

# Standards/Measurement Criteria

(\*\*Draft)

Woodworking

CIP No. 48.0700

These state standards are designed to be delivered in a sequence of courses. \*Standards 1-15 are to be taught as an introduction within the Woodworking program.

**\*\*Please note: The following CTE program Standards/Measurement Criteria are tentative until assessments are established.**

## **\*1.0 CONDUCT A CAREER SURVEY OF THE WOODWORKING FIELD**

- 1.1 Analyze career areas in woodworking
- 1.2 Recognize factors that influence career choices
- 1.3 Examine personal aptitudes and interests
- 1.4 Relate interests, skills and abilities to career choices in woodworking

## **\*2.0 DEMONSTRATE JOB SEARCH SKILLS NECESSARY TO OBTAIN EMPLOYMENT IN WOODWORKING**

- 2.1 Explain the steps in a job search
- 2.2 Research employment opportunities
- 2.3 Use technology in a job search
- 2.4 Critique a job application

## **\*3.0 DEMONSTRATE EMPLOYABILITY SKILLS FOR JOB SUCCESS IN WOODWORKING**

- 3.1 Use woodworking vocabulary in context
- 3.2 Use math and language skills in an occupational context
- 3.3 Plan, organize and implement woodworking related activities
- 3.4 Complete tasks on time and accurately
- 3.5 Develop a plan to achieve employment goals in woodworking
- 3.6 Evaluate factors that contribute to successful performance at work
- 3.7 Discuss work ethics and professionalism in woodworking

## **\*4.0 EXPLORE LEGAL AND ETHICAL ISSUES IN WOODWORKING**

- 4.1 Explain legal responsibilities of woodworking employees to comply with state and federal government laws and regulations
- 4.2 Explain employer expectations on workplace behavior and how they are expressed in organizational policies and culture in woodworking
- 4.3 Examine the relationship between ethics and the law in woodworking
- 4.4 Identify workers' rights regarding the workplace issues including safety, drug testing, harassment, discrimination, privacy, etc.

## **\*5.0 DEMONSTRATE TECHNOLOGICAL LITERACY FOR THE WOODWORKING WORKPLACE**

- 5.1 Examine the uses of technology in woodworking
- 5.2 Demonstrate basic usage of computers (input, storage, output)
- 5.3 Access information electronically (via Internet, CD-ROM, etc.)
- 5.4 Use industry-accepted software applications for word processing, database, spreadsheet, presentation and publication, and design-drafting.

## **\*6.0 APPLY EFFECTIVE COMMUNICATION SKILLS FOR WOODWORKING**

- 6.1 Interpret verbal and nonverbal communication
- 6.2 Identify barriers to effective communication in woodworking
- 6.3 Practice skills used to communicate with internal and external customers
- 6.4 Apply active listening skills using reflection, restatement, and clarification techniques
- 6.5 Recognize the difference between objective and subjective information when communicating
- 6.6 Use listening skills to determine the reasons for misunderstanding and conflict

## **\*7.0 PARTICIPATE IN LEADERSHIP ACTIVITIES SUCH AS THOSE SUPPORTED BY CAREER AND TECHNICAL STUDENT ORGANIZATION SkillsUSA**

- 7.1 Determine the roles and responsibilities that managers, supervisors and workers bring to an organization
- 7.2 Practice techniques to involve each member of the team
- 7.3 Discuss business etiquette
- 7.4 Practice effective meeting management
- 7.5 Practice decision-making processes
- 7.6 Practice problem-solving processes
- 7.7 Identify qualities of an effective team member in woodworking
- 7.8 Practice teamwork
- 7.9 Explore team problem solving techniques applicable to woodworking

## **\*8.0 APPLY PROBLEM SOLVING AND DECISION MAKING PROCESSES FOR WOODWORKING**

- 8.1 Identify decision making and goal setting processes
- 8.2 Demonstrate problem solving skills for woodworking
- 8.3 Apply problem-solving processes
- 8.4 Practice methods for establishing priorities
- 8.5 Solve problems individually and as part of a team
- 8.6 Generate new and creative ideas using critical thinking skills in solving drafting and design related problems
- 8.7 Evaluate facts, use logic and reason in decision making
- 8.8 Troubleshoot a problem in woodworking
- 8.9 Access information using manuals and reference materials in order to solve a woodworking related problem

