

SKILLED**TRADES**^{BC}

PROGRAM OUTLINE

Bricklayer

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BRICKLAYER PROGRAM OUTLINE

**APPROVED BY INDUSTRY
MARCH 2021**

**BASED ON
2021 RED SEAL OCCUPATIONAL STANDARD (RSOS)**

**Developed by
SkilledTradesBC
Province of British Columbia**

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Section 1
INTRODUCTION
Bricklayer

Foreword

The revised Bricklayer Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects updated standards based on the new Bricklayer Occupational Analysis (2021) and British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

The Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

The Program Outline was prepared with the advice and assistance of British Columbia industry and instructor subject matter experts and will form the basis for further updating of the British Columbia Bricklayer Program and learning resources.

Competencies are to be evaluated through written exams and practical assessments. A passing grade is achieved by getting an overall mark of 70%. See the Assessment Guidelines in Section 4 for more details. The types of questions used on these exams must reflect the cognitive level indicated by the learning objectives and the learning tasks listed in the related competencies.

Achievement Criteria are included for those competencies that require a practical component. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measureable and that they reflect the skills spelled out in the competency as those required of a competent journeyman. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

Acknowledgements

The 2021 Program Outline was reviewed, revised and prepared in consultation with the following subject matter experts. We thank them for lending their expertise and valuable time to the project.

- Geoff Higginson
- Ira Maheu
- Archie McDonald

The 2012 Program Outline was prepared with the advice and direction of an industry steering committee convened initially by the Construction Industry Training Organization (CITO). Members include:

- Alan Exner
- Mike Hazard
- Brian Magowan
- Bill McEwen
- Terry Mills
- Dan Morais
- Eric Sigurdson
- Rob Tuzzi

Industry Subject Matter Experts retained to assist in the development of 2012 Program Outline content:

- Danny Breslin
- Mike Hazard
- Geoff Higginson
- Karl Lukan
- Dan Morais
- Rob Skujins
- Peter Zirpke

Industry Subject Matter Experts retained as outline reviewers:

- Brian Magowan
- George McCall
- Dan Morais

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Bricklayer occupation.

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicates program length and structure, and all pathways to completion	Illustrates the length and structure of the program	Illustrates the length and structure of the program, and pathway to completion	Illustrates the challenger pathway to Certificate of Qualification
OAC	Communicates the competencies that industry has defined as representing the scope of the occupation	Displays the competencies that an apprentice is expected to demonstrate in order to achieve certification	Displays the competencies apprentices will achieve as a result of program completion	Displays the competencies challengers must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Shows the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Shows the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Shows the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measurable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment

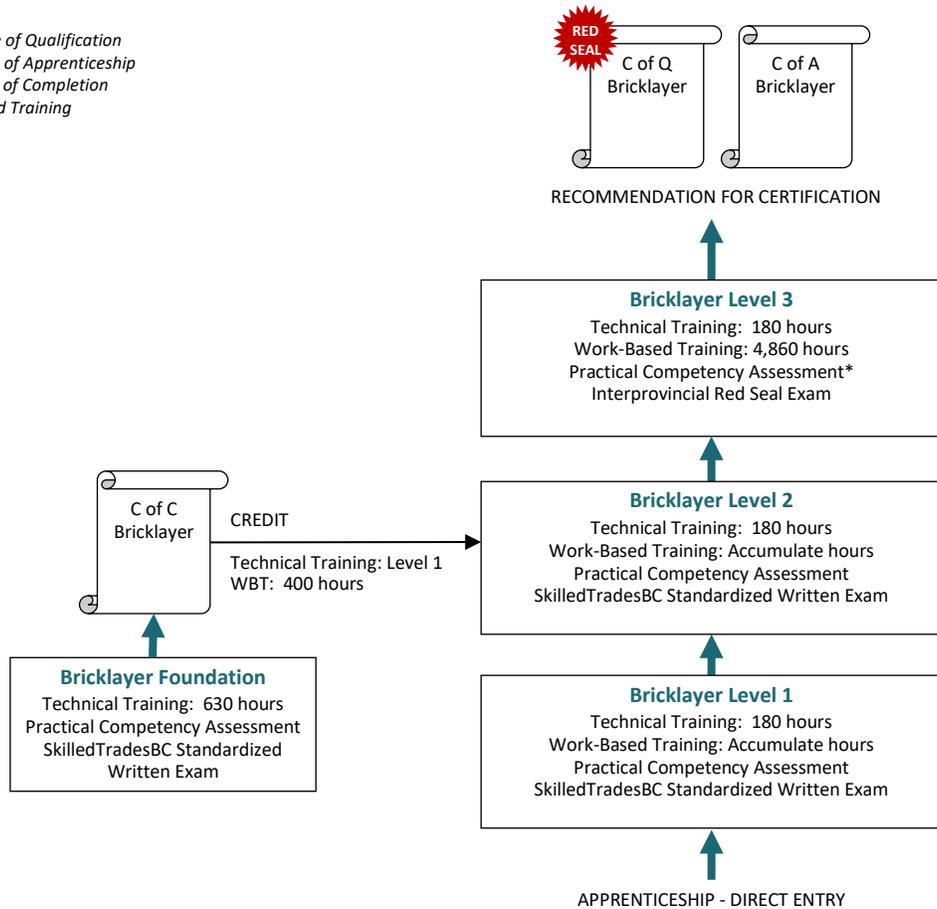
Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Appendix – Glossary of Terms and Acronyms			Defines program specific terms and acronyms	

Section 2
PROGRAM OVERVIEW
Bricklayer

Program Credentialing Model

Bricklayer

C of Q = Certificate of Qualification
 C of A = Certificate of Apprenticeship
 C of C = Certificate of Completion
 WBT = Work-Based Training



**Level 3 Practical Competency Assessment must be completed prior to writing the Interprovincial Red Seal Exam*

CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

None

Occupational Analysis Chart

BRICKLAYER

Occupation Description: Bricklayers build and repair walls, floors, arches, pavings, partitions, fireplaces, chimneys, smokestacks, furnaces, kilns and other structures. They work with materials such as brick, natural stone, manufactured stone, tiles, precast masonry panels, glass blocks, concrete blocks, lightweight insulated panels, other masonry units, insulation and membranes. They erect, install, maintain, repair and alter various masonry. The structures vary in complexity from a simple masonry walkway to an ornate exterior on a multi-level building.

USE SAFE WORK PRACTICES A	Manage workplace hazards A1	Apply OHS regulations and WorksafeBC standards A2	Use fall protection systems and equipment A3	Use personal protective equipment (PPE) A4	Use fire safety procedures A5	Apply GHS (formerly WHMIS) A6
	1	1	1	1	1	1
USE TOOLS AND EQUIPMENT B	Use hand tools and measuring equipment B1	Use power tools B2	Use ladders, scaffolds, and elevated platforms B3	Use rigging and hoisting equipment B4		
	1	1	1	1		
ORGANIZE WORK C	Use mathematics C1	Use drawings, specifications and documentation C2	Use communication techniques C3	Use mentoring techniques C4	Handle materials C5	Lay out wall and coursing C6
	1 2 3	1 2 3	1	3	1	1
PERFORM ROUTINE MASON PRACTICES D	Prepare the site D1	Install envelope materials D2	Use mortars, grouts and bonding agents D3			
	1	1	1 2 3			

Program Overview

APPLY MASONRY SYSTEMS
E

Build non load-bearing masonry walls					E1
1					

Build load-bearing walls and columns					E2
	2				

Build horizontal masonry					E3
	2	3			

Build and install pre-fabricated masonry					E4
	2				

Install surface bonded masonry units					E5
	2				

APPLY STONE SYSTEMS
F

Install stone veneer					F1
	2				

Install stone cladding					F2
		3			

BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS
G

Lay masonry units					G1
	2	3			

Install refractory materials for heat-resistant applications					G2
		3			

Install corrosion resistant materials for corrosion resistant applications					G3
		3			

PERFORM RESTORATION
H

Rebuild masonry work					H1
	2				

Restore existing masonry work					H2
	2	3			

Clean and seal masonry surfaces					H3
1					

PERFORM SPECIALIZED MASONRY WORK
I

Install glass blocks					I1
	2				

Install ornamental and sculptured masonry					I2
		3			

Build arches					I3
	2	3			

Training Topics and Suggested Time Allocation

Bricklayer – Level 1

		% of Time	% of Time Allocated to		
			Theory	Practical	Total
Line A	USE SAFE WORK PRACTICES	5%	80%	20%	100%
A1	Manage workplace hazards		✓		
A2	Apply OHS regulations and WorkSafeBC standards		✓		
A3	Use fall protection systems and equipment		✓	✓	
A4	Use personal protective equipment (PPE)		✓		
A5	Use fire safety procedures		✓		
A6	Apply Globally Harmonized System (GHS, formerly WHMIS)		✓		
Line B	USE TOOLS AND EQUIPMENT	15%	80%	20%	100%
B1	Use hand tools and measuring equipment		✓		
B2	Use power tools		✓	✓	
B3	Use ladders, scaffolds, and elevated platforms		✓	✓	
B4	Use rigging and hoisting equipment		✓	✓	
Line C	ORGANIZE WORK	20%	40%	60%	100%
C1	Use mathematics		✓		
C2	Use drawings, specifications and documentation		✓		
C3	Use communication techniques		✓		
C5	Handle materials		✓		
C6	Lay out wall and coursing		✓	✓	
Line D	PERFORM ROUTINE MASON PRACTICES	20%	70%	30%	100%
D1	Prepare the site		✓		
D2	Install envelope materials		✓		
D3	Use mortars, grouts and bonding agents		✓		
Line E	APPLY MASONRY SYSTEMS	35%	15%	85%	100%
E1	Build non load-bearing masonry walls		✓	✓	
Line H	PERFORM RESTORATION	5%	75%	25%	100%
H3	Clean and seal masonry surfaces		✓	✓	
Total Percentage for Bricklayer Level 1		100%			

Training Topics and Suggested Time Allocation

Bricklayer – Level 2

		% of Time	% of Time Allocated to		
			Theory	Practical	Total
Line C	ORGANIZE WORK	5%	100%	0%	100%
C1	Use mathematics		✓		
C2	Use drawings, specifications and documentation		✓		
Line D	PERFORM ROUTINE MASON PRACTICES	10%	100%	0%	100%
D3	Use mortars, grouts and bonding agents		✓		
Line E	APPLY MASONRY SYSTEMS	30%	30%	70%	100%
E2	Build load-bearing walls and columns		✓	✓	
E3	Build horizontal masonry		✓	✓	
E4	Build and install pre-fabricated masonry			✓	
E5	Install surface bonded masonry units		✓		
Line F	APPLY STONE SYSTEMS	5%	75%	25%	100%
F1	Install stone veneer		✓	✓	
Line G	BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS	15%	30%	70%	100%
G1	Lay masonry units		✓	✓	
Line H	PERFORM RESTORATION	5%	70%	30%	100%
H1	Rebuild masonry work		✓	✓	
H2	Restore existing masonry work		✓	✓	
Line I	PERFORM SPECIALIZED MASONRY WORK	30%	30%	70%	100%
I1	Install glass blocks			✓	
I3	Build arches			✓	
Total Percentage for Bricklayer Level 2		100%			

