



Masonry



Missouri

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Standards in this document are based on information from the following organizations:

- U.S. Department of Labor
Employment and Training Administration
Office of Youth Services and Job Corps.
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Education and Research, (352) 334-0920,
<http://www.nccer.org/>
- Workplace Skills for the
21st Century* Secretary's Commission on Achieving Necessary Skills.

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Vocational training programs in Iraq are faced with many challenges. Iraq needs a speedy reconstruction and the Iraqi people need a future with the promise of employment and prosperity.

This training will combine occupational skills with technical knowledge and will be competency based. We will customize training to meet employer demands, cultural differences, geographic location, and needs of the trainees. The technical approach is modeled after the U.S. Department of Labor, Employment and Training Administration, Office of Job Corps training model. This curricula is competency-based, meaning that the student actually demonstrates a competency in practice and assessments. The Job Corps vocational training curricula consist of competency objectives with corresponding lessons and tasks or skill assignments. Following completion of each level of difficulty or assigned task, assessment tools determine competency and will help with evaluation and remediation. The competency-based instructional programs will:

- ▶ Assess the trainee's needs, including strengths and weaknesses
- ▶ Select appropriate instructional goals based on the needs assessment
- ▶ Provide trainee-centered instruction aimed at the instructional goals
- ▶ Evaluate to determine if the trainee has mastered the goals and can apply them

The instructional design (competency-based) will let the trainees demonstrate competency for the skills they already have and then begin instruction at the point where competency is not demonstrated. From there, the trainee will progress through the competencies listed on a Training Achievement Record until they complete training and are prepared to work.

These instructional materials include a Training Achievement Record (TAR). TARs list each competency required for the trade grouped by skill type. The curricula also include sample lesson plans. The curricula will provide for development in general areas prior to competency in more specific trade areas. This allows those who are not able to complete an entire program to develop skills suitable for lower levels of employment.

This curriculum has been developed in collaboration with MOLSA instructors, Job Corps training experts, and other technical professionals. It was created for use in all MOLSA vocational technical training centers that educate and train students to become competent, entry-level Masonry workers. This curriculum will provide instructors with the necessary ingredients for a complete Masonry program. The purpose of this guide is to establish a common language of proficiency standards so that both the Vocational Technical Training Centers and industry have a universal set of standards for masonry programs.

This curriculum has been developed for use by all Iraq Vocational Technical Training Centers that offer programs in masonry. Because of the great diversity among the different regions of the country, this curriculum was designed, to be a flexible document that allows for the differences in instructor methodology. There are also differences in the length of programs and differences in equipment at some of the MOLSA centers. All content areas and competencies must be integrated into the training center masonry curricula so that students become competent in those areas.

This curriculum does not offer a step-by-step formula for teaching a masonry course. This guide is designed to facilitate the classroom work of masonry instructors but not to replace the decision-maker.

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who successfully pass this course may be certified by MOLSA and will receive documentation from MOLSA.

It is the instructor who organizes instructional materials for effective and efficient learning. And **it is the instructor** who integrates the latest teaching technologies into his or her classroom. It is in support of these professionals and of their students that this curriculum has been developed.

Each vocational course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Module Number and Title (TAR Skillset)
- Suggested Time to Train on Skillset - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the module. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Outcomes
 - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a module. The student, instructor and worksite supervisor (if applicable) will evaluate and record a pre-training mastery level for all skillsets, as well as a post-training mastery level review.
 - The outcomes represent the enabling and supporting knowledge and demonstrated performances that will indicate mastery of the competency at the course level.

- Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources, however, the only required assessment is completion of the TAR checklist.
- References - A list of suggested references is provided for each unit in the appendix. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested outcomes. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

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Masonry is an instructional program which prepares students to enter the field of masonry. Study in the course allows an individual to prepare for employment and/or continued education in the masonry field. Included in Masonry I are units of study for employability skills, measuring and leveling, installation and building, layout and bond, masonry wall reinforcement, grouting, and fireplaces.

