

Cabinetry and Millwork (2016)

CONTENT STANDARD
1.0: LAB ORGANIZATION
AND SAFETY SKILLS 1

1.1 Performance Standard 1.1: General Safety 1.1

- 1.1.1 Describe general shop safety rules, procedures and housekeeping duties. 1.1.1
 - 1.1.2. Demonstrate knowledge of OSHA/EPA and their role in workplace safety. 1.1.2.
 - 1.1.3. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment – PPE). 1.1.3.
 - 1.1.4. Utilize safe procedures for handling of tools and equipment. 1.1.4.
 - 1.1.5. Operate lab equipment according to safety guidelines. 1.1.5.
 - 1.1.6. Identify and use proper lifting procedures and proper use of support equipment. 1.1.6.
 - 1.1.7. Utilize proper ventilation procedures for working within the lab/shop area 1.1.7.
 - 1.1.8. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. 1.1.8.
 - 1.1.9 Identify the location and use of eye wash stations. 1.1.9
 - 1.1.10 Identify the location of the posted evacuation routes. 1.1.10
 - 1.1.11 Identify and wear appropriate clothing for lab/shop activities. 1.1.11
 - 1.1.12 Secure hair and jewelry for lab/shop activities. 1.1.12
 - 1.1.13 Locate and interpret safety data sheets (SDS). 1.1.13
 - 1.1.14 Follow written instructions to complete work assignments. 1.1.14
 - 1.1.15. Follow written instructions to complete work assignments. 1.1.15.
 - 1.1.16. Recommend attendance of OSHA 10-hr safety course 1.1.16.
 - 1.1.17 Review worker’s rights and responsibilities. 1.1.17
-

**CONTENT STANDARD
2.0: MANUAL AND
POWER TOOLS** 1.1.18.

2.1 Performance Standard 2.1: Hand Tools 2.1

- 2.1.1 Identify hand tools and their appropriate usage 2.1.1
 - 2.1.2 Demonstrate the proper techniques when using hand tools. 2.1.2
 - 2.1.3. Demonstrate safe handling and use of appropriate tools. 2.1.3.
 - 2.1.4 Demonstrate proper cleaning, storage, and maintenance of tools. 2.1.4
-

2.2 Performance Standard 2.2: Power Tools and Equipment 2.2

- 2.2.1 Identify power tools and their appropriate usage. 2.2.1
 - 2.2.2 Identify equipment and their appropriate usage. 2.2.2
 - 2.2.3 Demonstrate the proper techniques when using power tools and equipment. 2.2.3
 - 2.2.4 Demonstrate safe handling and use of appropriate power tools and equipment. 2.2.4
 - 2.2.5 Demonstrate proper cleaning, storage, and maintenance of power tools and equipment. 2.2.5
 - 2.2.6 Determine cut speeds and feed rates. 2.2.6
-

**CONTENT STANDARD
3.0: FUNDAMENTAL
DESIGN** 3

3.1 Performance Standard 3.1: Elements of Design 3.1

- 3.1.1 Explain the history and characteristics of cabinetry and furniture design styles. 3.1.1
- 3.1.2 Identify needs and wants in cabinets and furniture in everyday living. 3.1.2
- 3.1.3 Describe the relationship between the function and form of a cabinet or piece of furniture. 3.1.3
- 3.1.4 Identify various cabinet styles and components. 3.1.4
- 3.1.5 Identify common sizes in relation to furniture and cabinets. 3.1.5
- 3.1.6 Discuss elements of design (e.g., shapes, textures, lines, colors, etc.). 3.1.6
- 3.1.7 Discuss principles of design (e.g., harmony, symmetry, repetitions, balance, proportion, etc.). 3.1.7
- 3.1.8 Identify and describe Americans with Disabilities Act (ADA) requirements when applicable 3.1.8
- 3.1.9 Utilize client requirements and specifications to create a finish product. 3.1.9

3.2 Performance Standard 3.2: Print Reading Techniques 3.2

- 3.2.1 Interpret basic elements of a working drawing (e.g., annotation, dimensions, line types, etc.). 3.2.1
- 3.2.2 Identify and define industry standard terminology. 3.2.2
- 3.2.3 Describe various types of drawings (e.g., working, assembly, pictorial, orthographic, isometric, schematic, etc.). 3.2.3
- 3.2.4 Understand dimensioning, sectional drawings, fasteners, tables, charts, and assembly drawings. 3.2.4
- 3.2.5 Develop a materials list from a working drawing. 3.2.5
- 3.2.6 Develop a construction plan of procedure. 3.2.6
- 3.2.7 Develop a cut list from a working drawing. 3.2.7

3.3 Performance Standard 3.3: Measures and Scaling Techniques 3.3

- 3.3.1 Identify industry standard units of measure (e.g., standard, decimal, metric, etc.). 3.3.1
- 3.3.2 Define industry standard measurement terms (e.g., linear, square ft., tolerance, squareness, concentricity, perpendicular, parallel, etc.). 3.3.2
- 3.3.3 Demonstrate proper use of precision measuring tools (e.g., micrometer, dial-indicator, caliper, etc.). 3.3.3
- 3.3.4 Measure to the nearest 1/16th inch with a tape measure. 3.3.4
- 3.3.5 Demonstrate the use of geometric shapes (e.g., arcs, circles, angles, compound angles, tapers, etc.). 3.3.5

