

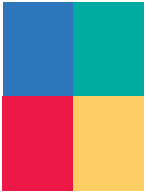


Woodworking: The Art and the Craft

CREATING DOVETAIL JOINTS AND CASEWORK



**TEACHER'S
GUIDE**



INTRODUCTION

This Teacher's Guide provides information to help you get the most out of *Creating Dovetail Joints and Casework*. The contents of this guide will allow you to prepare your students before using the program and to present follow-up activities to reinforce the program's key learning points.

Part of *Woodworking: The Art and the Craft* video series, *Creating Dovetail Joints and Casework* teaches how to make basic dovetail joints. This practical video explains the application and different types of dovetail joints, demonstrates how to make a through dovetail joint using hand tools and using a dovetail jig and router, and how to make the related housing joint using a router. Good safety practices are demonstrated throughout.

LEARNING OBJECTIVES

After viewing the program, students will be able to:

- Make a through dovetail joint using hand tools.
- Make a housing joint using a router.
- Make a dovetail joint using a dovetail jig with a hand-held router.

EDUCATIONAL STANDARDS

National Standards

This program correlates with the following competency standards from the National Center for Construction Education & Research. The content has been aligned with the following educational standards and benchmarks from this organization.

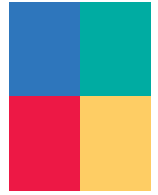
- Explain the role that safety plays in the construction crafts.
- Demonstrate the use and care of appropriate personal protective equipment.
- Use hand tools in a safe and appropriate manner.
- State the general safety rules for operating all power tools, regardless of type.
- Identify the portable power tools commonly used by carpenters and describe their uses.
- Use portable power tools in a safe and appropriate manner.
- Identify and cut the various types of joints used in cabinetmaking.

The competencies and objectives from the National Center for Construction Education & Research have been reprinted with permission.

English Language Arts Standards

The activities in this Teacher's Guide were created in compliance with the following National Standards for the English Language Arts from the National Council of Teachers of English.

- Uses the general skills and strategies of the writing process.
- Gathers and uses information for research purposes.
- Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade).
- Uses reading skills and strategies to understand and interpret a variety of informational texts.
- Uses discussions with peers as a way of understanding information.
- Uses listening and speaking strategies for different purposes.



- Makes formal presentations to the class (e.g., includes definitions for clarity; supports main ideas using anecdotes, examples, statistics, analogies, and other evidence; uses visual aids or technology, such as transparencies, slides, electronic media; cites information sources).
- Uses viewing skills and strategies to understand and interpret visual media.
- Uses a variety of criteria (e.g., clarity, accuracy, effectiveness, bias, relevance of facts) to evaluate informational media (e.g., web sites, documentaries, news programs).

Standards for the English Language Arts, by the International Reading Association and the National Council of Teachers of English, Copyright 1996 by the International Reading Association and the National Council of Teachers of English. Reprinted with permission.

Technology Standards

The activities in this Teacher's Guide were created in compliance with the following National Education Technology Standards from the National Education Technology Standards Project.

- Students demonstrate a sound understanding of the nature and operation of technology systems.
- Students are proficient in the use of technology.
- Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- Students use technology to locate, evaluate, and collect information from a variety of sources.
- Students use technology tools to process data and report results.
- Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

The National Education Technology Standards reprinted with permission from the International Society for Technology Education.

PROGRAM OVERVIEW

Used extensively in cabinet making and drawer construction, dovetail joints are the strongest and most attractive of the wood joints. They are also the most challenging joints to make. This video shows how to make dovetail joints using both hand tools and power tools. It also shows how to make the related housing joint using a router. Good safety practices are demonstrated.

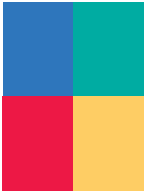
MAIN TOPICS

Topic 1: Introduction to Dovetail Joints

Introduces dovetail joints, defines terms related to dovetail joints, and illustrates the different types of dovetail joints.

Topic 2: Making a Through Dovetail Joint Using Hand Tools

Demonstrates making a through dovetail joint using hand tools. Includes laying out and cutting the tails, laying out and cutting the pins, sanding for a tight fit, and gluing and assembling the joint.



