SHOPWARE

Instructor's Guide

Safety and Technology Series
Woodworking Safety

Introduction

This guide provides information to help you get the most out of the *Woodworking Safety* program of the *Safety and Technology* series. *Woodworking Safety* introduces the most commonly used woodworking tools that require woodworkers to closely adhere to safety procedures, which include wearing the proper apparel and appropriately positioning the body when operating this specialized equipment.

Learning Objectives

After viewing the program, students will be able to:

- Describe the range of accidents/injuries that can occur in a woodworking environment when safety measures/rules are not heeded.
- Identify and describe how to use several common woodworking tools, such as a table saw, radial arm saw, planer, router, lathe, jointer, and belt sander.
- Outline specific safety measures to take when using standard woodworking tools and when working in a woodshop.

Educational Standards

This program content correlates with the following Carpentry Competency Objectives of the National Center for Construction Education and Research (NCCER).

Level One: MODULE 27101-06 — ORIENTATION TO THE TRADE
7. Explain the importance of safety in the construction industry.

MODULE 27103-06 — HAND AND POWER TOOLS
1. Identify the hand tools commonly used by carpenters and describe their uses.
2. Use hand tools in a safe and appropriate manner.
3. State the general safety rules for operating all power tools, regardless of type.
4. State the general rules for properly maintaining all power tools, regardless of type.
5. Identify the portable power tools commonly used by carpenters and describe their uses.
6. Use portable power tools in a safe and appropriate manner.

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This program correlates with the National Science Education Standards National Committee on Science Education Standards and Assessment, National Research Council.

Science as Inquiry
Content Standard A: As a result of activities in grades 9-12, all students should develop:
- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Science and Technology
Content Standard E: As a result of their activities in grades 9-12, all students should develop an understanding of:
- Abilities of technological design
- Understanding about science and technology

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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.
- Standard 7: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

- Standard 8: Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

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.

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.

- Standard 3: Research and Information Fluency. Students apply digital tools to gather, evaluate, and use information.

- Standard 4: Critical Thinking, Problem-Solving & Decision-Making. Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.

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Program Overview

Woodworking can be a fun and very rewarding hobby or profession. However, the technology behind it can be dangerous without proper training and attention. This video summarizes the most critical safety measures woodworkers must observe when using table saws, radial arm saws, planers, routers, lathes, joiners, large belt sanders, and other woodworking technology. The bottom line? Woodworking tools and equipment are very powerful machines that must be understood and respected.

Main Topics

Chapter 1: Introduction
This introductory segment briefly spells out the video's focus on the proper use of common woodworking tools in order to ensure that woodworking is not only enjoyable, but also safe.

Chapter 2: Table Saw Safety
This segment describes how to safely use a table saw, from where someone should stand to safely maneuvering the saw's blade.

Chapter 3: Radial Arm Saw Safety
Here, safety moves to how to carefully use the versatile radial arm saw, with a look at blade positioning and ways to avoid injuries that can result from things like binding and kickback.

Chapter 4: Wood Lathe Safety
Not only do viewers learn how quickly a wood lathe can spin, they also explore how to effectively operate this tool for a fine finished product while guarding against injury.

Chapter 5: Sander Safety
This section features steps to take to make sure that the sander is in good condition before it gets put to work. And then, when it's ready to go, there are tips for what to wear, where to place hands and fingers to avoid injury, and how to position the wood.

Chapter 6: Surface Planer, Joiner, Router Safety
Here, usage and safety descriptions move to the surface planer, joiner, and router, three common woodshop items that can put the woodworker at risk for injury if not used properly.

Chapter 7: General Woodworking Safety
The final segment addresses overall woodworking safety strategies beyond the use of common tools. Among the tips are wearing ear and eye protection and reading labels on wood finishing products.

Fast Facts

- Woodworking tools and equipment are very powerful.
- Loose fitting clothing or jewelry should never be worn while woodworking.
- A dull blade on a table saw will heat and burn the wood while it's being cut.
- Woodworkers should never wear gloves when running a table saw.
- A radial arm saw is one of the most versatile machines in the wood shop.
- Woodworkers should cut against the direction of the bit rotation when using a router.
- A wood lathe can spin the wood piece at speeds up to 4,000 rpm.
- A surface planer and joiner cut a thin layer off the surface of wood pieces.
- Woodworkers should read the operating manual before they use machinery for the first time.