## **\*9.0 APPLY MEASUREMENT TECHNIQUES TO PROBLEMS IN WOODWORKING**

- 9.1 Demonstrate knowledge of units of measurement (English and metric)
- 9.2 Identify common measurement tools used in woodworking and their functions
- 9.3 Select and use the appropriate measurement tool for the task
- 9.4 Determine degree of accuracy required for a specific task or situation

## **\*10.0 APPLY MATHEMATICAL PROCESSES TO PROBLEMS IN WOODWORKING**

- 10.1 Express problems in woodworking using numeric, symbolic and/or graphic representations
- 10.2 Perform mathematical calculations in the context of woodworking
- 10.3 Use technology in the solution of math-related problems

## **\*11.0 PRACTICE SAFE USE OF TOOLS AND EQUIPMENT UTILIZED IN WOODWORKING**

- 11.1 Evaluate factors contributing to a safe and healthy environment in woodworking
- 11.2 Explain appropriate safety precautions around common job-site hazards in woodworking
- 11.3 Analyze the impact of safety compliance to employees in woodworking
- 11.4 Wear/use protective clothing/gear to ensure personal safety in woodworking
- 11.5 Describe emergency procedures and protocols
- 11.6 Recognize and demonstrate safe use of basic hand tools in woodworking
- 11.7 Recognize and demonstrate safe use of hand-held power tools in woodworking
- 11.8 Recognize and demonstrate safe use of stationary power equipment in woodworking
- 11.9 Practice basic procedures for safe storage and upkeep of tools utilized in woodworking
- 11.10 Demonstrate personal responsibility for developing and maintaining a safe and healthy work environment in woodworking
- 11.11 Practice ergonomically sound working procedures for woodworking
- 11.12 Explain the importance of the OSHA (Occupational Safety and Health Administration) standards, HazCom (Hazard Communication Standard) requirements for woodworking

## **\*12.0 INTERPRET SCHEMATICS, BLUEPRINTS AND TECHNICAL DRAWINGS UTILIZED IN WOODWORKING**

- 12.1 Recognize dimensional and geometric tolerances
- 12.2 Analyze how content and meaning are communicated in schematics, blueprints, and technical drawings
- 12.3 Interpret dimensions, symbols, legends, scales, and directions
- 12.4 Interpret spatial layout of three-dimensional form from two-dimensional drawing

## **\*13.0 PRACTICE DRAWING AND VISUALIZATION SKILLS FOR WOODWORKING**

- 13.1 Identify composition elements utilized in technical drawing and blueprints for woodworking
- 13.2 Practice common types of drafting in digital and traditional form
- 13.3 Illustrate the basic elements and principles of wood structures using digital and traditional media

## **14.0\* EXPLORE CONSTRUCTION TECHNOLOGY**

- 14.1 Investigate components of the construction industry (e.g., residential, commercial, heavy, etc.)
- 14.2 Discuss the relationship between woodworking and other construction fields
- 14.3 Describe components of residential construction
- 14.4 Explore installation of cabinetry in commercial and residential construction

## **15.0\* EXPLORE MANUFACTURING TECHNOLOGY IN WOODWORKING**

- 15.1 Investigate types of manufacturing systems in woodworking
- 15.2 Describe how changing technology impacts woodworking manufacturing
- 15.3 Classify types and properties of materials used in woodworking manufacturing
- 15.4 Discuss elements of quality control methods and evaluation in woodworking

## **16.0 DEVELOP A CAREER PLAN FOCUSED ON THE WOODWORKING INDUSTRIES**

- 16.1 Investigate career opportunities in the woodworking industries
- 16.2 Examine professional woodworking organizations and associations
- 16.3 Compare career potential with skill attainment and certification
- 16.4 Develop career goals based on interests, aptitudes, and research
- 16.5 Identify employer's expectations of appropriate work ethic and habits
- 16.6 Describe factors that contribute to job satisfaction and success

