hours

Behavioural Objective**Statement of the Competency**

Build and repair structures with precast masonry units.

Achievement Context

- Given a work order
- Given plans or specifications
- Using glass blocks of different shapes and sizes
- With cut stone and glass block structures
- With structures comprising ordinary precast units and precast architectural units

Elements of the Competency**Performance Criteria**

1. Prepare the materials and the work area.

- Proper choice of masonry units
- Proper choice of masonry accessories: anchors, reinforcement rods, etc.
- Proper choice of type of mortar
- Estimation of materials required
- Mixing adapted to units being laid
- Functional, safe layout of work area

2. Lay cut stone and other precast units.

- Installation of anchors and reinforcement rods in accordance with manufacturer's instructions
- Proper techniques for laying accessories, cut stone or other precast units
- Proper tooling of joints

3. Lay glass blocks.

- Installation of anchors and reinforcement rods in accordance with manufacturer's instructions
- Stack bond pattern
- Proper pointing

4. Repair a glass-block and cut-stone structure.

- Proper preparation of surfaces
- Proper choice of replacement materials
- Joints consistent with existing structure

5. Repair a precast unit.

- Proper preparation of surfaces
- Harmonious restoration of unit

For the competency as a whole:

- Conformity with work order and plans and specifications
- Proper use of tools
- Solid construction
- Logical sequence of work steps
- Observance of safety rules
- Clean structure
- Concern for the economical use of materials

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the materials and the work area.

- Handle materials.

Characteristics of the most commonly used glass blocks
 Characteristics of the most commonly used cut construction stones
 Small precast units
 Handling of heavy and fragile materials:
 precautions to take for their personal safety and the protection of materials

- Choose the masonry accessories.

Types of anchors specific to precast units
 Choice in accordance with the unit and the back wall

- Interpret plans and specifications.

Review
 See Module 7.

2. Lay cut stone and other precast units.

- Install anchors and reinforcement rods.

Installation techniques: bolting, anchoring, welding, etc.

- Use accessories for laying cut stone and other precast units.

Methods of using metal, wood and PVC wedges, compressible flanges and sealants

- Arrange the cut stone or other units in the structure.

Projecting
 Recessed
 Arrangement ensuring a flat structure

3. Lay glass blocks.

- Install anchors and reinforcement rods.

Anchors for glass blocks
 Accessories: reinforcement, separators and expansion strips

- Handle glass blocks during the laying process. Spreading of mortar
Setup of line
Precautions to take to ensure that the bond pattern is maintained (alignment of joints)
Usual inspections: levelness, plumbness and alignment
4. Repair a glass-block and cut-stone structure.
- Replace one or more glass-block or cut-stone units. Review
See Module 8.
 - Repoint deteriorated joints. Review
See Module 8.
5. Repair a precast unit.
- Repair precast units on a recently constructed building. Preparation of surfaces: choice and application of product (Jahn mortar, latex cement glue, epoxy or colouring agent)
Finishing operations of the treated surface: grinding, roughening, polishing, sanding, etc.
 - Restore precast units on a building several years old. Specific precautions due to age and wear of materials
Analysis of causes of the deterioration
Preparation of surfaces
Restoration methods
- For the competency as a whole:*
- Situate the competency with respect to the trade. Links with other competencies
Reason for the competency
 - Show concern for working safely. Health and safety risks
Safety code
Safe attitudes and behaviours
 - Show concern for working with precision. Link with educational aim 2
 - Show concern for producing aesthetic work. Link with educational aim 3
 - Show concern for order and cleanliness in their work. Link with educational aim 5

Behavioural Objective**Statement of the Competency**

Cut and lay natural and artificial stones.

Achievement Context

- Given instructions that include a sketch and information on the structure
- Using a stonecutting bench
- Using appropriate tools and equipment
- Using different types of stones
- For the facing of residential and commercial buildings

Elements of the Competency**Performance Criteria**

1. Prepare the materials and the work area.

- Appropriate choice of stones, mortar and tools
- Mixing adapted to the units laid
- Functional, safe layout of the work area

2. Cut the stone.

- Proper cutting:
 - for the type of bond pattern
 - for the desired aspect
 - for the desired finish
 - for the physical characteristics of the raw material
 - for the intended method of stonelaying
- Clean cut
- Adjustment of the stone to maintain joint consistency

3. Lay the stones.

- Correct technique for laying cut stone
- Proper corner angle
- Appropriate selection of stones
- Precise adjustment of stones:
 - levelness
 - plumbness
 - alignment
- Proper method of anchoring to the back wall and the stone
- Uniform joints

4. Fill and finish the joints.

- Appropriate work method
- Quality and appearance of joints

For the competency as a whole:

- Conformity of structure with specifications
- Efficient, safe use of tools and equipment
- Observance of health and safety rules
- Concern for the economical use of materials
- Clean structure

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the materials and the work area.

