

Title 7: Education K-12

Part 49: Architecture and Construction, Career Pathway



Masonry

Mississippi Department of Education

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Program CIP: 46.0101 – Mason/Masonry

NOTE: This course uses the Construction core for the Year 1 or first two Carnegie units.

Direct inquiries to

Jo Ann Watts, MEd
Instructional Design Specialist
P.O. Drawer DX
Mississippi State, MS 39762
662.325.2510
E-mail: jo.watts@rcu.msstate.edu

Mike Barkett
Program Coordinator
Office of Career and Technical Education
Mississippi Department of Education
P.O. Box 771
Jackson, MS 39205
601.605.2989
E-mail: mike@mcef.net

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Mississippi State University
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Betsey Smith, Curriculum Manager
Jolanda Harris, Educational Technologist
Lisa Kröger, PhD, Editor

The Research and Curriculum Unit (RCU), located in Starkville, MS, as part of Mississippi State University, was established to foster educational enhancements and innovations. In keeping with the land grant mission of Mississippi State University, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Standards

Standards are superscripted in each unit and are referenced in the appendices. Standards in the *Masonry Curriculum Framework and Supporting Materials* are based on the following:

National Center for Construction Education Research, Masonry

The NCCER developed and published a set of industry standards that are taught nationwide by contractors, associations, construction users, and secondary and postsecondary schools called the Contren Learning Series. When developing this set of standards, the NCCER assembled a team of subject matter experts that represented construction companies and schools across the nation. Each committee met several times and combined experts' knowledge and experience to finalize the set of national industry standards. <http://www.nccer.org/>

Common Core State Standards Initiative

The Common Core State Standards© provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy. Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved. States and territories of the United States as well as the District of Columbia that have adopted the Common Core State Standards in whole are exempt from this provision and no attribution to the National Governors Association Center for Best Practices and Council of Chief State School Officers is required. Reprinted from <http://www.corestandards.org/>.

National Educational Technology Standards for Students

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21st Century Skills and Information and Communication Technologies Literacy Standards

In defining 21st century learning, the Partnership for 21st Century Skills has embraced five content and skill areas that represent the essential knowledge for the 21st century: global awareness; civic engagement; financial, economic, and business literacy; learning skills that encompass problem-solving, critical-thinking, and self-directional skills; and Information and Communication Technology (ICT) literacy.

Preface

Secondary career– technical education programs in Mississippi are faced with many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, ch. 487, §14; Laws, 1991, ch. 423, §1; Laws, 1992, ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act IV, 2007; and No Child Left Behind Act of 2001).

Masonry Executive Summary

Pathway Description

Masonry is a pathway in the Architecture and Construction career cluster. Study in the course allows an individual to prepare for employment and/or continued education in the masonry field. Skills developed through the course of study assist students in meeting requirements for the NCCER certification. Students are provided the opportunity to participate in Career and Technical Student Organizations to include SkillsUSA.

Industry Certification

The NCCER developed and published a set of industry standards that are taught nationwide by contractors, associations, construction users, and secondary and postsecondary schools called the Contren Learning Series. When developing this set of standards, the NCCER assembled a team of subject matter experts that represented construction companies and schools across the nation. Each committee met several times and combined experts' knowledge and experience to finalize the set of national industry standards.

As a part of the accreditation process, all Mississippi construction instructors will be required to successfully complete the Instructor Certification Training Program. This program ensures that instructors possess a deep knowledge of content of the standards.

This state-of-the-art curriculum is modeled after the eight Mississippi NCCER Accredited Training and Education Facilities (ATEF). In order to become an NCCER ATEF program, school districts must meet a set of guidelines including the following:

1. Use the approved curriculum.
2. All instructors must be NCCER certified.
3. All completed Form 200s and release forms on all student completions are to be forwarded to MCEF for proper approval. MCEF will in turn forward to NCCER for processing.
4. Follow NCCER guidelines on test security and performance profiles.
5. Have an active advisory committee with at least two commercial contractors involved.
6. Follow safety practices and Occupational Safety and Health Administration (OSHA) standards used in the class and lab areas.
7. Involve commercial contractors in class presentations or field trips.
8. All construction programs must be included in the accreditation process.
9. Show active involvement in student leadership development (e.g., VICA and SkillsUSA).
10. Provide demonstrated placement into construction-related occupations and timely reports to MCEF.

Districts will be required to complete a self-evaluation of all programs and host a site visit from industry to ensure proper lab, safety, and instructional procedures are in place.

Assessment

Students will be assessed using the Masonry Technology MS-CPAS2 test. The MS-CPAS2 blueprint can be found at the Research and Curriculum Unit's Web site (www.rcu.msstate.edu). All students will test after year one of the Construction program. A second test covering the second year material in Masonry will be administered to students upon completion of their program. If there are questions regarding assessment of this program, please contact the Architecture and Construction Instructional Design Specialist at the Research and Curriculum Unit at 662.325.2510.

Student Prerequisites

In order for students to be successful in the Masonry program, the following student prerequisites are in place:

1. C or higher in English (the previous year)
 2. C or higher in math (last course taken or the instructor can specify the math)
- or**
3. Instructor approval and TABE Reading Score (eighth grade or higher)

or

4. Instructor approval

Licensure Requirements

979 Career Pathway: Masonry

This endorsement licenses a person to teach the following secondary courses:

- 993101 Construction
- 993102 Safety and Orientation to Construction
- 993103 Introduction to Construction
- 993130 Masonry
- 993131 Theory and Application of Masonry I
- 993132 Theory and Application of Masonry II

Minimum Requirements for this Endorsement:

1. Education

- Applicant must have earned a two-year college degree (associate degree) or higher from an accredited institution of higher education. [Exception: Teachers with a currently valid license and endorsement #360 Brick, Block and Stone Masonry may earn this endorsement based on that #360 endorsement even if two-year college degree is not earned. All other requirements for this endorsement must be satisfied.]

2. Technology Literacy and Related Assessment of that Competency

- Applicant must validate technology competency by attaining the established minimum score or higher on an assessment approved by the Mississippi Department of Education (MDE). The assessment must be directly related to technology competency required by the grade level and subject matter being taught. Approved assessments for this license are IC3, Propulse, or other specific assessment created by third-party vendors, authorized by the Local Education Agency (LEA) and approved by the MDE.

3. Occupational Experience and Related Assessment of that Experience

- Applicants with an associate degree must have at least two years of verifiable occupational experience in the past ten years. Experience must be appropriate to the subject to be taught.
- Applicants with a bachelor or higher degree must have at least one year of verifiable occupational experience in the past ten years. Experience must be appropriate to the subject to be taught.

This endorsement requires the following assessment(s) of occupational expertise:

Teacher Occupational Competency Assessment at Mississippi State University's Research and Curriculum Unit in the following area:

TOCA at RCU—Masonry OR

Other teacher occupational competency assessment approved by MDE Office of Career and Technical Education.

4. Teacher Education Preparation and Related Assessment(s) of that Education

- Applicant must enroll immediately in Vocational Instructor Preparation (VIP) program or the College and Career Readiness Educator Program (CCREP).
- Applicant must complete the individualized professional development plan (PDP) requirements of the VIP or CCREP program prior to the expiration date of the three-year vocational license.
- Applicant must successfully complete the Contren Instructor Certification.
- Applicant must successfully complete a Certification for online learning workshop, module, or course that is approved by the Mississippi Department of Education.
- Applicant must successfully complete the Construction Certification workshop, module, or course that is approved by the Mississippi Department of Education.

Note #1: If the applicant meets all requirements listed above, that applicant will be issued a 977 endorsement—a five-year license. If the applicant does not meet all requirements, the applicant may be issued a three-year endorsement (license), and all requirements stated above must be satisfied prior to the ending date of that license.

Professional Learning

The professional learning itinerary for the middle school or individual pathways can be found at the Research and Curriculum Unit's Web site (www.rcu.msstate.edu). If you have specific questions about the content of each training session provided, please contact the Research and Curriculum Unit at 662.325.2510 and ask for the Professional Learning Specialist.

Course Outlines

Option 1—Two One-Carnegie-Unit Courses

Course Description: The Theory and Application of Masonry I course consists of an in-depth study of mortar, grout, measurements, drawings, and estimating. This one-Carnegie-unit course should only be taken after students successfully pass Safety and Orientation to Construction and Introduction to Construction.

Course Description: The Theory and Application of Masonry II course consists of an in-depth study of advanced laying techniques, construction techniques, and moisture control. This one-Carnegie-unit course should only be taken after students successfully pass Theory and Application of Masonry I

Theory and Application of Masonry I—Course Code: 993131

Unit	Unit Name	Hours
Unit 1	Orientation, Advanced Leadership, and Employability Skills (Review)	10
Unit 2	Basic Safety (Review)	15
Unit 3	Power Tools and Equipment (Review)	15
Unit 4	Mortar and Grout	25
Unit 5	Measurements/Drawings/Specifications and Estimating	35
Total		100

Theory and Application of Masonry II—Course Code: 993132

Unit	Unit Name	Hours
Unit 6	Advanced Laying Techniques and Metal Work	80
Unit 7	Construction Techniques and Moisture Control	30
Total		110

Option 2—One Two-Carnegie-Unit Course

Course Description: The Masonry course consists of an in-depth study of mortar, grout, measurements, drawings, estimating, advanced laying techniques, construction techniques, and moisture control. This two-Carnegie-unit course should only be taken after students successfully pass Construction. Upon the completion of the two courses, students will have the knowledge to complete the Contren Level I Certification.

Masonry—Course Code: Masonry-993130

Unit	Unit Name	Hours
Unit 1	Orientation, Advanced Leadership, and Employability Skills (Review)	10
Unit 2	Basic Safety (Review)	15
Unit 3	Power Tools and Equipment (Review)	15
Unit 4	Mortar and Grout	25
Unit 5	Measurements/Drawings/Specifications and Estimating	35
Unit 6	Advanced Laying Techniques and Metal Work	80
Unit 7	Construction Techniques and Moisture Control	30
Total		210

Masonry Research Synopsis

Introduction

Brick masons, block masons, and stonemasons create durable surfaces and structures. They build fences and buildings, and they are extremely vital to infrastructure (US Bureau of Labor statistics, 2011). Brick masons and block masons, or bricklayers, build and repair walls, floors, partitions, fireplaces, and other concrete and brick structures. Other bricklayers, like refractory masons, specialize in particular types of masonry. Finally, stonemasons specialize in building stone walls as well as setting exterior stone and stone floors.

Needs of the Future Workforce

There were 431,238 masons working in the United States in 2010. Masonry is projected to grow slower than average in the United States (4 percent). However, masonry is projected to grow much faster than average in Mississippi (16 percent). (EMSI, 2011) Job opportunities will be good, particularly for masons with restoration skills (US Bureau of Labor Statistics, 2011).

Region	2010 Jobs	2020 Jobs	Change	% Change	Openings	2011 Median Annual Income
Regional Total	3,493	4,059	566	16%	1,597	\$26,478.40
National Total	431,328	446,601	15,273	4%	158,031	\$36,816.00

Source: EMSI Complete Employment - 2011.2

Perkins IV Requirements

Carl Perkins IV Requirements	Masonry Curriculum
Program of Study	Yes
Aligned to Careers	Yes
Standards and Content	Yes
Continuous Improvement	Yes
Alignment and Articulation	Yes
Accountability and Assessment	Yes

Pathway Map

Masonry is an instructional program that 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.

Upon completion of the Masonry program and high school graduation, students may enter the workforce, continue education at a postsecondary institution and then enter the workforce, continue education at a postsecondary institution and then continue at an institution of higher learning (IHL), or continue education at an institution of higher learning (IHL)

Curriculum Content

Summary of Standards

Standards in the Masonry Curriculum are based on information from the following organizations:

- National Center for Construction Education Research

- Common Core State Standards Initiative

- National Educational Technology Standards for Students

- 21st Century Skills and Information and Communication Technologies Literacy Standards

Articulation from Secondary to Postsecondary Programs

Articulation credit from Secondary Masonry to Postsecondary Commercial/Residential Maintenance, Postsecondary Construction Engineering, or Postsecondary Brick, Block, and Stone will be awarded beginning with the fall semester of 2014. Secondary students must have completed the Secondary Masonry program and scored at the 80 percentile or higher on the Mississippi Career Planning and Assessment System (MS-CPAS). The Mississippi Community College Board will forward the scores for each district to the Director of Admissions/Registrar at each postsecondary institution. No grade will be given on the transcript; only hours granted will be transcribed (therefore making no changes to quality points). Twelve additional hours must be earned before credit is transcribed. No cost will be assessed on credit assigned to a student receiving articulated credit. MS-CPAS scores may be accepted for up to 12 months after they are published.

