



# **CABINETMAKING/MILLWORK**

## **Furniture Design & Manufacturing**

The second instructional course in a sequence that prepares individuals to apply technical knowledge and skills to prepare and execute furniture design projects; assemble and finish furniture articles; repair furniture; and stresses the safe use a variety of hand and power tools and machinery. Recommended projects would be anything that would allow students to incorporate all joints and tools e.g. a chest of drawers.

**USOE**  
**July 2009**

# Furniture Design & Manufacturing

Levels:	Grades 10-12
Units of Credit:	Minimum 0.5
CIP Code:	48.0702
11 Digit Code:	40-10-00-00-130
11 Digit DE Code:	40-10-00-13-130
Test #:	522
License:	CTE/Secondary
Endorsement:	Cabinetmaking/Millwork
Prerequisite:	Woodworking

## CORE STANDARDS, OBJECTIVES, AND INDICATORS

**STANDARD**  
**480702-01**      **Students will be able to understand the furniture making industry.**

### **OBJECTIVES**

480702-0101      Identify career opportunities in the furniture and cabinetmaking industries.

**STANDARD**  
**480702-02**      **Students will be able to understand the design, planning and estimation process.**

### **OBJECTIVES**

480702-0201      Identify elements and principles of design as they apply to woodworking and cabinetmaking/millwork manufacturing.

480702-0202      Identify standard furniture dimensions relating to tables, seating, bookshelves, and shelving.

480702-0203      Draw the necessary views of a selected project.

480702-0204      Create a material list for the selected project and determine the project cost.

480702-0205      Create a procedure list for construction of a cabinet.

480702-0206      Extract pertinent cabinet information and specifications from working drawings and specifications.

**STANDARD**  
**480702-03**      **Students will be able to understand and demonstrate safe practices.**

### **OBJECTIVES**

480702-0301      Demonstrate the ability to work safely in a wood shop following general safety rules.

480702-0302      Demonstrate the safe use of woodworking tools and machines.

- 480702-0303 Demonstrate how to handle, store, and dispose of materials according to MSDS sheets.
- 480702-0304 Pass a written safety test with a score of 100 percent.

**STANDARD 480702-04 Students will be able to understand and demonstrate the safe use of hand tools.**

**OBJECTIVES**

480703-0401 Describe the purpose and demonstrate the proper use of the following measuring and layout tools:

- |                    |                 |
|--------------------|-----------------|
| Measuring tape     | Scratch awl     |
| Combination square | Try square      |
| Framing square     | Sliding T-bevel |
| Tammel points      | Compass         |

480703-0402 Describe the purpose and demonstrate the proper use of the following cutting and shaping tools:

- |                |              |
|----------------|--------------|
| Utility knife  | Back saw     |
| Block plane    | Wood chisel  |
| Wood file/rasp | Hand saw     |
| Jack plane     | Glue scraper |
| Putty knife    |              |

480703-0403 Describe the purpose and demonstrate the proper use of the following striking tools:

- |               |                  |
|---------------|------------------|
| Claw hammer   | Dead-blow hammer |
| Rubber mallet | Nail set         |

480703-0404 Describe the purpose and demonstrate the proper use of the following drill bits:

- |  |              |
|--|--------------|
| Twist                                  | Forstner     |
| Spade                                  | Countersink  |
| Driver bits: Phillips, Square, slotted | Hole saw     |
| Multi spur bit                         | Hogging tool |

**STANDARD 480702-05 Students will be able to understand and demonstrate the safe use of portable power tools.**

**OBJECTIVES**

480703-0501 Describe the purpose and demonstrate the proper use of the following portable power tools:

- |                  |              |                |
|------------------|--------------|----------------|
| Pneumatic nailer | Power drills | Router         |
| Finish sander    | Belt sander  | Orbital sander |
| Biscuit jointer  | Hand jig saw |                |