Training Topics and Suggested Time Allocation

Bricklayer – Level 3

		% of Time Allocated to			
		% of Time	Theory	Practical	Total
Line C	ORGANIZE WORK	10%	100%	0%	100%
C1	Use mathematics		✓		
C2	Use drawings, specifications and documentation		✓		
C4	Use mentoring techniques		✓		
Line D	PERFORM ROUTINE MASONRY PRACTICES	5%	80%	20%	100%
D3	Use mortar, grouts and bonding agents		✓	✓	
Line E	APPLY MASONRY SYSTEMS	5%	30%	70%	100%
E3	Build horizontal masonry		✓		
Line F	APPLY STONE SYSTEMS	5%	80%	20%	100%
F2	Install stone cladding		✓	✓	
Line G	BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS	50%	20%	80%	100%
G1	Lay masonry units			✓	
G2	Install refractory materials for heat-resistant applications		✓		
G3	Install corrosion resistant materials for corrosion resistant applications		✓	✓	
Line H	PERFORM RESTORATION	5%	90%	10%	100%
H2	Restore existing masonry work		✓		
Line I	PERFORM SPECIALIZED MASONRY WORK	20%	20%	80%	100%
I2	Install ornamental and sculptured masonry		✓	✓	
I3	Build arches		✓	✓	
Total Percentage for Bricklayer Level 3		100%			

Section 3
PROGRAM CONTENT
Bricklayer

Level 1 Bricklayer

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A1 Manage workplace hazards**

Objectives

To be competent in this area, the individual must be able to:

- Recognize hazards in worksite scenarios.
- Assess worksite hazards for a given jobsite.
- Demonstrate emergency procedures for a given hazard.
- Apply safe work practices to minimize hazards at a given worksite.

LEARNING TASKS

1. Describe workplace hazards

CONTENT

- Differences between acute and chronic medical conditions
- Sharp objects (glass and metal)
- Overhead hazards and moving equipment
- Electrical
- Flammable and explosive materials
- Atmospheres
 - Flammable
 - Explosive
 - Oxygen-deficient
- Environmental
 - Weather
 - Work area
- Slips, trips and falls
- Toxic substances
 - Biohazards
 - Heavy metals
 - Asbestos
 - Industry products
- Respiratory
 - Silicosis
 - Asbestos related illnesses
- Repetitive strain injuries
- Back injuries
- Other
 - Head phones
 - Cell phones

LEARNING TASKS

CONTENT

2. Describe a confined space

- Definition
 - Legal definition
 - Health and safety definition
 - Hazard classifications
- Levels of confined space certification
- Occupational Health & Safety (OHS) regulation
- Responsibilities of worker and employer
- Procedures
 - Access/egress
 - Hole/fire watch
 - Air quality testing
 - Lock out and isolation
 - Ventilation
 - Cleaning/purging/venting/inerting
 - Rescue procedures

3. Identify equipment used when working in a confined space

- Entry permits
- Respiratory systems
- Ladders
- Tripod
- Harnesses
- Air tester

4. Assess worksite hazards for a given jobsite

- As per job requirements

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>5. Describe and interpret worksite safety policies</p> | <ul style="list-style-type: none"> • Site orientations • Hazard assessment <ul style="list-style-type: none"> ○ Conditions ○ Meeting requirements ○ Reporting hazards and incidents ○ Investigations ○ Committees ○ Employee orientation ○ First-aid ○ Hearing ○ Records and statistics ○ Non-compliance procedures • First aid facilities • Record keeping • Reporting to first aid attendant • Tape identification (red, yellow) • Minimum standards • Acts and Regulations |
| <p>6. Demonstrate emergency procedures</p> | <ul style="list-style-type: none"> • Emergency shutoffs • Fire control systems • Eye wash facilities • Emergency exits • Emergency contact/phone numbers • Marshalling/mustering areas • Emergency horn protocol • Emergency rescue procedures |
| <p>7. Control workplace hazards</p> | <ul style="list-style-type: none"> • Lifting techniques • Safety inspection • Equipment inspection • Engineering controls • Administrative controls • Lock-out/ tag-out • OHS programs <ul style="list-style-type: none"> ○ Regulatory ○ Contractor specific |

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A2 Apply OHS regulations and WorkSafeBC standards**

Objectives

To be competent in this area, the individual must be able to:

- Access applicable parts of the Workers Compensation Act and OHS Regulations.
- Interpret applicable parts of the OHS Regulations.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Access Workers Compensation Act and OHS Regulations
 2. Locate the Core Requirements of the OHS Regulation | <ul style="list-style-type: none"> • Compensation • Core Requirements • General Duties • Reporting of Accidents
 • Definitions • Application <ul style="list-style-type: none"> ○ Rights and responsibilities ○ Health and safety programs ○ Investigations and reports ○ Workplace inspections ○ Right to refuse unsafe work ○ Recognition, correction and reporting of unsafe work conditions and practices
 • General conditions <ul style="list-style-type: none"> ○ Building and equipment safety ○ Emergency preparedness ○ Preventing violence ○ Working alone ○ Ergonomics ○ Illumination ○ Indoor air quality ○ Smoking |
|---|---|

LEARNING TASKS**CONTENT**

- | | |
|---|--|
| 3. Locate the General Hazard Requirements of the OHS Regulation | <ul style="list-style-type: none">• Chemical and biological substances• Substance specific requirements• Noise, vibration, radiation and temperature• Personal protective clothing and equipment• Confined spaces• De-energization and lockout• Fall protection• Tools, machinery and equipment• Ladders, scaffolds and temporary work platforms• Rigging and hoisting equipment• Mobile equipment• Transportation of workers• Traffic control• Electrical safety |
| 4. Interpret relevant OHS information. | <ul style="list-style-type: none">• As per documentation |

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A3 Use fall protection systems and equipment**

Objectives

To be competent in this area, the individual must be able to:

- Recognize fall hazards.
- Apply fall protection controls for a given workplace scenario.

LEARNING TASKS

CONTENT

1. Describe fall protection equipment

- Fall arrest/restraint/work positioning equipment
 - Beam roller
 - Lanyard
 - Carabiner
 - Shock-absorbing devices
 - Retractable devices
 - Rope grab
 - Vertical and horizontal lines
 - Cable/nylon tie-off slings
 - Harnesses and waist belts
 - Standards
 - Canadian Standards Association (CSA)
 - American Society for Testing and Materials (ASTM)
 - American National Standards Institute (ANSI)
- Inspection and maintenance
- Worksite awareness
- Appropriate OHS Regulations

2. Describe fall protection systems

- Railings/scaffolds
- Barricades and control zones
- Safety monitor
- Nets
- Rigging hardware
- Anchor points
- Assembly
- Ladder systems
- Vertical and horizontal systems

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 3. Inspect, assemble and disassemble fall protection equipment and systems | <ul style="list-style-type: none"> • Appropriate OHS Regulations Regulations • Assembly/disassembly • Routine/scheduled inspection and maintenance <ul style="list-style-type: none"> ○ Required reference material |
| 4. Develop a fall protection plan | <ul style="list-style-type: none"> • Identify work area and hazards • List and choose equipment • Rescue procedures • Hierarchy of fall protection procedures |
| 5. Use a harness as per industry standards | <ul style="list-style-type: none"> • Inspect • Use • As per specifications <ul style="list-style-type: none"> ○ D ring positioning ○ Snugness of fit |

Achievement Criteria

- | | |
|-------------|--|
| Performance | The individual will perform a safety harness fit test. |
| Conditions | The individual will be given: <ul style="list-style-type: none"> • A harness • Instructions |
| Criteria | The individual will score 100% on a rating sheet that reflects the following criteria: <ul style="list-style-type: none"> • Manufacturer’s recommendations • Proper inspection • D ring position • Snugness of fit |

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A4 Use personal protective equipment (PPE)**

Objectives

To be competent in this area, the individual must be able to:

- Identify the appropriate PPE for given workplace hazards.
- Demonstrate proper use of PPE.
- Maintain PPE according to manufacturer’s specifications.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe PPE requirements</p> | <ul style="list-style-type: none"> • Legal requirements • Job/employer requirements • Safety footwear • Eye protection • Ear protection • Head protection • Gloves • Respiratory protection • Fit test for respirator • Clothing <ul style="list-style-type: none"> ○ Hi visibility ○ Thermal ○ Cooling • Fall protection <ul style="list-style-type: none"> ○ Visual indicators • Use of irritant to verify proper fit |
| <p>2. Demonstrate proper use of PPE</p> | <ul style="list-style-type: none"> • Use • Proper fit and seal test • Inspect before use |
| <p>3. Maintain PPE</p> | <ul style="list-style-type: none"> • Maintenance • Storage |

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A5 Use fire safety procedures**

Objectives

To be competent in this area, the individual must be able to:

- Identify the four classes of fires.
- Apply preventative fire safety precautions when handling or working near hazardous materials.
- Select and use fire extinguishers for the given class of fire and environmental condition.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Apply preventative fire safety precautions for classified combustibles, flammables, and explosive materials
 2. Describe the considerations and steps to be taken prior to fighting a fire | <ul style="list-style-type: none"> • Classes A-D • Symbols and colours • National Fire Protection Association (NFPA)
 • Safe handling and storage of fuels <ul style="list-style-type: none"> ○ Diesel ○ Gasoline ○ Propane ○ Natural gas ○ Acetylene ○ Chemicals • Lubricants • Contaminated rags • Combustible explosive dusts • Aerosols • GHS (Globally Harmonized System of Classification and Labelling of Chemicals) (formerly WHMIS) • Labelling • Ignition source • PPE |
|---|--|

3. Demonstrate proper use of fire extinguishers
 - Personal safety
 - Knowledge of equipment
 - Warning others and fire department
 - Evacuation protocols
 - Training
 - Awareness of fire suppression/fighting systems
 - PASS
 - Pull
 - Aim
 - Squeeze
 - Sweep

Line (GAC): **A USE SAFE WORK PRACTICES**
Competency: **A6 Apply Globally Harmonized System (GHS, formerly WHMIS)**

Objectives

To be competent in this area, the individual must be able to:

- Attain GHS Certification.