The content of the masonry curriculum framework follows the recommended national standards for the U.S. Office of Job Corps.

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who study this curriculum using the Contren Learning Series materials under the supervision of an instructor who has been certified by the NCCER are eligible to be tested on each module. Students who complete the course will receive a certificate provided by Iraq Ministry of Labor and Social Affairs (MOLSA).

Table 1: Curriculum

Module	Title	Hours
Module 1:	Employability Skills.....	10.0 hours
Module 2:	Measuring and Leveling.....	160.0 hours
Module 3:	Installation and Building.....	80.0 hours
Module 4:	Layout and Bond.....	160.0 hours
Module 5:	Masonry Wall Reinforcement.....	160.0 hours
Module 6:	Grouting.....	80.0 hours
Module 7:	Fireplaces (Optional).....	200.0 hours
Total		850.0

Employability Skills

Module 1

110 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Employability Skills.</p> <ul style="list-style-type: none"> a. Demonstrate the ability to arrive for work on time. b. Demonstrate the ability to work a full day. c. Demonstrate the ability to dress appropriately for work. d. Demonstrate the ability to recognize and work within chain of command. e. Demonstrate the ability to respond appropriately to supervision. f. Demonstrate the ability to accept constructive criticism. g. Demonstrate the ability to follow directions. h. Demonstrate the ability to listen effectively. i. Demonstrate the ability to ask for clarification when further information is required. j. Demonstrate the ability to share information and explain procedures to another person. k. Demonstrate the ability to take initiative. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Define trade terms related to basic employability skills. • Students will interview individuals in the bricklaying/masonry industry. Students will be provided questions by the instructor. The students will write a report on the interview and present the report to the class. • Use the Contren Series Core text, Basic Employability Skills Unit related to basic skills, to introduce the Competencies. <p>Assessment:</p> <ul style="list-style-type: none"> • Assess student understanding through instructor observations and written unit test. • Validate mastery of the skillsets using the TAR Checklist.

<ul style="list-style-type: none">l. Demonstrate the ability to work as a member of a team.m. Demonstrate the ability to work harmoniously with diverse races, sexes, ages, and cultures.n. Demonstrate the ability to troubleshoot and solve problems.o. Demonstrate the ability to access and use information from manuals and/ or computers.p. Demonstrate the ability to maintain good hygiene.q. Demonstrate the ability to stay on task.r. Demonstrate the ability to respect the worth of tools, equipment, materials and other people's property.	
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Measuring and Leveling

Module 2

1160 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Measuring and Leveling</p> <ul style="list-style-type: none"> a. Set up a corner pole. b. Use a story pole to set exterior elevations. c. Use levels, transits and rods. d. Demonstrate the 3-4-5 squaring method. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Discuss the importance of proper measuring and leveling in the field of masonry. • Discuss and demonstrate measuring, marking, and cutting brick and block to specification. • Discuss the importance of accuracy as related to cost. • Provide the students with specifications and have them demonstrate measuring and marking to specification. • Discuss and demonstrate the procedures for laying out a brick or block wall using levels, transit and rods. • Discuss and demonstrate the procedures for using the 3-4-5 squaring method. <p>Assessment:</p> <ul style="list-style-type: none"> • Evaluate the students for participation and accuracy of projects using the TAR Checklist and instructor observations.

	<ul style="list-style-type: none">• Validate mastery of the skillsets using the TAR Checklist.
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Module 3

Installation and Building

130 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Installation and Building</p> <ul style="list-style-type: none"> a. Describe safety precautions associated with installing and building masonry units. b. Lay up veneer. c. Lay overhand. d. Lay a rowlock course. e. Lay a soldier course. f. Install sills. g. Install headers. h. Build corners and leads. i. Build pilasters and piers. j. Demonstrate masonry replacement techniques. k. Install flashing. l. (Optional) Caulk masonry joints. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Describe the proper safety precautions when working with grout. • State the safety precautions that must be practiced at a work site. • Divide students into groups and give each group a scenario/case study involving an accident. Have each group identify safety mistakes in each situation; determine the correct procedures; and present the scenario, mistakes found, and procedures which should have been used to correct the problem. • Discuss the basics of brick laying techniques and demonstrate the process of laying up veneer. • Demonstrate the process of laying overhand. • Demonstrate the process to layout a rowlock course. • Demonstrate the process of laying a soldier course. • Lay masonry units in a true course. • Demonstrate the process of