- Associate tools and mortars with different types of stones.

Types of stones: artificial and natural
Artificial: concrete and silica
Natural: limestone, marble, granite, etc.

2. Cut the stone.

- Apply the technique for cutting natural stones.

Safe method of cutting natural stone
Marking out of templates
Tools used: carbon chisel, sledgehammer and square
Quality of the cut

- Apply the technique for cutting artificial stones.

Safe method of cutting artificial stone
Tools used: guillotine, saw, brick cutter, hammer and sledgehammer
Quality of the cut

- Show concern for the economical use of materials.

Link with educational aim 3
Ratio of quantity to square feet

- Adapt to the requirements for practising the trade.

Link with educational aim 1
Speed of execution

3. Lay the stones.

- Choose the stones.
 - In accordance with bond pattern
 - Consideration of where the stones will be used on the building
 - In accordance with the desired appearance (percentage of dimensions ordered)
- Apply the technique for laying natural stones.
 - Steps to follow
 - Mortar density
 - Levelness, plumbness and alignment
 - Anchoring methods: screwing, nailing and stapling
 - Arrangement of stones
- Apply the technique for laying artificial stones.
 - Steps to follow
 - Mortar density
 - Levelness, plumbness and alignment
 - Anchoring methods: screwed and nailed
 - Arrangement of stones.
 - Butting of units

4. Fill and finish the joints.

- Apply the technique for jointing natural stones.
 - Filling and compaction of mortar in the joint
 - Tools: trowel and jointer
 - Type of joint: flush, concave or rustic
- Apply the technique for jointing artificial stones.
 - Tools: trowel and jointer
 - Type of joint: flush, concave or rustic

For the competency as a whole:

- Situate the competency with respect to the trade.
 - Links with other competencies
 - Reason for the competency
- Show concern for working safely.
 - Health and safety risks
 - Safety code
 - Safe attitudes and behaviours
- Show concern for working with precision.
 - Link with educational aim 2
- Show concern for producing aesthetic work.
 - Link with educational aim 3
- Show concern for order and cleanliness in their work.
 - Link with educational aim 5

Behavioural Objective

Statement of the Competency

Build and repair chimneys and stove bases.

Achievement Context

- Given instructions that include a sketch and information on the structure
- Using appropriate materials
- Using appropriate tools
- For residential chimneys and stove bases

Elements of the Competency

Performance Criteria

1. Prepare the work.

- Suitable choice of materials
- Functional, safe layout of work area
- Determination of optimal layout (economical use of time and materials and aesthetic appearance) in accordance with the work to be done

2. Erect a chimney.

Install the cleanout doors.

- Suitable choice of location
- Solid, airtight installation
- Level door

Install the flue tiles.

- Correct installation technique: when to install, proper adjustment and proper placement
- Watertight joints
- Prescribed height in conformity with *National Building Code*

Lay the units.

- Precise adjustment of units (levelness, plumbness and alignment)

Joint the units.

- Uniform profile
- Proper smoothing
- Absence of porosity

3. Repair a chimney.

- Proper method of removing defective units
- Choice of appropriate tools
- Proper method of installing replacement units
- Work harmonious with existing structure
- Inspection of watertightness of flashing

4. Build a stove base.

- Proper construction method
- Quality of finishing

5. Build the chimney cap.

- Appropriate work method
- Watertight, solid chimney formwork
- Correct installation of flashing
- Presence of sufficient space for expansion between the flue tiles and the cap
- Placement of drip edge in conformity with standards
- Presence of reinforcement
- Slope of concrete such that water flows toward the exterior
- Absence of breakage following formwork removal
- Watertight joint between flue tiles and chimney cap

For the competency as a whole:

- Efficient, safe use of tools and equipment
- Conformity of structure with specifications
- Observance of the *National Building Code*
- Concern for the economical use of materials
- Clean, aesthetic structure
- Observance of health and safety rules

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the elements of the competency, the main components of these elements and the performance criteria related to the competency.

