

**Unit:** Hand Tools

**Title:** Measuring, Marking and Layout Tools

**Skill(s) and Knowledge:** Students will be able to: identify measuring and marking tools, describe the use and maintenance of each. Students will gain knowledge on why tools are important.

**Tasks:** Lead-up exercises for each tool, pages: 31-52.

**Performance objective:** To become familiar with each measuring, marking and layout tools by completing the lead up exercises and practicing using the tools and discussing with their peers.

**Tools, supplies and reference materials:**

Hand Tools: Tape measure, Combination square, speed square, compass, protractor, sliding T-bevel, Framing square, straight edge and chalk line. Career Connections Project Book 1 pages: 26-55. (Enough for each student or small group)

**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, and hands-on practice with each tool.

**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 measuring 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.

**Performance Notes:**

**Vocational Frameworks References**

- 2.E.01.01 Demonstrate use and maintenance of layout, marking, and measuring tools.
- 2.D.05.03 Check for square.
- 2.D.04.01 Read a tape measure to 1/16th of an inch

**English/Strand 3 Frameworks References:**

RST Grades 9-10 #4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a technical context relevant to grades 9-10 texts and topics.

**Frameworks References: Math**

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

**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 2, Measuring, Marking, and Layout Tools

**Time Required:** Five to ten 50-minute class periods (ten class periods are outlined below; the number of class periods depends on students' math skills)

**Goal:**

To demonstrate the proper use of measuring, marking, and layout tools.

**Objectives:**

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

1. Recognize the need to show respect for tools.
2. Explain the process of measuring, marking, and layout.
3. Identify and demonstrate the uses of a retractable tape measure.
4. Identify and demonstrate the uses of a combination square.
5. Identify and demonstrate the uses of a speed square.
6. Identify and demonstrate the uses of a compass.
7. Identify and demonstrate the uses of a protractor.
8. Identify and demonstrate the uses of a sliding T-bevel.
9. Identify and demonstrate the uses of a framing square.
10. Identify and demonstrate the uses of a straightedge and a chalk box.

**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 2 Introduction</i> Review the lesson goal and objectives with students.
45	<i>Section 1</i> Discuss the importance of showing respect for tools. Provide an overview of what tools are and the importance of tool care and tool safety. Provide an overview of the many types of tools used by carpenters.
Class Period 2	
5	<i>Review</i> Review chapter content previously taught.
45	<i>Section 2</i> Discuss how a project starts by using tools for measuring, marking, and layout. Explain linear measurements. Show how measuring tools are marked. If necessary, use <i>Math for the Trades</i> , the CITF technical math manual on the Resource CD to help students with deficient math skills.
Class Period 3	

5	<i>Review</i> Review chapter content previously taught.
45	<i>Section 3</i> Introduce the retractable tape measure. Explain the markings on the tape measure. Describe how this tool is used to measure inside and outside measurements. Demonstrate how to determine the outside dimensions of an object. Demonstrate measuring a given distance. Show how to determine inner dimensions by reading the curve and by using the case method. Demonstrate proper handling and care of a retractable tape measure. Have students practice on objects in the classroom or the shop area.
Class Period 4	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 4</i> Introduce the combination square. Explain why and how it is used.
35	<i>Activity</i> Have students perform the following procedures (making sure students have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Checking a Combination Square for Accuracy</li> <li>● Using a Combination Square to Check 90° Angles</li> <li>● Using a Combination Square to Lay Out a 45° Angle</li> <li>● Using a Combination Square to Lay Out a Parallel Line</li> </ul>
Class Period 5	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 5</i> Introduce the speed square. Explain why and how it is used.
35	<i>Activity</i> Have students perform the following procedures (making sure students have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Using a Speed Square to Check for Square</li> <li>● Using a Speed Square to Lay Out a 45° Angle</li> <li>● Using a Speed Square to Lay Out a 22 ½° Angle</li> </ul>
Class Period 6	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 6</i> Introduce the compass. Explain why and how it is used.
35	<i>Activity</i> Have students perform the following procedures (making sure students have the

	necessary tools and materials): <ul style="list-style-type: none"> <li>● Using a Compass to Draw a Circle</li> <li>● Using a Compass to Form an Arc</li> <li>● Using a Compass to Form Two Identical Arcs</li> </ul>
Class Period 7	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 7</i> Introduce the protractor. Explain why and how it is used.
35	<i>Activity</i> Have students perform the following procedure (making sure they have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Using a Protractor to Read Angles</li> </ul>
Class Period 8	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 8</i> Introduce the sliding T-bevel. Explain why and how it is used.
35	<i>Activity</i> Have students perform the following procedure (making sure they have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Setting the Angle of a Sliding T-Bevel Using a Protractor</li> </ul>
Class Period 9	
5	<i>Review</i> Review chapter content previously taught.
15	<i>Section 9</i> Introduce the framing square. Explain why and how it is used.
30	<i>Activity</i> Have students perform the following procedure (making sure they have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Checking a Framing Square for Accuracy</li> </ul>
Class Period 10	
5	<i>Review</i> Review chapter content previously taught.
10	<i>Section 10</i> Introduce the uses of a straightedge and a chalk box.
20	<i>Activity</i> Have students work in pairs to perform the following procedure (making sure they have the necessary tools and materials): <ul style="list-style-type: none"> <li>● Using a Chalk Box to Create a Straight Line</li> </ul>
15	<i>Chapter Check</i>

	Allow students to complete answers to the questions. Ask students to review Chapter 3 for the next class.
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**Assess**

<b>Assessment Activity</b>	<b>Assessment Method and Criteria</b>
Chapter Check questions	1 point for each correct answer