LEARNING TASKS

1. Attain GHS certification

CONTENT

- Arrange GHS training
- Documentation of certification

Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B1 Use hand tools and measuring equipment**

Objectives

To be competent in this area, the individual must be able to:

- Describe hand tools.
- Describe measuring equipment.
- Use hand tools and measuring equipment appropriate for a given task.
- Inspect and maintain hand tools and measuring equipment according to manufacturer’s specifications.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| 1. Describe hand tools | <ul style="list-style-type: none"> • Refer to tool list in appendix • Uses • Trowels • Hammers • Levels • Jointers |
| 2. Describe measuring equipment | <ul style="list-style-type: none"> • Refer to tool list in appendix • Mason tapes • Spacing rule/gauge tape • Laser levels • Storey poles • Transit • Laser level • Gauge • Rod pole |
| 3. Demonstrate proper use of hand tools | <ul style="list-style-type: none"> • Selection of proper tools according to job/task • Procedures according to manufacturer’s recommendations • Safety • Adjustments • Ergonomics |
| 4. Demonstrate proper use of measuring and layout equipment | <ul style="list-style-type: none"> • Selection of proper layout and measuring equipment according to job/task • Procedures according to manufacturer’s recommendations where applicable • Basic measuring and layout |

LEARNING TASKS

5. Inspect and maintain hand tools and measuring and layout equipment

CONTENT

- As per job requirement and manufacturer specifications
- Maintenance, cleaning
- Storage

Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B2 Use power tools**

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate proper use, set up and adjustment of power and powder-actuated tools appropriate for a given task.
- Demonstrate proper use, set up and adjustment of pneumatic and hydraulic tools appropriate for a given task.
- Describe welding and cutting tools.
- Inspect and maintain power, powder-actuated, pneumatic and hydraulic tools according to manufacturer’s specifications.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Describe gas and electric power tools</p> | <ul style="list-style-type: none"> • Refer to tool list in appendix • Gas-powered • Electrically powered • Battery operated • Uses • Terminology |
| <p>2. Describe powder-actuated tools</p> | <ul style="list-style-type: none"> • Types of fastening tools • Selecting shot and fastener • Training requirements |
| <p>3. Describe pneumatic and hydraulic tools</p> | <ul style="list-style-type: none"> • Pneumatic <ul style="list-style-type: none"> ○ Grinders ○ Air guns ○ Jack hammers ○ Chisels ○ Hoses • Hydraulic <ul style="list-style-type: none"> ○ Winches ○ Splitters |
| <p>4. Describe welding and cutting tools</p> | <ul style="list-style-type: none"> • Safety • Types • Materials • Licensing and training requirements |

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>5. Demonstrate proper use, set up and adjustment of power, powder-actuated, pneumatic and hydraulic tools</p> | <ul style="list-style-type: none"> • Proper use • Procedures/operations • Training requirements • Set-up • Safe use • Adjustment |
| <p>6. Inspect and maintain power, powder-actuated, pneumatic and hydraulic tools according to manufacturer's specifications</p> | <ul style="list-style-type: none"> • Inspection • Maintenance • Storage • Stewardship |

Achievement Criteria

- | | |
|-------------|---|
| Performance | The individual will use a saw to cut material. |
| Conditions | <p>The individual will be given:</p> <ul style="list-style-type: none"> • Electric table saw • Specifications • Masonry units |
| Criteria | <p>The individual will score 70% or better on a rating sheet that reflects the following criteria:</p> <ul style="list-style-type: none"> • Safety • Accuracy of cut (according to specifications) • Proper use of saw • Clean-up |

Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B3 Use ladders, scaffolds and elevated platforms**

Objectives

To be competent in this area, the individual must be able to:

- Use ladders, scaffolds and elevated platforms for a given task.
- Maintain access, hoisting and rigging equipment.

LEARNING TASKS

CONTENT

1. Describe ladders, scaffolding and elevated platforms

- Ground-based scaffolds
 - Self-elevating
 - Rolling
 - Stationary
 - Ladder jack
 - Tubular
 - Mechanical
 - Hydraulic
 - Jack-up
 - Aluminum and wooden planks
 - Components
- Planks
- Outriggers and cross braces
- Hand rails and posts
- Kick boards
- Mud sills
- Adjustable screw jacks/wheels
- Ladders
 - Extension
 - Step
- Aerial work platforms
 - Suspended
 - Swing stages
 - Boatswain chair/harness
 - Boom lifts
 - Scissor lift
- Components
- Safety
 - Hazard recognition
 - Fall prevention, restraint and arrest
 - Height restrictions
 - OHS, site-specific
 - Competency levels for inspection and erection

LEARNING TASKS

CONTENT

2. Set up, move and level ladders and scaffolding

- Three point contact
- Selection
- Site hazards
- Inspect for defects
 - Rusting
 - Split planks
 - Broken rungs
- Set up, lay out and level
- Restrictions
 - Height
 - No-step zones
 - Load limitations, no opaque coatings
- Secure
- Move ladders
- Competency levels for inspection and erection

3. Set up an elevated platform

- Selection
- Site hazards
- Set up, lay out and level
 - Tie-in to existing wall
 - Instal mud sills
- Restrictions
 - Height
 - Load limitations
- Secure

4. Dismantle scaffolding

- Removal sequence
- Deck removal
- Bracing removal
- Storage

5. Maintain scaffolding and ladders

- Maintenance
- As per manufacturers' specifications
- Storage

Achievement Criteria

Performance	The individual will set up the first lift of a scaffold.
Conditions	The individual will be given: <ul style="list-style-type: none">• Scaffold and components• Instructions
Criteria	The individual will score 100% on a rating sheet that reflects the following criteria: <ul style="list-style-type: none">• Safety• Level braces in proper spot• Proper base support• Proper use of components

Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B4 Use rigging and hoisting equipment**

Objectives

To be competent in this area, the individual must be able to:

- Describe hoisting, rigging and lifting equipment.
- Tie knots, bends and hitches.
- Select and use hoisting, lifting and rigging equipment.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Describe the principles of lifting and hoisting</p> | <ul style="list-style-type: none"> • Mechanical advantage • Balance points |
| <p>2. Describe hoisting, lifting and rigging equipment</p> | <ul style="list-style-type: none"> • Lifting and hoisting <ul style="list-style-type: none"> ○ Forklifts ○ Power cups ○ Cranes ○ Boom trucks ○ Engine hoist (Cherry picker) ○ Loaders ○ Tirlors ○ Come-alongs ○ Tuggers ○ Chain falls • Accessories <ul style="list-style-type: none"> ○ Slings/chokes ○ Shackles ○ Chains ○ Tag lines ○ Snatch blocks ○ Turnbuckles ○ Certification where required |
| <p>3. Describe lifting and hoisting communication</p> | <ul style="list-style-type: none"> • Purpose of proper communication • Hand signals • Communication with the operator • Communication with others |

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 4. Tie knots, bends and hitches | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Half hitch ○ Clove hitch ○ Figure of eight ○ Bowline ○ Trucker’s hitch • Purposes • Limitations |
| 5. Use hoisting, lifting and rigging equipment | <ul style="list-style-type: none"> • Safety • Certification requirements • Estimation of weights • Equipment capacities • Equipment selection • Lifting location • Operating procedures • Securing of loads • Equipment inspection • Equipment maintenance • Equipment storage • Disposal procedures |

Achievement Criteria

- | | |
|-------------|---|
| Performance | <p>The individual will tie the appropriate knot for a given application:</p> <ul style="list-style-type: none"> • Half hitch • Clove hitch • Figure of eight • Bowline • Trucker’s hitch |
| Conditions | <p>The individual will be given:</p> <ul style="list-style-type: none"> • Rope • Instructions (application) |
| Criteria | <p>The individual will score 100% on a rating sheet that reflects the following criteria:</p> <ul style="list-style-type: none"> • Properly tied knots • Appropriate knot for given application |

Line (GAC): C ORGANIZE WORK
Competency: C1 Use mathematics

Objectives

To be competent in this area, the individual must be able to:

- Perform basic mathematical calculations.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Use fractions to solve problems 2. Use decimal fractions to solve problems 3. Solve problems of ratio and proportion 4. Convert between metric and imperial measurements | <ul style="list-style-type: none"> • Add, subtract, multiply, divide • Simplify fractions • Add, subtract, multiply, divide • Convert between decimals and fractions • Decimal notation • Ratio • Proportion • Unknown quantities • Convert between metric and imperial <ul style="list-style-type: none"> ○ Feet, inches/metres, millimetres ○ Pounds, tons/kilograms, tonnes • Use conversion tables • Use calculator |
|--|---|

Line (GAC): C ORGANIZE WORK
Competency: C2 Use drawings, specifications and documentation

Objectives

To be competent in this area, the individual must be able to:

- Describe masonry units.
- Identify basic views on drawings.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe masonry units</p> | <ul style="list-style-type: none"> • Types • Sizes <ul style="list-style-type: none"> ○ Nominal versus actual • Specifications • Colours • Manufacturing techniques • Composition • Textures |
| <p>2. Identify basic views on drawings</p> | <ul style="list-style-type: none"> • Plan • Section • Elevation • Scale of drawings |
| <p>3. Describe general work-related documentation</p> | <ul style="list-style-type: none"> • As per job requirements |

Line (GAC): C ORGANIZE WORK
Competency: C3 Use communication techniques

Objectives

To be competent in this area, the individual must be able to:

- Describe the Bricklayer trade.
- Describe methods of communication used in the Bricklayer trade.
- Use appropriate communication methods for completing a given task.

LEARNING TASKS

CONTENT

1. Describe the Bricklayer trade	<ul style="list-style-type: none"> • History • Scope of evolution of masonry
2. Describe duties and responsibilities of apprentices and employers	<ul style="list-style-type: none"> • Scope of employer duties • Scope of apprentice duties • Mentee relationship • Joint responsibilities • Relationship between apprentice and employer
3. Describe methods of communication used in the Bricklayer trade	<ul style="list-style-type: none"> • Listening • Verbal • Written • Hand signals • Interpersonal skills • Trade terminology
4. Demonstrate proper use of electronic communication media	<ul style="list-style-type: none"> • Cell phone use • Safety • Emergency purposes • Company/site policy • Restricted use of: <ul style="list-style-type: none"> ○ Two-way radios ○ Fax machines ○ Computers
5. Recognize signage	<ul style="list-style-type: none"> • People working above • Tapes (yellow, red) and associated hazards

LEARNING TASKS

6. Use appropriate communication methods for completing a given task

CONTENT

- Other trades
- Industry people
- Customers
- Safety authorities
- Suppliers and manufacturers
- Apprentices (mentoring)
- General respect for others
- Barriers to effective communication
 - Body language
 - Tone of voice
 - Facial expression
 - Accent/language differences
 - Site noise
 - PPE

LEARNING TASKS

6. Finish joints

CONTENT

- Types of joints
 - Concave
 - Convex
 - Rake and flat
 - Extruded (bead)
 - Struck
 - Weathered
 - Brushed
 - V joints
- When to finish joints
- Select method of finishing joints
- Brush finished joints

Achievement Criteria

Performance The individual will build a block lead.