	<p>installing sills.</p> <ul style="list-style-type: none">• Demonstrate the process of installing headers.• Demonstrate the process of building corners and leads.• Demonstrate the process of building pilasters and piers.• Demonstrate the process of masonry replacement, installing sills. <p>Assessment:</p> <ul style="list-style-type: none">• Validate mastery of the skillsets using the TAR Checklist.
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Layout and Bond

Module 4

160 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Layout and Bond</p> <ul style="list-style-type: none"> a. Layout a brick wall. b. Layout a block wall. c. Layout a composite wall with control joints, flashing and weep holes. d. Describe various bond patterns (English, Flemish, running, stack, etc.). e. Layout and install pavers in various patterns. 	<p>Teaching:</p> <ul style="list-style-type: none"> • From a plan, calculate the square footage and layout of a brick wall. • Demonstrate how to construct a block wall, a composite wall with control joints, flashing and weep holes. • Discuss types of bond patterns. • Demonstrate how to layout and install pavers. <p>Assessment:</p> <ul style="list-style-type: none"> • Validate mastery of the skillsets using the TAR Checklist.

Masonry Wall Reinforcement

Module 5

1160 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Masonry Wall Reinforcement</p> <ul style="list-style-type: none"> a. Describe reinforcement safety precautions. b. Install lateral wall ties. c. Install horizontal wall reinforcements. d. Install rebars. e. Install lintels (pre-cast and angle iron). f. Install bond beams. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Discuss the structural principals and fundamental uses of basic types of walls. • Discuss and demonstrate the different types of horizontal joint reinforcements and ties. • Describe and construct the various types of walls using proper reinforcement, jointing, and bonding techniques. • Explain the requirements for wall bracing and demonstrate the techniques used to construct different types of bracing. <p>Assessment:</p> <ul style="list-style-type: none"> • Validate mastery of the skillsets using the TAR Checklist.

Module 6

Grouting

180 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Grouting</p> <ul style="list-style-type: none"> a. Describe grouting safety precautions. b. Mix reinforced grout. c. Mix grouts for brick pavers. d. Grout reinforced masonry. e. Grout brick pavers. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Describe the proper safety precautions when working with grout, and at a worksite. • Name and describe the primary ingredients in grout and their properties. • Explain and describe the common admixtures and their uses. • Identify the common problems found in grout application and the solutions. • Demonstrate the proper mix level (plus or minus). • Describe the use of steel bar reinforcement in construction. • Describe the uses of different types of horizontal joint reinforcements and ties. • Identify and explain the characteristics, uses, and installation techniques for brick pavers. <p>Assessment:</p> <ul style="list-style-type: none"> • Validate mastery of the skillsets using the TAR Checklist.

Fireplaces (Optional)

Module 7
1200 Hours!

Competencies and Outcomes	Strategies for Competencies
<p>1. Fireplaces (optional)</p> <ul style="list-style-type: none"> a. Describe masonry fireplace safety precautions. b. Layout a firebox. c. Install a firebox. d. Set dampers and headforms. e. Construct a brick corbel. f. Place a flue liner. 	<p>Teaching:</p> <ul style="list-style-type: none"> • Discuss and demonstrate safety precautions when installing fireplaces. • Discuss and demonstrate the correct procedures for laying out and installation of a masonry fireplace. Have students perform a complete project from job plans up to finish. • Given the proper rationale, the students will demonstrate the proper procedures for setting dampers and headforms. • Given the proper rationale, students will demonstrate the proper procedures for constructing a brick corbel. <p>Assessment:</p> <ul style="list-style-type: none"> • Validate mastery of the skillsets using the TAR Checklist.

