

Math-in-CTE Lesson Plan Template

Lesson Title: Use of hand tools		Lesson # C05
Author(s):	Phone Number(s):	E-mail Address(es):
Patrick Lessard	207 667 9729	plessard@rsu24.org
Kathleen Knight	207 422 3150	kknight@rsu24.org
Occupational Area: Carpentry		
CTE Concept(s): Hand tools		
Math Concepts: Primary: Direct Variation, Secondary: Reasoning, Problem solving, & measurements.		
Lesson Objective:	Address safety concerns (how to use hand tools safely), Identify common hand tools used in industry, correct uses for each, How to maintain tools in proper working condition.	
Supplies Needed:	Hand tools, various fasteners, wood, work sheets	

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
<p>1. Introduce the CTE lesson.</p> <p>Hand Tool Unit #5</p> <p>Today we will be talking about the proper use, how to maintain, and safety concerns involved with hand tools.</p> <p>Student poll. "How many of you have worked in the building trades?" "What kind of tools have you used?"</p> <p>Stress importance of learning hand tools as "building a solid foundation" for their carp. Skills.</p>	<p>Hand Tool Unit #5</p> <p>Call on individual students, for responses.</p> <p>Variety of hand tools displayed on lab bench.</p>

<p>2. Assess students' math awareness as it relates to the CTE lesson.</p> <p>1.) Ask students to demonstrate driving a nail. Ask why they do it that way.</p> <p>2.) Anyone know why a framing hammer is heavier and longer than a hammer used for finish nailing.</p> <p>3.) Ask students to use a tape measure to determine the length of 3 separate boards.</p> <p>Does anybody know any of these terms:</p> <ul style="list-style-type: none"> A) LEVERAGE B) FORCE C) CENTER OF MASS <p>Review Vocab.</p> <p>Pass out hand out #1</p> <p>Activity handout #1 page 2</p>	<p>Variety of hand tools displayed on lab bench.</p> <p>1.) Look for proper hand placement on hammer. If student does it incorrectly, ask them to try it again the correct way, compare results.</p> <p>2.) To maximize nail driving power in relation to effort you put in.</p> <p>3.) Checking students competency using a tape.</p> <p>A) Leverage-used with fulcrum to maximize mechanical force.</p> <p>B) Force-Any influence that causes a free body to accelerate.</p> <p>C) Center of Mass-Point where lines of balance intersect.</p> <p>Power Point slides 1-7 & handout 1</p>

<p>3. Work through the math example <i>embedded</i> in the CTE lesson.</p> <p>-Using an appropriate, and well maintained tool is important.</p> <p>1) Ask students for reasons why.</p> <p>2) Why do we use certain tools for certain jobs?</p> <p>3) Why is it important to be able to measure accurately?</p> <p>Activity on page 2 of handout 1</p> <p>Pass out Handout #2 Activity</p>	<p>1) Using the wrong or improperly maintained tool can be dangerous and costly.</p> <p>2) Using the correct tool is safer and more effective.</p> <p>See teachers copy for answers hand out 1</p> <p>Work through handout#2 page 1 with students</p> <p>Also view slides 8-9 on Power point.</p>
<p>4. Work through <i>related, contextual</i> math-in-CTE examples.</p> <p>Remember when we talked about using a crowbar.</p> <p>Why is it easier to pull nails using a crowbar rather then a normal 16oz. claw hammer</p> <p>Pass out Handout#3</p>	<p>See how many students hit on key words and concepts discussed earlier in the lesson.</p> <p>$W = F \times D$</p> <p>Center of Mass</p> <p>Literacy strategy: Students will alternate in reading the handout aloud.</p> <p>See teachers copy for answers to Hand out#3</p> <p>Power Point slides 10-13</p>

<p>5. Work through <i>traditional math</i> examples.</p> <p>We have talked about problem solving and how some times you will need to figure things out without having all the information.</p> <p>For example: A lazy Mason on the job site has left a pallet of brick in the way of your staging. You take out you tape measure and find that the shortest possible path you can move the stone and get the staging out is 25 ft. You can put about 285 lbs of force on the stone. How much work will you have to do?</p> <p>(Remember $W = F * D$)</p> <p>Use this same method of plugging in (substitution) things you know into an EQUATION to help you solve for the answer.</p> <p>Pass out Handout #4</p>	<p>$F = 285\text{lbs}$</p> <p>$D = 25\text{ft}$</p> <p>$W = 285 * 25$</p> <p>$W = 7,125\text{ft-lbs}$</p> <p>Review handout #4</p> <p>Refer to teacher's copy for answers.</p> <p>Power Point slides 14-15</p>
<p>6. Students demonstrate their understanding.</p> <p>Students will:</p> <p>A) List seven tools and their uses.</p> <p>B) Explain the advantage of different shapes and sizes of tools.</p> <p>Why is it important for carpenters to know hand tool uses and how they function.</p>	<p>A) Evaluate individual student answers for tools.</p> <p>B) The shape and size of the tool is designed in order to maximize the efficiency and effectiveness of the tool.</p> <p>-Knowledge base-</p> <p>-They work anywhere-</p> <p>-How to use them to maximum effect saves time and money-</p>

<p>7. Formal assessment.</p> <p>Students will be given scrap wood (Hard & Soft) and nails of various sizes and be asked to drive the nails into the material leaving approximately 1/4 " of the nail exposed, using the appropriate hammer.</p> <p>Next the students will choose from several different tools to remove the nails.</p>	<p>Students will be assessed on students choosing the correct tools.</p> <p>Teacher will also check that nail depth is not greater the 1/4".</p>

NOTES: