MASONRY I

COURSE DESCRIPTION

Masonry I is a course that will introduce students to basics skills and knowledge related to masonry construction in residential and commercial structures. Topics covered include safe practices, interpretation of construction drawings, basic laying techniques, masonry reinforcement, arch construction, and accommodations for weather. This course gives students an introduction to the skill and knowledge base typically required for apprentice masons.

It is strongly recommended that administration and guidance follow the scope and sequence and course recommendations as listed.

Recommended: Construction Core
Algebra I

Recommended Credits: 1

Recommended Grade Level(s): 10th 11th 12th

Number of Competencies in Course: 50

MASONRY I

STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will take personal responsibility for the safety of themselves, their coworkers, and bystanders.

3.0 Discuss history, modern materials and methods, career ladders and advancements, skills, attitudes, and abilities associated with masonry.

4.0 Identify tools and equipment. Describe how to use each tool and the equipment. Use trade terms for each tool and equipment. Demonstrate procedures for assembly and disassembly of scaffolding.

5.0 Measurements, Drawing and Specifications: Work with denominate numbers. Read a mason's rule. Convert measurements from English system to Metric equivalents. Calculate area, circumference, volumes of basic geometric shapes. Identify parts of set drawings.

6.0 Mortar: Ingredients in mortar and their properties, types of mortar, ad mixtures, common problems found in mortar applications. Set up a mortar mixing area and mix mortar by hand and machine.

7.0 Masonry units and installation techniques: Describe most common types of masonry units. Set-up a wall, dry bond, spread furrow a bed joint, butter masonry unit. Identify different types of masonry bonds. Cut brick and block. Lay units in a three course.

MASONRY I

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

1.1 Cultivate leadership skills.
1.2 Participate in SkillsUSA as an integral part of instruction.
1.3 Assess situations within the school, community, and workplace and apply values to develop and select solutions.
1.4 Demonstrate the ability to work cooperatively with others.
1.5 Exhibit integrity and pride in artisanship

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

1.1A Takes initiative in meetings to actively influence the results of deliberations.
1.1B Uses critical-thinking and consensus building skills in group deliberations.
1.2A Applies high ethical standards to personal, community, and professional situations.
1.2B Participates and conducts meetings according to accepted rules of parliamentary procedure.
1.3A Analyzes simulated workplace situations and uses problem-solving and critical-thinking techniques to suggest solutions to the problem.
1.3B Analyzes socio-economic conflicts associated with the construction industry and applies values to evaluate possible ways to mitigate the conflicts.
1.4A Participates in a committee.
1.4B Contributes to a group project.
1.5 Exhibits integrity and pride in artisanship.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various SkillsUSA or similar programs and/or competitive events.
- Evaluate a civic project within the school, community, and/or workplace and evaluate the expected long-term effects of the project.
- Prepare a meeting agenda for a school or a community meeting.
- Attend the meeting of a professional organization.

INTEGRATION LINKAGES

SkillsUSA *Professional Development Program* (PDP), SkillsUSA, Communications

and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Algebra, Geometry, English, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Chamber of Commerce, Colleges, Universities, Technology Centers

MASONRY I

STANDARD 2.0

Students will take personal responsibility for the safety of themselves, their coworkers, and bystanders.

LEARNING EXPECTATIONS

The student will:

2.1 Demonstrate a positive attitude regarding safety practices and issues.
2.2 Use and inspect personal protective equipment.
2.3 Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment.
2.4 Continuously respond appropriately to potential hazards to self and others.
2.5 Assume responsibilities under HazCom (Hazard Communication) regulations.
2.6 Perform in accordance with responsibilities, regulations, and Occupational Safety and Health Administration (OSHA) policies to protect coworkers and bystanders from hazards.
2.7 Adhere to responsibilities, regulations, and Occupational Safety and Health Administration (OSHA) policies regarding reporting of accidents and observed hazards and regarding emergency response procedures.
2.8 Demonstrate appropriate related safety procedures.
2.9 Passes with 100 % accuracy a written examination relating specifically to safety issues.
2.10 Passes with 100% accuracy a performance examination relating specifically to tool and equipment safety.
2.11 Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

2.1A Is attentive during safety discussions.
2.1B Actively seeks information about safe procedures.
2.1C Responds positively to instruction, advice, and correction regarding safety issues.
2.1D Does not deliberately create or increase hazards, such as by horseplay, practical jokes, or creating distractions.
2.1E Reports to school or work physically ready to perform to professional standards, such as rested, or not impaired by medications, drugs, alcohol, and so forth.
2.2 Selects, inspects, and uses the correct personal protective equipment for the assigned task.
2.3A Inspects power tools for intact guards, shields, insulation, and other protective devices.
2.3B Inspects extension cords for the presence of a functional ground connection, prior to use.
2.3C Operates and maintains tools in accordance with manufacturer's instructions and as required by regulation or Occupational Safety and Health Administration (OSHA) policy.
2.3D Properly places and secures ladders and scaffolding prior to use.
2.4A Is observant of personnel and activities in the vicinity of their work area.
2.4B Warns nearby personnel prior to starting potentially hazardous actions.