Appendix A

TAR

(Training Achievement Record)

**Evaluation Checklist
for
Masonry**

When the student performs a task listed in the "DUTIES AND TASKS" column, the instructor should rate the student's level of performance by circling a, b, or c in the "PERFORMANCE RATING" column.

RATING

a - Proficient and able to teach others	The student consistently performs the task accurately without supervision. The student possesses sufficient skill to teach the task to others.
b - Proficient	The student performs the task to industry standards with little or no supervision. This is the minimum performance rating for TAR skill completion.
c - Exposed/not proficient	The student has been introduced to the task, but cannot perform the task to industry standards.

1. If the student performs the task at a level c, circle the number in pencil so that it can later be erased and entered permanently as b or a when the student improves his/her performance. A performance level of b is satisfactory (passing) and can be entered permanently or, at the instructor's discretion, circled in pencil to allow the student to improve his/her performance at a later date.
2. When the student performs the task to the instructor's satisfaction, **(at a level of b or a)** circle the appropriate performance rating, and enter the date in the "DATE COMPLETED" column. The instructor and student should initial the **DUTY** area when **all the tasks** in that duty area are completed.

B. When the student completes the TAR or terminates the program before completing the TAR, the instructor must finalize the TAR by doing the following:

1. Check the appropriate box and enter the date that the student completed the TAR or terminated the training program in the space provided at the top of page 1:

Completed or Terminated Training: _____
Date

Training Guidelines



BRICKLAYER / MASONRY

TRAINING ACHIEVEMENT RECORD (TAR) FOR:

CENTER'S NAME: _____

Name: _____

Address: _____

SSN: _____

Date Entered Training: _____

Phone: _____

Completed or Terminated Training: _____
Date

Instructor: _____

PREREQUISITE:

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
A. EMPLOYABILITY SKILLS				
1. Demonstrate the ability to arrive for work on time.	a b c ¹			
2. Demonstrate the ability to work an eight-hour day.	a b c			

¹a - Proficient and able to teach others; b - Proficient; c - Exposed/not proficient

Training Guidelines

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
3. Demonstrate the ability to dress appropriately for work.	a b c			
4. Demonstrate the ability to recognize and work within a chain of command.	a b c			
5. Demonstrate the ability to respond appropriately to supervision.	a b c			
6. Demonstrate the ability to accept constructive criticism.	a b c			
7. Demonstrate the ability to follow directions.	a b c			
8. Demonstrate the ability to listen effectively.	a b c			
9. Demonstrate the ability to ask for clarification when further information is required.	a b c			
10. Demonstrate the ability to share information and explain procedures to another person.	a b c			
11. Demonstrate the ability to take initiative.	a b c			
12. Demonstrate the ability to work as a member of a team.	a b c			
13. Demonstrate the ability to work harmoniously with diverse races, sexes, ages and cultures.	a b c			
14. Demonstrate the ability to troubleshoot and solve problems.	a b c			
15. Demonstrate the ability to access and use information from manuals and/or computers.	a b c			
16. Demonstrate the ability to maintain good hygiene.	a b c			
17. Demonstrate the ability to stay on task.	a b c			

¹a - Proficient and able to teach others;

b - Proficient;

c - Exposed/not proficient

Training Guidelines

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
18. Demonstrate the ability to respect the worth of tools, equipment, materials and other people's property.	a b c			
19. (Optional) Complete "My Personal Employability Plan" (My-PEP, available on line at the www.jccdr.org website).	a b c			
B. MEASURING AND LEVELING				
1. Set up a corner pole.	a b c			
2. Use a story pole to set exterior elevations.	a b c			
3. Use levels, transits and rods.	a b c			
4. Demonstrate the 3-4-5 squaring method.	a b c			
C. INSTALLATION AND BUILDING				
1. Describe safety precautions associated with installing and building masonry units.	a b c			
2. Lay up veneer.	a b c			
3. Lay overhand.	a b c			
4. Lay a rowlock course.	a b c			
5. Lay a soldier course.	a b c			
6. Install sills.	a b c			
7. Install headers.	a b c			
8. Build corners and leads.	a b c			
9. Build pilasters and piers.	a b c			