Conditions The individual will be given:

- Tools and equipment
- Instructions
- Materials

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Level
- Plumb
- Alignment
- Height gauge
- Jointing

Line (GAC): D **PERFORM ROUTINE MASON PRACTICES**
Competency: D1 **Prepare the site**

Objectives

To be competent in this area, the individual must be able to:

- Prepare the job site according to job requirements.

LEARNING TASKS

CONTENT

1. Organize the job site

- Communicate with other trades
- Regulations and specifications
- Protect finished work
- Access to materials and utilities
- Access to work area
- Coordinate deliveries
- Waste disposal
- Estimate and confirm the amount of material required
- Types of materials
- Fuel storage
- Build temporary enclosures
- Store and protect materials
- Loading limitations of storage location

2. Weatherize the job site

- Tarp systems
 - Insulated tarps, sail and shrink wrap
 - Engineering
- Types of heaters
 - Salamanders
 - Furnaces
 - Construction heaters
- Types of heater power sources
 - Propane
 - Diesel
 - Electric
 - Natural gas
 - Kerosene
- Warm sand and water for preparing mortar
- Install tarp system
- Build temporary roof
- Recognize hazards of fuels and combustible materials
- Set up heaters and fuel tanks
- Ensure adequate ventilation for propane heaters

LEARNING TASKS

CONTENT

4. Install membrane

- Rock wool
- Mineral-refractory grade
- Insulation performance
- Fasteners
- Adhesives
- Cut and fit insulation
- Sealing joints
- Fasten insulation to substrate and membrane
- Importance of adhering to substrate
- Apply spray-on insulation

- Manufacturers' specifications
- Types of membranes
 - Torch-on
 - Self-adhesive
 - Troweled
- Effects of ultraviolet rays and moisture on membranes
- Apply primers before installing membranes
- Apply membranes to shed water
- Seal seams and tears
- Install protection/drainage boards or membranes below grade

LEARNING TASKS

CONTENT

5. Install anchoring/tie systems

- Types of substrate
- Substrate condition
- Anchoring/tie systems
 - Screwed-in-place
 - Embedded
- Types of anchors
 - Drop-in
 - Pin bolts
 - Wedge
 - Screws
 - Self-tapping
- Types of ties
 - Wire
 - Adjustable
 - Corrugated metal
- Codes and standards
- Apply epoxy and acrylic to secure anchors
- Drill and screw in anchors to solid substrate

6. Apply parging

- Types of parging material
 - Type M
 - Type N
 - Type S
- Ratios for mixing parging material
- Types of mesh
 - Wire
 - Fibre
- Types of anchors to secure wire mesh
- Application techniques
 - Scratch coat
 - Finish coat
- Dampen substrate
- Fasten mesh to substrate
- Apply bonding agents to substrate
- Mix parging material
- Set up straight edges to screed parging

7. Waterproof/damp-proof masonry surfaces

- Applications
- Types of materials
 - Silicone-based
 - Solvent-based

LEARNING TASKS

CONTENT

- Alkaline-based
- Environmental hazards
- Material selection according to locations
 - Above grade
 - Below grade
- Material application
 - Troweling
 - Spraying
 - Brushing
 - Rolling
- Protect surrounding area
- Clean surface before applying materials

Line (GAC): D PERFORM ROUTINE MASON PRACTICES
Competency: D3 Use mortars, grouts and bonding agents

Objectives

To be competent in this area, the individual must be able to:

- Use mortars.
- Use concrete or grout for block fill.
- Use bonding agents.

LEARNING TASKS

CONTENT

1. Describe mortars

- Types
 - Heat-setting and air setting
 - Refractory heat-resistant and corrosion resistant
 - Restoration mortars
- Strengths
- Purpose
- Applications
- Principle functions of mortar components
 - Aggregate
 - Cementitious materials
 - Lime
 - Potable water
- Codes and specifications

2. Describe grouts

- Types
 - Coarse
 - Fine
- Principle functions of grout components
 - Cement
 - Water
 - Air
 - Aggregate
 - Admixtures
- Purpose
- Applications
- Properties
 - Slump
 - Strength
 - Compression
 - Segregation

LEARNING TASKS

CONTENT

3. Describe admixtures

- Types
 - Accelerators
 - Retardants
- Purpose
- Application
 - Weather
 - Surface types
 - Specialty applications
 - Component properties

4. Mix and use mortars

- Safety
- Admixtures
 - Accelerators
 - Retardants
 - Dyes
 - Waterproofing components
- Mixing procedures
 - Ratio
 - Batching
 - Mixing time
- Testing
 - Colorimetric
 - Strength tests
 - Slump tests
 - Bond tests
- Mortar application
 - Buttering
 - Spreading
- Assess mortar condition and usability
- Adjust mortar consistency for particular use
- Assess mortar components
 - Sand
 - Cement
 - Water
 - Admixture

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E1 **Build non load-bearing masonry walls**

Objectives

To be competent in this area, the individual must be able to:

- Build non load-bearing masonry walls.
- Install flashings.
- Install ties.
- Describe principles of rain screen technology.
- Install masonry units for non load-bearing walls.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Describe types of non load-bearing masonry walls
 2. Describe flashings
 3. Install flashings
 4. Install ties | <ul style="list-style-type: none"> • Veneer walls • Interior partitions • Exterior curtain walls • Firewalls
 • PVC • Rigid • Self-adhesive • Rubber • Metal
 • Application techniques • Location of flashings • Counter flashing and step flashing • Applicable section of building code • Cut flashing to fit <ul style="list-style-type: none"> ○ Minimum overlap on joints ○ Minimum up-stand • Overlap • End dams • Clean and prepare bearing surfaces • Affix flashing • Seal cuts in flashing
 • Location • Spacings • Type of fasteners • Types of ties <ul style="list-style-type: none"> ○ Compatibility of metals • Tools |
|---|--|

LEARNING TASKS

CONTENT

- | | |
|--|---|
| 5. Describe principles of rain screen technology | <ul style="list-style-type: none"> • Air space <ul style="list-style-type: none"> ○ Size ○ Cleanliness ○ Venting ○ Horizontal breaks ○ Shelf angle ○ Pressure equalization • Installation of flashings and ties • Membranes and insulation • Importance of full joints |
| 6. Describe masonry units for non load-bearing walls | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Clay brick ○ Concrete brick ○ Sand-lime brick ○ Concrete block |
| 7. Install masonry units for non load-bearing walls | <ul style="list-style-type: none"> • Preparation <ul style="list-style-type: none"> ○ Sizes of bricks and blocks ○ Bond <ul style="list-style-type: none"> – One third – Running bond – English – Flemish ○ Stack pattern/stack bond ○ Types and consistencies of mortar • Installation <ul style="list-style-type: none"> ○ Movement joints • Expansion joints • Control joints • Caulking <ul style="list-style-type: none"> ○ Build leads ○ Set horizontal and vertical lines ○ Cut units ○ Lay units to the top of the line ○ Bonding around openings ○ Install lintels <ul style="list-style-type: none"> – Pre-cast – Angle iron ○ Follow gauge and measurements ○ Install accessories <ul style="list-style-type: none"> – Electrical |

LEARNING TASKS

CONTENT

- Mechanical
- Plumbing
- o Importance of full joints
- Bed and head joints

Achievement Criteria

Performance	The individual will build a brick veneer with a block backup.
Conditions	The individual will be given: <ul style="list-style-type: none"> • Instructions • Tools • Materials
Criteria	The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none"> • Safety • Plumb • Level • Square • Gauge • Clean cavity • Alignment • Jointing • Use of mortar • Clean work area • Proper set up of work station • Proper installation of hardware

LEARNING TASKS

4. Apply sealants and coating materials for new and restoration work

CONTENT

- Safety
- Knowledge of sealants
 - Caulking and polyurethane
- Waterproofing materials
 - Silicone and solvent-based, water-based
- Application methods
 - Brush
 - Roll
 - Spray
 - Trowel
- Hazards of sealants and coatings
- Protect surrounding area
- Prepare surface with a coating to allow for easy removal of graffiti

Achievement Criteria

- Performance** The individual will install backer rod and seal a movement joint with caulking.
- Conditions** The individual will be given:
- Instructions
 - Tools
 - Materials
- Criteria** The individual will score 70% or better on a rating sheet that reflects the following criteria:
- Clean cavity
 - Clean work area
 - Proper set up of work station
 - Proper installation of backer rod
 - Proper application of caulking

Level 2 Bricklayer

Line (GAC): C ORGANIZE WORK
Competency: C1 Use mathematics

Objectives

To be competent in this area, the individual must be able to:

- Perform basic mathematical calculations.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Review Level 1 2. Solve problems of ratio and proportion 3. Convert between metric and imperial measurements 4. Solve equations using trigonometry 5. Solve geometrical problems | <ul style="list-style-type: none"> • Fractions • Decimal fractions • Ratio • Proportion • Unknown quantities • Conversion between metric and imperial <ul style="list-style-type: none"> ○ Feet, inches/metres, millimetres ○ Pounds, tons/kilograms, tonnes • Use conversion tables • Use calculator • Pythagorean theorem • Radius of arches • Angles • Number of units • Dimension of units • Volume, area, perimeter • Circle radius, diameter |
|---|--|

Line (GAC): C ORGANIZE WORK
Competency: C2 Use drawings, specifications and documentation

Objectives

To be competent in this area, the individual must be able to:

- Describe the types and basic uses of drawings and specifications.
- Describe documentation.
- Use drawings, specifications and documentation appropriate for a given task.
- Estimate material requirements for a given task.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe types of drawings and terms</p> | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Architectural ○ Structural (Engineering) ○ Sketches • Hierarchy of drawings • Basic architectural terms • Specifications |
| <p>2. Identify drawing symbols and abbreviations</p> | <ul style="list-style-type: none"> • Types of symbols and abbreviations |
| <p>3. Describe drawing concepts</p> | <ul style="list-style-type: none"> • Site plans • Floor plans • Reference to <ul style="list-style-type: none"> ○ Interior and exterior elevations ○ Building sections ○ Details ○ Schedule ○ Specifications |
| <p>4. Describe documentation</p> | <ul style="list-style-type: none"> • Jurisdictional and national codes • CSA and other industry standards • Manufacturer specifications |
| <p>5. Draw basic sketch of a wall</p> | <ul style="list-style-type: none"> • 3-dimensional sketching concepts • Label of dimensions • Plan, elevation and section |
| <p>6. Estimate material requirements for a given job/task</p> | <ul style="list-style-type: none"> • Basic calculations <ul style="list-style-type: none"> ○ Area ○ Volume |

Line (GAC): D **PERFORM ROUTINE MASON PRACTICES**
Competency: D3 **Use mortars, grouts and bonding agents**

Objectives

To be competent in this area, the individual must be able to:

- Use mortars.
- Use concrete or grout for block fill.
- Use bonding agents.