Best Practices

Innovative Instructional Technologies

Recognizing that today's students are digital learners, the classroom should be equipped with tools that will teach them in the way they need to learn. The Masonry curriculum includes teaching strategies that incorporate current technology. Each classroom should incorporate one teacher desktop or laptop. It is suggested that each classroom be equipped with an interactive white board and projector, intensifying the interaction between students and teachers during class. Teachers are encouraged to make use of the latest online communication tools such as wikis, blogs, and podcasts. They are also encouraged to teach using the content delivery system Blackboard, which introduces students to education in an online environment and places the responsibility of learning on the student.

Differentiated Instruction

Students learn in a variety of ways. Some are visual learners, needing only to read information and study it to succeed. Others are auditory learners, thriving best when information is read aloud to them. Still others are tactile learners, needing to participate actively in their learning experiences. Add the student's background, emotional health, and circumstances, and a very unique learner emerges. To combat this, the Masonry curriculum is written to include several instructional methods by using the Understanding by Design (UbD) approach. This method of instruction design leads students to a deeper understanding of course material and provides multiple opportunities for students to succeed in different ways. Many activities are graded by rubrics that allow students to choose the type of product they will produce. By providing various teaching and assessment strategies, students with various learning styles can succeed.

Career and Technical Education Student Organizations

There are student organizations for students that would be relevant to this curriculum. Teachers are encouraged to charter one of these organizations if one is not already available to students. The suggested organization for this course is SkillsUSA. Contact information for this and other related organizations is listed under "Professional Organizations" in this document.

Conclusions

Based on the previous information, the Masonry curriculum will be filled with opportunities to develop workforce skills. Widely used teaching strategies such as cooperative learning, problem-based learning, and demonstration will also be included. These will help to prepare students for the hands-on instruction they will likely receive upon entering the workforce. Because many of the instructors make use of the rubrics and teaching and assessment strategies, they will continue to be included in the curriculum document. The curriculum document will be updated regularly to reflect the needs of the Masonry workforce.

Professional Organizations

SkillsUSA
14001 SkillsUSA Way
Leesburg, VA 20176
703.777.8810
<http://www.skillsusa.org/>

The Masonry Society
3970 Broadway, Suite -D
Boulder, CO 80304-1135
<http://masonrysociety.org/>

National Concrete Masonry Association
13750 Sunrise Valley Drive
Herndon, VA 20171-4662
<http://www.ncma.org/Pages/default.aspx>

NCCER
3600 NW 43rd Street, Bldg. G
Gainesville, FL 32606
<http://www.nccer.org/>

Using this Document

Unit Number and Title

Suggested Time on Task

An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75–80% of the time in the course.

Competencies and Suggested Performance Indicators

A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies. The suggested performance indicators represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.

Suggested Teaching Strategies

This section of each unit indicates research-based strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies that 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.

Suggested Assessment Strategies

This section indicates research-based 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.

Integrated Academic Topics, 21st Century Skills and Information and Communication Technology Literacy Standards, ACT College Readiness Standards, and Technology Standards for Students

This section identifies related academic topics as required in the Subject Area Testing Program (SATP) in Algebra I, Biology I, English II, and U.S. History from 1877, which are integrated into the content of the unit. Research-based teaching strategies also incorporate ACT College Readiness standards. This section also identifies the 21st Century Skills and Information and Communication Technology Literacy skills. In addition, national technology standards for students associated with the competencies and suggested objectives for the unit are also identified.

References

A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested, and the list may be modified or enhanced based on needs and abilities of students and on available resources.

Unit 1: Orientation, Advanced Leadership, and Employability Skills (Review)

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Review local program and vocational center policies and procedures.
- Describe employment opportunities and responsibilities.
- Explore leadership skills and personal development opportunities provided to students by student organizations to include SkillsUSA.
- Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.

Essential Questions

- What are the characteristics of a good leader?
- Why is it important to follow instructions?

Vocabulary

Absenteeism

Active listening

Appendix

Body Language

Confidentiality

Glossary

Graph

Harassment

Jargon

Leadership

Mission Statement

Permit

Reference

Table of contents

Teamwork

Suggested Learning Experiences

Competency 1: Review local program and vocational center policies and procedures. <small>(DOK 1 EMP)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, and transportation regulations. <small>CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6</small></p>	<p>a. Present local program and vocational center policies and procedures.</p> <p>Have students read the handbook to become aware of what is expected of them in relation to the policies and procedures of the school and explain the policies to the class This will include dress code, attendance, academic requirements, discipline, and transportation regulations.</p> <p>Have student's complete exercises to identify equipment and functions found in the school lab.</p> <p>Have students work together in pairs. A student with a higher reading ability will team up with a student with a lower reading ability to get a better understanding of the school's program policies and procedures. Have students write (or type) a report about what is expected in relation to local program and vocational center policies and procedures.</p>	<p>a. Evaluate student's explanation of local student handbook requirements.</p> <p>Evaluate exercises to identify equipment and functions found in the school lab.</p> <p>Evaluate student's written report on rules and regulations.</p> <p>Assess student orientation knowledge through teacher observations and written unit test. File completed test to document student mastery of the school and program policies and procedures.</p>

Competency 2: Describe employment opportunities and responsibilities. <small>(DOK1 EMP)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Describe employment opportunities including potential earnings, employee benefits, job availability, places of employment, working conditions, and educational requirements. <small>CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6</small></p>	<p>a. Explain educational and career opportunities that will be available to students after they complete the program.</p> <p>Have students use career software, such as Choices, to measure their aptitudes and abilities for particular careers.</p> <p>Have students work in groups and use the Internet, college catalogs, industry publications, and other information to research a list of careers for which they will be qualified upon program completion and postsecondary educational opportunities that will be available to them. Have each group orally present its findings to the class. Have each student select a career in a field related to the course and use the Occupational Outlook Handbook (book or Web site), Internet, and other resources to research job titles, educational and skill requirements, expected job</p>	<p>a. Monitor group work throughout the unit to ensure that each member participates.</p> <p>Evaluate the career and educational opportunities presentation for content and delivery.</p> <p>Evaluate the career report for content and grammar. Use a checklist to evaluate the resume and cover letter.</p>

	<p>growth, and entry-level salaries. Have each student report the findings in a two-page report.</p> <p>Use a transparency to discuss the parts of a résumé and cover letter, and provide each student a written sample.</p> <p>Have each student use the Internet or newspapers to choose a job for which they are qualified and prepare a résumé and cover letter that can be used to apply for the selected job.</p>	
<p>b. Describe basic employee responsibilities. ^{CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6}</p>	<p>b. Discuss basic employee responsibilities, including punctuality, honesty, and initiative. Have the students role-play various scenarios related to employee responsibilities.</p>	<p>b. Assess the role-playing activity using the role-play or skit rubric.</p>

Competency 3: Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA. ^{(DOK) EMP}

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Demonstrate effective teambuilding and leadership skills. ^{CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6}</p>	<p>a. Discuss the role of a team member and leader. Assign the students roles within a team and have them role play a situation in which there is a conflict which must be resolved. Utilize the lessons from SkillsUSA, Contren Tools for Success, or other resources to provide additional training.</p>	<p>a. Assess the role-playing activity using the role-play rubric for documentation. Lessons from other resources should be assessed according to the recommended resource guide.</p>
<p>b. Practice appropriate work ethics. ^{CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6}</p>	<p>b. Discuss appropriate work ethics standards. Have the students list what they believe to be the most common problems among the masonry profession.</p>	<p>b. Assess using the group discussion rubric.</p>

Competency 4: Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations. ^(DOK 2 COM)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance</p>	<p>a. Have the students perform an activity involving</p>	<p>a. The lesson will be</p>

<p>indicators are reflected in the competency.^{CS1, CS3, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T1, T2, T3, T4, T5, T6}</p>	<p>verbal instructions. Divide the students into groups and have one team be the customer and the other be the contractor. The customer will describe the project and the contractor will have to provide a brief plan for the construction of the project. Have the groups switch roles and the customer will provide the contractor with a written plan and blueprint. The contractor will describe the procedure for construction of the project. (Contren Core Text, Basic Communication Skills Unit).</p>	<p>assessed using a rubric or a checklist for the written projects and presentation.</p>
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Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task Title

No Performance Task is needed for the Orientation Unit.

Attachments for Performance Task

None

Unit Resources

General Books

National Center for Construction Education and Research. (2009). *Core curriculum*. Upper Saddle River, NJ: Pearson Prentice Hall.

National Center for Construction Education and Research. (2009). *Tools for success*. Upper Saddle River, NJ: Pearson Prentice Hall.

Web Sites

National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>

Build Your Future. (n.d.). Retrieved September 9, 2011, from <http://www.byf.org/> (Note: A new Build Your Future video is released each year.)

SkillsUSA. (n.d.). Retrieved September 9, 2011, from <http://www.skillsusa.org/>

Unit 2: Basic Safety (Review)

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Describe general safety rules for working in a shop and/or lab and industry.
- Identify and apply safety around welding operations.
- Identify and explain use of various barriers and confinements.
- Explain lifting, fall protection, and the use of ladders and scaffolds.
- Explain the Material Safety Data Sheet (MSDS).
- Explain fires.
- Explain safety in and around electrical situations.

Essential Questions

- Why are safety regulations important?
- How can you avoid on-site accidents?
- What are the hazards associated with welding?
- Why are evacuation plans important?
- What are the hazards of improper lifting?

Vocabulary

Combustible	Hazard Communication	Proximity work
Competent person	Standard (HazCom)	Qualified person
Confined space	Lockout/Tagout	Respirator
Excavation	Material safety data sheet	Scaffold
Extension ladder	(MSDS)	Shoring
Flammable	Occupational Safety and Health	Signaler
Flashback	Administration (OSHA)	Six-foot rule
Flash burn	Permit-required confined	Stepladder
Flash goggles	Spaces	Straight ladder
Flash point	Personal protective equipment	Trench
Ground fault circuit interrupter	(PPE)	Welding shield

Suggested Learning Experiences

Competency 1: Describe general safety rules for working in a shop and/or lab and industry. <small>(DOK 2 SAF)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Describe how to avoid on-site accidents. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>This can be used for the entire unit.</p> <p>a. Identify, discuss and demonstrate terms, rules, and procedures related to shop/lab and industry safety. (Contren Core Text Basic Safety Unit and Level I Introduction to Masonry Unit)</p>	<p>a. Student participation will be monitored by the teacher, and the written exam will be graded.</p>
<p>b. Explain the relationship between housekeeping and safety. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>b. Demonstrate the dangers of poor housekeeping using an illustration or actual shop simulation. Required written tests will follow each section of guidelines for safety rules and procedures.</p>	<p>b. Student participation will be monitored by the teacher, and the written exam will be graded.</p>
<p>c. Explain the importance of following all OSHA safety regulations and company safety policies. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>c. Provide the students with a list of terms and have them define the terms. Pair the students to quiz each other on the definitions in preparation for a written exam. Access the OSHA website to reference terms, videos, and regulations.</p>	<p>c. Student participation will be monitored by the teacher, and the written exam will be graded.</p>
<p>d. Recognize, explain, and maintain personal protective equipment. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>d. Divide the students into pairs and assign each pair one of the guidelines provided for personal safety (i.e., clothing, jewelry, hair, eyes, and ears). Have each pair demonstrate the “dos and don’ts” of the guidelines</p>	<p>d. The “dos and don’ts” exercise will be critiqued with a peer review.</p>
<p>e. Explain the importance of reporting all on-the-job injuries, accidents, and near misses. <small>CS4, CS6, CS7, CS8, CS9,</small></p>	<p>e. Have an industry speaker present to the class the necessity of safety in the work environment. Have students write a summary of the presentation. Provide a sample accident report for the students to practice completing.</p>	<p>e. The summary of the speaker’s presentation will be critiqued using a rubric. Use completed report key to grade the activity.</p>

CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6		
f. Explain the need for evacuation policies and the importance of following them. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	f. Review and practice evacuation procedures. Required written tests will follow each section of guidelines for safety rules and procedures.	f. Written exams will be graded.
g. Explain the employer's substance abuse policy and how it relates to safety. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	g. Have the class discuss various scenarios concerning operating equipment while under the influence of substances. Required written tests will follow each section of guidelines for safety rules and procedures.	g. Written exams will be graded.
h. Explain the safety procedures when working near pressurized or high temperature systems. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	h. Using video or field trip to a plant with high temperature or pressurized systems, explain the safety procedures. Required written tests will follow each section of guidelines for safety rules and procedures.	h. Written exams will be graded.

NOTE: SAFETY IS TO BE TAUGHT AS AN ONGOING PART OF THE COURSE THROUGHOUT THE YEAR.

Competency 2: Identify and apply safety around welding operations. ^(DOK 1 SAF)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Use proper safety practices when welding or working around welding operations. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6,	a. Where applicable, have the students tour the welding shop and simulate dangers in the work area. Required written tests will follow each section of guidelines for safety rules and procedures.	a. Written exams will be graded.