Topic 3: Making a Housing Joint Using a Router

Explains dovetail router bits. Demonstrates making a housing joint using a router and dovetail bit. Includes laying out and cutting the groove, and laying out and cutting the tongue.

Topic 4: Making a Dovetail Joint Using a Dovetail Jig with a Hand-Held Router

Explains the function of the dovetail jig. Explains the three types of dovetail jigs. Demonstrates making a dovetail joint using a dovetail jig with a hand-held router. Includes setting the tails jig and cutting the tails, setting the pins jig and cutting the pins, and assembling the joint.

FAST FACTS

- The dovetail joint is the strongest and most attractive wood joint.
- Both the through dovetail joint and half-blind dovetail joint are used extensively in cabinet making and drawer construction.
- The angle of the tail is critical to both strength and appearance. When the angle is too severe, the corners and neck are prone to damage. If the tail is only cut with a slight angle, the joint is more likely to separate.
- For soft woods, the tail angle should slope at a ratio of one inch for every six inches.
- For hardwoods, the tail angle should slope at a ratio of one inch for every eight inches.
- The line opposite the right angle is called the hypotenuse.
- The housing joint has a variety of applications, such as self-supporting shelving and drawer slides.
- There are three basic types of dovetail jigs: those designed for cutting through dovetails, jigs built exclusively for cutting half-blind dovetails, and combination jigs, which can accommodate both joint styles.
- To minimize friction between the router base and the template, sprinkle baby powder on the surface.

VOCABULARY TERMS

dovetail bit: A V-shaped router bit for making dovetail joints; they come in various sizes.

dovetail jig: A holding fixture and template for making dovetail joints using a saw or router. The fingers on the template not only guide the router bit, but also prevent the bit from removing the material directly below. This results in an equal number of pins and tails spaced evenly apart.

dovetail joint: A series of interlocking wedges primarily used for making corner joints.

half-blind dovetail joint: A dovetail joint in which the tails and pins are visible only on one side.

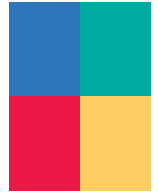
housing joint: Interlocking tongue and groove joint along the edges of two boards.

pins: The narrow projections on one piece of a dovetail joint.

shoulder line: A line defining the bottoms of the pins or tails.

tails: The wider projections on the mating piece of a dovetail joint.

through dovetail joint: A dovetail joint in which the pins and tails are exposed.



PRE-PROGRAM DISCUSSION QUESTIONS

1. What do you think is the strongest type of wood joint?
2. What do you think is the best looking type of wood joint?
3. Pass around a through dovetail joint and a half-blind dovetail joint and ask, "Where have you seen wood joints like these?"

POST-PROGRAM DISCUSSION QUESTIONS

1. What are the most critical steps in making a dovetail joint by hand? How can you be sure to do them well?
2. What projects are you planning (or can you think of) that would benefit from dovetail joints?
3. When is a dovetail joint not the best joint to use?
4. In what careers might the techniques demonstrated in this video be useful?

GROUP ACTIVITIES

Dovetail Joint Inventory

Have the class inventory the classroom, shop, or their homes to find all the dovetail joints. They should list the type of furniture and the part of the furniture in which the joint was found. This activity will help them realize the uses of dovetail joints in real applications.

INDIVIDUAL STUDENT PROJECTS

Make a Box Drawer

Have individuals make a box drawer using dovetail joints at the corners and a dado to support the bottom. You can allow only hand tools or power tools, or both in different places. This activity will develop their skills at making dovetail joints and dados.

Make a Tabletop Having Housing Joints

Have individuals make a tabletop of boards set edge-to-edge with housing joints. They should use a router for this. This activity will develop their skills at making and assembling housing joints.

INTERNET ACTIVITIES

Research Dovetail Joint Projects

Have individuals or groups research wood projects that use dovetail joints. This activity will develop their research skills, help them understand the applications of dovetail joints, and possibly result in some useable projects for hands-on practice.

ASSESSMENT QUESTIONS

Q: Why are dovetail joints used in furniture construction?

Answer/Feedback: Dovetail joints are the strongest and most attractive type of wood joint.