Vocabulary Terms

anti-kickback finger: Standard safety equipment on most new table saws, it is incorporated into the blade guard and prevents the stock from being thrown at the operator by biting into it when kickback occurs.

arbor: A shaft driven by the tool's motor that turns blades or other cutting tools.

binding: This occurs when the workpiece twists in relation to the fence (a result of the blade getting stuck).

blade guard: On a table saw, a plastic or metal shroud that covers the blade to prevent the saw operator from placing his hands in contact with a spinning blade. It also prevents small cutoffs from being thrown toward the front of the table saw and the operator.

chuck: An attachment to hold work or a tool in a machine.

crosscut: To create a cut which runs across the board perpendicular to the grain.

dado: A groove in the face of a board, usually to accept another board at 90 degrees.

fence: A straight guide on a tool, such as a table saw or router table, to keep the material a set parallel distance from the blade or cutter.

gouge: A chisel-like tool with a curved cutting edge.

headstock: The stationary support in a machine or power tool that supports and drives a revolving part, such as a chuck.

joiner: A machine to true the edges of boards, usually in preparation for gluing.

kickback: The dangerous mishap that occurs if a spinning blade or bit catches a workpiece and throws it toward the machine operator.

lathe: A machine for shaping a piece of material, such as wood or metal, by rotating it rapidly along its axis while pressing a fixed cutting or abrading tool against it.

miter gauge: A guide with an adjustable head that fits in a slot and slides across a power tool table to cut material at an angle.

parting tool: A deep, narrow V-ground chisel used in turning to indicate specific diameters at various sections.

pinch point: Any point at which it is possible for a person or part of a person's body to be caught between moving parts of a machine, or between the moving and stationary parts of a machine, or between material and any part of the machine.

rabbet: A groove in the edge or face of a board.

router: A power tool with a shaped cutter, typically used in carpentry for cutting grooves.

surface planer: A machine that is used to dress or plane the surface of a material such as stone, metal, or wood.

tailstock: The movable part of a lathe that supports the dead center.

Pre-Program Discussion Questions

1. What is woodworking? Give examples.
2. What sort of machinery/tools do woodworkers use?
3. What types of dangers might woodworkers experience on the job?
4. What types of safety errors might woodworkers make?
5. If you were a woodworker, how would you protect yourself from potential injury?

Post-Program Discussion Questions

1. What are likely to be the most common accidents in a woodworking shop?
2. Do you think there is an aspect of woodworking that is more dangerous than others? Explain and discuss.
3. Why might woodworkers, even following safety regulations, experience harm while working?
4. How would you ensure the proper use of woodworking machinery among your shop mates?
5. If you were a woodworking shop supervisor, how would you enforce safety regulations?

Student Projects

Woodworking Safety Training
Students work in small groups to create a brief woodworking safety training session for new woodworkers. Each group facilitates for their peers a brief interactive training session. Encourage students to use a variety of techniques (visuals, props, role plays, dramatization, etc.).

A Pictorial View of Woodworking Safety
Students review woodworking safety images on the Internet and then create a poster series that represents the woodworking safety tips presented in the film. The images might be created for workplace safety, a training program, etc. They might also serve as a checklist for woodworkers as they gear up for a job. Have students share their images with the class.

Read the Manual
Students find woodworking safety manuals on the Internet, then create their own manual that includes tips from the film. Have students share their manuals with their peers for review and feedback. They might use this manual in their school woodshop, or offer it as a general woodworking safety resource to local woodworkers, other school shops, etc.

Learning from the Woodworkers
Students can interview community-based woodworkers to learn about woodworking tasks and how these professionals guard against injuries, accidents, etc. Students share their interview findings with the class via mixed media, for example, using a visual presentation such as a PowerPoint slide, or an audio recording of the interviewees accompanied by "how to" charts.