1. Prepare the work.

- Estimate the materials required.

Method of calculating the materials required for the different parts of a chimney

- Plan the optimal layout.

Line layout technique

In accordance with the base, flue tiles and dimensions of the unit

Economical use of time and materials

- Install the corner lines.

Plumbness of the chimney

Method of installing corner lines

2. Erect a chimney.

- Determine the location of the cleanout doors. *National Building Code* standards
Accessibility
Aesthetic appearance
- Install the masonry units. Review
See Modules 5, 6 and 8.
- Install the cleanout doors. Steps to follow
Direction of casing installation
- Install the flue tiles. Different types of flue tiles: fire clay, concrete and cast iron
Calculation of height in accordance with the *National Building Code*
Steps to follow: when to install, use of refractory mortar, installation of flue tiles, adjustment, interlocking and connection to the heater
Plumbness, alignment and centring
Watertight joints
- Install the flashing. Steps to follow
Construction of grooves
Tools: chisels, locking pliers and bevel
Materials: galvanized sheet iron, prepainted steel or aluminum
Inspection and adjustment of flashing (solid and watertight)

3. Repair a chimney.

- Determine why the units that need to be repaired deteriorated. Reasons why a chimney does not function properly
Links between the repairs to be done and the reasons for the deterioration
- Apply the techniques for replacing masonry units. Review
See Module 8.
- Repoint the deteriorated joints. Review
See Module 8.
- Clean the work and the work area. Review
See Module 8.

4. Build a stove base.

- Install the masonry units for a stove base. Determination of dimensions for the stove base
Technique for laying units horizontally
Butting and jointing
Inspection of alignment, flatness and levelness
- Connect the heater to the chimney. Choice of materials, distance to be respected, and standards of the *National Building Code* and the municipalities

5. Build the chimney cap.

- Design the chimney cap.

Different types of chimney heads
Formwork method
Tools: hammer, saw
Construction of drip edge: wood and cord
Techniques for formwork positioning

- Build the chimney cap.

Installation of hidden flashing
Preparation of concrete (Review: see Module 3)
Concrete isolation joint (compressible materials)
Installation of reinforced concrete
Finishing of concrete with an exterior slope

- Strip the formwork.

Determination of when to remove formwork
Stripping method
Tools: hammer, crowbar and pliers
Sealing of isolation joint

For the competency as a whole:

- Situate the competency with respect to the program.
- Show concern for working safely.
- Show concern for working with precision.
- Show concern for producing aesthetic work.
- Show concern for order and cleanliness in their work.
- Adapt to the requirements for practising the trade.

Links with other competencies
Reason for the competency

Health and safety risks
Safety code
Safe attitudes and behaviours

Link with educational aim 2

Link with educational aim 3

Link with educational aim 5

Link with educational aim 1

Situational Objective

Statement of the Competency

Become familiar with the work and techniques related to refractory materials.

Elements of the Competency

- Be familiar with the job market in construction of industrial furnaces and industrial chimneys, the laying of acid-resistant bricks, as well as other activities related to the use of refractories.
- Be familiar with the major techniques for installing a variety of refractory units or products.
- Assess their interest in further exploring this field.

Learning Context

Information Phase

- Learning about the characteristics of the job market in the field of refractories.
- Learning details about the use of refractory materials.
- Learning about the occupational health and safety risks.
- During a group discussion, presenting the information gathered.

Participation Phase

- Participating in activities that allow them to explore techniques for preparing and installing various components and products: cements, mortars, acid-resistant bricks, refractory cements and mortars, firebricks, and refractory plastics, through viewing films and slide shows, handling materials, experimenting with laying techniques, visiting workplaces, etc.
- During a group meeting, discussing the results of their exploration.

Evaluation Phase

- Producing a report in which they must:
 - compare the work situation in the refractories field with that in masonry and bricklaying
 - justify their interest in the field

Instructional Guidelines

- Motivate the students to participate in activities.
- Organize lectures and meetings with trade specialists.
- Organize plant tours.
- Organize activities allowing students to explore preparation and laying techniques.
- Make available relevant reference materials.
- Encourage students to engage in discussions and express their opinions.
- Provide the students with the means to acquire a clear, objective understanding of the trade.