CC11, CC12, CC13, CC14, CC15, CC16, T2, T3, T4, T5, T6		
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Competency 3: Identify and explain use of various barriers and confinements. (DOK 1 SAF)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Explain the safety requirements for working in confined areas. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>a. Discuss the requirements for confined spaces. Have the students complete a sample confined space permit.</p>	<p>a. Assess accuracy using a permit key.</p>
<p>b. Explain and practice lockout/tagout procedures. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>b. Discuss the requirements for lockout/tagout. Have the students complete a sample lockout/tagout form.</p>	<p>b. Assess accuracy using a form key.</p>
<p>c. Explain the different barriers and barricades and how they are used. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>c. Divide the students into teams and have them develop scenarios of hazards and accidents using the Contren Series Core Text, Basic Safety Unit, publications, and the Internet. This will include tools; spills; working around welding; improper use of barriers, ladders, or scaffolds; use of MSDS information; fires; and electrical situations. In a game-type situation, one team will read a scenario, and the other teams will compete to be the first to provide the proper safety measures which should have been used to prevent the hazardous situation or accident. Points will be awarded to the teams with the correct answers.</p>	<p>c. The teams will be rewarded according to the points earned from the game. This could be extra points, classroom privileges, and so forth.</p>
<p>d. Use proper safety practices when working in or near trenches and excavations. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>d. Have the students research the safety hazards and requirements for working in trenches and excavation areas. Required written tests will follow each section of guidelines for safety rules and procedures.</p>	<p>d. Written exams will be graded.</p>
<p>e. Explain the term <i>proximity work</i>. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15,</p>	<p>e. Have the students discuss various scenarios for the dangers of proximity work. Required written tests will follow each section of guidelines for safety rules and</p>	<p>e. Written exams will be graded.</p>

CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	procedures.	
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Competency 4: Explain lifting, fall protection, and the use of ladders and scaffolds. (DOK 1 SAF)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Identify and explain the procedures for lifting heavy objects. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	a. Discuss the proper lifting procedures and have the students simulate lifting procedures.	a. Assess using the performance-assessment rubric.
b. Explain fall protection procedures. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	b. Have students build a scaffold and demonstrate the proper usage of fall protection gear.	b. Assess using the performance-assessment rubric.
c. Inspect and safely work with various ladders and scaffolds. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6	c. Have students practice building scaffolds and setting up ladders and inspect them for safety.	c. Assess using the performance-assessment rubric.

Competency 5: Explain the Material Safety Data Sheet (MSDS). (DOK 1 SAF)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Explain and interpret the function of the MSDS. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4,	a. Provide a sample copy of an MSDS and have the students interpret the information. Required written tests will follow each section of guidelines for safety rules and procedures.	a. Written exams will be graded.

CCL5, CCL6, T2, T3, T4, T5, T6		
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Competency 6: Explain fires. <small>(DOK 1 SAF)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Explain the process by which fires start. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small>	a. Discuss the basic fire triangle. Required written tests will follow each section of guidelines for safety rules and procedures.	a. Written exams will be graded.
b. Explain fire prevention of various flammable liquids.	b. Required written tests will follow each section of guidelines for safety rules and procedures.	b. Written exams will be graded.
c. Explain the classes of fire and the types of extinguishers. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small>	c. Discuss the types of fires and extinguishers. Review the tags and chart. Required written tests will follow each section of guidelines for safety rules and procedures.	c. Written exams will be graded.

Competency 7: Explain safety in and around electrical situations. <small>(DOK 1 SAF)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Explain safety around electrical hazards. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small>	a. Discuss the safety procedures to be used around electrical equipment and hazards. Required written tests will follow each section of guidelines for safety rules and procedures.	a. Written exams will be graded.
b. Explain electrical injuries and the actions to take when an electrical shock occurs. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small>	b. Discuss how electrocution affects the body and what actions to take if someone is electrocuted. Required written tests will follow each section of guidelines for safety rules and procedures.	b. Written exams will be graded.

Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task: Lift that Mortar

You are working on the job site and must lift a 70-lb bag of mortar and place it on top of the mixer. The masonry foreman will observe your safety procedures. These procedures will be evaluated using a lifting safety checklist.

Attachments for Performance Task

See the Lifting Safety Checklist in Appendix A

Unit Resources

General Books

Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.

Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.

National Center for Construction Education and Research. (2009). *Core curriculum*. Upper Saddle River, NJ: Pearson Prentice Hall.

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

Trade Publications

Fine Homebuilding. Newton, CT: Tauton Press. Retrieved June 22, 2011, from <http://www.finehomebuilding.com/>

Masonry Construction. Hanley-Wood, LLC. Retrieved June 22, 2011, from <http://www.masonryconstruction.com/>

Masonry: The Voice of the Masonry Contractor. Masonry Contractors Association of America. Retrieved June 22, 2011, from <http://www.masonrymagazine.com/>

Technical Notes on Brick Construction. The Brick Industry Association. Retrieved June 22, 2011, from <http://www.gobrick.com/>

Videos

Earth Communications. (2004). *Safety on the job part 1: Standards of personal protection and health care* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Earth Communications. (2004). *Safety on the job part 2: Fire protection, warnings and power tools* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Earth Communications. (2004). *Safety on the job part 3: Scaffolds, fall protections and controlled access zones* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Earth Communications. (2004). *Safety on the job part 4: Cranes, excavations, stairways, and ladders* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Web Sites

Construction Education Foundation, Georgia. (n.d.). Retrieved September 9, 2011, from <http://www.cefga.org/TeacherResources.htm>

Florida Masonry Apprentice & Education Foundation, Inc. (n.d.). Retrieved September 9, 2011, from <http://www.masonryeducation.org/onlineresources.html>

Mississippi Associated Builders and Contractors. (n.d.). Retrieved September 9, 2011, from <http://www.msabc.net/>

National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>

Occupational Safety & Health Administration. (n.d.). Retrieved September 9, 2011, from <http://www.osha.gov/SLTC/multimedia.html>

Online Stopwatch. (n.d.). Retrieved September 9, 2011, from <http://www.online-stopwatch.com/large-stopwatch/>

Quintessential Careers. (n.d.). Retrieved September 9, 2011, from http://www.quintcareers.com/employment_application.pdf

RS Innovative. (n.d.). Retrieved September 9, 2011, from <http://www.rsinnovative.com/rulergame/>

Unit 3: Power Tools and Equipment (Review)

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Safely use power tools.
- Safely use masonry equipment.

Essential Questions

- What type of accidents can occur when power tools are not used safely?
- What do you do with faulty or broken power tools?
- What are the dangers involving the use of a mechanical mixer?
- What do we do with frayed electrical cords?

Vocabulary

Bed joint

Corner pole

Lead

Parge

Pointing

Retempering

Skewback

Temper

Trestle

Suggested Learning Experiences

Competency 1: Safely use power tools. <small>(DOK 2 HTO, PTO)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Identify and demonstrate safety rules when using power tools. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>a. Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic power tools (e.g., masonry saw and mortar mixer) used in the field and how they have advanced through time. Discuss safety factors, proper use, and maintenance.</p> <p>Describe accidents that can occur while using tools. Divide students into groups and give each group a scenario/case study (on paper or video) involving an accident. Have each group identify safety mistakes in each situation, determine correct procedures, and present the scenario, mistakes found, and procedures which should have been used to the class.</p>	<p>a. Teacher will monitor the groups for participation using rubric or checklist.</p> <p>Use a performance-assessment rubric or checklist to grade activity. Teacher will grade the safety test.</p>
<p>b. List and demonstrate the parts of the brick saw. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>b. Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p> <p>Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class. Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.</p>	<p>b. Use a performance-assessment rubric or checklist to grade activity.</p> <p>Use a rubric or checklist to grade the written report.</p>
<p>c. Identify and demonstrate types of saw blades. <small>CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</small></p>	<p>c. Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p> <p>Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class. Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.</p>	<p>c. Use a performance-assessment rubric or checklist to grade activity.</p> <p>Use a rubric or checklist to grade the written report.</p>
<p>d. Identify and</p>	<p>d. Have the students complete a safety test for each</p>	<p>d. Use a performance-</p>

<p>demonstrate safety and maintenance rules when using the mortar mixer. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>specific tool (each student must answer 100% of questions accurately).</p> <p>Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class.</p> <p>Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.</p>	<p>assessment rubric or checklist to grade activity.</p> <p>Use a rubric or checklist to grade the written report.</p>
<p>e. Explain and demonstrate the use and care of the power grinder. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>e. Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p> <p>Demonstrate the uses of various hand and power tools for the class. Provide each student with a description of a project to be completed. Have the student select, demonstrate, and discuss and present the proper use of the appropriate tool to the entire class.</p> <p>Assign each student a specific set of tools (i.e., hammers, power saws, wrenches, etc.). Have students use the Internet to research and write or type (if technology resources are available) a report on the proper procedures for maintenance of the assigned set of tools.</p>	<p>e. Use a performance-assessment rubric or checklist to grade activity.</p> <p>Use a rubric or checklist to grade the written report.</p>

Competency 2: Safely use masonry equipment. (DOK 2 HTO, PTO)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Explain and demonstrate the care and use of the mortar boards. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>a. Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic masonry equipment (e.g., trowel, wheelbarrow, mortar hoe, and level) used in the field and explain each tool's care and use. Discuss safety factors, proper use, and maintenance.</p> <p>Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p>	<p>a. Teacher will monitor the students for class participation.</p> <p>Teacher will grade the safety test.</p>
<p>b. Explain and demonstrate the care and use of various types of wheelbarrows. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5,</p>	<p>b. Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic masonry equipment (e.g., trowel, wheelbarrow, mortar hoe, and level) used in the field and explain each tool's care and use. Discuss safety factors, proper</p>	<p>b. Teacher will monitor the students for class participation.</p> <p>Teacher will grade the safety test.</p>

<p>CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>use, and maintenance.</p> <p>Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p>	
<p>c. Explain and demonstrate the care and use of the mortar pan and stand. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>c. Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic masonry equipment (e.g., trowel, wheelbarrow, mortar hoe, and level) used in the field and explain each tool’s care and use. Discuss safety factors, proper use, and maintenance.</p> <p>Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p>	<p>c. Teacher will monitor the students for class participation.</p> <p>Teacher will grade the safety test.</p>
<p>d. Explain and demonstrate the care and use of scaffolding. CS4, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCW1, CCW2, CCW3, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCL1, CCL2, CCL3, CCL4, CCL5, CCL6, T2, T3, T4, T5, T6</p>	<p>d. Using the Contren Core Text, Introduction to Hand Tools Unit, Introduction to Power Tools, and Masonry Level I Masonry Tools and Equipment Unit, identify basic masonry equipment (e.g., trowel, wheelbarrow, mortar hoe, and level) used in the field and explain each tool’s care and use. Discuss safety factors, proper use, and maintenance.</p> <p>Have the students complete a safety test for each specific tool (each student must answer 100% of questions accurately).</p>	<p>d. Teacher will monitor the students for class participation.</p> <p>Teacher will grade the safety test.</p>

Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task: Which Blade is Best?

You are a brick mason and you must cut block and brick to specified dimensions. You are responsible to set up the saw and use the proper blade. The masonry foreman will observe the procedure to ensure you are safely operating the equipment. The performance assessment rubric will be used to assess the procedure.

Attachments for Performance Task

The specified dimensions for each cut.

Unit Resources

General Books

Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.

Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.

National Center for Construction Education and Research. (2009). *Core curriculum*. Upper Saddle River, NJ: Pearson Prentice Hall.

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

Trade Publications

Fine Homebuilding. Newton, CT: Tauton Press. Retrieved June 22, 2011, from <http://www.finehomebuilding.com/>

Masonry Construction. Hanley-Wood, LLC. Retrieved June 22, 2011, from <http://www.masonryconstruction.com/>

Masonry: The Voice of the Masonry Contractor. Masonry Contractors Association of America. Retrieved June 22, 2011, from <http://www.masonrymagazine.com/>

Technical Notes on Brick Construction. The Brick Industry Association. Retrieved June 22, 2011, from <http://www.gobrick.com/>

Web Sites

Construction Education Foundation, Georgia. (n.d.). Retrieved September 9, 2011, from <http://www.cefga.org/TeacherResources.htm>

Florida Masonry Apprentice & Education Foundation, Inc. (n.d.). Retrieved September 9, 2011, from <http://www.masonryeducation.org/onlineresources.html>

Mississippi Associated Builders and Contractors. (n.d.). Retrieved September 9, 2011, from <http://www.msabc.net/>

National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>

Occupational Safety & Health Administration. (n.d.). Retrieved September 9, 2011, from <http://www.osha.gov/SLTC/multimedia.html>

Online Stopwatch. (n.d.). Retrieved September 9, 2011, from <http://www.online-stopwatch.com/large-stopwatch/>

Quintessential Careers. (n.d.). Retrieved September 9, 2011, from http://www.quintcareers.com/employment_application.pdf

RS Innovative. (n.d.). Retrieved September 9, 2011, from <http://www.rsinnovative.com/rulergame/>

Unit 4: Mortar and Grout

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Discuss the various types of mortar and grout, including ingredients and their properties.
- Identify the common admixtures, including their uses and problems and solutions found in mortar and grout applications.
- Set up the mortar mixing area and mix by hand and with a mechanical mixer.