Q: Dovetails are a series of interlocking wedges primarily used for making lap joints. (*True or False*)

A: False

Feedback: Dovetails are a series of interlocking wedges primarily used for making corner



joints.

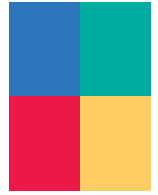
Q: What is a half-blind dovetail joint?

Answer/Feedback: A dovetail joint in which the tails and pins are visible only on one side.

Q: Place the steps for laying out and cutting the tails with hand tools in the correct order.

- (a) Divide the distance between the lines into an even number of equal parts.
 - (b) Make a thickness mark on one board using the mating board as a guide.
 - (c) Lay out the tail lines by placing the bevel on every other mark in one direction and drawing a line and then repeating the process on the other marks with the blade in the opposite direction.
 - (d) Lay out the tails by standing the board on end and drawing a line a quarter of an inch in from each edge and carry the lines over to the face of the board.
 - (e) Cut off the corner waste.
 - (f) Measure an eighth-inch on either side of the equal parts marks, draw parallel lines, and carry the lines slightly over to the face of the board.
 - (g) Cut the pieces to length and plane the ends smooth and square.
 - (h) Using a dovetail saw, cut down one side of each vertical tail, keeping the saw straight and the blade on the waste side of the line, then reposition the board and cut the other side.
 - (i) Draw a shoulder line around the entire board for both boards.
 - (j) Use a coping saw to remove as much of the material between the tails as possible, then remove the remaining material with a bevel-edged chisel.
- A:** (g) Cut the pieces to length and plane the ends smooth and square.
(b) Make a thickness mark on one board using the mating board as a guide.
(i) Draw a shoulder line around the entire board for both boards.
(d) Lay out the tails by standing the board on end and drawing a line a quarter of an inch in from each edge and carry the lines over to the face of the board.
(a) Divide the distance between the lines into an even number of equal parts.
(f) Measure an eighth-inch on either side of the equal parts marks, draw parallel lines, and carry the lines slightly over to the face of the board.
(c) Lay out the tail lines by placing the bevel on every other mark in one direction and drawing a line and then repeating the process on the other marks with the blade in the opposite direction.
(h) Using a dovetail saw, cut down one side of each vertical tail, keeping the saw straight and the blade on the waste side of the line, then reposition the board and cut the other side.
(e) Cut off the corner waste.
(j) Use a coping saw to remove as much of the material between the tails as possible, then remove the remaining material with a bevel-edged chisel.

Feedback: Mark the board thicknesses, inset the sides, lay out an even number of tails, set and mark the tail angle for the hardness of the wood, cut the tails, and remove the excess wood.



Q: Fill in the missing steps for making the pins in a dovetail joint with hand tools.

- (1) Set the board in the vise vertically.
- (2) Place the tail board on top, supporting the opposite end so that it sits flush against the mating board.
- (3) _____.
- (4) Square the lines down to the shoulder mark on each side of the board.
- (5) Align the saw with the angled knife marks, and position the blade slightly to the waste side.
- (6) Make the pin cuts being careful not to saw below the shoulder line.
- (7) Remove the material between the pins.

A: Trace the shape of the tails with a sharp knife.

Feedback: Using a sharp knife rather than a pencil creates a narrower, more precise line. This is what makes the joint fit tightly.

Q: What are the “pins” in a dovetail joint?

- (a) The narrow projections on one piece of a dovetail joint.
- (b) The narrow gaps between the projections of dovetail joints.
- (c) The empty space at either side of one piece of a dovetail joint.
- (d) The wider projections on the mating piece of a dovetail joint.
- (e) The reinforcing brads used to strengthen a dovetail joint.

A: (a) The narrow projections on one piece of a dovetail joint.

Feedback: The wider projections on the mating piece of a dovetail joint are call “tails.”

Q: What is a housing joint?

- (a) An overlapping joint used at the corners of the stud walls.
- (b) A tongue and groove joint joining boards edge to edge.
- (c) A special kind of dovetail joint used for door frames.
- (d) An invisible joint used for making beveled corners.
- (e) A double rabbet joint.

A: (b) A tongue and groove joint joining boards edge to edge.

