TEAMWORKS

PURPOSE

This contest is designed to evaluate team preparation for employment and to recognize outstanding students for excellence and professionalism in the field of residential carpentry, masonry, plumbing, electricity and teamwork skills.

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

ELIGIBILITY

Open to a team of four SkillsUSA members enrolled in a program or programs with building trades as the occupational objective. Team members may be from different chapters (schools).

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 1-888-501-2183.

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

SAFETY REQUIREMENT

Both the instructor and the contestants certify by agreeing to enter this contest that the contestants have received instructions and have satisfactorily passed an examination on the safe use of portable electric power tools (including cordless) and all hand tools. All team members are required to have an OSHA Certification prior to competition. To take the OSHA Certification test, go to: www.careersafeonline.com.

The contestants are responsible for inspecting the tools supplied and making sure they are in safe working condition. Further, they agree that SkillsUSA Inc., the SkillsUSA Championships technical committees, volunteers and the national judges are released from all responsibility relating to personal injuries resulting from their use. Contestants will be removed from competition if proper training has not been provided and/or they are using the equipment in an unsafe manner.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   All equipment, materials and most tools. Contestants who wish to use their own tool belt may do so after technical committee approval. If contestants do not bring their own tool belt, one will be provided. Any tools contestants are required to bring will be published in the SkillsUSA Championships Update annually at: http://updates.skillsusa.org.
2. Supplied by the contestant:
   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 at http://updates.skillsusa.org.

SCOPE OF THE CONTEST

The contest is designed to assess a team's ability to perform tasks identified by the national technical committee, which includes: Robert Bosch Tool Corp., The Stanley Works, Train2Build, Construction Management Advisory Group, State Farm Insurance, International Brotherhood of Electrical Workers, Lowe's Companies Inc., D&J Kitchens

and Baths and the National Association of the Remodeling Industry.

Knowledge Performance

The contest includes a written action plan developed by team members for the purpose of assessing the team's knowledge of the building trades.

Skill Performance

The contest includes a team project assessing the ability to analyze a project drawing, write an action plan, professionally present the team project and perform skills in residential carpentry, plumbing, electricity and masonry.

Contest Guidelines

1. Each team will be given the project drawing at the contest orientation meeting and given two hours to meet as a team, analyze the drawing and formulate a written action plan.
2. Each team will conduct a three- to five-minute professional presentation to the judges on how the team plans to accomplish the project.
3. Each team member is required to have an active part in the presentation.
4. The written action plan and the presentation will be judged.
5. Cleanliness of job site, timeliness of completion of the project, effective ordering of material and inventorying tools and equipment will be assessed.

Standards and Competencies

TW 1.0 — Present an action plan after analyzing the project drawing

1.1 Analyze the project drawing
- 1.1.1 Interpret and determine dimensions from multi-view drawings
- 1.1.2 Interpret specifications, abbreviations, symbols and drawing notes
- 1.1.3 Interpret oral and written changes
- 1.1.4 Prepare material take-off from blueprint

1.2 Write the action plan and give a presentation
- 1.2.1 Organize, prepare and present an action plan
- 1.2.2 Use data display instruments such as flow charts or cause and effect diagrams
- 1.2.3 As a team, develop a presentation that is three to five minutes in length portraying how your team will accomplish the building project including the team's safety plan
- 1.2.4 Use of visuals is permitted (e.g., flip chart with notes or diagrams, PowerPoint presentation). Each team will be provided with a flip chart stand.

TW 2.0 — Perform effectively as team members

2.1 Demonstrate group problem-solving techniques

2.2 Demonstrate team proficiency in construction of a building project

2.3 Perform additional teamwork competencies as determined by the technical committee

TW 3.0 — Perform carpentry skills

3.1 Estimate and use the amount of materials needed and proper tools
- 3.1.1 Identify, receive and inspect materials
- 3.1.2 Store materials correctly around work area
- 3.1.3 Use the correct amount of materials for the project in the correct manner
- 3.1.4 Identify and safely use carpentry hand and power tools

3.2 Perform framing and install sub-floor and common roof rafters
- 3.2.1 Frame and install sill plate, girders, floor joists and bridging
- 3.2.2 Use dimensional and engineered wood products and steel products
- 3.2.3 Frame floor opening and install sub-floor
- 3.2.4 Frame and brace walls to include corners, openings, trimmers, cripples, partitions, plumbing partitions, fixture backing and sheathing

3.2.5 Frame stair stringer and other components
3.2.6 Calculate and use the rise and run of a common roof
3.2.7 Lay out a common roof plan
3.2.8 Lay out, cut and install common rafters, ridge board, ceiling joists and collar ties
3.2.9 Install roof sheathing

TW 4.0 — Perform masonry skills by laying and installing a brick/block wall

4.1 Estimate and use the amount of materials needed and proper tools
- 4.1.1 Identify, receive and inspect materials
- 4.1.2 Store materials correctly around work area
- 4.1.3 Use the correct amount of materials for the project in the correct manner
- 4.1.4 Identify and safely use masonry hand and power tools
- 4.1.6 Organize area neatly
- 4.1.7 Place mortar pans properly
- 4.1.8 Select and effectively arrange masonry tools

4.2 Tool and polish joints
- 4.2.1 Tool concave, rake weather, V-jointer, grapevine and struck joints
- 4.2.2 Polish the joints
- 4.2.3 Tuckpoint a wall
- 4.2.4 Brush and touch up a wall