## **17.0 PREPARE FOR EMPLOYMENT IN THE WOODWORKING INDUSTRIES**

- 17.1 Develop a resume outlining woodworking skills and experience
- 17.2 Develop a portfolio demonstrating woodworking skills and knowledge
- 17.3 Complete job application process
- 17.4 Research a company as a potential employer
- 17.5 Demonstrate interviewing skills, including pre-interview preparation and post-interview follow-up

## **18.0 PARTICIPATE IN WORK-BASED LEARNING EXPERIENCES**

- 18.1 Use technology appropriate for the job
- 18.2 Demonstrate positive work behaviors
- 18.3 Demonstrate positive interpersonal behaviors
- 18.4 Demonstrate safe and healthy work behaviors
- 18.5 Adapt to changes in work assignments, work environment or co-workers
- 18.6 Attend work-based organization functions, events, trade shows, competitions and field trips
- 18.7 Participate in a variety of work-based experiences, paid or non-paid job

## **19.0 DEMONSTRATE ORAL COMMUNICATION SKILLS**

- 19.1 Demonstrate active listening during communications with customers, employers and coworkers
- 19.2 Accept and consider constructive criticism
- 19.3 Employ conflict resolution skills in workplace situations
- 19.4 Suggest innovative solutions in an appropriate manner
- 19.5 Present to an audience incorporating both appropriate verbal and nonverbal communication techniques

## **20.0 DEMONSTRATE WRITTEN COMMUNICATION SKILLS**

- 20.1 Write business communication using appropriate format for the situation
- 20.2 Use sketches and drawings in written communications
- 20.3 Using appropriate technology, prepare documents using established rules for grammar, spelling and sentence construction
- 20.4 Utilize multiple technologies for written and presentation communications
- 20.5 Demonstrate effective electronic mail language and technique

## **21.0 EVALUATE THE ROLE OF WOOD PRODUCTS MANUFACTURING IN THE ECONOMY**

- 21.1 Discuss the significance of wood products manufacturing in state, national and international economies
- 21.2 Explain how local, national and international trends affect woodworking businesses
- 21.3 List the factors, including personal traits, which contribute to the success of a small woodworking business
- 21.4 Compare/contrast the advantages/disadvantages of sole proprietorships, partnerships and corporations
- 21.5 Analyze the relationship of customer service and customer satisfaction on the success of a business

## **22.0 DEMONSTRATE BUSINESS PRACTICES FOR A WOODWORKING BUSINESS**

- 22.1 Estimate supplies, materials and labor costs
- 22.2 Develop a materials order from a cut list and plan
- 22.3 Explain product quality standards
- 22.4 Manage customer relations
- 22.5 Discuss the effect available technology and equipment has on a woodworking business

## **23.0 EVALUATE LEADERSHIP AND TEAMWORK STYLES APPROPRIATE FOR THE WORKPLACE**

- 23.1 Determine personal characteristics of effective leaders
- 23.2 Compare/contrast leadership and management styles
- 23.3 Evaluate characteristics of an effective team player
- 23.4 Evaluate characteristics of effective teams
- 23.5 Demonstrate teamwork

## **24.0 PARTICIPATE IN LEADERSHIP ACTIVITIES SUCH AS THOSE SUPPORTED BY CAREER TECHNICAL STUDENT ORGANIZATION SkillsUSA**

- 24.1 Determine the roles and responsibilities that leaders and members bring to an organization
- 24.2 Evaluate characteristics of effective teams
- 24.3 Evaluate characteristics of an effective team player
- 24.4 Practice techniques to involve each member of the team
- 24.5 Practice effective meeting management
- 24.6 Demonstrate business etiquette
- 24.7 Practice decision-making processes