¹a - Proficient and able to teach others;

b - Proficient;

c - Exposed/not proficient

Training Guidelines

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
10. Demonstrate masonry replacement techniques.	a b c			
11. Install flashing.	a b c			
12. (Optional) Caulk masonry joints.	a b c			
D. LAYOUT AND BOND				
1. Layout a brick wall.	a b c			
2. Layout a block wall.	a b c			
3. Layout a composite wall with control joints, flashing and weep holes.	a b c			
4. Describe various bond patterns (English, Flemish, running, stack, etc.).	a b c			
5. Layout and install pavers in various patterns.	a b c			
E. MASONRY WALL REINFORCEMENT				
1. Describe reinforcement safety precautions.	a b c			
2. Install lateral wall ties.	a b c			
3. Install horizontal wall reinforcements.	a b c			
4. Install rebar.	a b c			
5. Install lintels (precast and angle iron).	a b c			
6. Install bond beams.	a b c			
F. GROUTING				
1. Describe grouting safety precautions.	a b c			

¹a - Proficient and able to teach others;

b - Proficient;

c - Exposed/not proficient

Training Guidelines

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
2. Mix reinforced grout.	a b c			
3. Mix grouts for brick pavers.	a b c			
4. Grout reinforced masonry.	a b c			
5. Grout brick pavers.	a b c			
C. FIREPLACES (OPTIONAL)				
1. Describe masonry fireplace safety precautions.	a b c			
2. Layout a firebox.	a b c			
3. Install a firebox.	a b c			
4. Set dampers and headforms.	a b c			
5. Construct a brick corbel.	a b c			
6. Place a flue liner.	a b c			
H. EMPLOYER SPECIFIC SKILLS (OPTIONAL)				
1.	a b c			
2.	a b c			
3.	a b c			
4.	a b c			
5.	a b c			

¹a - Proficient and able to teach others;

b - Proficient;

c - Exposed/not proficient

Appendix B

Workplace Skills for the 21st Century for Masonry

For Module 1- Employability Skills

- WP1 Allocates resources (time, money, materials and facilities, and human resources).
- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
- WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
- WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
- WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
- WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 2- Measuring and Leveling

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
- WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
- WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
- WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
- WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

For Module 3- Installation and Building

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
 - WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
 - WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
 - WP5 Selects, applies, and maintains/troubleshoots technology.
 - WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
 - WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
 - WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management
-

For Module 4- Layout and Bond

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
- WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
- WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
- WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
- WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
- WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management

For Module 5- Masonry Wall Reinforcement

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
- WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
- WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
- WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
- WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

For Module 6- Grouting

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
 - WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
 - WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
 - WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
 - WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
 - WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management
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For Module 7- Fireplaces (Optional)

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
 - WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
 - WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
 - WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
 - WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management
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Appendix C

Suggested References

For Module 1- Employability Skills

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National Center for Construction Education and Research. (2004). *Masonry level II*. Upper Saddle River, NJ: Pearson Prentice Hall.

For Module 3- Installation and Building

Kreh, R. T. (2003). *Masonry skills*. Clifton Park, IL: Thompson/Delmar Learning.

National Center for Construction Education and Research. (2004). *Core curriculum*. Upper Saddle River, NJ: Pearson Prentice Hall.