LEARNING TASKS

1. Describe grouts

CONTENT

- Types
 - Coarse
 - Fine
- Principle functions of grout components
 - Cement
 - Water
 - Air
 - Aggregate
 - Admixtures
- Purpose
- Applications
- Properties
 - Slump
 - Strength
 - Compression
 - Segregation

2. Describe admixtures

- Types
 - Accelerators
 - Retardants
- Purpose
- Application
 - Weather
 - Surface types
 - Specialty applications
 - Component properties

LEARNING TASKS

CONTENT

3. Use concrete or grout for block fill

- Types of concrete or grout and their properties
- Concrete and grout components
 - Sand
 - Cement
 - Aggregates
 - Water
- Codes and specifications
- Concrete or grout tests
 - Slump tests
 - Compression tests
 - Segregation tests
- Reinforcing materials
- Consistency required to fill block
- Grouting procedures
 - Install grout using equipment
 - Prepare grout
 - Consolidate grout
 - Assess wall prior to filling
 - Adjust grout consistency
 - Confine grout to cells
 - Prevent excessive mortar fins in interior
 - High lift and low lift pouring
 - Clean outs

4. Use bonding agents

- Polymers, epoxies, resins, caulking and latex
- Codes and specifications
- Conditions and use
- Bonding agents' shelf and pot life
- Component properties
- Prepare bonding agents
- Prepare surfaces
- Apply bonding agents using methods
 - Toweled
 - Brushed on
 - Caulked
- Adjust bonding agent consistency

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E2 **Build load-bearing walls and columns**

Objectives

To be competent in this area, the individual must be able to:

- Build load-bearing walls.
- Build foundation walls.
- Build retaining walls.
- Install reinforcing systems.
- Build columns and pilasters.

LEARNING TASKS

1. Describe load-bearing walls

CONTENT

- Types
 - Structural
- Above grade
 - Foundation walls
- Below grade
 - Retaining walls
 - Cavity walls
- Purpose
 - Carry loads in addition to their own weight
 - Resist stresses and forces
- Cavity wall system components
 - Back-up wall
 - Membrane
 - Insulation
 - Exterior wythe
- Blocks
- Mortars
 - Type M
 - Type S
- Lintels
 - Angle iron
 - Lintel blocks/Bond beam
 - Cast in place
 - Precast
- Accessories
 - Anchors
 - Anchor plates
 - Bolts
- Coordination with other trades

LEARNING TASKS

2. Build structural walls
3. Describe foundation walls

CONTENT

- Reinforcing systems
- Load points
- Finished height of wall
- Horizontal and vertical coursing
- Codes and regulations
- Build back-up wall
- Bracing and support walls
- Lay units to line
- Set lines
- Build leads
- Maintain bond
- Shore up openings
- Install lintels and beams

- As per job requirements

- Blocks
- Mortars
 - Type M
 - Type S
- Lintels
 - Angle iron
 - Lintel blocks
 - Cast in place
 - Bond beam
- Waterproofing and damp-proofing methods
- Accessories
 - Anchors
 - Anchor plates
 - Bolts
- Coordination with other trades
- Drainage systems
- Finished height of wall
- Load points
- Horizontal and vertical coursing
- Codes and regulations
- Brace and support walls
- Lay units to line
- Set lines
- Build leads

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E3 **Build horizontal masonry**

Objectives

To be competent in this area, the individual must be able to:

- Lay masonry units on horizontal surfaces.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Describe horizontal masonry surfaces 2. Lay masonry units on horizontal surfaces | <ul style="list-style-type: none"> • Patios, walkways, stairways, driveways • Knowledge of bonds and patterns • Layout of pattern • Mortars and aggregates used • Bonding agents and additives • Alignment of units • Follow lines, slopes, grades, and angles • Stay on bond and keep the pattern • Align units for aesthetic reasons • Seal the surface <ul style="list-style-type: none"> ○ Release agent and cleaning |
|--|---|

Achievement Criteria

- | | |
|--------------------|--|
| Performance | The individual will build a horizontal installation. |
| Conditions | The individual will be given: <ul style="list-style-type: none"> • Tools • Materials • Instructions • Drawing |
| Criteria | The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none"> • Safety • Level • Slope • Gauge • Alignment • Jointing |

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E4 **Build and install pre-fabricated masonry**

Objectives

To be competent in this area, the individual must be able to:

- Build pre-fabricated masonry.
- Install pre-fabricated masonry.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe pre-fabricated masonry</p> | <ul style="list-style-type: none"> • Purpose • Fabrication method <ul style="list-style-type: none"> ○ Off site ○ Made of masonry units, steel, grout and mortar • Types <ul style="list-style-type: none"> ○ Brick panels ○ Lintels ○ Brick sills ○ Brick columns |
| <p>2. Build pre-fabricated masonry</p> | <ul style="list-style-type: none"> • Form release agents • Storage, stacking, transport • Colour match and test for restoration • Effects of temperature and humidity • Prepare forms or jigs to accept material • Material Installation to forms or jigs • Accessory installation <ul style="list-style-type: none"> ○ Reinforcing anchoring ○ Bearing plates • Align and level units • Grouting • Remove forms or jigs • Prepare for delivery |
| <p>3. Install/erect prefabricated masonry</p> | <ul style="list-style-type: none"> • Rigging considerations • Fastening systems • Grouting and caulking procedures • Align and set in place panels and anchors |

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E5 **Install surface bonded masonry units**

Objectives

To be competent in this area, the individual must be able to:

- Prepare surfaces for surface bonded masonry units.
- Apply surface bonded masonry units.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe surface bonded masonry units</p> | <ul style="list-style-type: none"> • Thin components applied to surfaces • Used for aesthetic purposes |
| <p>2. Prepare surfaces for surface bonded masonry units</p> | <ul style="list-style-type: none"> • Mortar and bonding agents used • Restrictions and standards regarding permitted height of unsupported surface-bonded masonry units <ul style="list-style-type: none"> ○ CSA ○ National Building Code of Canada (NBC) • Install building paper (where applicable) • Install rain screen • Install wire mesh • Apply mortar over wire mesh • Scratch mortar |
| <p>3. Apply surface bonded masonry units</p> | <ul style="list-style-type: none"> • Types of materials <ul style="list-style-type: none"> ○ Brick ○ Stone ○ Glass ○ Concrete ○ Manufactured stone • Mortar and bonding agents used • Layout dimensions • Types of bonds and patterns • Gauge height • Lay out units to the bond and pattern • Pre-butter back of surface bonded masonry units • Apply and finish joints for surface bonded masonry units |

Achievement Criteria

Performance	The individual will install surface-adhered masonry units to vertical sub-strate.
Conditions	The individual will be given: <ul style="list-style-type: none">• Tools• Materials• Instructions• Drawing
Criteria	The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none">• Safety• Plumb• Level• Gauge• Alignment• Placement of horizontal and vertical steel• Full joints (including collar)

Line (GAC): F **APPLY STONE SYSTEMS**
Competency: F1 **Install stone veneer**

Objectives

To be competent in this area, the individual must be able to:

- Prepare stone for veneer.
- Lay stone for a given application.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe stone types</p> | <ul style="list-style-type: none"> • Natural stone <ul style="list-style-type: none"> ○ Basalt ○ Granite ○ Sandstone ○ Limestone ○ Ledge stone ○ Marble ○ Field stone ○ River rock • Manufactured stone |
| <p>2. Describe stone shapes</p> | <ul style="list-style-type: none"> • Cornerstones • Sills • Lintels • Risers • Runner |
| <p>3. Describe stone patterns</p> | <ul style="list-style-type: none"> • Ashlar • Random and rubble • Sneck • Bonding rules |
| <p>4. Describe cutting and dressing stone</p> | <ul style="list-style-type: none"> • Selection <ul style="list-style-type: none"> ○ Wall stone ○ Corner stones • Cutting techniques • Tools • Dressing <ul style="list-style-type: none"> ○ Tracing ○ Breaking ○ Pitch ○ Shaping |

LEARNING TASKS

CONTENT

5. Describe mortar

- Types
- Consistency

6. Install stone

- Application methods
 - Dry pack
 - Full bed
- Shim and shore stones
- Build stone corners
- Abrade stone to match finish

Achievement Criteria

Performance The individual will cut, dress and install a stone detail in a project.

Conditions The individual will be given:

- Materials
- Tools
- Instructions
- Drawing

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Safe use of tools
- Selection of stone free of defects
- Size of stone
- Joint size
- Shape of stone
- Plumb
- Level
- Gauge
- Alignment
- Clean up

Line (GAC): **G BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS**

Competency: **G1 Lay masonry units**

Objectives

To be competent in this area, the individual must be able to:

- Build chimneys with flue liners.

LEARNING TASKS

1. Build chimneys complete with flue linings, thimble and ash clean-out

CONTENT

- Codes and regulations
- Install clean-out
- Calculate size of firebox
- Install flue liners

Achievement Criteria

Performance The individual will build a chimney with flue lining from roof line to cap.