2.5A When tasked to use a new hazardous material, retrieves material safety data sheets (MSDS), and identifies the health hazards associated with the new material.
2.5B Reports hazards found on the job site to the supervisor.
2.6A Erects shields, barriers, and signage to protect coworkers and bystanders prior to starting potentially hazardous tasks.
2.6B Provides and activates adequate ventilation equipment as required by the task.
2.7A Reports all injuries to themselves to their immediate supervisor.
2.7B Reports observed unguarded hazards to their immediate supervisor.
2.8 Comply with personal assignments regarding emergency assignments.
2.9 Passes with 100 % accuracy a written examination relating to safety issues.
2.10 Passes with 100% accuracy a performance examination relating to safety.
2.11 Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Conduct a practice drill simulating a hazardous solvent spill in which an emergency action plan is to be implemented.
- Instruct a visitor to obviously approach the vicinity of a student conducting a hazardous activity and note the level of awareness demonstrated by the student.
- For a project requiring the use of ladders and/or scaffolding, note the proper placement and securing procedures followed by students.

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

MASONRY I

STANDARD 3.0

Discuss history, modern materials and methods, career ladders and advancements, skills, attitudes, and abilities associated with masonry.

LEARNING EXPECTATIONS

The student will:

3.1 Discuss the history of masonry.
3.2 Describe modern masonry materials and methods.
3.3 Explain career ladders and advancement possibilities in masonry work.
3.4 Describe the skills, attitudes, and abilities needed to work as a mason.
3.5 State the safety precautions that must be practiced at a work site, including the following:

- Safety practices
- Fall protection
- Forklift-safety operations

3.6 Perform the following basic bricklaying procedures:

- Mixing of mortar
- Laying a mortar bed
- Laying bricks

3.7 Put on eye protection, respiratory protection, and a safety harness.
3.8 Use correct procedures for fueling and starting gasoline-powered tools.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

3.5 Put on eye protection, respiratory protection, and a safety harness.
3.6 Demonstrate the ability to properly use a trowel to spread and furrow bed joints and butter head joints.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Students will watch an instructional video or CD on proper tool usage, mortar mix, and laying of brick.
- Have a local mason come to class and demonstrate proper techniques used in the field.
- Have students do an on-line search for jobs in the masonry field. Ask them toompare salaries in different locations in the country.

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

MASONRY I

STANDARD 4.0

Identify tools and equipment. Describe how to use each tool and the equipment. Use trade terms for each tool and equipment. Demonstrate procedures for assembly and disassembly of scaffolding.

LEARNING EXPECTATIONS

The student will:

4.1 Identify and name the tools used in performing masonry work
4.2 Identify and name the equipment used in performing masonry work.
4.3 Describe how each tool is used.
4.4 Describe how the equipment is used
4.5 Associate trade terms with the appropriate tools and equipment
4.6 Demonstrate the correct procedures for assembling and dissembling scaffolding according to federal safety regulations, under the supervision of a competent person.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

4.1 Identify masonry hand and power tools
4.6 Assemble and disassemble scaffolding under the supervision of a competent person according to federal safety regulations.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Bring in local masonry contractor who has necessary OSHA certifications to erect scaffolding.
- When possible show safety video or CD on erecting scaffolding

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

MASONRY I

STANDARD 5.0

Measurements, Drawing and Specifications: Work with denominate numbers. Read a mason's rule. Convert measurements from English system to Metric equivalents. Calculate area, circumference, volumes of basic geometric shapes. Identify parts of set drawings.

LEARNING EXPECTATIONS

5.1 Use a mason's rule to measure a space and calculate volume.
5.2 Use a mason's rule to measure
5.3 Convert measurements in the US Customary (English) system into their metric equivalents
5.4. Recognize and calculate areas, circumferences, and volumes of basic geometric shapes
5.5 Identify the basic parts of a set of drawings.
5.6 Discuss the different types of specifications used in the building industry and the sections that pertain to masonry.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student will:
5.1 Work with denominate numbers
5.2 Read a mason's measure
5.3 Interpret information on blue prints.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Use work sheets to help students with denominate number calculations
- Give students an oral examination having them read the rule and call out measurements
- Work from actual blueprints possibly of the school to do calculations of volume etc...

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

MASONRY I

STANDARD 6.0

Mortar: Ingredients in mortar and their properties, types of mortar, ad mixtures, common problems found in mortar applications. Set up a mortar mixing area and mix mortar by hand and machine.

LEARNING EXPECTATIONS

The student will:

6.1 Identify and describe the primary ingredients in mortar and their properties.
6.2 Identify the various types of mortar used in masonry work.
6.3 Describe the common admixtures and their uses.
6.4 Identify the common problems found in mortar applications and their solutions.
6.5 Properly set-up the mortar mixing machine.
6.6 Properly mix mortar by hand.
6.7 Properly mix mortar with a mechanical mixer.

PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:

6.5 Properly set-up mortar mixing area
6.6 Properly mix mortar by hand
6.7 Properly mix mortar with a mortar mixing machine.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Research and report on admixtures commercially available in your area.
- Using the Internet and e-mail, contact a mason or masonry organization to bring in his mortar mixing equipment and demonstrate machine mixing

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

MASONRY I

STANDARD 7.0

Masonry units and installation techniques: Describe most common types of masonry units. Set-up a wall, dry bond, spread furrow a bed joint, butter masonry unit. Identify different types of masonry bonds. Cut brick and block. Lay units in a three course.

LEARNING EXPECTATIONS

The student will:

7.1 Describe the most common types of masonry units.

7.2 Describe and demonstrate how to set-up a wall.
7.3 Lay a dry bond.
7.4 Spread and furrow a bed joint, and butter a masonry units.
7.5 Describe the different types of masonry bonds.
7.6 Cut brick and block accurately
7.7 Lay masonry units in a true course

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PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET

The student:
7.3 Lay a dry bond.
7.4 Spread, edge and furrow bed joints.
7.6 Accurately cut masonry units with a brick set and masonry hammer, block set and mash, and a masonry hammer, power saw, and splitter.
7.7A Butter bricks and blocks and place them on a bed joint.
7.7B Lay masonry units in courses that are true for height, level, plumb, and straightness.
7.7C Lay masonry units to the line.

SAMPLE PERFORMANCE TASKS

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Practice laying brick and block using various bonds and materials.

INTEGRATION LINKAGES

Science, Computer Skills, Research and Writing Skills, Language Arts, Communication Skills, Leadership Skills, Teamwork Skills, Algebra, Geometry, English, Secretary's Commission on Achieving Necessary Skills (SCANS), Skills USA, Associated Builders and Contractors (ABC), Associated General Contractors (AGC), MAVCC, National Center for Construction Education Research (NCCER), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, United States Department of Labor, Tennessee Department of Labor and Workforce Development

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SAMPLING OF AVAILABLE RESOURCES

- *Core Curriculum*, National Center for Construction Education and Research (NCCER), Prentice Hall, Upper Saddle River, NJ; ©2000. Also known as the "Wheels of Learning" materials.

- *Masonry Level One*, National Center for Construction Education and Research (NCCER), Prentice Hall, Upper Saddle River, NJ; ©1996. Also known as the "Wheels of Learning" materials.

- *Masonry Level Two*, National Center for Construction Education and Research (NCCER), Prentice Hall, Upper Saddle River, NJ; ©1999. Also known as the "Wheels of Learning" materials.

- *Masonry Level Three*, National Center for Construction Education and Research (NCCER), Prentice Hall, Upper Saddle River, NJ; ©1999. Also known as the "Wheels of Learning" materials.

- *Reinforced Masonry Engineering Handbook*, James E. Amrhein, Masonry Institute of America, Second Edition; ©1972, 1973.

- *Structural Analysis for Engineering Technology*, Jack D. Bakos, Jr., Charles E, Merrill Publishing Company, Columbus, OH; ©1973.

- *Structural Design Guide to the ACI Building Code*, Paul F. Rice, et. al., Van Nostrand Reinhold Company, New York, NY; ©1985.

- *Concrete and Cement Masonry, Year I*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Concrete and Cement Masonry, Year II*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Introduction to Bricklaying*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Brick and Block Masonry*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Fundamentals of Bricklaying*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Stone Masonry, Panel, and Tile Installation*, MAVCC, Oklahoma Department of Vocational and Technical Education

- *Concrete, Masonry and Brickwork: A Practical Handbook for the Home Owner and Small Builder*, U. S. Department of the Army, Dover Publications, Inc., August 1999.

- *Masonry and Concrete*, C. Beall, McGraw-Hill Professional Book Group, August 2000.

- *Modern Masonry*, Clois E. Kicklighter, Goodheart-Willcox, 2003

- *Modern Masonry, Job Practice Manual*, Clois E. Kicklighter, Goodheart-Willcox, 2003

- *Total Quality Curriculum*, National SkillsUSA, www.skillsusa.org

- Professional Development Program, National SkillsUSA, www.vica.org
- American Concrete Institute International, http://www.aci-int.org/
- American Society for Testing and Materials, http://www.astm.org/
- Building Officials and Code Administrators International, http://www.bocai.org
- International Union of Bricklayers and Allied Craft Workers, www.bacweb.org
- Concrete Masonry Online, National Concrete Masonry Association, www.ncma.org
- Power Tool Institute (PTI), www.powertoolinstitute.com
- Occupation Safety and Health Administration (OSHA), www.osha.gov
- National Skills Standards Board Institute, http://www.nssb.org
- Vocational Information Center, http://www.khake.com/index.html
- Secretary's Commission on achieving Necessary Skills, http://www.dol.gov
- U. S. Department of Labor, Occupational Outlook Handbook, http://stats.bls.gov/oco/home.htm
- Environmental Protection Agency (EPA), http://www.epa.gov