

# WOOD MANUFACTURING 30

## Description

This course is designed to introduce to the student the processes and techniques of leg and rail construction. Student skills will be developed through tool and machine use in individual project construction. Techniques in lathe work, joinery and inlaying will also be offered. Upon completion of required projects, the student will continue on advanced project work.

## Course Overview

### Course Objectives

Students should:

- develop the ability to analyze and resolve problems through practical experiences.
- understand and apply practical technological methods in a problem-solving situation.
- apply math and science concepts to solve material processing problems.
- demonstrate how to construct projects from a given plan or working drawing, and modify plans as necessary
- identify and safely use many of the resources, processes, concepts, and tools related to woodworking technology.
- operate, correctly, basic woodworking equipment as well as other complex woodworking machines.

### Essential Questions

- Why is it important to always follow the proper safety and operation related to each tool and machine in the wood lab?
- Why is it important to understand the steps for preparing wood for use in wood products?
- What are the basic principles of “leg and rail construction?”
- What is the importance of preparing a surface for a finish and being able to correctly apply a finish?
- Why is proper machine set-up so important?

### Assessments

*Common Assessments*

- Written tests and quizzes on material presented
- Verbal questioning and explanation

*Skill Assessments*

- Performance Based Assessment on
- Machine /Tool Use
- Teacher visual evaluation of student practices and behavior
- Evaluation of student projects

### Content Outline

- I. [Unit 1](#) - Safety
- II. [Unit 2](#) - Machine Use
- III. [Unit 3](#) - Major Project Construction
- IV. [Unit 4](#) - Assembly
- V. [Unit 5](#) - Finishing types and methods
- VI. [Unit 6](#) - Hardware
- VII. [Unit 7](#) - Project Review and Evaluation

### Standards

Connecticut Technology Education Standards have been met in the following area:

- **Wood Technology**
- **Careers In Tech Ed**

### Grade Level Skills

Students will:

- apply glue and clamp a project.
- construct a box/drawer assembly.
- construct frame.
- construct a “leg and rail” type furniture piece (table).
- demonstrate the procedure for measuring out stock and squaring a board with a minimum of waste.
- demonstrate the proper and safe use of the lathe and shaper.
- describe “spindle turning” and “faceplate turning” on the lathe.
- explain the uses of different types of fasteners.

		<ul style="list-style-type: none"> <li>• identify and select kinds of wood appropriate for intended application.</li> <li>• practice all general shop safety rules and policies.</li> <li>• properly construct an overlay drawer.</li> <li>• set –up and utilize stationary power circular saws for machining wood.</li> </ul>
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**Pacing Guide**

September	October	November	December	January	February	March	April	May	June
Unit 1 <u>Safety</u>  1 week	Unit 2 <u>Machine Use</u>  4 weeks	Unit 3 <u>Major Project Construction</u>  20 weeks			Unit 4 <u>Assembly</u>  4 weeks	Unit 5 <u>Finishing types and methods</u>  4 weeks	Unit 6 <u>Hardware</u>  2 weeks	Unit 7 <u>Project Review and Evaluation</u>  1 week	

**Unit 1 –Safety, 1week [top](#)**

**Standards**

***Wood Technology***

**WM.02 Describe and demonstrate the procedures related to workplace and job-site safety including personal protective equipment, machine safety, and material handling practices.**

WM.02.01, WM.02.03, WM.02.04, WM.02.05

***Essential Knowledge and Skills***

**EKS.06 Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.**

EKS.02.04, EKS.02.05, EKS.02.07

**Unit Objectives**

Students will be able to:

- describe the dangers and ramifications of unsafe behavior.
- develop a personal respect for machines, equipment and colleagues in the shop area.
- identify and describe various types of personal protective equipment.
- read and discuss information on OSHA, EPA and other safety regulations.
- describe safe material handling practices

**Essential Question**

Why is practicing safety in the workplace so important all the time?

**Focus Questions**

- What needs to be done to ensure student safety in the wood shop?
- What are the basic shop safety rules?
- How should students behave in the wood shop?