Essential Questions

- When and where do you use the various types of mortar?
- What is the difference between cement, mortar, grout, and concrete and their uses?
- When and where do admixtures need to be used?
- What are the factors that need to be considered when setting up a mixing area?

Vocabulary

Identify and review the unit vocabulary.

Air-entraining

ACI

ASCE

ASTM

Blowout

Bond beam

Bridging

Grouted walls

Hydration

Key

Lift

Masonry cement

Plasticity

Pozzolan

Rebar

Reinforced Walls

Rodding

Slaked lime

Water retention

Workability

Suggested Learning Experiences

Competency 1: Identify types, uses, and mixing procedures of mortar. <small>(DOK2 MOR)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Match terms associated with mortar and grout to their correct definitions. <small>CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</small></p>	<p>a. Using the Contren, Masonry Level I, Mortar Unit and Masonry Level II, Grout and Other Reinforcement teacher-made handouts, and other resources, have the students discuss the terms and factors that affect mortar. <small>E2, E10</small></p>	<p>a. Assessment of the terms and factors will be a written test.</p>
<p>b. List the various types of mortar and its primary ingredients.</p>	<p>b. Discuss use of mortar in various seasonal situations. Given a variety of situations the student will determine when and why various types of mortar are used and present each situation to the class.</p>	<p>b. Presentation rubric will be used to assess the activity.</p>
<p>c. Demonstrate mixing mortar manually and mechanically to include the material proportions. <small>CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</small></p>	<p>c. Have the student demonstrate the use of calibrated containers when mixing mortar.</p>	<p>c. Performance rubric will be used to assess the activity.</p>

<p>d. Discuss the storage of materials^{CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4}</p>	<p>d. Discuss the storage of materials on a given job site on a seasonal basis. Given the opportunity, take the students to a commercial and/or residential job site to see how the materials are stored. Students will be given a checklist to evaluate the procedures.</p>	<p>d. Assessment will be by observation and checklist for procedure and consistency.</p>
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Competency 2: Identify types, uses, and mixing procedures of grout. ^(DOK2 GRO)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. List the various types of grout and its primary ingredients.^{CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4}</p>	<p>a. Discuss use of grout in various seasonal situations. Given a variety of situations the student will determine when and why various types of grout are used and present each situation to the class.</p>	<p>a. Presentation rubric will be used to assess the activity.</p>
<p>b. Describe the use of steel bar reinforcement in masonry construction^{CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19,}</p>	<p>b. Discuss the sizes and types of reinforcement and their applications. Provide samples various types of reinforcement materials and have the students identify and/or label the samples.</p>	<p>b. Teacher observation and/or label grading key.</p>

<p>CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>c. Discuss grout in low and high lifts using the proper techniques. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>c. Show a video or take field trip to demonstrate the low and/or high lift procedures. Given various scenarios, have the students explain the procedures needed.</p>	<p>c. Assess using the group discussion rubric</p>
<p>d. Discuss grout in a hollow block wall and rod it into place. ^{CS4, CS5,} CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>d. Show a video or take field trip to demonstrate grouting a hollow block wall and rod it into place. Have the students place grout in a hollow block wall and put rod in place.</p>	<p>d. Assess using the performance rubric</p>

Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task: Mortar Mixing

You are the bricklayer on a new job site. You are responsible for setting up the mixing site and mixing mortar. You must consider seasonal conditions and proximity to the actual work area and available utilities. You will mix a batch of mortar to the proper specifications. The masonry foreman will inspect the batch for proper consistency. You will be judged using a performance assessment rubric.

Attachments for Performance Task

Job-site description to include seasonal conditions and type of structure to be built.

Unit Resources

General Books

Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.

Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.

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

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

Nolan, K. (n.d.). *Masonry and concrete construction*. Carlsbad, CA: The Craftsman Book.

Curriculum and Instructional Materials Center. (1999). *Fundamentals of bricklaying*. Stillwater, OK: Author.

Curriculum and Instructional Materials Center. (1999). *Introduction to bricklaying*. Stillwater, OK: Author.

Curriculum and Instructional Materials Center. (1999). *Brick and block masonry*. Stillwater, OK: Author.

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Technical Notes on Brick Construction. The Brick Industry Association. Retrieved June 22, 2011, from <http://www.gobrick.com/>

Web Sites

Construction Education Foundation, Georgia. (n.d.). Retrieved September 9, 2011, from <http://www.cefga.org/TeacherResources.htm>

Florida Masonry Apprentice & Education Foundation, Inc. (n.d.). Retrieved September 9, 2011, from <http://www.masonryeducation.org/onlineresources.html>

Mississippi Associated Builders and Contractors. (n.d.). Retrieved September 9, 2011, from <http://www.msabc.net/>

National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>

Occupational Safety & Health Administration. (n.d.). Retrieved September 9, 2011, from <http://www.osha.gov/SLTC/multimedia.html>

Online Stopwatch. (n.d.). Retrieved September 9, 2011, from <http://www.online-stopwatch.com/large-stopwatch/>

Quintessential Careers. (n.d.). Retrieved September 9, 2011, from http://www.quintcareers.com/employment_application.pdf

RS Innovative. (n.d.). Retrieved September 9, 2011, from <http://www.rsinnovative.com/rulergame/>

Unit 5: Measurements/Drawings/Specifications and Estimating

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Identify and discuss drawings and specifications.
- Estimate material for a masonry project.

Essential Questions

- Why is a blueprint needed?
- Why is it necessary to estimate correctly?
- Why are specifications needed?

Vocabulary

Identify and review the unit vocabulary.

Legend

Blueprints

Change order

Denominate numbers

HVAC

International System (SI)

Nominal dimension

Sectional drawing

Shop drawing

U.S. Customary system

Suggested Learning Experiences

Competency 1: Apply basic mathematics for masonry. <small>(DOK2 MDS)</small>		
<p>a. Apply the four basic math skills with whole numbers, fractions, and percentages. <small>CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6</small></p>	<p>a. Have students complete a short pretest to apply the four basic math skills with whole numbers, fractions, and percentages (may use Contren Core Text, Basic Math Unit).</p> <p>Give students the correct answers to problems and ask at least one student who got the answers for whole numbers correct to write the problems on the chalkboard or a piece of chart paper. Have students who did not get the problems correct listen as the student at the board or paper works the problems. Do this procedure for fractions and percentages as well, having students rotate through the skills until each student has spent time with each set of problems. Have a different student lead the discussion each time students rotate so that the students who are just learning how to work the problems have a chance to teach the other students.</p> <p>Provide students with additional problems to apply the four basic math skills with whole numbers, fractions, and percentages while working in small groups and then alone.</p>	<p>a. Monitor group work as students perform calculations.</p> <p>Evaluate students on a posttest with whole number, fraction, and percentage problems.</p>
<p>b. Convert the Customary system to metric system. <small>CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6</small></p>	<p>b. Briefly discuss the metric system and its relationship to the Customary System, and have students use the Internet to research the standard and metric units of length, weight, volume, and temperature.</p>	<p>b. Evaluate each student's measurements for accuracy.</p>
<p>c. Identify and read measuring tools. <small>CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9,</small></p>	<p>c. Using the internet, locate a ruler game and have the students complete the activities.</p>	<p>c. Give award to the highest scores.</p>

<p>CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6</p>		
<p>d. Solve basic algebraic and geometric equations. CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6</p>	<p>d. Provide various activities such as blueprints, shapes, and other geometric and algebraic equations for the students to calculate.</p>	<p>d. Assess with activity key.</p>

<p>Competency 2: Identify and discuss drawings and specifications. (DOK1 MDS, RPD)</p>		
<p>Suggested Performance Indicators</p>	<p>Suggested Teaching Strategies</p>	<p>Suggested Assessment Strategies</p>
<p>a. Match terms, abbreviations, and symbols associated with specifications and drawings. CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28,</p>	<p>a. Using Contren Core Text Introduction to Blueprints Unit, Masonry Level I Measurements, Drawings, and Specifications Unit, and Level II Residential Plans and Drawings Interpretation Unit, provide the students with handouts relating to terms, definitions, scales, and abbreviations.</p>	<p>a. Assessment for the terms, abbreviations, and symbols will be determined with a written test</p>

CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6		
b. Discuss the purposes of specifications. ^{CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6}	b. Given a set of blueprints, the students must identify the parts of the blueprint and identify the various plans. ^{E3, E4, E8}	b. Teacher observation and/or label grading key.
c. Identify commonly used scales and dimension lines for blueprints. ^{CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6}	c. Have the students draw a set of plans and label the parts and plans.	c. Assessment of the activity will be determined by the accuracy of the student drawn parts and plans.

Competency 3: Estimate material for a masonry project. ^(DOK3 RPD)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. List the rule-of-thumb guidelines for estimating. ^{CS2, CS6, CS7, CS8, CS9, CS11, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5,}	a. Discuss the rule-of-thumb guidelines for estimating. Provide the student with a plan for a job relating to brick, block, and stone. The student will figure the estimation for each job. This may be done by hand and/or computer.	a. Assessment for the estimation will be determined by the accuracy of the estimation.

CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T1, T2, T3, T4, T5, T6		
b. Estimate material for a brick, block, and stone job.	b. Given a specific set of specifications the student will estimate materials needed.	b. Assessment for the estimation will be a grading key.

Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task: Cost of Job Estimate

You are a masonry contractor. You have a blueprint of a house to be built. From the blueprint and specifications, estimate the amount of materials needed for the job. You will present the estimation to the building contractor. The estimation will be judged according to its accuracy.

Attachments for Performance Task

Blueprint and Specifications

Unit Resources

General Books

- Atcheson, D. (2010). *2010 national concrete & masonry estimator*. Carlsbad, CA: The Craftsman Book.
- Bealle, C., & Jaffe, R. (2003). *Concrete and masonry databook*. New York, NY: Glencoe McGraw-Hill.
- Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.
- Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.
- National Center for Construction Education and Research. (2004). *Core curriculum*. Upper Saddle River, NJ: Pearson Prentice Hall.
- National Center for Construction Education and Research. (2004). *Masonry level I*. Upper Saddle River, NJ: Pearson Prentice Hall.
- National Center for Construction Education and Research. (2004). *Masonry level II*. Upper Saddle River, NJ: Pearson Prentice Hall.
- National Center for Construction Education and Research. (2004). *Masonry level III*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Nolan, K. (n.d.). *Masonry and concrete construction*. Carlsbad, CA: The Craftsman Book.

Math Books

- Ball, J. (1980). *Practical problems in mathematics for masons*. Albany, NY: Delmar.
- Barrows, R. & Jone, B. (2002). *Fundamentals of math with career applications*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Boyce, J., Margolis, L., & Slade, S. (2000). *Mathematics for technical and vocational students*. Upper Saddle River, NJ: Prentice Hall.
- Carman, R., & Saunders, H. (2011). *Mathematics for the trades: A guided approach*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Cook, N. (2004). *Mathematics for technical trades*. Upper Saddle River, NJ: Pearson Prentice Hall.

Print Reading Books

- Huth, M. (2010). *Understanding Construction Drawings*. Clifton Park, NJ: Cengage.
- Olivo, T., & Olivo, C. T. (2010). *Basic blueprint reading and sketching*. Albany, NY: Delmar Learning.

Estimating Books

- Fatzinger, J. (2004). *Basic estimating for construction*. Upper Saddle River, NJ: Pearson Prentice Hall.

Holm, L., Schaufelberger, J., Griffin, D., & Cole, T. (2005). *Construction cost estimating: Process and practice*. Upper Saddle River, NJ: Pearson Prentice Hall.

Pratt, D. (2004). *Fundamentals of construction estimating*. Clifton Park, NY: Thomson Delmar Learning.

Pratt, D. (2006). *Estimating for residential construction*. Clifton Park, NY: Thomson Delmar Learning.

Toenjes, L. (2000). *Building trades estimating*. Homewood, IL: American Technical.

Unit 6: Advanced Laying Techniques and Metal Work

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Explain the terms associated with the layout of a masonry wall. (Review)
- Identify and explain different types of expansion joints and control joints.
- Explain and perform basic bricklaying and block-laying techniques.
- Explain arches, including semicircular arch and jack arch.

