MASONRY

PURPOSE
To evaluate each contestant’s preparation for employment and to recognize outstanding students for excellence and professionalism in the field of masonry.

First, download and review the General Regulations at: http://updates.skillsusa.org.

ELIGIBILITY
Open to active SkillsUSA members enrolled in programs with masonry or bricklaying as the occupational objective.

CLOTHING REQUIREMENTS
Class C: Contest Specific — Manufacturing/Construction Khaki Attire
- Official SkillsUSA khaki short-sleeve work shirt and pants
- Black, brown or tan leather work shoes

Note: Safety glasses must have side shields or goggles (prescription glasses may be used only if they are equipped with side shields. If not, they must be covered with goggles).

These regulations refer to clothing items that are pictured and described at: www.skillsusastore.org. If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

Note: Contestants must wear their official contest clothing to the contest orientation meeting.

EQUIPMENT AND MATERIALS
1. Supplied by the technical committee:
   a. Tenders
   b. Hose
   c. Three 55-gallon water drums
   d. Mortar pans, boards, pails, and wheelbarrows
   e. Hoes
   f. Square-nosed, short-handled shovels
   g. Sand
   h. Masonry mix or ready-mixed mortar
   i. Resin paper or suitable area covering

2. Supplied by the contestant:
   a. One trowel
   b. Two levels (24" and 48")
   c. One “S” jointer
   d. Long jointer
   e. One brick hammer
   f. Two 6-foot folding rules (one modular, one standard)
   g. One carrying bag
   h. One pencil
   i. One square
   j. One brush
   k. One brick chisel
   l. Line and line blocks
   m. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty.

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the SkillsUSA website: http://updates.skillsusa.org.

SCOPE OF THE CONTEST
The contest is defined by industry standards as determined by the SkillsUSA Championships technical committee comprised of the Arizona Masonry Contractors Association, Bon Tool Co., Brick Industry Association, Brick Industry Association SE Region, E/Z Grout Corp., Hanley-Wood LLC, Marshalltown Co., Mason Contractors Association of America, Masonry Institute of Tennessee, National Concrete Masonry Association and SPEC MIX Inc.

Knowledge Performance
The contest will include a written knowledge exam assessing mastery of the knowledge of brick masonry techniques including but not limited to: safety; identification and usage of hand tools, power tools, measuring tools and equipment; and blueprint reading.
Skill Performance
The contest will include a skills performance demonstration that will assess the ability of the contestant to safely construct a composite brick and block project.

Contest Guidelines
1. Contestants will construct a project or wall system using brick or brick and block, according to project specifications and drawings, within an allotted period of time.
2. The project will include components of the most frequently used details in residential construction. In addition, the assessment will also include the vital elements of quality workmanship.

Standards and Competencies
*Considered essential competencies
**Should be mastered at the journeyman level
All other items are considered supplemental.

M 1.0 — Practice safe brick and masonry techniques according to industry standards as set forth by the SkillsUSA technical committee
1.1 *Choose proper tools and materials
1.2 *Perform work in a reasonable amount of time as determined by the instructor and/or industry standards
1.3 **Lay up masonry products in an accurate and professional manner
1.4 *Load and unload materials as directed
1.5 *Clean up work areas properly and thoroughly

M 2.0 — Model safety standards according to and following OSHA regulations
2.1 *Demonstrate appropriate safety precautions when performing all tasks
2.2 *Demonstrate awareness of potential hazards when performing all tasks
2.3 *Accept responsibility for the safety of other workers
2.4 *Keep work areas neat and organized
2.5 *Wear proper safety equipment and clothing
2.6 Follow prescribed OSHA standards

M 3.0 — Use hand tools and equipment according to industry standards as set forth by the SkillsUSA technical committee
3.1 *Cut masonry safely around others
3.2 *Place mortar cautiously in the mortar pan or on the mortar board
3.3 *Keep tools out of the paths of other people working on the job
3.4 *Handle tools properly

M 4.0 — *Identify and use basic hand tools used in brick masonry according to industry standards as set forth by the SkillsUSA technical committee
4.1 *Demonstrate an understanding of the specific uses of each hand tool
4.2 *Practice the safety rules for each hand tool
4.3 *Identify quality tools
4.4 *Store and care for hand tools