Woodworking Safety Quiz
Instruct students to take the online woodworking safety quiz at www.finewoodworking.com (search on "safety quiz") to see how much they know about the topic. Have them research any topics they are not familiar with. Invite students to create a quiz based on the film topics that trade professionals might take to test their woodworking safety knowledge and skills.

Assessment Questions

Q1: True or False? An important piece of gear when working with a table saw is a set of gloves.

Q2: What causes binding when using a radial arm saw?

a) The blade not resting tightly in the arbor
b) Moving a blade through a short piece of wood
c) The blade moving too quickly
d) Moving the blade through a long piece of wood

Q3: The radial arm saw is best used for _____.

Q4: Which of the following is required when centering wood on a lathe?

a) tailstock
b) chuck key
c) parting tool
d) gouge

Q5: These sander elements can severely damage fingers: _____.

Q6: True or False? A router cuts a thin layer off the surface of wood pieces.

Q7: Which of the following should a woodworker *not* do when using a planer?

a) Stand in front of it
b) Shut it off if the wood jams
c) Run a short piece of wood through it
d) All of the above

Q8: True or False? Woodworkers should cut against the direction of the bit rotation when using a router.

Q9: Loose fitting clothing and _____ can get tangled in blades.

Q10: Name three items (other than appropriate clothing) that woodworkers should wear in the woodshop.

_____
_____
_____

Assessment Questions Answer Key

Q1: True or False? An important piece of gear when working with a table saw is a set of gloves.
A: False
Feedback: A woodworker should never wear gloves when running a table saw. He or she needs to feel the wood as it moves past the blade. A table saw blade cuts through even the thickest leather gloves.

Q2: What causes binding when using a radial arm saw?
a) The blade not resting tightly in the arbor
b) Moving a blade through a short piece of wood
c) The blade moving too quickly
d) Moving the blade through a long piece of wood
A: d
Feedback: To avoid binding and kickback when working with a radial saw arm, a woodworker should support very long pieces that extend off of the worktable. An adjustable stand works well. It can be set to the same height as the radial arm table.

Q3: The radial arm saw is best used for _____.
A: crosscutting
Feedback: A radial arm saw is ideal for crosscutting smaller pieces of wood to length, cutting compound angles, cutting dadoes, and rabbets. It is one of the most versatile machines in the wood shop.

Q4: Which of the following is required when centering wood on a lathe?
a) tailstock
b) chuck key
c) parting tool
d) gouge
A: a
Feedback: A wood piece sitting on a lathe must be properly centered and secured between the headstock and tailstock.

Q5: These sander elements can severely damage fingers: _____
A: pinch points
Feedback: Woodworkers are encouraged to wear thick leather gloves when operating any type of sander. Gloves protect their hands and fingers from painful abrasions when wood sanding. However, even with the gloves, woodworkers should keep their fingers away from the pinch points between the sanding belt and the machine. If pulled into the belt, fingers can be broken and badly cut.

Q6: True or False? A router cuts a thin layer off the surface of wood pieces.
A: False
Feedback: A surface planer and joiner are both designed to cut a thin layer off the surface of wood pieces.

Q7: Which of the following should a woodworker *not* do when using a planer?

a) Stand in front of it
b) Shut it off if the wood jams
c) Run a short piece of wood through it
d) All of the above

A: d

Feedback: Woodworkers should not run a very short piece of wood through a planer. It can cock upward and get caught in the cutter head, flying out of the machine with dangerous force. They should not shut the planer off when a piece of wood jams it. They should adjust the cutter up and away from the wood until the wood starts feeding again. And, they should stand to one side (not in front) of the planer to stay clear of kick-outs.

Q8: True or False? Woodworkers should cut against the direction of the bit rotation when using a router.
A: True
Feedback: When using the router, a woodworker should always cut against the direction of bit rotation. If they cut with bit rotation, the cutter bit will tend to catch and walk uncontrollably down the wood edge, possibly causing damage or injury.

Q9: Loose fitting clothing and _____ can get tangled in blades.
A: jewelry
Feedback: Woodworkers should always wear appropriate clothing when working in the woodshop. They should avoid loose fitting clothing that can get entangled in spinning saw blades. They should button shirtsleeves and tuck their shirts completely into their pants. AND…they should remove all jewelry.