Essential Questions

- What are some terms used when laying out a masonry wall?
- What is the difference between expansion and control joints?
- Why are expansion and control joints used?
- Why are there different types of pattern bonds?

Vocabulary

Identify and review the unit vocabulary.

Arch	Humored
Accessories	Jamb
Anchor	Lintel
Bond beam	Masonry Standards Joint Committee
Cap	Panel
Coping	Pencil rod
Empirically designed	Reveal
Fastener	Segmental retaining wall
Galvanic action	Sill
Galvanizing	Skew

Suggested Learning Experiences

Competency 1: Explain the terms associated with the layout of a masonry wall. (Review) ^(DOK1 ALT)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance indicators are reflected in the competency. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a. Provide the students with a list of terms and definitions related to the layout of a masonry wall using Contren Masonry Level I Masonry Units and Installation Techniques Unit and Level II Advanced Laying Techniques Unit. Discuss these terms with the class in detail.</p> <p>Divide the students into pairs and have them ask each other questions concerning the terms and definitions as practice for assessment.</p>	<p>a. Assessment for the terms and definitions will be determined with a matching test.</p>

Competency 2: Identify and explain different types of expansion joints and control joints. ^(DOK1 ALT)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance indicators are reflected in the competency. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a. The students will identify and explain the uses of expansion and control joints.</p>	<p>a. Monitor student mastery by observing groups. Assessment will be determined by a written exam.</p>

Competency 3: Explain and perform basic bricklaying and block-laying techniques. ^(DOK3 ALT)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Review and demonstrate the steps in laying up corners, coursing, racking, toothing, stack bond, and other bond patterns. <small>CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</small></p>	<p>a. Properly establish various types of corners and pattern bonds. Have students perform a complete project from job setup to finished masonry project in the lab.</p>	<p>a. The project will be assessed using a performance assessment rubric.</p>
<p>b. Lay up a block and/or brick wall using steel tape bonding. <small>CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</small></p>	<p>b. Given the proper materials, the students will demonstrate the proper procedure for building a wall.</p>	<p>b. The project will be assessed using a performance assessment rubric.</p>

Competency 4: Explain arches, including semicircular arch and jack arch. ^(DOK2 ALT)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Identify the types and parts of arches. <small>CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15,</small></p>	<p>a. Have the students identify and label different arches and their parts.</p>	<p>a. Written exam will be used to assess the activity.</p>

<p>CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>b. Identify the various arch forms. CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>b. Demonstrate the use of various arch forms.</p>	<p>b. Assess through teacher observation.</p>

<p>Competency 5: Describe the uses and installation of metal work in masonry. (DOK2 ALT)</p>		
<p>Suggested Performance Indicators</p>	<p>Suggested Teaching Strategies</p>	<p>Suggested Assessment Strategies</p>
<p>a. Describe the uses and installation of vertical and horizontal reinforcement. CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28,</p>	<p>a., b. Using the specifications, have students identify where and when to install vertical, horizontal reinforcement, ties, anchors, fasteners, and embedded items.</p>	<p>a., b. Assess the activity with an identification key.</p>

<p>CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>b. Describe the uses and installation of ties, anchors, fasteners, and embedded items. ^{CS4, CS5,} CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>c. Describe hollow metal frames, sills, and lintels. ^{CS4, CS5, CS6, CS7, CS8, CS9, CS12,} CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>c. Using blueprints, have students locate the placement and explain the use of hollow metal frames, sills, and lintels.</p>	<p>c. Assess the activity with an identification key.</p>

Competency 6: Install hollow metal frames, sills, and lintels. ^(DOK3 ALT)		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance indicators are reflected in the competency. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3,</p>	<p>a. Have students demonstrate the proper installation of hollow metal frames, sills, and lintels.</p>	<p>a. Assess using a performance assessment rubric.</p>

CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4		
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Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task : Brick by Brick

You are a brick layer working on a construction project. You are to build a wall and install expansion and/or control joint as drawn on the plans. The masonry foreman will inspect the wall and/or joint for proper installation and use a performance-assessment rubric to judge the wall.

Attachments for Performance Task

Blueprint/specifications

Unit Resources

General Books

- Atcheson, D. (2010). *2010 national concrete & masonry estimator*. Carlsbad, CA: The Craftsman Book.
- Bealle, C., & Jaffe, R. (2003). *Concrete and masonry databook*. New York, NY: Glencoe McGraw-Hill.
- Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.
- Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.
- National Center for Construction Education and Research. (2004). *Masonry level II*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Nolan, K. (n.d.). *Masonry and concrete construction*. Carlsbad, CA: The Craftsman Book.

Brick

- Curriculum and Instructional Materials Center. (1999). *Fundamentals of bricklaying*. Stillwater, OK: Author.
- Curriculum and Instructional Materials Center. (1999). *Introduction to bricklaying*. Stillwater, OK: Author.
- Curriculum and Instructional Materials Center. (1999). *Brick and block masonry*. Stillwater, OK: Author.

Trade Publications

- Fine Homebuilding*. Newton, CT: Tauton Press. Retrieved June 22, 2011, from <http://www.finehomebuilding.com/>
- Masonry Construction*. Hanley-Wood, LLC. Retrieved June 22, 2011, from <http://www.masonryconstruction.com/>
- Masonry: The Voice of the Masonry Contractor*. Masonry Contractors Association of America. Retrieved June 22, 2011, from <http://www.masonrymagazine.com/>
- Technical Notes on Brick Construction*. The Brick Industry Association. Retrieved June 22, 2011, from <http://www.gobrick.com/>

Web Sites

- Construction Education Foundation, Georgia. (n.d.). Retrieved September 9, 2011, from <http://www.cefga.org/TeacherResources.htm>
- Florida Masonry Apprentice & Education Foundation, Inc. (n.d.). Retrieved September 9, 2011, from <http://www.masonryeducation.org/onlineresources.html>
- Mississippi Associated Builders and Contractors. (n.d.). Retrieved September 9, 2011, from <http://www.msabc.net/>
- National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>

Occupational Safety & Health Administration. (n.d.). Retrieved September 9, 2011, from <http://www.osha.gov/SLTC/multimedia.html>

Online Stopwatch. (n.d.). Retrieved September 9, 2011, from <http://www.online-stopwatch.com/large-stopwatch/>

Quintessential Careers. (n.d.). Retrieved September 9, 2011, from http://www.quintcareers.com/employment_application.pdf

RS Innovative. (n.d.). Retrieved September 9, 2011, from <http://www.rsinnovative.com/rulergame/>

Unit 7: Construction Techniques and Moisture Control

Understandings and Goals

Enduring Understandings

In this unit, the student will:

- Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
- Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing.
- Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
- Identify and demonstrate various types of moisture control used in masonry.
- Construct corbeling in a double-wythe wall.
- Join intersecting walls.

Essential Questions

- How do we prevent moisture infiltration around windows and doors?
- How do we prevent a wall from collapsing in high winds?
- What are the various methods for insulating masonry walls?
- What is corbeling?
- How do we join intersecting walls?

Vocabulary

Identify and review the unit vocabulary.

Capillary

Chase

Dampproofing

Membrane

Reveal

Toothing

Waterproofing

Wick

Suggested Learning Experiences

Competency 1: Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings. <small>(DOK3 CTM)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance indicators are reflected in the competency. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a. Have students lay out a dry bond through the opening to adjust for necessary cuts. Students will then make the cuts and install the brick.</p>	<p>a. Assessment will be the performance-assessment rubric.</p>

Competency 2: Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing. <small>(DOK3 CTM)</small>		
Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Explain the forces which affect masonry structures. ^{CS4, CS5, CS6, CS7,} CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a., b., c., d. Provide terms and definitions related to reinforcing and wall supports of brick structures. Using a handout, video, and/or demonstration, explain the techniques of providing reinforcement and wall supports.</p>	<p>a., b., c., d. Assessment will be a written exam or performance-assessment rubric.</p>
<p>b. Explain the materials</p>		

used in reinforced brick masonry.

CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, C CSL1, C CSL2, C CSL3, C CSL4, C CSL5, C CSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4

c. Explain the process of bracing and its purpose.

CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, C CSL1, C CSL2, C CSL3, C CSL4, C CSL5, C CSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4

d. Explain the difference among piers, pilasters, columns, and buttresses.

CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, C CSL1, C CSL2, C CSL3, C CSL4, C CSL5, C CSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39,

CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4		
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Competency 3: Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques. ^(DOK2 CTM)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Performance indicators are reflected in the competency. ^{CS4,} CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a. Discuss the various types of insulation. Have the students identify the various types of insulation and their uses.</p>	<p>a. Assessment will be teacher observation.</p>

Competency 4: Identify and demonstrate various types of moisture control used in masonry. ^(DOK3 CTM)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
<p>a. Define <i>parging</i>, including its purpose, placement, and effectiveness. ^{CS4, CS5, CS6,} CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>	<p>a., b., c. Provide terms and definitions related to moisture control.</p> <p>Using a handout, video, and/or demonstration explain the techniques of providing moisture control.</p>	<p>a., b., c. Assessment for the activity can be written or performance test.</p>
<p>b. Explain weep holes,</p>		

<p>including purpose and placement. ^{CS4, CS5, CS6, CS7,} CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4,CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>c. Explain various flashing materials, including advantages, disadvantages, placement, and purpose. ^{CS4, CS5, CS6, CS7, CS8, CS9, CS12,} CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4,CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4</p>		
<p>d. Install flashing. ^{CS4, CS5,} CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4,CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32,</p>	<p>d. Have the students install flashing to a specified wall.</p>	<p>d. Assessment will be a performance-assessment rubric.</p>

CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4		
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Competency 5: Construct corbeling in a double-wythe wall. ^(DOK3 CTM)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Explain corbeling and its uses CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4	a. Have students build a double-wythe wall and install corbeling .	a. Assessment will be a performance-assessment rubric.

Competency 6: Join intersecting walls. ^(DOK3 CTM)

Suggested Performance Indicators	Suggested Teaching Strategies	Suggested Assessment Strategies
a. Performance indicators are reflected in the competency. CS4, CS5, CS6, CS7, CS8, CS9, CS12, CS13, CS14, CS15, CS16, CCR1, CCR2, CCR3, CCR4, CCR5, CCR6, CCR7, CCR8, CCR9, CCR10, CCSL1, CCSL2, CCSL3, CCSL4, CCSL5, CCSL6, CCM1, CCM2, CCM3, CCM4, CCM5, CCM6, CCM7, CCM8, CCM9, CCM10, CCM11, CCM12, CCM13, CCM14, CCM15, CCM16, CCM17, CCM18, CCM19, CCM20, CCM21, CCM22, CCM23, CCM24, CCM25, CCM26, CCM27, CCM28, CCM29, CCM30, CCM31, CCM32, CCM33, CCM34, CCM35, CCM36, CCM37, CCM38, CCM39, CCM40, CCM41, CCM42, CCM43, CCM44, T2, T4	a. Discuss and explain and demonstrate the methods of wall intersections using the Contren Level II Module- Construction Techniques and Moisture Control. Have the student construct an intersecting wall.	a. Assessment will be from the Contren Module. Assessment will be a performance-assessment rubric.

Note: Instruction for a portion of this unit may be accomplished in an online environment.

Performance Task

Performance Task: Don't Get Wet!

You are the bricklayer, and you must prevent moisture penetration in the building to be constructed. You are responsible for installing the flashing and weep holes at the base of the walls. The construction building inspector will determine proper installation. You will be judged using the specifications and/or blueprints checklist for the project.

Attachments for Performance Task

Project specifications/blueprints.

Unit Resources

General Books

- Atcheson, D. (2010). *2010 national concrete & masonry estimator*. Carlsbad, CA: The Craftsman Book.
- Bealle, C., & Jaffe, R. (2003). *Concrete and masonry databook*. New York, NY: Glencoe McGraw-Hill.
- Kicklighter, C. (2010). *Modern masonry*. Tinley Park, IL: Goodheart-Willcox.
- Kreh, R. (2008). *Masonry skills*. Clifton Park, IL: Thomson Delmar Learning.
- National Center for Construction Education and Research. (2004). *Masonry level II*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Nolan, K. (n.d.). *Masonry and concrete construction*. Carlsbad, CA: The Craftsman Book.

