

Math-in-CTE Lesson Plan Template

Lesson Title: Material Estimation, Ordering and Usage		Lesson # 2
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Occupational Area: Building Trades		
CTE Concept(s): Proper amount of material (to little\much) accounting for waste and mistakes		
Math Concepts: Percentages		
Lesson Objective:	To order material without under or over ordering	
Supplies Needed:	Pencil, paper, calculator, blue prints or area measurements for material application, prices for materials	

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
<p>1. Introduce the CTE lesson.</p> <p>Lesson will occur early in September and be reinforced through remainder of the school year.</p> <p>This lesson will cover different aspects when ordering building materials, In construction we need to include extra material for waste and or damage during and after installation and bracing when framing.</p> <p>This lesson will stress importance of placement of the decimal point. The hand out shows the big difference of the amount or value upon where the decimal point is placed.</p> <p>A friend of mine had an employee that miss read a note and ordered 100% of the number of studs for bracing walls in stead of 10% which is what the foreman wanted.</p>	<p>Lesson will build on future cost estimation of projects.</p> <p>Write examples on board of 5.00%, 50.0%, 500%, and .500%,</p> <p>Share example of contractor that ordered 100% instead of 10%, extra studs for bracing.</p> <p>Show picture of shed project</p>

<p>Here is a picture of a shed we will be building</p> <p>Here are a couple math terms we will be talking about today</p> <p>Percent- Of or out of one hundred, 8% is 8 of 100</p> <p>Decimal – Part of a number represented by digits to the right of a point, called a decimal point. For example in the number 1.25, .25 is the decimal part of the number.</p> <p>%- The symbol for percentage</p>	
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2. Assess students' math awareness as it relates to the CTE lesson.

Why do you need to order 15% more stud material? (Bracing)

What does 15% look like? (Is it doubling the order?)

Remember the extra bracing because the person just did not know.

Work through these examples.

Pass out scrap paper

Show picture of a braced wall and talk about how it is extra material that might not be part of the final building.

Put these examples on the board

1. If we need 20 2x4's for a job. How many should you order if you need 15% extra for bracing?

$$\text{Ans: } 20 + 20(.15) = 23$$

2. Ho much bracing is necessary if a job calls for 100 wall studs?

$$\text{Ans: } 100(.15) = 15$$

3. Work through the math example *embedded* in the CTE lesson.

We are talking about our shed project.

You are going to work in groups to come up with an estimate of the number of 2x4 you will need for the framing and bracing on the part of the shed I assign to your group.

Group 1 will work on 2 walls.

Group 2 will work on 2 walls.

Group 3 will work on the floor.

How many 2x4's will you need for framing and bracing?

How much will it cost including sales tax?

Work through this example to show them how their final assignment will look

Use these numbers as a fake example to show them how to do it.

31 2x4's How many will I need total including bracing, and how much will it cost if they cost \$2.90 each

Answer: $31 + (31)(.15) = 35.65$ 2x4's

Talk about the fact that you can't buy part of a 2x4 so you'll always have to round up when ordering.

$$36 \text{ 2x4's} * \$2.90 = \$104.40$$

Total cost including sales tax (5%)

$$\$104.40 + (104.40 * 0.05) = \$109.62$$

4. Work through *related, contextual* math-in-CTE examples.

Where else do we see **percentages** come into play?

Percent Discount: I can buy Styrofoam at Store #1 for \$19.00 per sheet, or I can buy the same Styrofoam at store #2 for \$20.00 per sheet with a 10% discount. Which store will give me the best price

Sales Tax: I assume you will all want to buy a truck someday. If your truck costs \$30,000. How much will you actually have to finance when you include sales tax?

Answer: Store #2 will cost \$18.00 per sheet.

Answer: $\$30,000 + (.05)(\$30,000)$
 $= \$30,000 + 1500$
 $= \$31,500$

5. Work through *traditional math* examples.

A percentage is another way of expressing a fraction or a decimal

Percentages are written with the percent symbol

25 percent is written as 25%

An equivalent way to write this is 0.25

Another equivalent way to write this is 25/100

To calculate the percentage of a number you multiply the decimal equivalent of the percentage by the number.

Here are a couple of examples:

What is 25% of 200?

250 is 50% of what number?

Has anyone noticed that the unknown is in different spots in our equation. The wording will give us clues as to where the numbers go.

Here is a formula for calculating percentage problems.

(% in decimal form) * (number next to of) = (number next to is)

Talk about percent formula and work through example on first page.

Answer: $0.25 * 200 = ?$
 $= 50$

Answer: $0.5 * (\text{number}) = 250$

Number = 500

You would use algebra to solve for the number and divide 250 by 0.5 to get 500

11 Here are some practice problems that you might see in your math class. Pass handout #1.

<p>6. Students demonstrate their understanding.</p> <p>Here is an example that you might see on a job.</p> <p>You are installing hardwood flooring that you buy in bundles. We must figure extra material when installing wood flooring for waste (Joints must stagger).</p> <p>Find the total amount of flooring material needed for job.</p> <p>Find the total number of bundles we have to buy, and find the find the total cost</p>	<p>Have Students do estimate for hardwood flooring example with 5 percent extra for waste.</p> <p>Have students figure cost of floor with.</p> <p>Have students figure how many boxes of flooring needed.</p> <p>Educate of possibility on manufacturing trend that replacement material may not be available for future repairs. (Order extra for replacement)</p> <p>Pass out Hardwood Flooring Problem</p>
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7. Formal assessment.

You are going to pass these in for a grade.

Completed materials list for the shed project with accurate calculations.

You must show that sales tax is part of materials cost.

Turn in completed percentage worksheet.

Grade according to teacher's grading procedures