Conditions The individual will be given:

- Ash clean-out
- Flue liners
- Facing brick
- Mortar
- Tools
- Instructions
- Drawing

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Safe use of tools
- Joint size
- Square
- Plumb
- Level
- Gauge
- Alignment
- Proper spacing between flue lining and brick
- Clean up

Line (GAC): **H** **PERFORM RESTORATION**
Competency: **H1** **Rebuild masonry work**

Objectives

To be competent in this area, the individual must be able to:

- Disassemble unit masonry construction.
- Reinstall masonry and accessories.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Disassemble unit masonry construction</p> | <ul style="list-style-type: none"> • Masonry construction techniques • Masonry load patterns • Identify causes of deterioration • Identify hazards when moving masonry • Assess support and anchoring requirements • Record placement of units • Remove mortar and units • Salvage reusable materials • Clean masonry units |
| <p>2. Prepare restoration work area</p> | <ul style="list-style-type: none"> • Types of mortar • Remove mortar from standing wall and back-up wall • Repair back-up wall • Clean and restore components <ul style="list-style-type: none"> ○ Anchors ○ Ties ○ Shelf angles |
| <p>3. Reinstall masonry and accessories</p> | <ul style="list-style-type: none"> • Types of mortars • Types of tie systems • Reinstall components <ul style="list-style-type: none"> ○ Flashings ○ Electrical ○ Plumbing • Colour mortar to match previous or existing work |

Achievement Criteria

Performance	The individual will remove and reinstall several units from a project wall.
Conditions	The individual will be given: <ul style="list-style-type: none">• Materials• Tools• Instructions
Criteria	The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none">• Safety• Match existing wall• Full joints

Line (GAC): I **PERFORM SPECIALIZED MASONRY WORK**
Competency: II **Install glass blocks**

Objectives

To be competent in this area, the individual must be able to:

- Prepare the site to install glass blocks.
- Lay glass blocks.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Describe glass blocks</p> | <ul style="list-style-type: none"> • Purpose • Decorative/aesthetic • Security • Insulation • Transfer of light |
| <p>2. Prepare the site to install glass blocks</p> | <ul style="list-style-type: none"> • Types and sizes of glass blocks • Anchoring • Calculate dimensions • Determine gauge of mortar joints • Set channels • Install expansion strips • Flashings |
| <p>3. Lay glass blocks</p> | <ul style="list-style-type: none"> • Types and sizes of glass blocks • Manufacturer's instructions • Lay blocks <ul style="list-style-type: none"> ○ Stabilize ○ Spacers ○ Clean ○ Maintain elevation ○ Layout to pattern and design ○ Install accessories such as vents and soap/shampoo dish • Reinforce • Mortar • Grouting or pointing • Full joints |

Achievement Criteria

Performance The individual will build, joint and clean a glass block panel.

Conditions The individual will be given:

- Tools
- Instructions
- Materials

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Level
- Plumb
- Alignment
- Jointing
- Gauge
- Cleanup
- Neatness

LEARNING TASKS

CONTENT

3. Build templates

- Types and sizes of arch
- Materials
 - Wood
 - Metal (kiln ring)
 - Extruded foam
- Apply geometric concepts and basic math
- Template construction techniques
- Template design
- Template assembly
- Determine type, location, span, rise and depth of arch
- Determine structural strength requirements for templates

4. Place templates

- Incorporate template on support system
- Adjust template for level and plumb
- Shimming and shoring

5. Install arch masonry units

- Materials
 - Brick
 - Stone
 - Mortar
- Installation procedures
 - Determine angle of skew-back
 - Lay out and align to bond
 - Determine center of arch
 - Cut creepers around arch
 - Full joints
- Shape masonry voussoirs (arch brick)

6. Remove templates

- Mortar setting times
- Remove shims
- Remove support
- Remove template without damaging arch material
- Point and joint mortar in arch
- Clean up

Achievement Criteria 1

Performance	The individual will design a template for an arch.
Conditions	The individual will be given: <ul style="list-style-type: none">• Materials• Tools• Instructions
Criteria	The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none">• Proper dimensions and shape

Achievement Criteria 2

Performance	The individual will build an arch.
Conditions	The individual will be given: <ul style="list-style-type: none">• Materials• Tools• Instructions
Criteria	The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none">• Proper dimensions and shape• Proper cuts• Alignment• Jointing• Proper joint spacing and gauging• Level• Plumb• Bond• Safety

Level 3 Bricklayer

Line (GAC): **C ORGANIZE WORK**
Competency: **C1 Use mathematics**

Objectives

To be competent in this area, the individual must be able to:

- Perform basic mathematical calculations.
- Solve geometric problems.
- Lay out arches.

LEARNING TASKS

1. Review Level 2
2. Solve geometrical problems
3. Perform layout of arches

CONTENT

- Ratio and proportion
- Imperial and metric conversions
- Volume, area, perimeter
- Circle radius, diameter
- Calculate angles and radii
- Rise and span

Line (GAC): C ORGANIZE WORK
Competency: C4 Use mentoring techniques

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate knowledge of strategies for learning skills in the workplace.
- Demonstrate knowledge of strategies for teaching workplace skills.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe shared responsibilities for workplace learning</p> | <ul style="list-style-type: none"> • Apprentice • Journey person • Employer • Union • Training organization |
| <p>2. Identify different learning needs</p> | <ul style="list-style-type: none"> • Learning disabilities • Learning preferences • Language proficiencies • Prior learning |
| <p>3. Identify strategies to assist in learning a skill</p> | <ul style="list-style-type: none"> • Coaching skills • Feedback • Patience • Linking lessons • Establishing skill practice • Assessment • Adapting |
| <p>4. Identify different responsibilities of a workplace mentor</p> | <ul style="list-style-type: none"> • Skill demonstration • Assist skill practice • Assess performance • Encourage independence • Support training opportunities • Support anti-harassment culture • Dispute mediation |
| <p>5. Identify techniques for giving feedback</p> | <ul style="list-style-type: none"> • Clear • Concise • Constructive • Transformative • Objective • Relevant • Supportive |

Line (GAC): D **PERFORM ROUTINE MASON PRACTICES**
Competency: D3 **Use mortars, grouts and bonding agents**

Objectives

To be competent in this area, the individual must be able to:

- Use mortars.
- Use concrete or grout for block fill.
- Use bonding agents.

LEARNING TASKS

CONTENT

- | | |
|-------------------------------|---|
| <p>1. Describe mortars</p> | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Heat-setting and air setting ○ Refractory heat-resistant and corrosion resistant ○ Restoration mortars • Strengths • Purpose • Applications • Principle functions of mortar components <ul style="list-style-type: none"> ○ Aggregate ○ Cementitious materials ○ Lime ○ Potable water • Codes and specifications |
| <p>2. Describe admixtures</p> | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Accelerators ○ Retardants • Purpose • Application <ul style="list-style-type: none"> ○ Weather ○ Surface types ○ Specialty applications ○ Component properties |
| <p>3. Mix and use mortars</p> | <ul style="list-style-type: none"> • Safety • Admixtures <ul style="list-style-type: none"> ○ Accelerators ○ Retardants ○ Dyes ○ Waterproofing components • Mixing procedures <ul style="list-style-type: none"> ○ Ratio ○ Batching |

LEARNING TASKS

CONTENT

- Mixing time
 - Testing
 - Colorimetric
 - Strength tests
 - Slump tests
 - Bond tests
 - Mortar application methods
 - Buttering
 - Spreading
 - Assess mortar condition and usability
 - Adjust mortar consistency for particular use
 - Assess mortar components
 - Sand
 - Cement
 - Water
 - Admixture

- 4. Use concrete or grout for block fill
 - Types of concrete or grout and their properties
 - Concrete and grout components
 - Sand
 - Cement
 - Aggregates
 - Water
 - Codes and specifications
 - Concrete or grout tests
 - Slump tests
 - Compression tests
 - Segregation tests
 - Reinforcing materials
 - Consistency required to fill block
 - Grouting procedures
 - Install grout using equipment
 - Prepare grout
 - Consolidate grout
 - Assess wall prior to filling
 - Adjust grout consistency
 - Confine grout to cells
 - Prevent excessive mortar fins in interior
 - High lift and low lift pouring
 - Clean outs

LEARNING TASKS

5. Use bonding agents

CONTENT

- Polymers, epoxies, resins, caulking and latex
- Codes and specifications
- Conditions and use
- Bonding agents' shelf and pot life
- Component properties
- Prepare bonding agents
- Prepare surfaces
- Apply bonding agents using methods such as toweled, brushed on and caulked
- Adjust bonding agent consistency

Line (GAC): E **APPLY MASONRY SYSTEMS**
Competency: E3 **Build horizontal masonry**

Objectives

To be competent in this area, the individual must be able to:

- Prepare horizontal substrate.
- Prepare masonry units for horizontal surfaces.
- Lay masonry units on horizontal surfaces.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Describe horizontal masonry surfaces 2. Prepare horizontal substrate | <ul style="list-style-type: none"> • Patios, walkways, stairways, driveways • Excavation considerations • Soil conditions • Drainage • Membranes • Codes and regulations • Slope and grade • Application <ul style="list-style-type: none"> ○ Mortared ○ Mortarless • Form and pour concrete • Compact materials used • Screeding • Production and maintenance of even surfaces • Edging |
| <ol style="list-style-type: none"> 3. Prepare masonry units for horizontal surfaces | <ul style="list-style-type: none"> • Types of masonry units <ul style="list-style-type: none"> ○ Pavers and flagstone ○ Brick, cobblestone, pre-cast concrete, slabs • Selection and cutting of units |
| <ol style="list-style-type: none"> 4. Lay masonry units on horizontal surfaces | <ul style="list-style-type: none"> • Knowledge of bonds and patterns • Layout of pattern • Mortars and aggregates used • Bonding agents and additives • Alignment of units • Follow lines, slopes, grades, and angles • Stay on bond and keeping the pattern • Align units for aesthetic reasons • Seal the surface <ul style="list-style-type: none"> ○ Release agent and cleaning |

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>3. Build chimneys and install dampers and flue linings</p> | <ul style="list-style-type: none"> • Expansion and contraction of installation materials • Types and sizes of flues and fireboxes • Codes and regulations • Install clean-out • Calculate size of firebox • Build backup work • Install steel angles • Create smoke shelf • Corbel bricks to create smoke chamber • Parging inside of smoke chamber • Install dampers • Install flue liners • Install chimney flashing |
| <p>4. Install prefabricated masonry heater/stove units</p> | <ul style="list-style-type: none"> • Expansion and contraction • Types and sizes of heaters • Codes and regulations • Types of insulation • Install steel angles • Corbel brick to create smoke chamber • Parge inside of smoke chamber • Install flue liner • Install cap • Install step flashing |
| <p>5. Face fireplaces and masonry heaters</p> | <ul style="list-style-type: none"> • Materials <ul style="list-style-type: none"> ○ Brick ○ Stone ○ Tile • Codes and regulations • Determine dimensions • Lay out bonds and heights • Install lintels • Corbel and install mantles • Install accessories • Fans, vents, doors, intake |

Achievement Criteria

Performance	The individual will build a fireplace from ground to the first flue.
Conditions	<p>The individual will be given:</p> <ul style="list-style-type: none"> • Ash dump • Fresh air intake • Damper • Flue liners • Facing brick • Back up brick • Fire brick • Fire clay • Tools • Instructions • Drawing
Criteria	<p>The individual will score 70% or better on a rating sheet that reflects the following criteria:</p> <ul style="list-style-type: none"> • Proper dimension of fire box • Proper ratio of flue liner to fire box • Back up walls • Proper construction of smoke chamber • Parging of smoke chamber • Corbel brick to create the smoke chamber • Proper fire place facing construction • Skirt dimension • Bonding of facing to rough-in