Trade Publications

- Fine Homebuilding*. Newton, CT: Tauton Press. Retrieved June 22, 2011, from <http://www.finehomebuilding.com/>
- Masonry Construction*. Hanley-Wood, LLC. Retrieved June 22, 2011, from <http://www.masonryconstruction.com/>
- Masonry: The Voice of the Masonry Contractor*. Masonry Contractors Association of America. Retrieved June 22, 2011, from <http://www.masonrymagazine.com/>
- Technical Notes on Brick Construction*. The Brick Industry Association. Retrieved June 22, 2011, from <http://www.gobrick.com/>

Web Sites

- Construction Education Foundation, Georgia. (n.d.). Retrieved September 9, 2011, from <http://www.cefga.org/TeacherResources.htm>
- Florida Masonry Apprentice & Education Foundation, Inc. (n.d.). Retrieved September 9, 2011, from <http://www.masonryeducation.org/onlineresources.html>
- Mississippi Associated Builders and Contractors. (n.d.). Retrieved September 9, 2011, from <http://www.msabc.net/>
- National Center for Construction Education and Research. (n.d.). Retrieved September 9, 2011, from <http://www.nccer.org/>
- Occupational Safety & Health Administration. (n.d.). Retrieved September 9, 2011, from <http://www.osha.gov/SLTC/multimedia.html>
- Online Stopwatch. (n.d.). Retrieved September 9, 2011, from <http://www.online-stopwatch.com/large-stopwatch/>
- Quintessential Careers. (n.d.). Retrieved September 9, 2011, from http://www.quintcareers.com/employment_application.pdf
- RS Innovative. (n.d.). Retrieved September 9, 2011, from <http://www.rsinnovative.com/rulergame/>

Student Competency Profile

Student's Name: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student, and it can serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Orientation, Advanced Leadership, and Employability Skills (Review)	
	1. Review local program and vocational center policies and procedures. (DOK 1 EMP)
	2. Describe employment opportunities and responsibilities. (DOK1 EMP)
	3. Explore leadership skills and personal development opportunities provided students by student organizations to include SkillsUSA. (DOK) EMP
	4. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations. (DOK 2 COM)
Unit 2: Basic Safety (Review)	
	1. Describe general safety rules for working in a shop and/or lab and industry. (DOK 2 SAF)
	2. Identify and apply safety around welding operations. (DOK 1 SAF)
	3. Identify and explain use of various barriers and confinements. (DOK 1 SAF)
	4. Explain lifting, fall protection, and the use of ladders and scaffolds. (DOK 1 SAF)
	5. Explain the Material Safety Data Sheet (MSDS). (DOK 1 SAF)
	6. Explain fires. (DOK 1 SAF)
	7. Explain safety in and around electrical situations. (DOK 1 SAF)
Unit 3: Power Tools and Equipment (Review)	
	1. Safely use power tools. (DOK 2 HTO, PTO)
	2. Safely use masonry equipment. (DOK 2 HTO, PTO)
Unit 4: Mortar and Grout	
	1. Identify types, uses, and mixing procedures of mortar. (DOK2 MOR)
	2. Identify types, uses, and mixing procedures of grout. (DOK2 GRO)
Unit 5: Measurements/Drawing/Specifications and Estimating	
	1. Apply basic mathematics for masonry. (DOK2 MDS)
	2. Identify and discuss drawings and specifications. (DOK1 MDS, RPD)
	3. Estimate material for a masonry project. (DOK3 RPD)
Unit 6: Advanced Laying Techniques and Metal Work	
	1. Explain the terms associated with the layout of a masonry wall. (Review) (DOK1 ALT)
	2. Identify and explain different types of expansion joints and control joints. (DOK1 ALT)

	3.	Explain and perform basic bricklaying and block-laying techniques. ^(DOK3 ALT)
	4.	Explain arches, including semicircular arch and jack arch. ^(DOK2 ALT)
	5.	Describe the uses and installation of metal work in masonry. ^(DOK2 ALT)
	6.	Install hollow metal frames, sills, and lintels. ^(DOK3 ALT)
Unit 7: Constructing Techniques and Moisture Control		
	1.	Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings. ^(DOK3 CTM)
	2.	Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing. ^(DOK3 CTM)
	3.	Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques. ^(DOK2 CTM)
	4.	Identify and demonstrate various types of moisture control used in masonry. ^(DOK3 CTM)
	5.	Construct corbeling in a double-wythe wall. ^(DOK3 CTM)
	6.	Join intersecting walls. ^(DOK3 CTM)

Appendix A: Activities and Rubrics

Written Report Assessment Rubric

	Exemplary	Accomplished	Developing	Beginning	Score
	4 points	3 points	2 points	1 point	
Content	Clear thesis and focus that remain apparent	Thesis and focus that remain apparent	Addresses subject matter with minimal support	Does not focus on topic	
Grammar	Correct and effective use of grammar and mechanics	Occasional errors in use of grammar and mechanics	Problems in use of grammar and mechanics	Repeated errors in use of grammar and mechanics	
Organization	Ideas flow smoothly and logically with clarity and coherence	Logical order and appropriate sequencing of ideas with adequate transition	Some evidence of an organizational plan or strategy	Lacks organization	

WRITTEN REPORT EVALUATION SHEET

- ____/16 Preparation
- ____/28 Organization
- ____/24 Thoroughness
- ____/19 Extra Materials
- ____/13 Final Report

Preparation:

1. ____/2 Information written (neatly)
2. ____/2 Sources used listed
3. ____/5 Worked every day (did not waste time)
4. ____/5 Has all materials ready for use
5. ____/2 Cooperative

Organization

1. ____/2 Report in a logical order
2. ____/2 Interesting manner
3. ____/20 Notebook check
4. ____/2 Understanding of topic
5. ____/2 Spelling and sentence structure (did not copy from books)

Thoroughness

1. ____/5 Main points given
2. ____/5 Details to explain given
3. ____/5 Information presented clearly
4. ____/4 More than one source used
5. ____/5 Extra materials are appropriate

Extra Materials

1. ____/2 Neatness
2. ____/7 Creativity
3. ____/2 Dramatic value
4. ____/3 Useful
5. ____/5 Correctness

Final Report

1. ____/3 Written clearly
2. ____/2 Organized
3. ____/2 Sources documented correctly
4. ____/2 Spelling
5. ____/2 Grammar
6. ____/2 Neatness

____/100 Total points earned

Presentation Assessment Rubric

	Exemplary	Accomplished	Developing	Beginning	Score
	4 points	3 points	2 points	1 point	
Content	Clear, appropriate, and correct	Mostly clear, appropriate, and correct	Somewhat confusing, incorrect, or flawed	Confusing, incorrect, or flawed	
Clarity	Logical, interesting sequence	Logical sequence	Unclear sequence	No sequence	
Presentation	Clear voice and precise pronunciation	Clear voice and mostly correct pronunciation	Low voice and incorrect pronunciation	Mumbling and incorrect pronunciation	
Visual Aids	Attractive, accurate, and grammatically correct	Adequate, mostly accurate, and few grammatical errors	Poorly planned, somewhat accurate, and some grammatical errors	Weak, inaccurate, and many grammatical errors	
Length	Appropriate length	Slightly too long or short	Moderately too long or short	Extremely too long or short	
Eye Contact	Maintains eye contact and seldom looking at notes	Maintains eye contact most of time but frequently returns to notes	Occasionally uses eye contact but reads most of information	No eye contact because reading information	

PRESENTATION EVALUATION SHEET

____/16 Preparation
____/28 Organization
____/24 Thoroughness
____/19 Extra Materials
____/13 Actual Presentation

Preparation:

1. ____/2 Information written (neatly)
2. ____/2 Sources used listed
3. ____/5 Worked every day (did not waste time)
4. ____/5 Has all materials ready for use
5. ____/2 Cooperative

Organization

1. ____/2 Report in a logical order
2. ____/2 Interesting manner
3. ____/20 Notebook check
4. ____/2 Understanding of topic
5. ____/2 Spelling and sentence structure (did not copy from books)

Thoroughness

1. ____/5 Main points given
2. ____/5 Details to explain given
3. ____/5 Information presented clearly
4. ____/4 More than one source used
5. ____/5 Extra materials are appropriate

Extra Materials

1. ____/2 Neatness
2. ____/7 Creativity
3. ____/2 Dramatic value
4. ____/3 Useful
5. ____/5 Correctness

Actual Presentation

1. ____/3 Speaks clearly and distinctly
2. ____/2 Uses extra materials effectively
3. ____/2 Posture
4. ____/2 Pronounces all words correctly
5. ____/4 Organized in thought

____/100 Total points earned

Group Work Assessment Rubric

	Highly Successful	Meeting Success	Experiencing Difficulty	Score
	3 points	2 points	1 point	
Sharing	Shared ideas with others	Occasionally shared ideas with others	Seldom shared ideas with others	
Listening	Always listened to peers	Occasionally listened to peers	Ignored ideas of peers	
Respecting	Interacted with, encouraged, and supported ideas of others	Occasionally encouraged and supported others	Seldom encouraged and supported others	
Participating	Shared task equally with group members	Did most of the task	Did very little of the task	

Role Play or Skit Assessment Rubric

	Excellent 4 Points	Good 3 Points	Average 2 Points	Needs Improvement 1 Point	Total
Accuracy	All information was accurate	Almost all information was accurate	Most information was accurate	Very little information was accurate	
Role	Excellent character development; student contributed in a significant manner	Good character development; student contributed in a cooperative manner	Fair character development; student may have contributed	Little or no character development; student did not contribute much at all	
Knowledge Gained	Can clearly explain several ways in which his or her character "saw" things differently than other characters and can explain why	Can clearly explain several ways in which his or her character "saw" things differently than other characters	Can clearly explain one way in which his or her character "saw" things differently than other characters	Cannot explain any way in which his or her character "saw" things differently than other characters	
Props	Used several props and showed considerable creativity	Used one or two appropriate props that made the presentation better	Used one or two props that made the presentation better	Used no props to make the presentation better	
Required Elements	Included more information than required	Included all required information	Included most required information	Included less information than required	

Group Discussion Rubric

	Beginning	Developing	Accomplished	Exemplary	Score
	1 point	2 points	3 points	4 points	
Group Discussions	Rarely contributed to discussions of the group	Contributed good effort to discussions of the group	Contributed great effort to discussions of the group	Contributed exceptional effort to discussions of the group	
On-task Behavior	Exhibited on-task behavior inconsistently	Exhibited on-task behavior some of the time	Exhibited on-task behavior most of the time	Exhibited on-task behavior consistently	
Helping Others	Did not assist other group members	Seldom assisted other group members	Occasionally assisted other group members	Assisted other group members	
Listening	Ignored ideas of group members	Seldom listened to ideas of group members	Occasionally listened to ideas of group members	Always listened to ideas of group members	

Performance Assessment

Student's Name _____

Date _____

Task to be performed _____

	Possible Points	Points Awarded
Safety Personal safety (glasses, clothing, etc.) Safe use of tool Safely perform the task	25	
Performance of the Task Insert specific procedures for each performance activity Follow the task instructions Performs the task efficiently Performs the task satisfactorily	50	
Lab Maintenance Area cleanup (clean and tidy) Area organization (before, during, and after the task)	25	
Total	100	

Comments for deductions:

Instructor's Signature

Ladder Safety Checklist

- _____ 1. Ladder has been properly set up and is used in accordance with safety instructions and warnings
- _____ 2. Body is centered on the ladder
- _____ 3. Hold the ladder with one hand while working with the other
- _____ 4. Move materials with extreme caution
- _____ 5. Climb facing the ladder and maintain a firm grip
- _____ 6. Move one step at a time firmly setting one foot before moving the other
- _____ 7. Haul materials up on a line

Lifting Safety Checklist

- _____ Determine the weight of the load prior to lifting
- _____ Plan your lift
- _____ Make sure you have firm footing
- _____ Bend your knees
- _____ Get a good grip
- _____ Lift with your legs, keep your back straight, and keep your head up
- _____ Keep the load close to your body
- _____ Do not turn or twist until you are standing straight, then pivot your feet and body

Workplace Skills Checklist

- Follow rules, regulations, and policies as established
- Implement responsibilities of job position
- Maintain regular attendance
- Assume responsibility for decisions and actions
- Demonstrate willingness to learn
- Practice time management
- Practice cost effectiveness
- Apply ethical reasoning
- Display initiative
- Display assertiveness
- Exhibit pride

NOTE: The Workplace Skills Checklist may be used throughout the program.

Teamwork Checklist

- _____ Followed team leader's and/or supervisor's directions
- _____ Accepts that others might be better at some tasks
- _____ Positive attitude when working with others
- _____ Recognizes that the work benefits the team and/or company not the individual
- _____ Works well with people who work at different speeds
- _____ Accepts goals that are set by others
- _____ Trusts others to perform their assignments
- _____ Appreciates the work of others

NOTE: The Teamwork Checklist may be used throughout the program.

Communication Checklist

_____ Communicates orally with others

_____ Asks questions about tasks

_____ Follows written and oral directions

_____ Interprets the use of body language

_____ Uses proper telephone etiquette (where applicable)

NOTE: The Communication Skills Checklist may be used throughout the program.