M 5.0 — Use measuring tools according to industry standards as set forth by the SkillsUSA technical committee
5.1 Use and maintain a modular ruler and a spacing ruler
5.2 Set and use a story pole
5.3 Power tool identification and usage

M 6.0 — Identify and use brick masonry power tools according to industry standards as set forth by the SkillsUSA technical committee
6.1 *Demonstrate the specific uses of each power tool
6.2 *Practice the safety rules for each power tool
6.3 Maintain power tools
6.4 *Set up power tools correctly

M 7.0 — Use equipment according to industry standards as set forth by the SkillsUSA technical committee
7.1 *Identify equipment generally used in brick masonry
7.2 Correctly use each piece of equipment
7.3 Store, maintain and repair all equipment
7.4 Inspect, assemble and disassemble rigging and scaffolding properly

M 8.0 — Use masonry levels according to industry standards as set forth by the SkillsUSA technical committee
8.1 **Use a 24" and 48" level for plumbing and leveling
8.2 *Care for and maintain a level
M 9.0 — Possess an appropriate knowledge of the fundamental theories in brick masonry

9.1 Demonstrate knowledge of trade terminology
   9.1.1 **Identify terms used in brick masonry
   9.1.2 **Incorporate trade terminology into oral communication relating to masonry tasks

9.2 Demonstrate knowledge of basic math
   9.2.1 *Add, subtract, multiply and divide with whole numbers, decimals and fractions
   9.2.2 *Figure proportions to mix masonry materials according to specifications
   9.2.3 *Compute percentages to estimate and determine material requirements, work performed, schedules and costs
   9.2.4 *Express answers relative to the trade

9.3 Read blueprints
   9.3.1 *Read basic drawings and sketches and understand the information contained in them
   9.3.2 *Know the meanings of basic architectural symbols and abbreviations
   9.3.3 *Use a builder's level relative to a benchmark

M 10.0 — Use materials and methods according to industry standards as set forth by the SkillsUSA technical committee

10.1 Use brick masonry materials with accuracy
   10.1.1 *Arrange masonry materials for efficient use
   10.1.2 *Place mortar pans properly
   10.1.3 *Temper or shake-up mortar with proper shovels

10.2 Use hod-carrying
   10.2.1 *Arrange masonry materials for efficient use
   10.2.2 *Place mortar pans properly
   10.2.3 *Temper or shake-up mortar with proper shovels

10.3 Use trowels properly
   10.3.1 **Manipulate a trowel properly
   10.3.2 **Cut and roll, and cut and cup mortar to load trowel properly
   10.3.3 **Spread and furrow mortar properly

M 11.0 — Prepare mortar according to industry standards as set forth by the SkillsUSA technical committee

11.1 Follow correct safety practices when mixing mortar
11.2 *Proportion mortar ingredients for specific mixes
11.3 *Mix mortar manually with hoe and mortar box
11.4 *Mix mortar with a mortar mixer

M 12.0 — Demonstrate bonding methods according to industry standards as set forth by the SkillsUSA technical committee

12.1 *Possess knowledge of different types of bonding used in masonry construction
12.2 **Lay out bond
12.3 **Determine coursing

M 13.0 — Use tool and point joints according to industry standards as set forth by the SkillsUSA technical committee

13.1 **Use tool concave joints
13.2 Use a tool rake, weather, V-jointer, grapevine and struck joints
13.3 Perform cut/rough joints
13.4 *Tuck-point a wall properly
13.5 **Brush and touch up a wall

M 14.0 — Clean brick and structural tile according to industry standards as set forth by the SkillsUSA technical committee

14.1 *Follow correct procedures for keeping masonry work clean
14.2 *Follow correct procedures in cleaning brick and structural tile
14.3 *Follow correct procedures for rubbing and tuck pointing concrete block and slag block
14.4 Clean and tuck-point stonework

M 15.0 — Lay brick and blocks according to industry standards as set forth by the SkillsUSA technical committee