**STANDARD 480702-06 Students will be able to understand and demonstrate the safe use of power machines.**

## **OBJECTIVES**

- 480701-0601 Describe the purpose and demonstrate the proper use of the following sawing machines:  
Table saw                      Power Miter Saw                      Radial arm saw  
Band saw
- 480701-0602 Describe the purpose and demonstrate the proper use of the following surfacing machines:  
Surface planer                      Jointer
- 480701-0603 Describe the purpose and demonstrate the proper use of the following sanding machines:  
Disc sander                      Surface sander                      Spindle sander
- 480701-0604 Describe the purpose and demonstrate the proper use of the following shaping machines:  
Router table                      Shaper
- 480701-0605 Describe the purpose and demonstrate the proper use of the following drilling and turning machines:  
Drill press                      Line boring machine                      Lathe

**STANDARD**                      **Students will be able to understand wood products, characteristics, and procedures.**  
**480702-07**

## **OBJECTIVES**

- 480702-0701 Describe the parts of a tree and the significance that it has in cabinet construction.  
▪ Bark  
▪ Sap wood  
▪ Pith  
▪ Annual (growth) rings
- 480702-0702 Describe and know how natural defects.  
▪ Warp  
▪ Cracks  
▪ Bark inclusions  
▪ Knots
- 480702-0703 Demonstrate a knowledge of the seasoning and drying of lumber.
- 480702-0704 Distinguish between softwoods and hardwoods.
- 480702-0705 Identify the difference between solid wood and manmade goods and describe the use of each.
- 480702-0706 Identify wood species and list the species most suited for furniture construction.  
▪ Alder  
▪ Cherry  
▪ Oak  
▪ Walnut  
▪ Maple  
▪ Poplar

- Pine
  - Mahogany
  - Cedar
- 480702-0707 Identify the common grades of lumber and sheet goods.
- FAS
  - Select
  - #1COM
- 480702-0708 Properly store material.

**STANDARD  
480702-08**      **Students will be able to understand and demonstrate basic math and measuring concepts.**

**OBJECTIVES**

- 480701-0801 Add two- and three-digit numbers.
- 480701-0802 Subtract two-, three-, and four-digit numbers.
- 480701-0803 Solve two-digit divisor numbers.
- 480701-0804 Multiply a two-digit factor.
- 480701-0805 Add, subtract, multiply, and divide fractions and mixed numbers.
- 480701-0806 Convert fractions to decimals.
- 480701-0807 Reduce fractions.
- 480701-0808 Add, subtract, multiply, and divide decimal numbers.
- 480701-0809 Calculate percentages and basic ratios.
- 480701-0810 Add and subtract linear measurement in feet and inches.
- 480701-0811 Use a ruler or measuring tape to measure within a sixteenth (1/16) of an inch.
- 480702-0812 Calculate board feet and square feet.
- 480702-0813 Demonstrate the optimization of materials.

**STANDARD  
480702-09**      **Students will be able to understand and demonstrate the use of fasteners and adhesives.**

**OBJECTIVES**

- 480701-0901 Identify the various woodworking fasteners and the application of each.
- Nails
  - Screws
  - Staples
  - Pins
  - Bolts
- 480702-0902 Identify the different adhesives and preferred use of each.
- Yellow glue
  - Polyurethane glue
  - Cyanoacrylate
  - Epoxy

- 480701-0903 Identify the different types of clamps.
- Bar
  - “C”
  - Spring
  - Band
  - Handscrew.

**STANDARD**  
**480702-10** **Students will be able to understand and demonstrate the use of joinery.**

**OBJECTIVES**

480702-1001 Identify the basic wood joints used in furniture making.

- Butt
- Miter
- Rabbet
- Dado
- Spline
- Mortise and tenon
- Dovetail
- Groove (plough)
- Lap
- Pocket
- Dowel
- Biscuit
- Blind dado

480702-1002 Construct the basic wood joints used in cabinetmaking/millwork.

**STANDARD**  
**480702-11** **Students will be able to understand and demonstrate the use of cabinet components and hardware.**

**OBJECTIVES**

480702-1101 Identify the cabinet components of a face frame and cabinet box.