4.3 Lay a brick/block wall
- 4.3.1 Lay out a wall in preparation for building a straight and/or corner wall
- 4.3.2 Spread and furrow mortar correctly for brick units
- 4.3.3 Construct a straight wall
- 4.3.4 Construct an outside and inside corner lead
- 4.3.5 Spread bed joints and throw on full head joints for block units
- 4.3.6 Build a block corner to a specified height
- 4.3.7 Install lintels and moisture drainage such as masonry flashing and weep holes
- 4.3.8 Install brick detailing if requested

TW 5.0 — Perform plumbing by installing cleanout drains, roughing in water supply lines, performing pressure tests and cutting, reaming and joining

5.1 Estimate and use materials and proper tools
- 5.1.1 Identify, receive and inspect materials
- 5.1.2 Store materials correctly around work area
- 5.1.3 Use the correct amount of materials for the project in the correct manner
- 5.1.4 Identify fittings from a sketch of a piping system
- 5.1.5 Identify and safely use plumbing hand and power tools

5.2 Rough in water supply lines and perform pressure tests
- 5.2.1 Calculate the slope required for waste and vent lines
- 5.2.2 Rough in waste and vent lines for sinks, lavatories, bathtubs, showers and water closets
- 5.2.3 Install cleanout drains
- 5.2.4 Secure horizontal and vertical lines of pipe to wood, metal and masonry surfaces
- 5.2.5 Rough in water supply lines for sinks, lavatories, bathtubs, showers and water closets
- 5.2.6 Perform pressure tests on water supply system

5.3 Join pipes
- 5.3.1 Cut, ream and join copper tubing using the sweat method
- 5.3.2 Cut, ream and join copper tubing using the compression method
- 5.3.3 Cut, ream and join CPVC and other similar pipe
- 5.3.4 Cut, ream and join PVC pipe
- 5.3.5 Cut, ream and join ABS pipe
- 5.3.6 Cut, ream and join copper tubing by sweat, compression or other methods

TW 6.0 — Perform electrical skills by laying out electrical installations

6.1 Estimate and use materials and use tools properly
- 6.1.1 Apply the current National Electrical Code
- 6.1.2 Plan, work and lay out electrical installations

6.1.3 Identify, receive and inspect materials
6.1.4 Correlate specifications, prints and job sites
6.1.5 Use the correct amount of materials for the project in the correct manner
6.1.6 Store materials correctly around work area
6.1.7 Identify and safely use electrical hand and power tools

6.2 Rough in
6.2.1 Choose size and install ganged, octagon and surface mount boxes to a specified height
6.2.2 Install and staple all electrical wire essentially free from hazard according to a blueprint
6.2.3 Perform splices and junctions in boxes

6.3 Install devices such as single pole switch, three-way switch, four-way switch, duplex grounded receptacle, ground fault circuit interrupter, light fixtures and wall plates

TW 7.0 — Prepare for unique tasks that may be included in a given situation

7.1 Run conduit in the electrical unit
7.2 Troubleshoot electrical circuits
7.3 Install plumbing fixtures
7.4 Install electric fixtures
7.5 Repair or replace a P trap
7.6 Build a brick/block composite wall
7.7 Complete exterior or interior carpentry finish work
7.8 Install shingles
7.9 Install window(s)
7.10 Install door(s)
7.11 Install underlayment
7.12 Install floor coverings

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.
- Solve practical problems involving percentages
- Solve single variable algebraic expressions.
- Solve multiple variable algebraic expressions.
- Measure angles.
- Find surface area and perimeter of two-dimensional objects.
- Construct three-dimensional models.
- Apply Pythagorean Theorem.
- Make comparisons, predictions and inferences using graphs and charts.
- Organize and describe data using matrixes.
- Find slope of a line.
- Solve practical problems involving complementary, supplementary and congruent angles.
- Find arc length and the area of a sector.

Science Skills

- Plan and conduct a scientific investigation.
- Use knowledge of the particle theory of matter.
- Describe and recognize elements, compounds, mixtures, acids, bases and salts.
- Describe and recognize solids, liquids and gases.
- Describe characteristics of types of matter based on physical and chemical properties.
- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point, color).
- Use knowledge of classification of elements as metals, metalloids and nonmetals.
- Describe and identify physical changes to matter.
- Use knowledge of potential and kinetic energy.
- Use knowledge of mechanical, chemical and electrical energy.
- Use knowledge of heat, light and sound energy.
- Use knowledge of temperature scales, heat and heat transfer.
- Use knowledge of speed, velocity and acceleration.
- Use knowledge of Newton's laws of motion.
- Use knowledge of work, force, mechanical advantage, efficiency and power.
- Use knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices.

- Use knowledge of principles of electricity and magnetism.
- Use knowledge of static electricity, current electricity and circuits.
- Use knowledge of magnetic fields and electromagnets.

Language Arts Skills

- Demonstrate comprehension of a variety of informational texts.
- Use text structures to aid comprehension.
- Demonstrate knowledge of appropriate reference materials.
- Use print, electronic databases and online resources to access information in books and articles.

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.
- Data analysis and probability.
- Problem solving.
- Reasoning and proof.
- Communication.
- Connections.
- Representation.

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: standards.nctm.org/document/chapter7/index.htm. Select "Standards" from menu.

Science Standards

- Understands the structure and function of cells and organisms.
- Understands relationships among organisms and their physical environment.
- Understands biological evolution and the diversity of life.
- Understands the structure and properties of matter.
- Understands the sources and properties of energy.
- Understands forces and motion.
- Understands the nature of scientific inquiry.
- Understands the scientific enterprise.

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks.

Language Arts Standards

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.
- 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 employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of 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 develop an understanding of and respect for diversity in language use, patterns and dialects across cultures, ethnic groups, geographic regions and social roles.
- 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.