Student's Name: _____

Class: _____

Date: _____

**RUBRIC FOR
ASSESSING APPLICATION OF LIFE AND CAREER SKILLS**

The following scale can be used to assess application of each of the Life and Career Skills of students.

- Superior** (18-20 points) The student consistently demonstrates all aspects of this skill in classroom and laboratory activities.
- Exceptional** (15-17 points) The student consistently demonstrates most of the aspects of this skills in classroom and laboratory activities but lapses at times on one or two of the indicators.
- Adequate** (12-14 points) The student demonstrates knowledge of the skill during classroom and laboratory activities, but lapses on three or more indicators from time to time.
- Improving** (9-11 points) The student is vaguely aware of the skill but shows only marginal evidence of being able to apply it in the classroom or laboratory.
- Minimal** (0-8 points) The student consistently fails to demonstrate knowledge or application of the skill.

Skill	Comments	Score
Flexibility and Adaptability		
Initiative & Self-Direction		
Social & Cross-Cultural Skills		
Productivity & Accountability		
Leadership & Responsibility		
TOTAL SCORE		

NOTE: The Life and Career Skills Scale may be used throughout the program.

Appendix B: Glossary

Unit 1

Absenteeism: consistent failure to show up for work

Active listening: a process that involves respecting others, listening to what is being said, and understanding what is being said

Appendix: a source of detailed or specific information placed at the end of a section, a chapter, or a book

Body language: a person's physical posture and gestures that reflect how that person is feeling

Confidentiality: privacy of information

Glossary: an alphabetical list of terms and definitions

Graph: information shown as a picture or chart. Graphs may be represented in various forms, including line graphs and bar graphs.

Harassment: a type of discrimination that can be based on race, age, disabilities, sex, religion, cultural issues, health, or language barriers

Jargon: specialized terms used in a specific industry.

Leadership: the ability to set an example for others to follow by exercising authority and responsibility

Mission statement: a statement of how a company does business

Permit: a legal document that allows a task to be undertaken

Reference: a person who can confirm to a potential employer that you have the skills, experience, and work habits that are listed in your résumé

Table of contents: a list of book chapters or sections, usually located at the front of the book

Teamwork: The cooperation of coworkers to achieve one or more goals

Unit 2

Combustible: capable of easily igniting and rapidly burning; used to describe a fuel with a flashpoint at or above 100°F

Competent person: a person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them

Confined space: a work area large enough for a person to work but arranged in such a way that an employee must physically enter the space to perform work. A confined space has a limited or restricted means of entry and exit. It is not designed for continuous work. Tanks, vessels, silos, pits, vaults, and hoppers are examples of confined spaces.

Excavation: any man-made cut, cavity, trench, or depression in an earth surface, formed by removing earth. It can be made for anything from basements to highways.

Extension ladder: a ladder made of two straight ladders that are connected so that the overall length can be adjusted

Flammable: capable of easily igniting and rapidly burning; used to describe a fuel with a flashpoint below 100°F

Flashback: a welding flame that flares up and chars the hose at or near the torch connection; caused by improperly mixed fuel

Flash burn: the damage that can be done to eyes after even brief exposure to ultraviolet light from arc welding; requires medical attention

Flash goggles: eye protection worn during welding operations

Flash point: the temperature at which fuel gives off enough gases (vapors) to burn

Ground fault circuit interrupter (GFCI): a device that interrupts and de-energizes an electrical circuit to protect a person from electrocution

Hazard Communication Standard (HazCom): the Occupational Safety and Health Administration standard that requires contractors to educate employees about hazardous chemicals on the job site and how to work with them safely

Lockout/tagout: a formal procedure for taking equipment out of service and ensuring that it cannot be operated until a qualified person has removed the lockout or tagout device (such as a lock or warning tag)

Material safety data sheet (MSDS): a document that must accompany any hazardous substance. The MSDS identifies the substance and gives the exposure limits, the physical and chemical characteristics, the kind of hazard it presents, precautions for safe handling and use, and specific control measures.

Occupational Safety and Health Administration (OSHA): an agency of the U.S. Department of Labor; also refers to the Occupational and Safety and Health Act of 1970, a law that applies to more than 111 million workers and 7 million job sites in the country

Permit-required confined spaces: a confined space that has been evaluated and found to have actual or potential hazards, such as a toxic atmosphere or other serious safety or health hazard. Workers need written authorization to enter a permit-required confined space.

Personal protective equipment (PPE): equipment or clothing designed to prevent or reduce injuries

Proximity work: work done near a hazard while not actually in contact with the hazard

Qualified person: a person who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has demonstrated the ability to solve or prevent problems relating to a certain subject, work, or project

Respirator: a device that provides clean, filtered air for breathing, regardless of what is in the surrounding air

Scaffold: an elevated platform for workers and materials

Shoring: using pieces of timber, usually in a diagonal position, to hold a wall in place temporarily

Signaler: a person who is responsible for directing a vehicle when the driver's vision is blocked in any way

Six-foot rule: a rule stating that platforms or work surfaces with unprotected sides or edges that are six feet or higher than the ground or level below it require fall protection

Stepladder: a self-supporting ladder consisting of two elements hinged at the top

Straight ladder: a nonadjustable ladder

Trench: a narrow excavation made below the surface of the ground that is generally deeper than it is wide, with a maximum width of 15 feet

Welding shield: (1) a protective screen set up around a welding operation designed to safeguard workers not directly involved in that operation; (2) a shield that provides eye and face protection for welders by either connecting to helmet-like headgear or attaching directly to a hard hat; also called a welding helmet

Unit 3

Bed joint: a horizontal joint between two masonry units

Corner pole: any type of post braced into a plumb position so that a line can be fastened to it; also called a "dead man"

Lead: the two corners of a structural unit or wall, built first and used as a position marker and measuring guide for the entire wall

Parge: a thin coat of mortar or grout on the outside surface of a wall. Parging prepares a masonry surface for attaching veneer or tile, or parging can waterproof the back of a masonry wall.

Pointing: troweling mortar or a mortar-repairing material, such as epoxy, into a joint after masonry is laid

Retempering: adding water to mortar to replace evaporated moisture and restore proper consistency. Any rettempering must be done within the first two hours after mixing, as mortar begins to harden after 2-1/2 hours.

Skewback: a sloping surface against which the end of an arch rests, may be brick cut on an angle

Temper: to remix mortar by adding water to make it more workable

Trestle: a system of scaffolding with diagonal legs, a split-leg support for a system of scaffolding

Unit 4 -Mortar

Air-entraining: a type of admixture added to mortar to increase microscopic air bubbles in mixed mortar. The air bubbles increase resistance to freeze-thaw damage.

Hydration: a chemical reaction between cement and water that hardens the mortar. Hydration requires the presence of water and an air temperature between 40°and 80 °F.

Masonry cement: cement that has been modified by adding lime and other materials

Masonry Standards Joint Committee (MSJC): a committee of the American Concrete Institute that develops recommended standards for masonry construction

Plasticity: the ability of mortar to flow like a liquid and not form cracks or break apart

Pozzolan: a finely powdered material that can be added to mortar to increase durability and provide a positive set

Slaked lime: lime reduced by mixing with water to a safe form that can be used in the production of mortar

Water retention: the ability of mortar to keep sufficient water in the mix to enhance plasticity and workability

Workability: the property of mortar to remain soft and plastic long enough to allow the mason to place and align masonry units and strike off the mortar joints before the mortar hardens completely

Grout

ACI: American Concrete Institute

ASCE: American Society of Civil Engineers

ASTM: American Society for Testing and Materials

Blowout: the swelling or rupture of a cavity wall from too much pressure caused by pouring liquid grout into the cavity

Bond beam: a course or column of masonry units with steel rebar inserted and held in place by a solid fill of grout or mortar; used as a lintel or reinforcement beam to distribute stress

Bridging: the mounding of grout or cement over an obstruction, creating a void under the obstruction

Grouted walls: hollow masonry walls where the voids are filled with grout but not reinforcing bar

Key: a recess or groove in one placement of grout or concrete that is later filled with a new placement of grout or concrete so that the two lock together in a tongue-and-groove configuration

Lift: one continuous placement of grout or cement without interruption. This would be equivalent to one layer.

Rebar: reinforcing bars embedded in concrete, mortar, or grout in such a manner that they act together in resisting forces

Reinforced walls: hollow masonry walls where the voids are filled with grout and are reinforced with steel bars

Rodding: poking the grout with a rod or using a vibrator to drive air bubbles out of grout

Unit 5 – Measurement

Denominate numbers: those number indicating a unit of measure, such as feet or tons

International System (SI): the metric-based units of measure used in most countries

Nominal dimension: the size of the masonry unit plus the thickness of one standard ($\frac{1}{2}$ inch or $\frac{3}{8}$ inch) mortar joint; used in laying out courses

U.S. Customary system: the units of measure commonly used in the United States, such as inches, feet, yards, miles, quarts, and gallons; also known as the English System

Plans and Specs

Blueprints: architectural or working drawings used to represent a structure or system

Change order: a document or form used during the construction process to document a change in the construction requirements from the original plans or specifications

HVAC: standard abbreviation for Heating, Ventilation, and Air-Conditioning; also a reference to the function of the heating, ventilating, and air -conditioning system and its components

Legend: a listing that explains or defines symbols or special marks placed on plans or drawings; usually on the front sheet or index of the plan set

Sectional drawing: a drawing that shows the inside of a component or structure. The view would be as if you cut the item into two pieces and looked at the end of the cut.

Shop drawing: a drawing that is usually developed by manufacturers, fabricators, or contractors to show specific dimensions and other pertinent information concerning a particular piece of equipment and its installation methods

Unit 6 – Advanced Laying

Arch: a form of construction in which a number of units span an opening by transferring vertical loads laterally to adjacent units and thus to supports

Cap: masonry units laid on top of a finished wall

Coping: the materials or masonry units used to form a cap or finish on top of a wall, pier, chimney, or pilaster to protect the masonry below from water penetration. Coping is usually projected from both sides of the wall to provide a protective covering as well as an ornamental design.

Empirically designed: design based on the application of physical limitations learned from experience or from observations gained through experience without structural analysis

Humored: a slang term for moving slightly or nudging gently in order to move

Masonry Standards Joint Committee (MSJC): a committee of the American Concrete Institute that develops recommended standards for masonry construction

Pencil rod: a type of metallic tie that is similar to the shape of a straight wooden pencil; used for control joints in concrete masonry construction

Segmental retaining wall (SRW): a wall made of segmental block stacked on top of each other without mortar bonding

Metal Work

Accessories: items, usually metal, used to help reinforce and/or anchor masonry units

Anchor: a metal assembly used to attach masonry to structural support

Bond Beam: a course of masonry filled with steel reinforcing rods and grout that serves as a lintel or reinforcement beam designed to strengthen a wall

Fastener: a metal assembly used to attach building parts to masonry

Galvanic action: the generation of a weak electric current by immersing two different metals in liquid. This results in corrosion of one metal and plating of the other.

Galvanizing: plating metal with zinc, originally by galvanic action.

Jamb: the side of an opening, or the vertical framing member on the side of the opening, usually for door and window frames

Lintel: the horizontal member or beam over an opening that carries the weight of the masonry above the opening

Panel: a section of wall between control joints, wall ends, or a control joint and wall end

Reveal: the side of an opening in a wall for a window or door. This is the part of the masonry jamb around a window frame that can be seen from the frame to the face of the masonry wall.

Sill: a horizontal member under a door or window. Slip sills fit inside the door or window frame; lug sills extend beyond the frame and into the masonry on the jamb sides of the frame.

Skew: the condition when two parts come together at an angle which is not 90 degrees or perpendicular to each other

Unit 7

Capillary: refers to movement of underground water due to molecular attraction between masonry and water

Chase: a continuous recess built into a wall to receive pipes, wires, or heating ducts

Dampproofing: the application of materials or treatment of surfaces to prevent moisture penetration due to capillary action

Membrane: a layer of thin, pliable material used to waterproof masonry

Reveal: the portion of a masonry jamb or recess placed between the jambs and visible from the face of the wall back to the frame

Toothing: construction of the temporary end of a wall with the end stretcher of every alternate course projecting. The projecting units are toothers.