15.1 Lay straight brick wall
   15.1.1 *Lay brick at the rate of 75–100 bricks per hour
   15.1.2 **Attach a line block and line pins to a wall
   15.1.3 **Set a trig
   15.1.4 **Lay brick to a line while holding bond
   15.1.5 **Throw a full head joint
15.2 Lay straight block wall
   15.2.1 *Spread bed joints and throw on full head joints for block units
15.2.2 *Lay block units to the line
15.3 Build the brick corner
15.3.1 *Lay out a wall in preparation for building a brick corner
15.3.2 *Construct a rack-back lead
15.3.3 *Construct an outside and inside corner lead (+ or $-\frac{1}{16}"$)
15.4 Lay the block corner
15.4.1 *Lay out a wall in preparation for building a block corner
15.4.2 *Install wire reinforcements in bed joints
15.4.3 *Build a block corner to a specified height
15.5 Lay brick veneer wall
15.5.1 Determine type of brick to be used
15.5.2 *Bond the wall
15.5.3 *Scale each course
15.5.4 *Lay brick in mortar to scale
15.5.5 *Secure wall with ties at desired intervals
15.5.6 *Point and joint the wall
15.6 Lay brick masonry cavity wall
15.6.1 *Determine width of cavity and type of brick to be used
15.6.2 *Construct components of the wall in the proper sequence
15.6.3 *Spread mortar to achieve the required bond without getting mortar into the cavity
15.6.4 **Install wall ties that join the exterior and interior wythes together into a single cavity wall
15.6.5 **Install flashings and construct weep holes in a manner that permits effective drainage of moisture from cavity
15.6.6 **Construct and maintain the cavity during construction so that the air space provides insulation
15.7 Lay single Wythe brick (load-bearing wall using units that are a minimum of 5" wide)
15.7.1 Determine type of brick to be used
15.7.2 *Bond the wall
15.7.3 *Scale each course
15.7.4 *Lay brick in mortar to scale
15.7.5 **Secure wall with ties at desired intervals
15.7.6 *Point and joint the wall
15.8 Lay a brick and block composite wall
15.8.1 Determine type of brick and block to be used
15.8.2 *Bond the wall
15.8.3 *Scale each course
15.8.4 *Lay brick and block in mortar to scale
15.8.5 *Secure wall with ties at desired intervals
15.8.6 *Point and joint the wall

M 16.0 — Construct fireplaces and chimneys according to industry standards as set forth by the SkillsUSA technical committee
16.1 Identify various components of a fireplace
16.2 Build a fireplace according to plans
16.3 Identify various components of a chimney
16.4 Build a one-flue chimney from given plans

M 17.0 — Construct arches, columns and piers according to industry standards as set forth by the SkillsUSA technical committee
17.1 Demonstrate knowledge of architectural features including aesthetic trims, course designs, period and antique applications
17.2 Construct an arch using given plans
17.3 Construct a column using given plans
17.4 Construct a pier using given plans

M 18.0 — Lay floors, pavers and stairs according to industry standards as set forth by the SkillsUSA technical committee
18.1 Lay floors according to given plans
18.2 Lay pavers according to given plans
18.3 Lay stairs according to given plans
18.4 Concrete work

M 19.0 — Prepare footers according to industry standards as set forth by the SkillsUSA technical committee
19.1 Lay out footings properly
19.2 Place rebar properly
19.3 Place and rough finish concrete properly

M 20.0 — Lay out and establish foundations according to industry standards as set forth by the SkillsUSA technical committee
20.1 Lay out and establish grades for foundation
20.2 *Establish corners and lay out concrete block according to a specific bonding plan
20.3 Lay foundation wall to joist and brick shelf height
20.4 Waterproof foundation wall
20.5 *Install flashing, anchor bolts, termite shield and weep holes

Committee Identified Academic Skills
The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills
- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Simplify numerical expressions
- Solve practical problems involving percentages
- Measure angles
- Find surface area and perimeter of two-dimensional objects
- Find volume and surface area of three-dimensional objects
- Make predictions using knowledge of probability
- Make comparisons, predictions, and inferences using graphs and charts
- Solve problems using proportions, formulas and functions
- Find slope of a line
- Find arc length and the area of a sector

Science Skills
None Identified

Language Arts Skills
- Provide information in conversations and in group discussions

Connections to National Standards
State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards
- Numbers and operations
- Algebra
- Geometry
- Measurement
- Problem solving
- Communication
- Connections

Science Standards
- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: http://www2.mcrel.org/compendium/browse.asp.

Language Arts Standards
- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.ncte.org/standards.

Source: NCTM Principles and Standards for School Mathematics. For more information, visit: www.nctm.org.