Line (GAC): G BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS

Competency: G2 Install refractory materials for heat-resistant applications

Objectives

To be competent in this area, the individual must be able to:

- Remove existing heat resistant materials.
- Prepare for installation of heat resistant materials.
- Install heat resistant materials.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Remove existing heat resistant materials</p> | <ul style="list-style-type: none"> • Materials <ul style="list-style-type: none"> ○ Bricks ○ Basic refractory mortar ○ Insulation back-up • Equipment • Safety codes and regulations, Safety Data Sheets (SDS) • Lockout procedures • PPE for refractory material removal • Work in confined spaces • Work procedures <ul style="list-style-type: none"> ○ Cutting ○ Grinding ○ Hammering • Take out materials • Dispose of hazardous materials • Clean up |
| <p>2. Prepare for installation of heat resistant materials</p> | <ul style="list-style-type: none"> • Specifications • Types of materials <ul style="list-style-type: none"> ○ Bricks <ul style="list-style-type: none"> – Alumina – Silica – Insulator – Plastic ○ Carbon ○ Castables ○ Blanket ○ Board insulation • Codes and regulations • Build forms and arches |

LEARNING TASKS

CONTENT

3. Prepare mortar and accessories for heat-resistant materials

- Types of refractory material
 - Mortar and brick
 - Safety codes and regulations
- Installation sequence of brick and tile according to number and quality
- Forms and arches
- PPE for refractory materials installation
- Installation of forms and arches
- Pouring, spraying and vibrating castables
- Lay firebrick
- Install insulation (blankets and modules)
- Ram plastic
- Ensure expansion and contraction provisions of materials

4. Install heat resistant materials

- Materials
 - Mortar and brick
- Safety codes and regulations, SDS
- Installation sequence of brick and tile according to number and quality
- Forms and arches
- PPE for refractory material installation
- Install forms and arches
- Pouring, spraying and vibrating castables
- Lay firebrick
- Install insulation (blanket and modules)
- Ram plastic
- Ensure expansion and contraction provisions of materials

Line (GAC): G BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS

Competency: G3 Install corrosion resistant materials for corrosion resistant applications

Objectives

To be competent in this area, the individual must be able to:

- Remove corrosion resistant materials.
- Prepare for installation of corrosion resistant materials.
- Prepare mortar and accessories for corrosion resistant materials.
- Install corrosion resistant materials.

LEARNING TASKS	CONTENT
1. Remove existing corrosion resistant materials	<ul style="list-style-type: none"> • Lockout procedures • Codes and regulations • Hazards <ul style="list-style-type: none"> ○ Ammonia ○ Chlorine ○ Hydrogen sulphate • Materials <ul style="list-style-type: none"> ○ Acid-resistant bricks ○ Acid-resistant tiles ○ Refractory non-corrosive mortar ○ Membrane concrete ○ C-Mag • Cut, grind and hammer materials • Take out materials • Work in confined spaces
2. Prepare for installation of corrosion resistant materials	<ul style="list-style-type: none"> • Types of materials <ul style="list-style-type: none"> ○ Number -2 acid brick ○ C-Mag ○ Acid resistant tile ○ Concrete • Codes and regulations • Spark test membranes • Build forms • Install membranes
3. Prepare mortar and accessories for corrosion resistant materials	<ul style="list-style-type: none"> • Types of refractory non-corrosive mortar <ul style="list-style-type: none"> ○ Air setting ○ Polyurethane ○ Resins
4. Install corrosion resistant materials	<ul style="list-style-type: none"> • Materials

LEARNING TASKS

CONTENT

- Mortar and brick
 - Forms
 - Installation sequence of brick and tile according to number and colour
 - Codes and regulations
 - PPE for refractory material installation
 - Install forms
 - Pour, spray and vibrate castables
 - Lay brick
 - Lay tile
 - Spray gunitite
 - Pour concrete

Achievement Criteria

Performance The individual will build a free-standing acid-resistant tile mock up.

Conditions The individual will be given:

- Tools
- Instructions
- Materials
- Plan

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Level
- Hammer cut
- Plumb
- Alignment
- Jointing

Line (GAC): I **PERFORM SPECIALIZED MASONRY WORK**
Competency: I2 **Install ornamental and sculptured masonry**

Objectives

To be competent in this area, the individual must be able to:

- Prepare surfaces for ornamental and sculptured masonry.
- Install ornamental and sculptured masonry units.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>1. Describe ornamental and sculptured masonry</p> | <ul style="list-style-type: none"> • Types of materials • Stone, brick, marble, clay, pre-cast concrete • Purpose • Installations <ul style="list-style-type: none"> ○ Serpentine walls, gateposts, garden walls ○ Terracotta, carved stone, carved brick, pre-cast concrete ○ Piers ○ Chimney pots ○ Columns, fences, handrails, cornices |
| <p>2. Prepare surfaces for ornamental and sculptured masonry</p> | <ul style="list-style-type: none"> • Types of surfaces <ul style="list-style-type: none"> ○ Stone ○ Brick ○ Concrete ○ Marble • Types of bonds and patterns <ul style="list-style-type: none"> ○ Running ○ Stack ○ Herringbone ○ Basket weave • Types of mortars • Reference to sketch or numbered unit • Match mortar to material • Calculate dimensions • Determine gauge of mortar joints • Sketch bond and pattern |

LEARNING TASKS

CONTENT

3. Install ornamental and sculptured masonry units

- Types of materials
 - Stone
 - Brick
 - Concrete
 - Terracotta
 - Marble
- Factors affecting durability
 - Local frost level
 - Foundation
 - Batter and backing
 - Mortar
 - Height
 - Movement joints
 - Flashing and capping
- Types of bonds and patterns
 - Running, stack
 - Herringbone
 - Basket weave
- Types of mortars
- Lay out the location of installation
- Determine the location of pilaster in wall
- Lay out for tying in or bonding intersections
- Maintain the bond

Achievement Criteria

Performance The individual will build a brick wall with a herringbone pattern on 45° angle.

Conditions The individual will be given:

- Materials
- Tools
- Instructions

Criteria The individual will score 70% or better on a rating sheet that reflects the following criteria:

- Proper pattern
- Proper dimensions
- Proper angles
- Level, plumb and alignment
- Jointing
- Safety
- Cleanliness

Line (GAC): I **PERFORM SPECIALIZED MASONRY WORK**
Competency: I3 **Build arches**

Objectives

To be competent in this area, the individual must be able to:

- Prepare sites for arches.
- Install arch masonry units.
- Remove arch template.

LEARNING TASKS

CONTENT

1. Prepare sites for arches

- Materials
- Types and sizes of arch
- Location of arch
- Reinforce surrounding masonry
- Install anchors and ties for masonry arch
- Build support system for template

2. Build templates

- Types and sizes of arch
- Materials
 - Wood
 - Metal (kiln ring)
 - Extruded foam
- Application of geometric concepts and basic math
- Construction techniques of templates
- Design of template
- Assembly of template
- Determine type, location, span, rise and depth of arch
- Determine structural strength requirements for templates

3. Place templates

- Incorporate template on support system
- Adjust template for level and plumb
- Shim and shore

LEARNING TASKS

CONTENT

- | | |
|-------------------------------|---|
| 4. Install arch masonry units | <ul style="list-style-type: none"> • Materials <ul style="list-style-type: none"> ○ Brick, stone and mortar • Installation procedures <ul style="list-style-type: none"> ○ Determine angle of skew-back ○ Lay out and align to bond ○ Determine center of arch ○ Cut creepers around arch ○ Full joints • Shape masonry voussoirs (arch brick) |
| 5. Remove templates | <ul style="list-style-type: none"> • Mortar setting times • Remove shims • Remove support • Remove template without damaging arch material • Point and joint mortar in arch • Clean up |

Achievement Criteria

- | | |
|-------------|--|
| Performance | The individual will build an arch integrated into a fireplace project (G1). |
| Conditions | The individual will be given: <ul style="list-style-type: none"> • Materials • Tools • Instructions |
| Criteria | The individual will score 70% or better on a rating sheet that reflects the following criteria: <ul style="list-style-type: none"> • Proper dimensions and shape • Proper cuts • Alignment • Jointing • Proper joint spacing and gauging • Level and plumb • Bond • Safety |

Section 4

ASSESSMENT GUIDELINES

Assessment Guidelines – Level 1

Level 1 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		BRICKLAYER LEVEL 1	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	USE SAFE WORK PRACTICES	5%	15%
B	USE TOOLS AND EQUIPMENT	15%	15%
C	ORGANIZE WORK	20%	10%
D	PERFORM ROUTINE MASON PRACTICES	20%	0%
E	APPLY MASONRY SYSTEMS	35%	50%
H	PERFORM RESTORATION	5%	10%
	Total	100%	100%
In-school theory/practical subject competency weighting		40%	60%
Final in-school percentage score		IN-SCHOOL %	

In-school percentage score Combined theory and practical subject competency multiplied by	80%
Standardized level exam percentage score The exam score is multiplied by	20%
Final percentage score	FINAL %

Assessment Guidelines – Level 2

Level 2 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		BRICKLAYER LEVEL 2	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
C	ORGANIZE WORK	5%	0%
D	PERFORM ROUTINE MASON PRACTICES	10%	0%
E	APPLY MASONRY SYSTEMS	30%	30%
F	APPLY STONE SYSTEMS	5%	10%
G	BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS	15%	10%
H	PERFORM RESTORATION	5%	10%
I	PERFORM SPECIALIZED MASONRY WORK	30%	40%
	Total	100%	100%
In-school theory/practical subject competency weighting		40%	60%
Final in-school percentage score		IN-SCHOOL %	

In-school percentage score Combined theory and practical subject competency multiplied by	80%
Standardized level exam percentage score The exam score is multiplied by	20%
Final percentage score	FINAL%

Assessment Guidelines – Level 3

Level 3 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		BRICKLAYER LEVEL 3	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
C	ORGANIZE WORK	10%	0%
D	PERFORM ROUTINE MASON PRACTICES	5%	0%
E	APPLY MASONRY SYSTEMS	5%	0%
F	APPLY STONE SYSTEMS	5%	0%
G	BUILD CHIMNEYS, FIREPLACES AND REFRACTORY MATERIALS	50%	70%
H	PERFORM RESTORATION	5%	0%
I	PERFORM SPECIALIZED MASONRY WORK	20%	30%
	Total	100%	100%
In-school theory/practical subject competency weighting		40%	60%
Final in-school percentage score		IN-SCHOOL %	
Apprentices must achieve a minimum 70% for the final in-school mark to be eligible to write the Bricklayer Interprovincial Red Seal exam.			