## **25.0 ANALYZE WOODWORKING MATERIALS, PRODUCTS AND PROCESSES**

- 25.1 Use vocabulary and terminology of the woodworking industry appropriately in context
- 25.2 Explore sources of raw materials
- 25.3 Classify the basic components of wood product manufacturing (e.g., adhesives, coatings, etc.)
- 25.4 Explain the properties, uses and pricing of wood species and grades
- 25.5 Explain the properties, uses, and pricing of manufactured board (e.g., plywood, particle board, medium density fiberboard-MDF)
- 25.6 Compare solid wood and wood composites and their uses
- 25.7 Examine the conditioning, drying, and storage of wood
- 25.8 Investigate frameless or 32mm technology
- 25.9 Compare manufacturing and construction processes as they integrate in woodworking
- 25.10 Evaluate the impact of technological changes in wood products manufacturing in the last 25 years
- 25.11 Explain the potential impact of new technologies on the wood industry

## **26.0 PRACTICE SAFE WOOD PRODUCTS MANUFACTURING**

- 26.1 Work safely in a woodworking shop
- 26.2 Maintain safe work attire and appearance
- 26.3 Wear appropriate personal protective equipment (e.g., eye protection, ear protection, impact hat, etc.)
- 26.4 Use equipment safety features correctly
- 26.5 Use proper lifting techniques
- 26.6 Examine health-related problems that may result from exposure to hazardous materials in the woodworking shop
- 26.7 Examine principles and methods of dust collection
- 26.8 Adhere to government regulations (e.g., OSHA, EPA, DNR) in the woodworking shop

- 26.9 Adhere to lockout / tagout rules and procedures
- 26.10 Handle, use and store materials according to MSDS sheets
- 26.11 Apply fire safety rules and procedures

## **27.0 APPLY MATHEMATICAL AND MEASUREMENT CONCEPTS IN WOOD PRODUCTS MANUFACTURING**

- 27.1 Solve woodworking problems using basic math
- 27.2 Solve manufacturing and construction word problems
- 27.3 Calculate linear feet, square feet, and board feet
- 27.4 Calculate prices with margins and profits
- 27.5 Tally accurately
- 27.6 Measure accurately
- 27.7 Lay out straight and angled cuts accurately
- 27.8 Convert standard and metric measurements

## **28.0 PRACTICE SAFE AND EFFECTIVE USE OF HAND AND PORTABLE POWER TOOLS**

- 28.1 Use steel rules/tapes, marking gauges and T-bevels correctly
- 28.2 Utilize planes and cabinet scrapers to smooth surfaces
- 28.3 Utilize wood chisels to notch or mortise stock
- 28.4 Drive and set nails and screws
- 28.5 Fasten materials using a pneumatic stapler or nailer
- 28.6 Utilize a circular saw to make straight, beveled and compound angle cuts
- 28.7 Utilize a sabre/jig saw to plunge/cut curves
- 28.8 Drill holes with a portable power drill
- 28.9 Utilize a power drill to bore holes to a specified depth
- 28.10 Create pocket screwed joints using a drill with jig
- 28.11 Utilize a router to shape edges and cut a groove, dado and rabbet
- 28.12 Utilize a router with a dovetail jig
- 28.13 Utilize plate and biscuit joiners for square and angled joints
- 28.14 Utilize a sander for roughing and finishing
- 28.15 Clean and maintain hand and portable power tools
- 28.16 Utilize a belt sander and grinder to scribe cut a product

## **29.0 PRACTICE SAFE AND EFFECTIVE USE OF STATIONARY WOODWORKING MACHINES**

- 29.1 Utilize a table saw to make rip, cross, miter, bevel and groove cuts
- 29.2 Change and set up blades on a table saw
- 29.3 Utilize a radial saw to make cross, miter and compound angle cuts
- 29.4 Change blade and adjust squareness of a radial saw
- 29.5 Cut vertical with a panel saw
- 29.6 Change blade on a panel saw
- 29.7 Cut arcs and circles with a band saw
- 29.8 Set up, adjust and bore using a drill press
- 29.9 Utilize a jointer to square, bevel, chamfer, or flatten stock
- 29.10 Utilize a router in a router table
- 29.11 Utilize a surfacer to plane and smooth surfaces
- 29.12 Create edges and curves utilizing a shaper with a fence, collar or dead stop
- 29.13 Utilize a power feed unit with a table saw, shaper or jointer
- 29.14 Utilize a bench morticer
- 29.15 Finish edges using an edge bander
- 29.16 Set up and utilize a lathe for woodturning