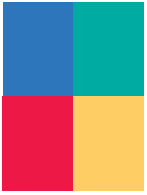
Feedback: The housing joint has a distant relationship to the dovetail joint in that the tongue piece fits snugly into the groove. It is best made with a router.

Q: A dovetail jig... (select all that apply)

- (a) is a holding fixture and template for making dovetail joints.
- (b) is for making dovetail joints.
- (c) is used with a router and a special dovetail bit.
- (d) must be clamped to the wood.
- (e) comes in a variety of sizes and styles.

A: All choices should be selected.

Feedback: Dovetail joints can be cut using a holding fixture and template, known as a dovetail jig. This tool is designed to be used with a hand-held router. There are three basic types of dovetail jigs: those designed for cutting through dovetails, jigs built exclusively for cutting half-blind dovetails, and combination jigs, which can accommodate both joint styles.



Q: How can you recognize a dovetail router bit?

Answer/Feedback: By its distinctive V shape.

Q: A dovetail jig allows the dovetail to be cut and centered in one pass. (*True or False*)

A: True

Feedback: It also keeps you from making mistakes with the router.

Q: When must safety glasses be worn?

- (a) At all times when near power equipment.
- (b) When power equipment is running.
- (c) When others are using power equipment.
- (d) None of the above.
- (e) All of the above.

A: (e) All of the above.

Feedback: All these times present a possible danger to your eyes—even when equipment is not running or you are not the one using it.

ADDITIONAL RESOURCES

WEBSITES

Woodworking.com

www.woodworking.com

New Woodworker.com

www.newwoodworker.com

Fine Woodworking

www.taunton.com/finewoodworking/index.asp

Women in Woodworking

www.womeninwoodworking.com

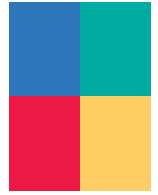
National Center for Construction Education and Research

www.nccer.org

BOOKS

The Basics of Craftsmanship: Key Advice on Every Aspect of Woodworking (Essentials of Woodworking), by Purdy Strother. Rodney Crosby Publishers' Group West, 1999.
ISBN: 1561582972

Tage Frid Teaches Woodworking 1&2: A Step-By-Step Guidebook to Essential Woodworking Technique, by Tage Frid, Peter Chapman (Editor). Taunton Press, 1994.
ISBN: 1561580686



Setting Up Shop: The Practical Guide to Designing and Building Your Dream Shop, by Sandor Nagyszalanczy. Taunton Press, 2001. ISBN: 1561585556

Wood: Technology and Processes, by John L. Feirer and Mark D. Feirer. McGraw Hill, 2002. ISBN: 007822411X

MAGAZINES

American Woodworker, F&W Publications Inc., ASIN: B00005NION

Fine Woodworking, Taunton Direct, Inc., ASIN: B000063XJH

Popular Woodworking, F&W Publications Inc., ASIN: B00005NION

Woodworkers Journal, Rockler Press, ASIN: B00005N7TN

OTHER PRODUCTS

Woodworking: The Art and the Craft, VHS/DVD, Meridian Education

Woodworking: The Art and the Craft is a 15-part video series that explains and illustrates a variety of common techniques and cuts used in woodworking. While each program includes information on the tools and safety requirements of each task, the focus of the program is to provide specific information on "how to" accomplish each task. The series includes the following titles: *Ripping and Crosscutting; Finishing Techniques; Basic Methods of Measuring and Cutting; Working with Nails and Screws; Planning; Sanding; Methods of Cutting Circles and Curves; Sawing & Shaping; Gluing & Clamping; Creating Biscuit and Dowel Joints; Creating Rabbet Joints; Creating Dado Joints; Creating Miter Joints; Creating Mortise-and-Tenon Joints; Creating Dovetail Joints and Casework.*

Item no: 31970, www.meridianeducation.com, 1-800-727-5507

Careers in Construction Trades, CD-ROM, Shopware

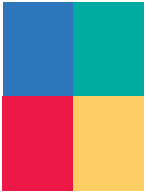
The need for qualified construction workers continues to grow. This interactive CD-ROM guides users through several occupations in the construction industry, including cement masons, bricklayers, plumbers, pipe fitters, carpenters, and electricians. Video interview segments include information on the background of each job, what is expected of the employee, qualifications, subjects in which to enroll, what the job is like, expected wages, and outlook for each job. Interactions and quiz segments appear throughout the program to help reinforce concepts and information. This is the perfect program for those interested in a construction career! Windows only.