- Stile
- Rail
- Mullion
- Side
- Skin
- Base
- Shelf
- Web frame
- Kicker
- Drawer runner/glide
- Toe kick
- Back

- 480702-1102 Describe the concept of a European (frameless) cabinet system and the advantages and disadvantages of that system.
- 480702-1103 Identify the door options in cabinetmaking:
- Flush
  - Overlay
  - Lip
  - Tambour
- 480702-1104 Identify the components of a drawer.
- 480702-1105 Identify and properly install common cabinet/furniture hardware such as:
- Hinges - offset, overlay, European, butt, lip
  - Drawer guides,
  - Pulls and knobs,
  - Shelf supports.
- 480702-1106 Assemble a project with the proper adhesive and fasteners.
- 480702-1107 Use frame and panel construction in a project .
- 480702-1108 Construct a drawer.
- 480702-1109 Install lid or door and drawer.
- 480702-1110 Identify basic construction methods.
- Frame and panel
  - Casework construction
  - Post and rail

**STANDARD**            **Students will be able to understand and demonstrate finishing techniques.**  
**480702-12**

**OBJECTIVES**

- 480703-1201 Understand and properly apply the basic rules of sanding
- 480702-1202 Select and correctly use each specified grit size.
- 480702-1203 Properly prepare a surface for finishing.
- 480702-1204 Properly apply stain, penetrating oil, and/or a clear finish
- 480702-1205 Properly spray a clear coat.

**PROFESSIONAL DEVELOPMENT**

**STANDARD**            **Students will understand the need for professional development.**  
**480702-13**

**OBJECTIVES**

- 480702-1301 Complete a personal inventory.
- 480702-1302 Set and meet goals.
- 480702-1303 Be self-motivated.
- 480702-1304 Know how to make decisions.
- 480702-1305 Know how to manage time.
- 480702-1306 Organize personal belongings and lab equipment.
- 480702-1307 Learn to communicate verbally.

- 480702-1308 Write effective communications.  
 480702-1309 Establish a personal reading program.  
 480702-1310 Develop effective work skills and attitudes.  
 480702-1311 \*Master a working knowledge of SkillsUSA.
- Learn the acronym SkillsUSA.
  - State the SkillsUSA motto.
  - State the SkillsUSA creed.
  - Learn the SkillsUSA colors.
  - Describe the official SkillsUSA dress.
  - Describe the procedure for becoming a SkillsUSA officer.

**STANDARD**  
**480702-14**      **Students will understand the need for leadership skills.**

**OBJECTIVES**

- 480702-1401 Serve on a committee.  
 480702-1402 Prepare an agenda.  
 480702-1403 Assist in planning a meeting.  
 480702-1404 Review basic parliamentary procedure.
- Make a main motion.
- 480702-1405 Participate in a school project.  
 480702-1406 Attend a community meeting.  
 480702-1407 Practice effective speaking.  
 480702-1408 Present a three- to five-minute talk.  
 480702-1409 Implement a leadership project.  
 480702-1410 \*Master a working knowledge of SkillsUSA.
- Describe the meaning of the SkillsUSA emblem.
  - State the SkillsUSA pledge.
  - Describe the duties of a SkillsUSA officer.

**STANDARD**  
**480702-15**      **Students will understand the need for career planning.**

**OBJECTIVES**

- 480702-1501 Define your future occupation.  
 480702-1502 Survey employment opportunities.  
 480702-1503 Report on a trade journal article.  
 480702-1504 Explore opportunities for advanced training.  
 480702-1505 Conduct a worker interview.  
 480702-1506 Contact a professional association.  
 480702-1507 Explore entrepreneurship opportunities.  
 480702-1508 Give a talk about your career.  
 480702-1509 Review career goals.



**STANDARD  
480702-16**

**Students will understand the importance of employability and work habits.**

**OBJECTIVES**

- 480702-1601 Develop a list of work standards to follow at school and on the job.
  - 480702-1602 Evaluate your personal ethics.
    - Evaluate your personal ethics against acceptable workplace ethics.
  - 480702-1603 Build a job search network.
  - 480702-1604 Find job leads.
  - 480702-1605 Write a resume.
  - 480702-1606 Create a job portfolio.
  - 480702-1607 Complete a job application.
  - 480702-1608 Write a business letter and memo.
  - 480702-1609 Participate in an actual or simulated job interview.
- \* SkillsUSA PDP requirements - recommended