

Furniture Manufacturing: Grades 9, 10, 11, 12

Adopted 2004

Trees

A001. Discuss a structural diagram of a tree A001

A002. Explain the functions of different parts of a tree A002

A003. Name and identify conifers and broad leaf species A003

A004. Explain processes and functions of a tree on the microscopic level, such as photo synthesis, movement of water, etc. A004

Forestry

B001. Identify major forest regions in the United States B001

B002. Discuss local forest regions and their impact on local economies B002

B003. Practice forest measurements on a short timber cruise B003

B004. Discuss forest protection (fires, insects, and diseases) B004

Environmental Issues

C001. Discuss the issue of protecting forests (local forest, rain forests, etc.) C001

C002. Explain the term "sustainable forestry" and view video by Patrick Moore C002

C003. Explain the terms "selective cutting" and "clear cutting" and their applications C003

C004. Discuss current environmental issues, such as the Kyoto Protocol, global warming, depletion of the ozone layer, etc. C004

Lumber and Lumber Grading

D001. Collect and identify samples of various wood species D001

D002. List the working characteristics of various wood species D002

D003. List natural defects in wood D003

D004. Name grades of softwood lumber D004

D005. Name grades of hardwood lumber D005

D006. List different sawing patterns for lumber and their preferred use D006

D007. Identify the commercial value of various wood species in different lumber grades D007

Wood Moisture Relationship and Lumber Drying

E001. Explain the term "relative humidity" as it relates to lumber E001

E002. Explain the transport of water in lumber E002

E003. Describe the process of shrinkage and swelling in wood E003

E004. Describe problems caused by wood moisture in manufacturing wood products E004

E005. Measure the moisture content of different wood samples using a moisture meter E005

E006. Measure wood movements under changing climatic conditions E006

E007. Describe ideal conditions for storing lumber E007

E008. List methods of drying lumber E008

E009. Explain the process of drying lumber in a kiln E009

E010. Describe drying-related defects in lumber and their causes E010

Veneer and Wood Composites

F001. Describe different methods and applications in producing veneers F001

F002. Describe the correct storage and handling of veneers F002

F003. Define the field of wood composites F003

F004. List advantages and disadvantages of wood composites F004

F005. Identify the commercial value of different wood composite materials F005

Design

G001. Describe good principles in design G001

G002. Discuss methods of constructing furniture G002

G003. Explain design and function of a project G003

G004. Discuss aesthetic proportions and features of wood components and furniture G004

G005. Discuss the impact that grain patterns, stains, colors, etc., have on a selected project G005

G006. Discuss appropriate surfaces (visible and nonvisible) for the selected project **G006**

G007. Select an appropriate connection method **G007**

G008. Discuss the characteristics of functional and nonfunctional design **G008**

Information Gathering

H001. Select project components and raw materials from books, catalogues, Internet, etc. **H001**

H002. Discuss assembly drawings and assembly directions for project components **H002**

H003. Discuss norms and regulations (i.e., OSHA, ISO, etc.) that pertain to the project **H003**

Work Flow

I001. Sequence work steps for the project **I001**

I002. Evaluate the effectiveness of machinery and tools required for the project **I002**

I003. Discuss appropriate preventive measures for job safety and health protection **I003**

I004. Determine labor hours for the project (including time for helpers) **I004**

I005. Develop a format for customer invoicing **I005**

Project Presentation

J001. Review bill of materials and labor estimates **J001**

J002. Determine the total overhead cost for the project **J002**

J003. Discuss advantages of design features and workmanship incorporated in the project **J003**

J004. Prepare a customer presentation **J004**

Measurement

K001. Measure length using a rule or tape measure **K001**

K002. Measure objects using a slide caliper and micrometer **K002**

K003. Measure objects using metric and customary measuring systems **K003**

K004. Perform basic mathematical computations used in measurement **K004**

K005. Explain the term "board foot" **K005**

K006. Determine the board footage of actual boards **K006**

K007. Calculate the board footage of volumetric objects, such as a bunk of lumber, capacity of a dry kiln, etc. **K007**

K008. Describe other measuring systems common in the national and international trade of forest and wood products, such as chord, bole, etc. **K008**

Area and Volumetric Calculations

L001. Calculate material requirements for square and triangular areas **L001**

L002. Apply formula for calculating area and circumference of a circle in an industry-specific application **L002**

L003. Calculate the ft³ of a wooden block **L003**

L004. Calculate the volume of wood in a log **L004**

Angles

M001. Review basic geometric concepts **M001**

M002. Draw different angles, and determine their degrees **M002**

M003. Measure different angles on woodworking machinery **M003**

M004. Add and subtract angles **M004**

M005. Discuss application of compound angles **M005**

Percentages

N001. Calculate percentages using industry examples **N001**

N002. Calculate reject rates of machine runs **N002**

N003. Calculate total material requirements **N003**

Wood Moisture Calculations

O001. Determine moisture content in wood **O001**

O002. Observe and measure dimensional changes in wood **O002**

O003. Calculate incremental, dimensional changes in wood **O003**

Project Cost

P001. Discuss prices for different raw materials **P001**

P002. Calculate total material cost of a project **P002**

Feed Speed

Q001. Measure feed rates of various woodworking machines **Q001**

Q002. Calculate expected machine output **Q002**

Q003. Observe and discuss surface qualities at different machine speeds **Q003**

Planning a Project with a Working Drawing

R001. Sketch an example of each type of drawing technique R001

R002. Discuss "exploded view" R002

R003. Produce a working drawing R003

R004. Draw the selected class project in the appropriate drawing style R004

R005. Sketch and dimension a floor plan R005

Bill of Materials

S001. Determine a bill of materials for project construction S001

S002. Develop a format for customer invoicing that shows bill of materials and costs S002