Waterproofing: the process of treating masonry with a material that will prevent penetration of moisture

Wick: a bundle of fibers that are loosely twisted or braided and woven together to form a cord that can carry water away from an area by capillary action, which occurs as long as the drip end is lower than the absorption end

Appendix C: Industry Standards

Contren Best Practices for Masonry

	Units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
Industry Standards								
CCR		X	X	X				
Level One								
ITM		X	X					
SAR			X	X				
MDS						X		
MOR					X			
Level Two								
RPD						X		
GOR					X			
MWM							X	
ALT							X	
CTM								X

Contren Core

Level One

ITM- INTRODUCTION TO MASONRY

SAR- SAFETY REQUIREMENTS

MDS - MEASUREMENTS, DRAWINGS, AND SPECIFICATIONS

MOR – MORTAR

Level Two

RPD- RESIDENTIAL PLANS AND DRAWING INTERPRETATION

GOR - GROUT AND OTHER REINFORCEMENT

MWM - METAL WORK IN MASONRY

ALT - ADVANCED LAYING TECHNIQUES

CTM - CONSTRUCTION TECHNIQUES AND MOISTURE CONTROL

Appendix D: 21st Century Skills¹

	Units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
21 st Century Standards								
CS1		X						
CS2						X		
CS3		X						
CS4			X	X	X		X	X
CS5					X		X	X
CS6		X			X	X	X	X
CS7		X	X	X	X	X	X	X
CS8		X	X	X	X	X	X	X
CS9		X	X	X	X	X	X	X
CS10		X						
CS11		X				X		
CS12		X	X	X	X	X	X	X
CS13		X	X	X	X	X	X	X
CS14		X	X	X	X	X	X	X
CS15		X	X	X	X	X	X	X
CS16		X	X	X	X	X	X	X

CSS1-21st Century Themes

CS1 Global Awareness

- Using 21st century skills to understand and address global issues
- Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
- Understanding other nations and cultures, including the use of non-English languages

CS2 Financial, Economic, Business, and Entrepreneurial Literacy

- Knowing how to make appropriate personal economic choices
- Understanding the role of the economy in society
- Using entrepreneurial skills to enhance workplace productivity and career options

CS3 Civic Literacy

- Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
- Exercising the rights and obligations of citizenship at local, state, national, and global levels
- Understanding the local and global implications of civic decisions

CS4 Health Literacy

- Obtaining, interpreting, and understanding basic health information and services and using such information and services in ways that enhance health
- Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance, and stress reduction
- Using available information to make appropriate health-related decisions
- Establishing and monitoring personal and family health goals
- Understanding national and international public health and safety issues

CS5 Environmental Literacy

- Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water, and ecosystems.
- Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.).

¹ *21st century skills*. (n.d.). Washington, DC: Partnership for 21st Century Skills.

3. Investigate and analyze environmental issues, and make accurate conclusions about effective solutions.
4. Take individual and collective action toward addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues).

CSS2-Learning and Innovation Skills

CS6 Creativity and Innovation

1. Think Creatively
2. Work Creatively with Others
3. Implement Innovations

CS7 Critical Thinking and Problem Solving

1. Reason Effectively
2. Use Systems Thinking
3. Make Judgments and Decisions
4. Solve Problems

CS8 Communication and Collaboration

1. Communicate Clearly
2. Collaborate with Others

CSS3-Information, Media and Technology Skills

CS9 Information Literacy

1. Access and Evaluate Information
2. Use and Manage Information

CS10 Media Literacy

1. Analyze Media
2. Create Media Products

CS11 ICT Literacy

1. Apply Technology Effectively

CSS4-Life and Career Skills

CS12 Flexibility and Adaptability

1. Adapt to Change
2. Be Flexible

CS13 Initiative and Self-Direction

1. Manage Goals and Time
2. Work Independently
3. Be Self-directed Learners

CS14 Social and Cross-Cultural Skills

1. Interact Effectively with Others
2. Work Effectively in Diverse Teams

CS15 Productivity and Accountability

1. Manage Projects
2. Produce Results

CS16 Leadership and Responsibility

1. Guide and Lead Others
2. Be Responsible to Others

Appendix E: Common Core Standards

Common Core Crosswalk for Masonry										
	Units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7		
Common Core Standards										
CCR1		X	X	X	X	X	X	X		
CCR2		X	X	X	X	X	X	X		
CCR3		X	X	X	X	X	X	X		
CCR4		X	X	X	X	X	X	X		
CCR5		X	X	X	X	X	X	X		
CCR6		X	X	X	X	X	X	X		
CCR7		X	X	X	X	X	X	X		
CCR8		X	X	X	X	X	X	X		
CCR9		X	X	X	X	X	X	X		
CCR10		X	X	X	X	X	X	X		
CCW1		X	X	X						
CCW2		X	X	X						
CCW3		X	X	X						
CCW4		X	X	X						
CCW5		X	X	X						
CCW6		X	X	X						
CCW7		X	X	X						
CCW8		X	X	X						
CCW9		X	X	X						
CCW10		X	X	X						
CCSL1		X	X	X	X	X	X	X		
CCSL2		X	X	X	X	X	X	X		
CCSL3		X	X	X	X	X	X	X		
CCSL4		X	X	X	X	X	X	X		
CCSL5		X	X	X	X	X	X	X		
CCSL6		X	X	X	X	X	X	X		
CCL1		X	X	X						
CCL2		X	X	X						
CCL3		X	X	X						
CCL4		X	X	X						
CCL5		X	X	X						
CCL6		X	X	X						
CCM1					X	X	X	X		
CCM2					X	X	X	X		
CCM3					X	X	X	X		
CCM4					X	X	X	X		
CCM5					X	X	X	X		
CCM6					X	X	X	X		
CCM7					X	X	X	X		
CCM8					X	X	X	X		
CCM9					X	X	X	X		
CCM10					X	X	X	X		
CCM11					X	X	X	X		
CCM12					X	X	X	X		
CCM13					X	X	X	X		
CCM14					X	X	X	X		
CCM15					X	X	X	X		
CCM16					X	X	X	X		
CCM17					X	X	X	X		
CCM18					X	X	X	X		
CCM19					X	X	X	X		
CCM20					X	X	X	X		
CCM21					X	X	X	X		

CCM22					X	X	X	X			
CCM23					X	X	X	X			
CCM24					X	X	X	X			
CCM25					X	X	X	X			
CCM26					X	X	X	X			
CCM27					X	X	X	X			
CCM28					X	X	X	X			
CCM29					X	X	X	X			
CCM30					X	X	X	X			
CCM31					X	X	X	X			
CCM32					X	X	X	X			
CCM33					X	X	X	X			
CCM34					X	X	X	X			
CCM35					X	X	X	X			
CCM36					X	X	X	X			
CCM37					X	X	X	X			
CCM38					X	X	X	X			
CCM39					X	X	X	X			
CCM40					X	X	X	X			
CCM41					X	X	X	X			
CCM42					X	X	X	X			
CCM43					X	X	X	X			
CCM44					X	X	X	X			

English Language Arts (6-12)

College and Career Readiness Anchor Standards for *Reading*

Key Ideas and Details

CCR1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCR2: Determine central ideas or themes of a text, and analyze their development; summarize the key supporting details and ideas.

CCR3: Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

CCR4: Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCR5: Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

CCR6: Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

CCR7: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

CCR8: Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

CCR9: Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

CCR10: Read and comprehend complex literary and informational texts independently and proficiently.

College and Career Readiness Anchor Standards for *Writing*

Text Types and Purposes

CCW1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

CCW2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCW3: Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

CCW4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCW5: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

CCW6: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

CCW7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

CCW8: Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

CCW9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

CCW10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

College and Career Readiness Anchor Standards for *Speaking and Listening*

Comprehension and Collaboration

CCSL1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCSL2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

CCSL3: Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

CCSL4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

CCSL5: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

CCSL6: Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

College and Career Readiness Anchor Standards for *Language*

Conventions of Standard English

CCL1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCL2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Knowledge of Language

CCL3: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Vocabulary Acquisition and Use

CCL4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

CCL5: Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

CCL6: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level;

demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Mathematics (High School)

Number and Quantity

The Real Number System

CCM1: Extend the properties of exponents to rational exponents.

CCM2: Use properties of rational and irrational numbers.

Quantities

CCM3: Reason quantitatively and use units to solve problems.

The Complex Number System

CCM4: Perform arithmetic operations with complex numbers.

CCM5: Represent complex numbers and their operations on the complex plane.

CCM6: Use complex numbers in polynomial identities and equations.

Vector and Matrix Quantities

CCM7: Represent and model with vector quantities.

CCM8: Perform operations on vectors.

CCM9: Perform operations on matrices and use matrices in applications.

Algebra

Interpret the structure of expressions

CCM10: Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

CCM11: Perform arithmetic operations on polynomials.

CCM12: Understand the relationship between zeros and factors of polynomials.

CCM13: Use polynomial identities to solve problems.

CCM14: Rewrite rational expressions.

Creating Equations

CCM15: Create equations that describe numbers or relationships.

Reasoning with Equations and Inequalities

CCM16: Understand solving equations as a process of reasoning and explain the reasoning.

CCM17: Solve equations and inequalities in one variable.

CCM18: Solve systems of equations.

CCM19: Represent and solve equations and inequalities graphically.

Functions

CCM20: Understand the concept of a function and use function notation.

CCM21: Interpret functions that arise in applications in terms of the context.

CCM22: Analyze functions using different representations.

Building Functions

CCM23: Build a function that models a relationship between two quantities.

CCM24: Build new functions from existing functions.

Linear, Quadratic, and Exponential Models

CCM25: Construct and compare linear, quadratic, and exponential models, and solve problems.

CCM26: Interpret expressions for functions in terms of the situation they model.

Trigonometric Functions

CCM27: Extend the domain of trigonometric functions using the unit circle.

CCM28: Model periodic phenomena with trigonometric functions.

CCM29: Prove and apply trigonometric identities.

Geometry

CCM30: Experiment with transformations in the plane.

CCM31: Understand congruence in terms of rigid motions.

CCM32: Prove geometric theorems.

CCM33: Make geometric constructions.

Similarity, Right Triangles, and Trigonometry

CCM34: Understand similarity in terms of similarity transformations.

CCM35: Prove theorems involving similarity.

CCM36: Define trigonometric ratios and solve problems involving right triangles.

CCM37: Apply trigonometry to general triangles.

Circles

CCM38: Understand and apply theorems about circles.

CCM39: Find arc lengths and areas of sectors of circles.

Expressing Geometric Properties with Equations

CCM40: Translate between the geometric description and the equation for a conic section.

CCM41: Use coordinates to prove simple geometric theorems algebraically.

Geometric Measurement and Dimension

CCM42: Explain volume formulas and use them to solve problems.

CCM43: Visualize relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry

CCM44: Apply geometric concepts in modeling situations.

Statistics and Probability

CCM45: Summarize, represent, and interpret data on a single count or measurement variable.

CCM46: Summarize, represent, and interpret data on two categorical and quantitative variables.

CCM47: Interpret linear models.

Making Inferences and Justifying Conclusions

CCM48: Understand and evaluate random processes underlying statistical experiments.

CCM49: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Conditional Probability and the Rules of Probability

CCM50: Understand independence and conditional probability and use them to interpret data.

CCM51: Use the rules of probability to compute probabilities of compound events in a uniform probability model.

Using Probability to Make Decisions

CCM52: Calculate expected values, and use them to solve problems.

CCM53: Use probability to evaluate outcomes of decisions.

Appendix F: National Educational Technology Standards for Students (NETS-S)

NETS Crosswalk for Masonry											
	Course	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
NETS Standards											
T1		X				X					
T2		X	X	X	X	X	X	X			
T3		X	X	X		X					
T4		X	X	X	X	X	X	X			
T5		X	X	X		X					
T6		X	X	X		X					

- T1** Creativity and Innovation
- T2** Communication and Collaboration
- T3** Research and Information Fluency
- T4** Critical Thinking, Problem Solving, and Decision Making
- T5** Digital Citizenship
- T6** Technology Operations and Concepts

T1 Creativity and Innovation
 Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students do the following:

- a. Apply existing knowledge to generate new ideas, products, or processes.
- b. Create original works as a means of personal or group expression.
- c. Use models and simulations to explore complex systems and issues.
- d. Identify trends and forecast possibilities.

T2 Communication and Collaboration
 Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students do the following:

- a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
- b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- c. Develop cultural understanding and global awareness by engaging with learners of other cultures.
- d. Contribute to project teams to produce original works or solve problems.

T3 Research and Information Fluency
 Students apply digital tools to gather, evaluate, and use information. Students do the following:

- a. Plan strategies to guide inquiry.
- b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- d. Process data and report results.

T4 Critical Thinking, Problem Solving, and Decision Making

Students use critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students do the following:

- a. Identify and define authentic problems and significant questions for investigation.
- b. Plan and manage activities to develop a solution or complete a project.
- c. Collect and analyze data to identify solutions and/or make informed decisions.
- d. Use multiple processes and diverse perspectives to explore alternative solutions.

T5 Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students do the following:

- a. Advocate and practice safe, legal, and responsible use of information and technology.
- b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
- c. Demonstrate personal responsibility for lifelong learning.
- d. Exhibit leadership for digital citizenship.

T6 Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students do the following:

- a. Understand and use technology systems.
- b. Select and use applications effectively and productively.
- c. Troubleshoot systems and applications.
- d. Transfer current knowledge to learning of new technologies.