**Assessments**

- Students will be evaluated on their knowledge of safety through objective tests, quizzes, and assignments.
- Safe working habits during shop activities will also be observed and evaluated

**Skill Objectives**

Students will:

- practice general shop safety and safe practice policies.
- demonstrate safe material handling practices.
- follow workplace and job-site safety procedures.
- use various types of personal protective equipment.
- describe safety practices for specific machines.
- follow OSHA, EPA and other safety regulations.

**Unit 2 – Machine Use, 4 weeks [top](#)**

**Standards**

***Wood Technology***

**WM.03 Identify and describe the safe and appropriate use of various types of hand and power tools and machinery used for building.**

WM.03.06, WM.03.08

**WM.07 Set-up, adjusts, and maintains a variety of wood manufacturing power equipment.**

WM.07.02, WM.07.04, WM.07.05, WM.07.09, WM.07.21, WM.07.27

**Unit Objectives**

Students will be able to:

- identify and describe the safe and appropriate use of various types of hand and power tools and machinery used for building.
- demonstrate the methods involved in turning raw materials into useable products.
- maintain a variety of wood manufacturing power equipment.

**Essential Question**

- What advantages are gained using machines to do work?

**Focus Questions**

- How do we safely utilize the circular saws to cut wood?
- On what machine is it best to crosscut a board?
- What is the importance of knowing your hand position when jointing a board?
- On what machines can we cut “free-hand”?

**Assessments**

- Observation and evaluation of correct and safe machine operation by the student
- Student performance
- Tests and/or quizzes on individual machines (written and/or practical)

**Skill Objectives**

Students will:

- joint edges of a board on a jointer.
- rip a board on a table saw.
- crosscut on a Radial Arm saw.
- cut curves on a band saw.
- surface plane a board to thickness.
- drill holes.
- shape edges with a hand and/or table router.
- sand with a disc, belt or spindle sander.
- use a panel saw.
- cut angles with a miter saw.
- use a mortiser and/or horizontal boring machine.

**Unit 3 – Major Project Construction, 20 weeks [top](#)**

**Standards**

***Wood Technology***

**WM.05 Identify and assemble wood joinery and install mechanical fasteners.**

WM.05.14, WM.05.15

**WM.06 Identify and demonstrate sanding and gluing techniques.**

WM.06.08

**WM.07 Set-up, adjusts, and maintains a variety of wood manufacturing power equipment.**

WMO7.01, WM.07.02, WM.07.05, WM.07.06, WM.07.08, WM.07.09, WM.07.10, WM.07.26, WM.07.28, WM.07.31, WM.07.34

**WM.11 Fabricate Furniture**

WM.11.06, WM.11.07

**Unit Objectives**

Students will be able to:

- extrapolate information from a set of plans
- describe and interpret technical drawings.
- illustrate leg and rail construction
- construct and produce parts of a “Leg and Rail” type table.
- properly make and utilize several basic wood joints in construction of a project
- set-up, adjust and maintain a variety of wood manufacturing power equipment.

**Essential Questions**

- Why are demonstrating positive work behavior, self-discipline and integrity important to success when competing large tasks?

**Focus Questions**

- Why is it essential to “square up” a board to correct size before construction begins?
- What type of joints are constructed and used in table construction?
- What types of drawers can be used under a table?
- What methods are used to join the table skirts to the corner legs?

**Assessments**

- Student’s performance of construction
- Quality of finished parts
- Quantity of student work performed
- Safety performance

**Skill Objectives**

Students will:

- laminate boards by gluing and clamping.
- identify styles of table legs.
- construct legs by laminating squared up pieces of wood.
- square up a leg block.
- taper cut a leg
- turn a leg on the lathe using the standard tools and technique and/or cut a Cabriole leg on the Band saw.(optional)
- build an overlay, lip or flush drawer.
- construct at least one type of drawer mount.
- recognize at least three tabletop styles and construct one.

**Unit 4 – Assembly, 4 weeks [top](#)**

**Standards**

***Wood Technology***

**WM.04 Explain and be able to demonstrate the methods involved in turning raw materials into useable products.**

WM.04.11

**WM.11 Fabricate Furniture**

WM.11.03, WM.11.05, WM.11.06, WM.11.09, WM.11.10

**Unit Objectives**

Students will be able to:

- construct components and assemble a drawer using dado, rabbet and/or dovetail joints.
- assemble a leg and rail type table utilizing Mortise and Tenon joints.
- demonstrate one of several learned methods to fasten a top to a project.