Q10: Name three items (other than appropriate clothing) that woodworkers should wear in the woodshop. _____
A: Possible answers may include: dust respirator, cartridge respirator, plastic gloves, earplugs, earmuffs, ear protection, safety glasses
Feedback: Woodworkers should wear:

- *Safety glasses when operating woodworking power tools and equipment. Blindness or painful eye injuries can result from wood chips, knots, or other debris flying out of the machine if problems occur.*
- *Ear protection (earplugs or earmuffs) when using very loud woodworking equipment, like a planer, joiner, or table router. Many woodworking machines are loud enough to cause permanent ear injury and hearing loss.*
- *Dust respirators when woodworking machines generate wood dust in the air*
- *Cartridge respirators when using finishing chemicals on wood*
- *Plastic gloves when coating with stains, varnishes, and other chemical finishes*

Additional Resources

Fine Woodworking's Guide to Safety
Search on "Woodworking Safety"
www.finewoodworking.com

The Wood Whisperer
http://thewoodwhisperer.com

Top 10 Safety Rules Every Woodworker Should Know
Search on "10 Safety Rules"
http://woodworking.about.com

Woodworker's Central
Click on "Accident Survey"
www.woodworking.org

Woodworking Machinery Industry Association
www.wmia.org

Additional Video Programs from Films Media Group

Available from Films Media Group • www.films.com • 1-800-322-8755

Hand Tools for Woodworking
Even though there are plenty of machines and portable power tools available to undertake most woodworking tasks, there will always be a place for hand tools in the modern workshop. In this program, woodworking enthusiast Stuart Lees shows how to use a variety of saws, planes, and chisels. In the process, he explains how to measure and mark out a project and then safely secure it. (24 minutes) © 2009. Order # 42220

Woodworking Basics
This 4-part series of live-action videos covers the set-up and basic operation of four of the most commonly used stationary woodworking machines: jointer, drill press, radial arm saw, and table saw. Each comprehensive program begins with a brief segment covering safety procedures and guidelines, proper conduct and behavior, and the importance of a clean work area that are applicable to all

woodshop environments. Close-ups, on-screen graphics, and step-by-step procedures give viewers detailed instruction concerning proper usage of safety guards, accessories, and other complementary tools. These programs help introduce novice workers to basic woodshop techniques and are ideal for helping instructors provide new students with an understanding of each machine and its capabilities. Highly recommended for agricultural, building construction, and facilities maintenance students. A Cambridge Educational Production. (20 minutes each) © 1994. Order # 14477

Woodworking Poster Set
Which saw should I use? What's a dovetail joint look like? What's the trick to getting hinges to work right? Let these eye-catching posters show your students how to use the tools of the trade as they hone their carpentry skills! A Shopware Product.
• Saws and Saw Cuts
• Decorative Edges and Surfaces
• Cylinders
• Planing and Chiseling
• Hinges
• Rabbet and Dado Joints
• Lap Joints
• Miter Joints
• Mortise and Tenon Joints
• Dovetail Joints
Ten 17" x 32" laminated posters. © 2004. Order # 36951

Woodworking: The Art and the Craft
Imagine having a master craftsman as a teacher's aide, always ready to talk to your class or to tutor one-on-one. That's what this 15-part series is like! Each video focuses on essential techniques students must master to skillfully complete a wide range of projects. And because safety's always job one, background on the careful and appropriate use of the hand and power tools involved is also included. Viewable/printable instructor's guides are available online. A Shopware Production. (9-17 minutes each) © 2004. Order # 31970

Woodworking Tools
Show your students the safe way to run them all with this no-nonsense 16-part series. Used as an introduction or as a refresher, each video demonstrates correct operation and maintenance. Changing blades, cutters, bits, and other parts is also illustrated, where applicable. Increase the value of your woodshop video library with *Woodworking Tools.* Viewable/printable instructor's guides are available online. A Shopware Production. (12-22 minutes each) © 2006. Order # 35529