Item no: 20434, www.shopware-usa.com, 1-800-257-5126

Carpenters, VHS/DVD, Cambridge Educational

This fast-paced program provides a concise profile of carpenters, looking at educational background, apprenticeships, salary, and the work itself.

Item no: 32261, www.cambridgeeducational.com, 1-800-468-4227



Building Basics: An Interactive Guide to the Fundamentals of Construction, CD-ROM, Shopware

Learn the basics of construction in this exciting and informative CD-ROM. The program covers all aspects of construction, from the initial planning to the steps involved in building both light and heavy constructions. All construction should begin with a good plan—Section One outlines factors to consider during the planning phase, including identifying the purpose of the structure, its form, cost, and types of materials to use. It also introduces various tools used in the construction process and discusses the functions of each. Light construction methods are discussed in Section Two, using homes, small apartment buildings, and offices as examples. Windows only.

Item no: 24232, www.shopware-usa.com, 1-800-257-5126

Building Trades Series, VHS/DVD, Meridian Education

A very comprehensive overview of the many elements needed to build a structure. Each of the ten videos provides a look at a specific construction area and shows the work being performed, while explaining what's involved in the job. Individual titles offer flexibility to cover topics as needed...fits any curriculum requiring general information. The series includes *Blueprints: Planning a Building; Climate Control; Drywalling and Interior Trimming; Electricity; Exterior Walls and Roof Construction; Floor and Wall Construction; Interior Finish Work; Plumbing; Site Preparation; and The Foundation*.

Item no: 24841, www.meridianeducation.com, 1-800-727-5507

Construction Technology, VHS/DVD, Meridian Education

This five-part video series explores the world of construction technology. It provides an overview for elements of project design, site preparation, erecting sub- and superstructures, installing utilities, and enclosing, finishing, and landscaping. Using an entertaining format, the series follows a student in the future who uses his home computer to answer questions on a school project. The series includes *Enclosing, Finishing, and Landscaping Structures; Erecting Substructures and Superstructures; Installing Utilities; Introduction to Construction Technology; and Project Design and Site Preparation*.

Item no: 17674, www.meridianeducation.com, 1-800-727-5507

Introduction to Construction Technology, VHS/DVD, Meridian Education

Covers basic information on construction technology, including a definition of construction, the project design, types of construction, the involvement of architects in the construction process, zoning laws, building codes, local covenants, site preparation, substructure and superstructure, building materials, installation of utilities, enclosing, and finishing.

Item no: 25678, www.meridianeducation.com, 1-800-727-5507

Millwrights, VHS/DVD, Meridian Education

This fast-paced program provides a concise profile of millwrights, looking at educational background, apprenticeships, salary, and the work itself.

Item no: 32270, www.meridianeducation.com, 1-800-727-5507

Residential Carpentry Framing Series, VHS/DVD, Meridian Education

A step-by-step "how-to" series of videos that will show your students how to build. Whether working with floor, wall, ceiling, or roof framing, viewers get a first-hand look at construction procedures, safety issues, and proper tools. A clear explanation of each step provides in-depth information, while viewers watch actual carpenters do the work.

"Notes" are given throughout, offering tips and safety warnings. The series includes *Residential Ceiling Framing*; *Residential Floor Framing*; *Residential Roof Framing*; and *Residential Wall Framing*.

Item no: 26204, www.meridianeducation.com, 1-800-727-5507

Tour of the Trades, VHS/DVD, Meridian Education

The construction industry is big business, involving hundreds of professions and specialty areas. This program offers a fast-paced survey of the skilled construction trades, providing a sense of the diversity of jobs available, as well as comparing the wages of construction trades to other industries. Along with dozens of scenes from construction projects on a variety of scales, apprentices and journeyman workers discuss what they enjoy about their trade and how they got started.

Item no: 32258, www.meridianeducation.com, 1-800-727-5507



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