Math-in-CTE Lesson Plan

Lesson Title: Estimating gypsum board (drywall) (1205)	Lesson Number: 49

Occupational Area: Carpentry and Building Construction
CTE Concept(s):   Determine number of sheets of gypsum board for a given room
Math Concepts: Formula for finding area; computation

Lesson Objective:	Students will estimate the number of sheets of gypsum board for a given room to cover the walls and ceiling using the Area formula.
Supplies Needed:	Worksheet; calculator

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
1. Introduce the CTE lesson. *Now it's time to cover all the framing mistakes, insulation and graffiti with gypsum board.* *Ask: Why do we need to figure how many sheets of gypsum we need? Why can't we just guess and order more so we have enough?* *The cost of the gypsum is included in the price of the job, so an accurate number of sheets mean more profit for you.* *Ask: How do you think we can determine how many sheets we need?*	Students will reply with many different answers, some may even have the correct answer. Find the area of the walls and ceiling then divide by the area of one sheet to find the number of sheets to complete the job. Remember gypsum comes in many sizes but we will only be using 4 x 8 and 4 x 12 sheets.
2. Assess students' math awareness as it relates to the CTE lesson. *Ask: What do we mean by area?* *Ask: What is the formula for finding area?* *What do we need to find the area?* *Once we find the area of the wall and/or ceiling we need to divide it by*	Area is a surface measurement without any thickness. Area = $L \times W$ You need the length and the height of each wall and the length and width of the ceiling.

the area of one sheet of gypsum.	Area (4 x 8 sheet) = 32 sq. ft.
It's a good idea to start with a 4 x 12 sheet then take the remainder and divide by the area of a 4 x 8 sheet.	Area (4 x 12 sheet) = 48 sq. ft.
You can use different sizes on a wall to get the most out of your material. *Remember to use the sheets that give you the least number of joints.*	Number of sheets = $\dfrac{lxw}{48}$
3. Work through the math example *embedded* in the CTE lesson. *Let's say our wall is 16' x 8'. How many sheet of gypsum do you need to cover one wall?* *Let's try another wall 18' 3" x 7' 9".*	$A = l \times w = 16 \times 8 = 128$ sq. ft. Number of sheets = $\dfrac{A}{48} = \dfrac{128}{48} = 2.66$ (12' sheets) Or: $\dfrac{128}{32} = 4$ (8' sheets) $A = l \times w = 18.25 \times 7.75 = 141.44$ sq. ft. (remember you must change all inches to feet before you can use the formula) Number of sheets $= \dfrac{A}{48} = \dfrac{141.44}{48} = 2.9$ (12'sheets) (when this close to a full sheet round up to next number. Your answer should be 3 sheets) Or: $\dfrac{141.44}{32} = 4.5$ (8' sheets)

4. Work through *related, contextual* math-in-CTE examples. Find the number of 12' sheets needed for a room 8' x 10' with 8' ceilings. What if we wanted to use 8' sheets?	A (8' wall) = 8 x 8 = 64 sq. ft. x 2 = 128 sq. ft. (2 walls in a room will be the same size) A (10' wall) = 8 x 10 = 80 sq. ft. x 2 = 160 sq. ft. A (ceiling) = 8 x 10 = 80 sq. ft. Total area of walls = 288 sq. ft. Number of 12' sheets = $\dfrac{288}{48}$ = 6 sheets for the walls Number of 12'sheets for ceiling = $\dfrac{80}{48}$ = 1.66 sheets Total 12' sheets for room = 8 (you can't buy parts of a sheet so you have to round up) The area is still the same only now we divide by the area of a 4 x 8 sheet which is 32 sq. ft. Number of 8' sheets for walls = $\dfrac{288}{32}$ = 9 sheets Number of 8' sheets for ceiling = $\dfrac{80}{32}$ = 2.5 sheets Total 8' sheets for room = 12

5. Work through *traditional math* examples. Let's do some other practice problems using the Area formula. How many sq. feet of turf is needed to sod a yard 80' x 110' 6". What if we need a tarp to cover a picnic table 5' x 8'?	$A = l \times w$ = 80 x 110.5 = 8840 sq. ft. (remember to convert inches to feet) $A = l \times w$ = 5 x 8 = 40 sq. ft. tarp
6. Students demonstrate their understanding. Have students discuss the procedure for finding the number of sheets of gypsum for any room.	Have students one by one go to the board and list the steps for completing the project. Have another student explain each step as it is written on the board.
7. Formal assessment. Give students a blueprint and assign a room to them. Have them determine how many sheets are needed to cover the walls and what size sheet would work best.	Answers must be within the 10% waste limit.

Adaptations for special needs students.   **Teacher Notes:**

Break down procedure into smaller steps. Have students explain how they arrived at their answer. Have worksheets for students to do and if necessary get help from learning support staff.	Review basic math with students

Math Standards and Assessment Anchors addressed with this lesson.

M.11.B.2.2.1; M 11.B.2.3

References.

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PRACTICE PROBLEMS for FINDING AREA

Instructions: find the area of the rectangles using the following measurements

 1. *l= 23'; w= 25'*

 2. *l=19'; w= 14'*

 3. *l= 12' 6"; w=16' 8"*

 4. *l=9'4"; w= 13' 9"*

 5. *l=124'; w = 58'3"*

Questions 6 – 10 Instructions: Divide the area found in each of the above problems by 48 sq. ft.