



## Cabinetmaking

**Purpose:** To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of cabinetmaking and millwork. First, download and review the General Regulations at: [updates.skillsusa.org](http://updates.skillsusa.org).

**Eligibility:** Open to active SkillsUSA members enrolled in career and technical programs.

**Knowledge Performance:** The contest will begin with a one-hour written test.

**Skill Performance:** The contest consists of workstations that require the building of a small cabinet from the materials and drawings supplied. Contestants will demonstrate their ability to perform jobs or skills selected from the following list of competencies as determined by the SkillsUSA Iowa Cabinetmaking technical committee.

**Coordinator Notes:** The contest criteria were drawn from the CTE Standards for the Wood and Wood Products Industry with emphasis in Cabinetmaking. The core elements to be tested are:

1. **Planning and Layout** – will include exercise in plan reading, estimating and cost calculations. It will include a written and hands-on activity.
2. **Materials processing and assembly** – will involve layout, cutting and assembling a typical framing component used in the cabinetmaking industry.
3. **Tool handling and techniques** – contestants will demonstrate their ability to safely use, care and transport hand tools and portable power tools.

**Description:** contest components:

1. Contestants will receive pre-cut components of Red Oak Solid Stock and Plywood Sheet Goods. Most material to be used will be rough width and rough length. Only a couple of the large components will be cut to net size. Joinery for the Top, Case, and Drawer will have one or more of the following, butt joint, biscuit joint, pocket hole, and glue. Drawer Front and Door to be edge-banded on all four sides.
2. The Top is to have the self-edging applied with miters at corners and routed with edge profile on three sides. The Case will be assembled using biscuits as a guide and pocket hole screws to fasten components together.
3. The Top will be fastened to the Case through the stretchers with four screws. The Drawer Box is to be assembled using butt joint construction, and glue. Drawer slides will be installed using Blum TANDEM drawer sides and case filler. Drawer Front will be attached to Drawer box using four truss head drawer screws. A hinge boring machine will be used for boring cup holes on door and inserting hinges. A 3/16" diameter drill bit will be used to locate and drill knob locations and apply knobs. Use fine sandpaper to ease all hard edges.

4. Read drawings, lay out and cut parts using a table saw, laminating trimmer, hand drilling, and various hand tools are skills that will be assessed. In addition, the parts must be accurately assembled, sanded and adjusted to tolerances specified.
5. Contestant will be given all necessary information by job sheets or prints of articles to be constructed. Contestants will use joinery techniques as specified
- 6.

**Safety Requirements:** Both the instructors and the contestants certify by agreeing to enter this contest that the contestant has received instruction and has satisfactorily passed examination and instructor observation on the safe use of the following power equipment that may be used in the contest:

- |                |                                    |
|----------------|------------------------------------|
| 1. Hand Tools  | 8. Miter/Cutoff saw                |
| 2. Router      | 9. Disc and belt sander            |
| 3. Table saw   | 10. Kreg® jig pocket screw machine |
| 4. Jointer     | 11. Biscuit Joiner                 |
| 5. Band saw    | 12. Edge Router                    |
| 6. Drill press | 13. Plunge Router                  |
| 7. Hand drill  |                                    |

They also certify that SkillsUSA Iowa, the Cabinetmaking technical committee and judges are released from all responsibility relating to personal injury resulting from the use of the above-listed power equipment. Contestants will be removed from competition if proper training has not been provided and/or they are using the equipment in an unsafe manner.

### ***Cabinetmaking Standards and Competencies –***

**Note: not all standards and competencies covered in this contest.**

#### **CM 1.0 — Apply wood veneers and plastic laminates**

- 1.1 Apply adhesives, edge banding and wood edges
- 1.2 Apply laminate to core
- 1.3 Cut plastic to size
- 1.4 Fit plastic laminate joints
- 1.5 Trim edges

#### **CM 2.0 — Assemble, fasten and install components**

- 2.1 Apply clamping devices
- 2.2 Assemble drawers, panel door and joint
- 2.3 Assemble ends, back, bracing and face frame
- 2.4 Attach molding/trim
- 2.5 Fasten parts with nails, screws and staples
- 2.6 Fasten top to casework
- 2.7 Glue boards edge to edge
- 2.8 Install catches, doors, drawer rail and guides, hinges, pulls and knobs, shelves and track and slide for sliding doors
- 2.9 Reinforce joints with block/dowel

### **CM 3.0 — Cut and shape components**

- 3.1 Cut butt joint, counter top, dado/rabbet joint, doors, doweled joint, and drawer guides and runners (rails)
- 3.2 Cut drawer front, sides, back and bottom
- 3.3 Cut ends, back and interior bracing
- 3.4 Cut face frame, miter joints, molding trim, mortise and tenon joints, frames and panels, shelving, spline joints and tongue and groove joints
- 3.5 Cut out for sink
- 3.6 Edge (shape) counter top
- 3.7 Plane stock
- 3.8 Square solid stock

### **CM 4.0 — Design and lay out**

- 4.1 Determine materials from a blueprint
- 4.2 Draw detailed plans
- 4.3 Estimate labor and material cost
- 4.4 Sketch shop plans