Participation Criteria

Information Phase

- Gather information on most of the topics to be covered.
- Appropriately express their views of the characteristics of the field at a group meeting, comparing them with the information they have gathered.

Participation Phase

- Give their opinions on some of the techniques specifically related to the trade specialty.
- Appropriately express their views on the techniques for laying various refractory materials.
- Follow instructions for participating in activities.
- Observe health and safety rules.

Synthesis Phase

- Write a report that contains:
 - the similarities and differences in work situations in the field of refractory materials and that of masonry and bricklaying
 - explanations regarding their interest in this trade specialty

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the learning context, the elements of the competency related to each phase as well as the instructional guidelines.

Information Phase

- | | |
|---|--|
| • Be receptive to information on refractory materials. | Conditions indicative of being receptive: review of Module 1 |
| • Be concerned with sharing their perception of refractory materials with other persons in the group. | Review of Module 1 |
| • Determine a method of taking notes and presenting the information they have gathered. | Review of Module 1 |

Participation Phase

- | | |
|---|--|
| • Distinguish between refractory materials and other materials. | Cements, mortars, acid-resistant bricks, refractory cements and mortars, firebricks, refractory plastics, etc. |
|---|--|

Synthesis Phase

- | | |
|--|---|
| • Determine the elements to include in the report. | Elements to include: <ul style="list-style-type: none"> - comparison of work situations (firebricks and red bricks) - links with their interests, aptitudes, preferences and values |
|--|---|

Module 15 Duration 120 hours

Situational Objective

Statement of the Competency

Adapt to the work environment in masonry and bricklaying.

Elements of the Competency

- Improve their productivity with basic skills in masonry and bricklaying.
- Work in a team.
- Become aware of the specific requirements for working on a construction site.

Learning Context

Information Phase

- Learning about how work is organized on a construction site.
- Learning about the conditions for carrying out masonry and bricklaying tasks.
- Learning about the expectations of employers and colleagues with regard to apprentices.
- Learning about attitudes and behaviours that are appropriate and inappropriate in a work team.
- Learning about the conditions prerequisite to entering the job market.

Participation Phase

- Practising the basic techniques of the trade.
- Carrying out alone all of the steps involved in simple tasks.
- Carrying out as part of a team all of the steps involved in simple tasks.
- Resolving any difficulties or problems related to working on a construction site.

Evaluation Phase

- Participating in a feedback session with the teacher regarding their mastery of basic skills of the trade and their individual performance.
- Participating in a feedback session with the teacher and members of their group regarding the work carried out as a group.
- Writing a brief report stating their strengths and the aspects that need to be improved in order to help them adapt to the workplace.

Instructional Guidelines

- Reproduce the conditions for carrying out tasks on a construction site, including working with scaffolding and using plans and specifications.
- Prepare observation checklists for the evaluation of the students' attitudes and behaviours.
- Reinforce the attitudes and behaviours that are helpful in adapting smoothly to the workplace.
- Ensure that the assignments encourage the transfer and integration of learning acquired during the training.

Participation Criteria

Information Phase

- Gather information on the various topics to be covered.
- Show interest and openness during the activities.

Participation Phase

- Follow instructions.
- Observe health and safety rules.
- Carry out the assignments conscientiously and diligently.

Synthesis Phase

- Be open during the feedback session.
- Identify their strengths and the aspects to be improved with respect to adapting to the workplace.

Suggestions for Competency-Related Knowledge, Skills, Attitudes and Perceptions

The following suggestions take into account the learning context, the elements of the competency related to each phase as well as the instructional guidelines.

Information Phase

- | | |
|---|---|
| • Situate the competency with respect to the trade and the program. | Reason for the competency
Importance of initial and ongoing training |
|---|---|

Participation Phase

- | | |
|---|--------------------|
| • Spread mortar on blocks and bricks. | Review of Module 3 |
| • Lay bricks and blocks to the line. | Review of Module 5 |
| • Build corners with blocks and bricks. | Review of Module 6 |
| • Erect scaffolding. | Review of Module 4 |

Synthesis Phase

- | | |
|------------------------------|--|
| • Give and receive feedback. | Characteristics of useful feedback (no judgment of values, based on observable behaviours, respectful of others, etc.)
Open-mindedness
Level of tolerance
Receptivity |
|------------------------------|--|