**Essential Question**

- How does following a plan lead to success in a products manufacture?

**Focus Questions**

- Which joints are stronger in various applications?
- Where might some of these joints be used?
- What type of clamps are used for clamping lumber in various directions?
- When and how are wood screws used?
- How do we “set” a nail?
- What types of glues are available?
- How long does glue have to dry?
- What types of clamps are available?
- How do we set a “parallel” clamp correctly?

**Assessments**

- Student’s performance of construction
- Quality of finished parts
- Quantity of student work performed
- Safety performance

**Skill Objectives**

Students will:

- construct and assemble a table.
- attach table legs to skirts.
- construct and assemble an overlay drawer.
- construct a table top.
- square-up a base and attach a table top to the base.

**Unit 5 – Finishing, 4 weeks [top](#)**

**Standards**

***Wood Technology***

**WM.16 Finish woodwork.**

WM.16.03, WM.16.05, WM.16.07

**Unit Objectives**

Students will be able to:

- recognize and use the correct abrasive paper and method for sanding wood.
- properly identify and apply various types of stain to wood.
- explain transparent finish systems.
- explain opaque finish systems.
- properly apply several coats of a topcoat finish to their wood project.
- identify the cleaners and solvents for various finishes and properly use each.

**Essential Question**

- When is it best to choose one finish type over another, water based versus oil based?

**Focus Questions**

- Why do we apply a finish to wood projects?
- How do we apply a finish to projects?
- What is the difference between finishes?
- What do we use to clean brushes?
- What does Latex mean?
- What is the difference between water-based and petroleum based products?
- What does a stain do?
- Are finish types interchangeable?
- Why and when do we wax a project?

**Assessments**

- Student's performance of finish work
- Quality of finished parts
- Quantity of student work performed
- Safety performance
- Finish preparation

**Skill Objectives**

Students will:

- apply a protective finish to their wood project.
- understand the difference between stains, primer coats and top coats.
- utilize the correct solvent when cleaning brushes.
- sand project to finished smoothness utilizing correct abrasive papers.

**Unit 6 – Hardware, 2 weeks** [top](#)

**Standards**

***Wood Technology***

**WM.10 Identify types, finishes, and mechanisms of hardware**

WM.10.02, WM.10.04

**WM.11 Fabricate Furniture**

WM.11.11

**Unit Objective**

Students will be able to:

- utilize layout techniques to place hardware for functionality.

**Essential Question**

- What are the advantages and disadvantages of applying different types of hardware?

**Focus Questions**

- What is the purpose of a knob or handle?
- What ergonomic factors should be explored when considering different types of knobs and pulls?
- Why is it important to consider whether to mount hardware after or before finishing?
- What are different applications and types of drawer slides?

**Assessments**

- Student’s performance of hardware application.
- Quality of finished “look”
- Quantity of student work performed
- Safety performance
- Properly mounted hardware

**Skill Objectives**

Students will:

- lay out the location of knobs and/or handles.
- drill proper holes to accommodate screws.
- properly mount knobs and handles to the drawer fronts.
- set the drawer square and level.
- apply pulls to cabinet doors and drawers.
- apply drawer slides to projects.
- apply latches and catches to projects.



**Unit 7 - Project Review and Evaluation, 1 week [top](#)**

**Standards**

***Wood Technology***

**WM.04 Explain and be able to demonstrate the methods involved in turning raw materials into useable products.**

WM.04.01, WM.04.05

**Unit Objectives**

Students will:

- explain and be able to demonstrate the methods involved in turning raw materials into useable product.
- assess the positives and negatives of the project's construction.
- evaluate the project based on the initial plan.

**Essential Question**

- Why is it important to verify that completed work matches expectations?

**Focus Questions**

- Has the project been constructed properly?
- How can the project construction be improved?
- What other techniques can be used in constructing this project?

**Assessments**

- Student work self evaluation
- Teachers evaluation and comparison

**Skill Objectives**

Students will:

- self-evaluate work.
- identify quality aspects of completed work
- identify changes which could improve the process.