### **CM 5.0 — Finish surfaces**

- 5.1 Apply lacquers, paints, stains, varnishes/polyurethanes and wood filler to nail or screw holes
- 5.2 Clean surfaces
- 5.3 Remove excess glue
- 5.4 Sand surfaces
- 5.5 Swell dents

### **CM 6.0 — Transport and install cabinets**

- 6.1 Fasten cabinet to wall
- 6.2 Trim cabinets
- 6.3 Prepare cabinets for transporting

## **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
- Apply transformations (rotate or turn, reflect or flip, translate or slide, and dilate or scale) to geometric figures
- Construct three-dimensional models
- Apply Pythagorean Theorem
- Solve practical problems involving complementary, supplementary and congruent angles
- Use measures of interior and exterior angles of polygons to solve problems

**Science Skills** - None Identified

### **Language Arts Skills**

- Provide information in conversations and in group discussions
- Provide information in oral presentations

- Demonstrate use of such nonverbal communication skills as eye contact, posture and gestures using interviewing techniques to gain information

## 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
- Communication
- Connections
- Representation

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

### Language Arts Standards

- 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 apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and nonprint texts
- 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](http://www.ncte.org/standards).

### Science Standards - None Identified

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

## Contest Requirements

### 1. Tools Required for Contest (provided by Organizers)

- a. Table Saws
- b. Miter Saws
- c. Biscuit Jointers
- d. Routers and ¼" round-over bit (2)
- e. Adjustable Shelf Templates
- f. Pocket Hole Fixtures (Kreg® Jigs)
- g. Hinge Boring Fixtures
- h. Edge-banding irons or Virutex® edge-bander

### 2. Material required for contest (provided by organizers)

- a. ¾" Red Oak Plywood
- b. ½" Red Oak Plywood
- c. ¼" Red Oak Plywood
- d. 4/4 Solid Red Oak S2S
- e. Iron-on Red Oak edge-banding
- f. #20 biscuits (12 per student)
- g. Wood glue
- h. Hinges and plates (screws) – 1 pr
- i. Drawer slides 12" with screws – 1 pr
- j. Drawer knobs (2)
- k. Shelf pins, ¼" (4) l. 1-1/4" brads (30)
- m. 1" drawer front screws (4)
- n. 1-1/4" face frame screws (32) with 4" square drivers
- o. 2" flathead screws (8)
- p. 1-1/4" flathead screws (8)
- q. Double stick tape – 8" strip

### 3. Student Tool List

- a. Safety glasses
- b. nail apron
- c. Claw hammer
- d. Measuring tape
- e. Combination square
- f. 2 pencils – (no carpenters pencils/no ink pens)
- g. 1/32", 1/16", 3/32" nail sets
- h. Block Plane
- i. Utility Knife
- j. Backsaw
- k. 2 C-clamps (8")
- l. 1 set of wood chisels ¼" – 1"
- m. 10 mill bastard file
- n. screwdriver with interchangeable bits (#2 square drive)
- o. sanding block
- p. cabinet scraper
- q. calculator
- r. 3 pieces of sandpaper (80 – 220)
- s. 18 ga. Air nailers (Headless) with 18 ga. brads
- t. Cordless drill • Screw tip holder and screw tips
  - 6" pocket hole screw tip – sq. drive
  - Drill bits
  - Extra battery and charger
- u. 1/8" drill bit
- v. Wood putty
- w. 4 – 36" clamps
- x. 4 – 24" clamps
- y. 2 – 12" clamps
- z. 1 roll 1" masking tape (if you it – one roll of 1.5" masking tape).
- aa. 1 pint of titebond

## Cabinetmaking Safety Verification/Liability Release

The SkillsUSA Iowa Cabinetmaking Competition will involve the use of tools and equipment in completing tasks within the competition. It is absolutely necessary that complete operation and safety instructions for the use of the tools and equipment have been given to the contestant in his/her training program at the local school/community college division, as stated in the National SkillsUSA National Standards, before he/she competes. This includes the proper safety instruction in the use of the tools and equipment listed in the scope of the contest and the use of protective equipment while using the tools and materials. Contestants/Students and/or their Guardians, and Instructor/Advisor certify that SkillsUSA Iowa, the Cabinetmaking technical committee and judges are released from all responsibility relating to personal injury resulting from the use of the tools/equipment listed. Contestants will be removed from competition if proper training has not been provided and/or they are using tools or equipment in an unsafe manner.

- |                |                                    |
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| 7. Hand drill  |                                    |

By the affixing of my signature below, I certify that my student, who is entering the Cabinetmaking Competition, has had proper operating and safety instruction in the use of the tools and equipment listed.

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(Signature of Instructor/Advisor)

By affixing of my signature below, I certify that I, (Contestant) has had proper operating and safety instruction in the use of the tools and equipment listed, to be used in the Cabinetmaking Competition, and that I understand the correct operating procedures and safety precautions for the use of the tools and equipment.

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(Signature of Student or Guardian if under 18 and Date)

THIS FORM MUST BE SIGNED AND TURNED IN TO THE CABINETMAKING CONTEST CHAIRMAN ON THE DAY OF THE COMPETITION. FAILURE TO TURN IN THIS FORM WILL RESULT IN THE STUDENT NOT BEING ALLOWED TO COMPETE.