

**Unit:** Power Tools

**Title:** Cutting and Shaping Power Tools

**Skill(s) and Knowledge:** Students will be able to: identify the circular saw, miter saw, saber saw, and router; the accessories and the use and maintenance of each. Students will gain knowledge on why power tools are important and what safety measures must be followed.

**Tasks:** Lead-up exercises for each tool, pages: 97-121.

**Performance objective:** To become familiar with each saw and router by completing the lead up exercises and practicing using the tools and discussing with their peers.

**Tools, supplies and reference materials:**

Circular saw --1 x 6 x 8', clamps, speed square, combination square, pencil, tape measure.

Miter saw--1 x 6 x 8', clamps, speed square, combination square, pencil, tape measure.

Saber saw--replacement blades, tools required for blade change on your particular model, square, pencil, template for cutting curves, 1 x 6 x 16" or larger board.

Router--wrenches and collets for your model router, Bits-- $\frac{3}{4}$ " straight cutting and  $\frac{3}{8}$ " round-over with bearing guide, 1 x 10 x 16", 1 x 6 x 4', clamps, Straight edge jig for dados and rabbets.

Other items- PPE, extension cords, Career Connection Book 1 Chapter 4 pages: 87-121.

**Methods of instruction:** Demonstration on how to identify and use and maintenance of each tool, lecture on safe work habits and respect for tools, reference to the Career Connections Book 1 Chapter 4, and hands-on practice with each tool. Try to have enough tools for each student or small group of students. Depending on the tool quantities in your shop, you could dedicate a station to each tool and then students could be divided into small groups and rotate through each station.

**Estimated time:** 4 hrs. **Number of students:** 10-15

**Task analysis or activities:** Students will work in small groups at shop tables, with all the previously mentioned power tools, working together to complete all the lead-up exercises and helping each other as they progress at their own pace.

**Evaluation:** Students will be graded on their use of time, safety methods, quality of work, cleaning and organization of their work area, interaction with other students, and vocational employability skills grading rubric. Manipulative skills assessments and written evaluations on the power tools should be implemented by the instructor to be sure the student can operate the tool safely and with confidence.

**Performance Notes:**

**Vocational Frameworks References**

- 2.F.01.01 Demonstrate the use and maintenance of a portable circular saw.
- 2.F.01.02 Demonstrate the use and maintenance of a portable power miter box.
- 2.F.01.04 Demonstrate the use and maintenance of reciprocating saws.
- 2.F.03.01 Demonstrate the use and maintenance of a portable router.

**English/Strand 3 Frameworks References:**

RST Grades 9-10 #4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases in a technical context.

**Frameworks References: Math**

G-CO12 Make formal geometric constructions with a variety of tools and methods.

**Common Core References:**

Read and listen critically for information understanding and enjoyment  
Set goals and achieve them by organizing time, workspace, and resources effectively  
Work both independently and in groups

**SCANS references:****Foundation Skills:**

1. Basic skills— reading, writing, mathematics, speaking, and listening.
2. Thinking Skills-- thinking creatively, making decisions, solving problems, visualizing, knowing how to learn, and reasoning
3. Personal qualities--individual responsibility, self-esteem, sociability, self management, and integrity

**Work Place Competencies**

1. Resources--allocating time, money, material, space, and staff.
2. Interpersonal skills--working in teams, teaching others, serving customers, leading negotiating, and working well with culturally diverse populations.
3. Information--acquiring and evaluating data, organizing and maintaining files, interpreting & communicating, and using computer to process information
4. Systems--understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems.
5. Technology--selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies

**CAREER CONNECTIONS: PROJECT BOOK 1**

**Lesson Plan:** Chapter 4, Power Tools for Cutting and Shaping

**Time Required:** Three to five 50-minute class periods (five class periods are outlined below; alternatively, present the information on each tool and check out students using the Tool Safety and Operation Checklist when students need to use the tool for a project)

**Goal:**

To demonstrate the purpose and proper use of common power tools.