All apprentices who complete Level 3 of the Bricklayer program with a FINAL level mark of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.

SkilledTradesBC will enter the apprentice’s Bricklayer Interprovincial Red Seal examination mark in ITADA.

A minimum mark of 70% on the examination is required for a pass.

Section 5

TRAINING PROVIDER STANDARDS

Facility Requirements

Classroom Area

- Comfortable seating and tables suitable for learning
- Compliance with the local and national fire code and occupational safety requirements
- Overhead and/or multimedia projectors with a projection screen
- Whiteboard with marking pens and erasers
- Lighting controls to allow easy visibility of the projection screen while allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature control to ensure comfortable room temperature
- Acoustics in the room must allow audibility of the instructor
- Access to a computer with internet access
- Appropriate reference material for student and instructor use

Shop Area

- Adequate space for a tool crib and storage
- Minimum 10 foot ceiling height in shop areas
- Minimum 200 sq. ft./student (not including tool crib and storage)
- Adequate heating, lighting
- Adequate ventilation
- Refuse and recycling bins for used shop materials.
- First-aid equipment.
- Shops will support practical requirements as outlined in the Program Outline

Lab Requirements

- N/A

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal Storage lockers
- Clean-up (personal hygiene) facilities for students

Instructor Office Space

- Desk and secure filing space
- Computer
- Staff lounge appropriate for the number of staff

Tools and Equipment

Shop Equipment

Required Power, Hydraulic and Pneumatic, Powder-actuated, and Welding Tools and Equipment

- Circular saw
- Compressors
- Couplers
- Diamond or abrasive disk
- Dollies / pump jacks
- Drill
- Grinder
- Jig saw
- Masonry table saw
- Mortar box
- Mortar buggy
- Mortar mixer
- Portable masonry saw
- Vacuum cleaner

Required Hoisting and Lifting Equipment and Scaffolding

- Bracing
- Forklift
- Handcart
- Ladders
- Planks
- Scaffolding
- Scaffolds and their components

Required Measuring and Layout Tools and Equipment

- Bricklayer's tape
- Chalk line
- Gauge rod / storey pole
- Laser level
- Line block
- Mason's level
- Mason's line
- Mason's spacing rule
- Plumb-bob
- Square
- Straightedge

Required Hand Tools

- Brushes
- C- clamps
- Caulking gun
- Caulking tool
- Chisels
 - Flat
 - Brick Set
 - Pitching
 - Plugging
 - Pointed
 - Splitting
 - Straight
 - Toothed
- Curry comb
- Grout bag
- Pliers
- Portable sprayer
- Pry bar
- Raker-wheel type
- Sandbox
- Sandscreen
- Scrapers
- Screwdrivers
- Shims/spacers
- Shim driver
- Shovels
- Slicker
- Socket set / wrench
- Sponges

- Hammers
 - Brick
 - Bush
 - Claw
 - Dead blow
 - Face
 - Mash
 - Refractory (rawhide)
 - Rubber mallet
 - Sledge hammer
- Hawk
- Jointer
- Knives
- Line holders
- Line pins
- Line trigs
- Level
- Manual splitter
- Mortar hoe
- Pallet jack
- Staple gun
- Straps and chockers
- Tarpaulin (tarp)
- Templates
- Trammels points
- Trimmers
- Trowels
 - Bucket
 - Battering
 - Duck billed
 - Margin
 - Mason's
 - Pointing
 - Tuck pointer
- Venting tool
- Water bucket
- Water drum
- Water hose
- Wheelbarrow
- Wire snips

Required PPE and Safety Equipment

- Apron
- Eye protection
- Eye wash station
- Face shields
- Fire blankets
- Fire extinguisher
- First aid kit
- Fresh air respirator
- Gas detection equipment
- Gloves
- Hard hat
- Hearing protection
- Heat and cold protection
- Insulated gloves
- Lock-out tags / locks
- Respiratory protection
- Safety boots / footwear
- Safety harness and fall arrest system
- Safety vest
- Skin barrier cream

Student Tools (supplied by student)

Required

- Steel toed boots
- Hard hats

Reference Materials

Required Reference Materials

- Relevant BC Building Code
 - Section 9.20
 - Section 9.21
 - Section 9.22

- CSA MASONRY STANDARD
 - A82-06 Fired Masonry Brick Made from Clay or Shale
 - A65.1-04 Concrete Block Masonry Units
 - A179-04 Mortar and Grout for Unit Masonry
 - A370-04 Connectors for Masonry
 - A371-04 Masonry Construction for Buildings

- HEALTH AND SAFETY REGULATIONS
 - WorkSafeBC (Available online at <https://www.worksafebc.com/en>)

- MEASUREMENT AND CALCULATION FOR THE TRADES
 - BC Construction Industry Skills Improvement Council

- TECHNICAL MANUAL
 - Masonry Institute of BC (Available online at <http://www.masonrybc.org>)

- TEXTBOOK OF CANADIAN MASONRY - 1ST Edition - (2010)
Canadian Masonry Contractors Association ISBN 978-0-9737209-3-8

- BUILDING TRADES BLUEPRINT READING-Part 1 Fundamentals - 5TH Addition Elmer W. Sundberg
American Technical Society ISBN 0-82669-0441-6

Recommended Resources

- BOOK OF SUCCESSFUL FIREPLACES
Structures Printing Co.

- MASONRY SKILLS, 5th Addition (2003)
Richard T. Kreh
Delmar Publishers Inc.

- RECOMMENDED PRACTICES AND GUIDE SPECIFICATIONS FOR MASONRY CONSTRUCTION -
COLD WEATHER
International Masonry Industry All-Weather Council

Instructor Requirements

Occupation Qualification

The instructor must possess:

- Bricklayer BC Certificate of Qualification with an Interprovincial Red Seal Endorsement, or
- Bricklayer Certificate of Qualification from another Canadian jurisdiction with an Interprovincial Red Seal Endorsement

Work Experience

- A minimum of 10 years of experience working in the industry as a journeyperson.

Instructional Experience and Education

- The instructor must possess or be working towards a BC Provincial Instructor Diploma

Appendices

Appendix A
Glossary of Terms

TERM	DEFINITION
Ash dump	A trap door for ashes in the floor of a fireplace leading to a chute.
Batter	Recessing or sloping masonry in successive courses; the opposite of a corbel.
Buttering	Applying mortar to a masonry unit with a trowel.
Castables	A refractory concrete that can be installed by pouring, gunning, shotcreting and hand packing.
Cavity wall	A refractory concrete that can be installed by pouring, gunning, shotcreting and hand packing.
Cement	A burned mixture of clay and limestone pulverized (crushed) for making mortar or concrete.
Control joint	(movement joint) a joint or space to allow for dimensional change of parts of a structure due to expansion, shrinkage, temperature variations or other causes.
Corbel	To build a projection or one of a series of projections, of masonry, brick, or concrete built into a wall or any standing member, each projecting progressively farther from its anchoring point and used to support an overhanging member above.
Course	One of the continuous horizontal layers of units, bonded with mortar in masonry.
Curtain wall	A non-load-bearing wall built for the enclosure of a building.
Dowels	(pins) round metal bars used to connect two sections of masonry
Expansion joint	Is a (movement joint) joint in a concrete or masonry structure designed to permit expansion without damage to the structure.
Face	The exposed surface of a wall or masonry unit.
Flashing	Shielding material (often sheet metal) put around building openings to prevent water penetration and/or provide water drainage.
Footing	The broadened base of a foundation wall or other superstructure that distributes load to ground.
Foundation wall	That portion of a load-bearing wall below the level of the adjoining grade, or below first floor beams or joists.
Grout	A cementitious compound of high water-cement ratio that permits it to be poured into spaces within masonry walls. Grout consists of water, Portland cement, lime and aggregate.
Hearth	(inner) that portion of a fireplace parallel to the floor, upon which the fire is built; (outer) that portion of a fireplace that is the non-combustible area in front of the firebox opening that protects the floor from flying sparks.
Insulation	A material with above-average thermal resistance, that inhibits the flow of heat.
Joint	The narrow space between adjacent stones, bricks or other building blocks usually filled with mortar.
Kerf	A slot in the stone for the insertion of anchors.
Lime	The result of limestone burned in a kiln until the carbon dioxide has been driven off.
Lintel	A load-bearing element placed over a wall opening.
Load-bearing wall	One which supports a load in addition to its own weight.

TERM	DEFINITION
Masonry	Brick, block, tile, terracotta, and stone or combination of masonry products bonded with mortar.
Parging	The process of applying a coat of cement mortar on a substrate.
Pilaster	A square or rectangular column forming part of a wall, partially projecting from it and bonded to it.
Pointing	Compressing mortar to fill voids in joints.
Retardant	A set inhibitor to delay the setting and curing time of concrete and mortar
Reinforcing	Steel bars, wire mesh and reinforcement wire which are embedded in concrete or mortar to give extra tensile strength to control movement in masonry assemblies or concrete slabs.
Smoke chamber	The space in a fireplace immediately above the throat where the smoke gathers before passing into the flue.
Stone cladding	Masonry units that are mechanically fastened to a structural backup wall. Stone used for cladding are typically large and are pre-finished in a stone-cutting and finishing shop.
Surface bonded masonry units	Thin masonry components installed directly to prepared substrates. They are used for aesthetic purposes.
Template	Any form over which masonry may be installed
Tie	Any unit of material that connects masonry units to each other or the substrate
Veneer wall	A non-load-bearing wall securely anchored to a backup wall.
Voussoir	Masonry units which form an arch.
Waterproofing	Treatment of a below-grade masonry surface to prevent the passage of water by vapour pressure, capillarity, gravity or hydrostatic pressure.
Wythe	A continuous vertical section of masonry one unit in thickness



**Appendix B
Acronyms**

TERM	MEANING
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
CITO	Construction Industry Training Organization
C of A	Certificate of Apprenticeship
C of C	Certificate of Completion
C of Q	Certificate of Qualification
CSA	Canadian Standards Association
GAC	General Areas of Competencies
GHS	Globally Harmonized System
NBC	National Building Code
NFPA	National Fire Protection Association
OAC	Occupational Analysis Chart
OHS	Occupational Health & Safety
PPE	personal protective equipment
PSI	personal safety information
PVC	polyvinyl chloride
SDS	Safety Data Sheets
TDG	transportation of dangerous goods
WBT	Work based training
WHMIS	Workplace Hazardous Materials Information System