3.4 Performance Standard 3.4: Freehand Technical Sketching Techniques 3.4

- 3.4.1 Identify industry standard units of measure (e.g., standard, decimal, metric, etc.). 3.4.1
- 3.4.2 Define industry standard measurement terms (e.g., linear, square ft., tolerance, squareness, concentricity, perpendicular, parallel, etc.). 3.4.2
- 3.4.3 Demonstrate proper use of precision measuring tools (e.g., micrometer, dial-indicator, caliper, etc.). 3.4.3
- 3.4.4 Demonstrate the use of geometric shapes (e.g., arcs, circles, angles, compound angles, tapers, etc.). 3.4.4

3.5 Performance Standard 3.5: Computer Design Technologies 3.5

- 3.5.1 Introduction to current software programs. 3.5.1
- 3.5.2 Design and create a model. 3.5.2
- 3.5.3 Create shop drawings. 3.5.3
- 3.5.4 Modify and adjust standards within a software program. 3.5.4

3.6 Performance Standard 3.6: Mathematical Concepts 3.6

- 3.6.1 Convert between customary and metric systems 3.6.1
- 3.6.2 Identify and convert standards and metric designation. 3.6.2
- 3.6.3 Add, subtract, multiply and divide fractions, decimals, and whole numbers. 3.6.3
- 3.6.4 Convert fractions to decimals. 3.6.4
- 3.6.5 Determine the cost of materials needed for a furniture/cabinetmaking project. 3.6.5

3.7 Performance Standard 3.7: Layout Principles and Practices 3.7

- 3.7.1 Interpret drawing, sketch or specification information. 3.7.1
- 3.7.2 Prepare work area for layout. 3.7.2
- 3.7.3 Select appropriate materials to complete work assignment. 3.7.3
- 3.7.4 Use layout and marking tools as required. 3.7.4
- 3.7.5 Layout parts using measurement practices. 3.7.5

CONTENT STANDARD 4.0: MATERIALS AND HARDWARE 4

4.1 Performance Standard 4.1: Materials 4.1

- 4.1.1 Identify and describe the major materials and their characteristics used in furniture and cabinetmaking (e.g., hardwood, softwood, composites, laminates, veneers, edge treatment, etc.) 4.1.1
- 4.1.2 Define material terminology (e.g., air dry, kiln dry, defects, lumber grade, face grades, sanded, etc.) 4.1.2
- 4.1.3 Differentiate between the various types of material properties and their applications. 4.1.3
- 4.1.4 Discuss the impact of material usage on the environment. 4.1.4
- 4.1.5 Discuss the impact of the environment and climate on materials. 4.1.5
- 4.1.6 Explain how production is affected by the availability, quality, and quantity of resources. 4.1.6
- 4.1.7 Differentiate between raw materials, standard stock, and finished products. 4.1.7

4.2 Performance Standard 4.2: Fasteners and Methods 4.2

- 4.2.1 Identify and discuss various fasteners (e.g., type, purpose, application, etc.) 4.2.1
- 4.2.2 Categorize fastening methods by appropriate applications. 4.2.2
- 4.2.3 Discuss fastening methods for various materials (e.g., toenailing, countersinking, pocket screws, dowels, biscuits, dominos, etc.) 4.2.3

4.3 Performance Standard 4.3: Adhesives and Methods 4.3

- 4.3.1 Identify and discuss various adhesives (e.g., glues, contact adhesives, edge bending adhesives, etc.) 4.3.1
- 4.3.2 List and define common terminology (e.g., open assembly time, closed assembly time, cure time, 1-piece flow, slip, and shelf life, etc.) 4.3.2
- 4.3.3 Discuss adhesive methods for various materials. 4.3.3
- 4.3.4 Compare characteristics of adhesives that affect the assembly time, cure time and strength of the product. 4.3.4
- 4.3.5 Demonstrate the proper cleanup procedures for specific adhesives. 4.3.5

4.4 Performance Standard 4.4: Hardware 4.4

- 4.4.1 Identify and describe common types of hardware and their applications. 4.4.1
- 4.4.2 Select the hardware for the appropriate application. 4.4.2
- 4.4.3 Layout, install, and adjust hardware. 4.4.3

CONTENT STANDARD 5.0: MANUFACTURING PROCESSES 5

5.1 Performance Standard 5.1: Manufacturing 5.1

- 5.1.1 Identify and describe the current manufacturing processes (e.g., layout, milling, joinery, sanding, assembly, finishing, installation, etc.) 5.1.1