For Module 4- Layout and Bond

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For Module 5- Masonry Wall Reinforcement

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For Module 6- Grouting

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For Module 7- Fireplaces (Optional)

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Appendix D

Recommended Tools & Equipment

ITEM	المادة	الكمية
Air compressor	ضاغط هواء	1
Mixer, cement, gas or electric powered	خباطة اسمنت (كهربائية أو تعمل بالضغط)	2
Saw, demolition, gas powered with blade	منشار تفليش يعمل بالضغط مع النصل	2
Scaffold 4'X2	سقالة 4 × 2 قدم	4
Box, mortar (15 cu. ft.)	حوض لخلط المونة قياس 15 قدم مكعب	2
Corner poles	أعمدة زاوية	4
Brush, masonry	فرشاة حجر	20
C-clamp, vise grip	ملزمة معكوسة (فخة قارصة)	30
C-clamp, assorted sizes	ملزمة بالأحجام منوعة (فخات متعددة)	30
Chalkline	مطبشر (لرسم بالطباشير)	30
Chisel, ripping	أزميل نبش	30
Chisel set, cold	سيت أزميل (1" - 3")	30
Clamp, bar	ملزمة قضيبية (فخة طويلة)	4
Cutter, bolt – 8" and 24"	مقص براغي (كتر) قياس 8 انج و 24 انج	2
Drill, portable 3/4 hammer with bits	مقرب (دريل) محمول قياس 4/3 مع لقم	2
Edger, cement	مالج ذو حافة مدورة لتنعيم حواف الاسمنت	30
Extension cord (100' 12/3 conductor)	سيار كهرباء	2
Float, rubber	ماسح مطاطي لتعديل صبة الاسمنت	6
Float, bull	ماسح المنيوم لتعديل صبة الاسمنت	1
Groover, cement	مالج لعمل حفرة في الاسمنت	10
Hacksaw	منشار يدوي	30
Hammer, straight claw	مطرقة مستقيمة المخلب	3
Hammer, sledge	مطرقة تفليش	3
Hammer, brick	مطرقة تفليش طابوق	30
Hammer, curved claw (16 oz.)	مطرقة معقوفة 16 اونس	3
Handsaw, crosscut	منشار متموج	30
Hawk, plastering	مالج بياض	30
Hoe, mortar	مجرفة يدوية للمونة	6
Hose, water	(خرطوم مياه (صوندة 50')	6
Hose, air (50')	خرطوم هواء طول (50 قدم)	6
Ladder, step (8')	سلم قياس 8 قدم	2
Ladder, extension (16')	سلم تطوالة قياس 16 قدم	2
Level, transit with tripod and leveling rod	جهاز ليفيل مع مسند ثلاثي الارجل	1
Level, masonry	ميزان بناء (قبان)	30
Pliers, channel lock (12")	كماشة قابلة للقفل (بلايس) قياس 12 انج	30
Pliers, vise grip	كماشة معكوسة	2

Plumb bob	شاقول	30
Industrial kit (OSHA approved)	عدة سلامة	1
Saw, circular (72" portable)	منشار دائري محمول قياس 72 انج	1
Screwdriver set (Phillips, assorted sizes)	سيت مفكات متكامل	30
Set, brick	سيت طابوق	10
Shield safety	غطاء واقى	5
Shovel, round point	مسحاة مدورة الطرف	12
Shovel, square point	مسحاة مربعة الطرف	12
Square, framing with rafter chart	مسطرة زاوية	6
Square, combination	مسطرة زاوية مثلثة	10
Tamper, hand	دكاكة يدوية	5
Trowel, bricklaying	مالج بناء	30
Trowel, tuck point	مالج صغير	30
Trowel, cement finishing	مالج لتنعيم السمنت	30
Wheelbarrow (6 cu. ft.)	عربانة قياس 6 فدام مكعب	6
Wheelbarrow, brick	عربانة طابوق	3
Wrench, pipe (8")	مفتاح انابيب (سكول سبانه) 8 انج	3
Wrench, pipe (10")	مفتاح انابيب (سكول سبانه) 10 انج	3
Tool bags	حقيبة عدد	30
Line blocks with pins	بلوك	20
Hammer, chipping	مطرقة فأسية	30