Safety

T001. Explain the term "OSHA," and state some regulations covered by OSHA T001

T002. Recite the emergency plan for the shop T002

T003. Discuss hearing loss T003

T004. Describe personal protective equipment (PPE) used in a woodworking facility T004

T005. Explain the term "MSDS" and the information it contains T005

T006. Discuss machine guards and the importance of having them in place at all times T006

T007. Name the basic safety rules for electrical equipment T007

T008. Practice a "lock-out – tag-out procedure" on one stationary woodworking machine in your facility T008

Hand Tools

U001. Review hand tools used in the woodworking trade U001

U002. Discuss basic safety rules for using hand tools U002

U003. Discuss typical applications of hand tools U003

U004. State proper techniques for using hand tools U004

Tool Sharpening

V001. Describe safety precautions followed while sharpening hand tools V001

V002. List different tool materials, their properties, and preferred applications V002

V003. Explain operation of the grinder V003

V004. Practice sharpening tools using a grinder V004

V005. Discuss advantages of automatic grinding equipment V005

V006. Practice sharpening and honing V006

Use of Power Tools

W001. Explain general safety procedures for the use of power tools W001

W002. Explain specific safety procedures for portable power tools W002

W003. Practice operation of portable power tools, applying appropriate safety procedures W003

W004. Explain specific safety procedures for stationary power tools W004

W005. Practice operation of stationary power tools, applying appropriate safety procedures W005

Operation of Power Tools (apply to each machine installed in the shop)

X001. Explain the function of each machine X001

X002. Perform tool change and bring each machine back into operational status X002

X003. Perform preventive maintenance procedures on each machine X003

Preparing Stock for Layout

Y001. Select the appropriate stock for a job Y001

Y002. Glue stock to rough size using proper clamping procedures Y002

Y003. Square rough stock to actual size for the job Y003

Wood Sanding

Z001. Explain the purpose of sanding Z001

Z002. Define terms used in sanding wood Z002

Z003. Describe different abrasives and their common applications Z003

Z004. Sand wood parts using a hand held abrasive Z004

Z005. Sand wood parts with a power sander Z005

Z006. Change abrasive on a power sander Z006

Fasteners

AA001. Identify types and purposes of fasteners related to woodworking AA001

AA002. Explore style, functionality, and cost of fasteners from catalogues and the Internet AA002

AA003. Use at least three different kinds of fasteners in woodworking projects AA003

Adhesives	<p>BB001. Identify appropriate adhesives for assembling various projects BB001</p> <hr/> <p>BB002. Apply adhesives BB002</p>
Cutting Joints with Power Equipment and Hand Tools	<p>CC001. Explain the technique for constructing basic joints CC001</p> <hr/> <p>CC002. Lay out wood joints on stock CC002</p> <hr/> <p>CC003. Construct examples of basic joints CC003</p>
Assembly Techniques	<p>DD001. Explain procedures for assembling a job DD001</p> <hr/> <p>DD002. Complete a trial assembly DD002</p> <hr/> <p>DD003. Assemble a job using prepared stock and appropriate adhesives, clamps, and fastening devices DD003</p>
Finishing	<p>EE001. Discuss terms related to finishing wooden furniture EE001</p> <hr/> <p>EE002. State safety procedures related to finishing wooden furniture EE002</p> <hr/> <p>EE003. Describe the safe storage of finishes EE003</p> <hr/> <p>EE004. Identify types of finishes and their purpose EE004</p> <hr/> <p>EE005. Select an appropriate finish for a job EE005</p> <hr/> <p>EE006. Apply finishes using manual devices such as a sponge, paint brush, or roller EE006</p> <hr/> <p>EE007. Explain the proper care, cleaning, and maintenance of manual devices used in applying finishes EE007</p> <hr/> <p>EE008. Apply finishes with a spray gun EE008</p> <hr/> <p>EE009. Clean equipment, store supplies, and dispose of excess materials properly EE009</p>
Wood Veneers and Laminates	<p>FF001. Define terms involved with laminates and veneers FF001</p> <hr/> <p>FF002. Apply laminates and veneers to wood parts FF002</p>
Assembling an Advanced Project	<p>GG001. True up stock for project construction GG001</p> <hr/> <p>GG002. Clamp all stock to rough size GG002</p> <hr/> <p>GG003. Square rough stock to correct size GG003</p>

GG004. Sand stock using power sander GG004

GG005. Cut all joints laid out on stock GG005

GG006. Assemble project using prepared stock and appropriate fastening devices GG006

GG007. Perform finish sanding and scraping GG007

GG008. Apply finish to advanced project GG008

**Careers in Wood
Manufacturing Industry**

HH001. Discuss careers within the wood manufacturing industry HH001

HH002. List local business and industries involved in wooden furniture making HH002

HH003. Visit a local business or industry involved in the wood manufacturing industry HH003