## **30.0 EXAMINE COMPUTERS AND COMPUTER-CONTROLLED EQUIPMENT IN WOODWORKING APPLICATIONS**

- 30.1 Find information on (Computer Aided Drafting and Design) CADD drawings
- 30.2 Investigate (Computer Aided Manufacturing) CAM software for programming Computer Numerical Control (CNC) manufacturing equipment
- 30.3 Explore CNC equipment and equipment operations
- 30.4 Demonstrate CNC equipment operation (actual or simulated)
- 30.5 Enter CNC programs and run a machine to produce a part
- 30.6 Explore the application of 3-dimensional technology in woodworking

## **31.0 INTERPRET PLANS AND PRINTS**

- 31.1 Extract information from plans and specifications
- 31.2 Read and interpret a floorplan
- 31.3 Verify design plans with field measurements
- 31.4 Interpret a cut sheet
- 31.5 Create a material list
- 31.6 Specify wood stock for compatibility of grain and color
- 31.7 Construct and install wood products from plans

## **32.0 CUT AND SHAPE STOCK**

- 32.1 Mill rough lumber to create S4S stock
- 32.2 Cut panelized materials to size and shape
- 32.3 Manufacture woodturnings
- 32.4 Manufacture wood moldings
- 32.5 Re-saw wood parts when required

### **33.0 USE WOOD VENEERS**

- 33.1 Cut and edge veneer for joining
- 33.2 Join veneer sheets with glue and tape
- 33.3 Use and machine wood panel products (i.e., particle board, MDF)
- 33.4 Apply veneer with appropriate adhesive using a platen or vacuum press
- 33.5 Trim excess veneer
- 33.6 Prepare veneer surface for finishing

### **34.0 DEMONSTRATE PRINCIPLES OF JOINERY**

- 34.1 Explain the purpose and appropriate applications of common joints
- 34.2 Layout and make butt joints using dowels, screws, biscuits, and/or pocket screws
- 34.3 Layout and make a dado joint
- 34.4 Layout and make a rabbet joint
- 34.5 Layout and make a half-lap joint
- 34.6 Layout and make a miter joint
- 34.7 Layout and make a tongue and groove joint
- 34.8 Layout and make a mortise and tenon joint
- 34.9 Layout and make a dovetail joint
- 34.10 Layout and make a finger joint

### **35.0 ASSEMBLE WOOD PRODUCTS USING FASTENERS, ADHESIVES AND HARDWARE**

- 35.1 Explain the purpose and appropriate applications of common fasteners
- 35.2 Use various fasteners and Ready To Assemble (RTA) connectors in manufacturing a wood product
- 35.3 Explain the purpose and appropriate applications of common woodworking adhesives
- 35.4 Use adhesives appropriate to the application
- 35.5 Use bar, C, spring, band and handscrew clamps
- 35.6 Install hinges, pulls, handles and drawer slides
- 35.7 Use fasteners and levelers to install products

### **36.0 USE LAMINATES**

- 36.1 Cut laminates with appropriate saw blades and router bits
- 36.2 Seam two pieces of laminate
- 36.3 Apply laminate adhesives
- 36.4 Trim and finish laminate edges

## **37.0 DEMONSTRATE FINISHING MATERIALS AND PROCESSES**

- 37.1 Explain the purpose and appropriate applications of various types of finishes and finishing processes
- 37.2 Follow a finish schedule
- 37.3 Apply filler to a wood surface
- 27.4 Apply a wash coat to a wood surface
- 37.5 Apply a seal coat to a wood surface
- 37.6 Select and use appropriate abrasive types and grit sizes
- 37.7 Stain a wood surface
- 37.8 Apply clear coating finishes to wood surfaces
- 37.9 Apply pigmented finishes to wood surfaces
- 37.10 Apply safe and approved (OSHA, EPA, DNR) methods for cleaning finishing tools