5.2 Performance Standard 5.2: Milling Operations 5.2

- 5.2.1 Identify terms used with milling tools (e.g., kerf, set, grain, drilling, boring, counterboring, countersinking, etc.) 5.2.1
- 5.2.2 Select the proper milling tools for specific operations (e.g., table saw, drill press, joiner, lathe, band saw, jigsaw, routers, etc.) 5.2.2
- 5.2.3 Demonstrate the steps to square a board. 5.2.3
- 5.2.4 Demonstrate cutting and handling techniques used for lumber and sheet goods. 5.2.4
- 5.2.5 Demonstrate the use of a jig, template, and fixture. 5.2.5
- 5.2.6 Demonstrate safety operating procedures, (e.g. feather boards, holders, and power feeders). 5.2.6
- 5.2.7 Identify terms used with milling tools (e.g., kerf, set, grain, drilling, boring, counterboring, countersinking, etc.) 5.2.7

5.3 Performance Standard 5.3: Computer Numerical Control (CNC) 5.3

- 5.3.1 Discuss the applications of CNCs and CNC technology. 5.3.1
- 5.3.2 Understand the programming and set up of CNCs. 5.3.2
- 5.3.3 Discuss the outcomes of appropriate G codes/M codes. 5.3.3
- 5.3.4 Discuss troubleshooting methods 5.3.4
- 5.3.5 Advantages and disadvantages of using CNCs. 5.3.5

5.4 Performance Standard 5.4: Joinery Techniques 5.4

- 5.4.1 Identify terms used with joinery techniques (e.g., doweling, biscuits, floating tenon, tongue & groove, dados, miter, dovetail, etc.). 5.4.1
- 5.4.2 Determine the appropriate joinery applications 5.4.2
- 5.4.3 Discuss the advantages and disadvantages of joinery types. 5.4.3
- 5.4.4 Select the proper joinery tools and machinery for specific operations. 5.4.4
- 5.4.5 Construct various joints (i.e., dado, miter, rabbet, butt). 5.4.5

5.5 Performance Standard 5.5: Sanding 5.5

- 5.5.1 Identify terms used with sanding processes and techniques (e.g., grit, belt, disc, hand, etc.) 5.5.1
- 5.5.2 Properly prepare a surface for a treatment or finish. 5.5.2
- 5.5.3 Demonstrate proper application methods for different types of filler materials. 5.5.3
- 5.5.4 Select the proper tool and abrasive for shaping and smoothing materials. 5.5.4
- 5.5.5 Select the proper grit sizes and sequences for shaping and smoothing operations. 5.5.5
- 5.5.6 Utilize the proper health and safety procedures when working with abrasives and fillers 5.5.6

5.6 Performance Standard 5.6: Assembly 5.6

- 5.6.1 Identify terms used with assembly procedures (e.g., dry fitting, clamping, gluing, etc.) 5.6.1
- 5.6.2 Select the proper assembly tools for specific operations (e.g., c-clamps, bar clamps, pipe clamps, etc.) 5.6.2
- 5.6.3 Demonstrate assembly and clamping procedures. 5.6.3
- 5.6.4 Demonstrate common case construction techniques (e.g., face frame, frameless, etc.) 5.6.4
- 5.6.5 Demonstrate common frame and panel construction techniques (e.g., stile, rail, panel, etc.) 5.6.5
- 5.6.6 Demonstrate furniture construction techniques. 5.6.6
- 5.6.7 Construct a project that includes a drawer and a door. 5.6.7
- 5.6.8 Use specific quality control criteria to check the accuracy and squareness of a project. 5.6.8
- 5.6.9 Demonstrate laminating techniques (e.g., plastic, veneers, edge treatment, etc.) 5.6.9
- 5.6.10 Demonstrate molding and trim usage and installation 5.6.10

5.7 Performance Standard 5.7: Finishing 5.7

- 5.7.1 Identify terms and products used in finishing procedures (e.g., staining, clear coating, penetrating oils, sheen, sealer, etc.) 5.7.1
- 5.7.2 Select the proper finishing tools and materials for specific operations. 5.7.2
- 5.7.3 Demonstrate proper application methods for different types of finishes. 5.7.3
- 5.7.4 Demonstrate clean up procedures for various types of finishing products and equipment. 5.7.4
- 5.7.5 Utilize the proper health and safety procedures when working with finishes. 5.7.5

5.8 Performance Standard 5.8: Installation 5.8

- 5.8.1 Discuss cabinet layout and installation techniques. 5.8.1
- 5.8.2 Discuss countertop layout, materials, and installation techniques. 5.8.2
- 5.8.3 Check walls and floors for level and plumb. 5.8.3
- 5.8.4 Determine fasteners for walls. 5.8.4
- 5.8.5 Install upper and lower cabinets and other casework. 5.8.5
- 5.8.6 Install countertops, including sink cutouts and back splash. 5.8.6
- 5.8.7 Cut and install molding and trim. 5.8.7
- 5.8.8 Adjust doors and drawers. 5.8.8
- 5.8.9 Clean work site. 5.8.9

6.1 Performance Standard 6.1: Career Exploration 6.1

- 6.1.1 Discuss the employment opportunities in the industry. 6.1.1
- 6.1.2 Discuss economic impacts within the industry. 6.1.2
- 6.1.3 Create an employment application and resume. 6.1.3
- 6.1.4 Explore education and training for careers in the industry. 6.1.4

Standard