**Objectives:**

At the end of this chapter, students should be able to:

1. Classify the basic types of power tools used in carpentry.
2. Recognize the potential hazards and outline the safety rules associated with power tools.
3. Identify the purpose of and show how to use a portable circular saw.
4. Identify the purpose of and show how to use a power miter saw.
5. Identify the purpose of and show how to use a saber saw.
6. Identify the purpose of and show how to use a router.

**Instruction and Assessment:**

The following provides a summary of steps for instruction and assessment.

**Teach**

<b>Minutes</b>	<b>Activity</b>
Class Period 1	
5	<i>Chapter 4 Introduction</i> Review the lesson goal and objectives with students.
10	<i>Section 1</i> Provide a classroom introduction to the kinds of power tools used for cutting and shaping. Discuss the need for proper training and use of PPE.
10	<i>Section 2</i> Discuss the hazards associated with power tools and the importance of following general safety rules.
10	<i>Section 3</i> Introduce the portable circular saw. Describe its uses and parts. Discuss the list of safety rules for this tool.
15	<i>Activity</i> Have students perform the following procedures (making sure they have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Changing a Portable Circular Saw Blade</li> </ul>

	<ul style="list-style-type: none"> <li>● Setting the Depth of a Portable Circular Saw Cut</li> </ul>
Class Period 2	
5	<p><i>Review</i></p> <p>Review chapter content previously taught about the portable circular saw.</p>
45	<p><i>Activity</i></p> <p>Have students continue practice on the circular saw by performing the following procedures (making sure they have the necessary tools and materials):</p> <ul style="list-style-type: none"> <li>● Making a Square Cross Cut with a Portable Circular Saw</li> <li>● Making a Rip Cut with a Portable Circular Saw</li> <li>● Cutting a Miter with a Portable Circular Saw</li> <li>● Making a Bevel Cut with a Portable Circular Saw</li> <li>● Making a Compound Miter Cut with a Portable Circular Saw</li> </ul>
Class Period 3	
5	<p><i>Review</i></p> <p>Review chapter content previously taught.</p>
10	<p><i>Section 4</i></p> <p>Introduce the power miter saw. Describe the types of cuts it makes and review the list of safety precautions.</p>
35	<p><i>Activity</i></p> <p>Have students perform the following procedures (making sure they have the necessary tools and materials):</p> <ul style="list-style-type: none"> <li>● Making a Slide Cut with a Sliding Compound Miter Saw</li> <li>● Making a Chop Cut with a Sliding Compound Miter Saw</li> <li>● Making a Miter Cut with a Sliding Compound Miter Saw</li> <li>● Making a Bevel Cut with a Sliding Compound Miter Saw</li> <li>● Making a Compound Cut with a Sliding Compound Miter Saw</li> </ul>
Class Period 4	
5	<p><i>Review</i></p> <p>Review chapter content previously taught.</p>
10	<p><i>Section 5</i></p> <p>Introduce the saber saw. Explain why and how it is used. Discuss saber saw safety.</p>
35	<p><i>Activity</i></p> <p>Have students perform the following procedures (making sure they have the necessary tools and materials):</p> <ul style="list-style-type: none"> <li>● Changing a Saber Saw Blade</li> <li>● Using a Saber Saw</li> </ul>
Class Period 5	
5	<p><i>Review</i></p> <p>Review chapter content previously taught.</p>

10	<p><i>Section 6</i></p> <p>Introduce the router. Describe router parts and discuss router safety precautions. Explain how to control a router.</p>
30	<p><i>Activity</i></p> <p>Have students perform the following procedures (making sure they have the necessary tools and materials):</p> <ul style="list-style-type: none"> <li>● Installing or Changing Router Bits</li> <li>● Setting and Testing the Depth of a Router Cut</li> <li>● Making a Router Cut</li> <li>● Cutting Rabbets with a Router</li> <li>● Cutting a Dado with a Router</li> </ul>
5	<p><i>Chapter Review</i></p> <p>Answer any questions students have about this chapter.</p> <p>Ask students to review Chapter 5 for the next class.</p>

### Assess

<b>Assessment Activity</b>	<b>Assessment Method and Criteria</b>
Procedures	Use the Tool Safety and Operation Checklist to score student competency. Monitor students for safe and accurate results.