

WAMC Lab Template

Math Concept(s): Measuring lengths and calculating area

Source / Text:

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Short Description (Be sure to include where in your instruction this lab takes place):

Beginning in the classroom space of the construction shop, teacher will prepare materials for student use. Teacher will review use of the tape measure, how to calculate area, and provide important information like the difference between 5/8" and 1/2" rock and how to calculate the square footage of a sheet of drywall. Then, students will work in groups to accomplish the lab. Each student will measure the wall and ceiling square footage of one of three rooms adjacent to the classroom (storage closet, room 301, and the classroom). Then students will return to the classroom to complete the drywall order list to be submitted by the end of class.

Lab Plan

Lab Title: Drywall order

Prerequisite skills: Using tape measure to accurately determine distance
Understanding how to calculate area

Lab objective: Students will perform measurements in indoor spaces to calculate the square area of the walls and ceiling to prepare a drywall order.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standards for Mathematical Practice:

- Attend to precision

Technology

- Develop skills to use technology effectively

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- | | | |
|---|---|---|
| <input type="checkbox"/> Global Awareness | <input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy | <input type="checkbox"/> Civic Literacy |
| <input type="checkbox"/> Health/Safety Literacy | <input type="checkbox"/> Environmental Literacy | |

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- One tape measure for each student
- Three open room spaces
- Pen/pencil and paper
- Calculator or phone with calculator for each group

Each lab group will need the following:

- Three tape measures
- A calculator or may use calculator application on their phone
- Pen/Pencil
- Paper

Set-Up Required:

- Clear access to the walls in three differently sized rooms
- Assemble items and arrange on front table to distribute to students
- Prepare correct answers for total drywall order broken down by room (walls and ceilings separately)

Lab Organization Strategies:

- By working in groups with divided tasks, students will need to collaborate to accomplish the work of the lab. Each group will need to communicate effectively to make judgements and decisions such as how much extra material to order. Decisions as to which group member will do which part will need to be made and then students will need to accomplish their individual tasks independently. To finish the lab, the measurements from each student will need to be shared with their group members so each student is responsible for the success of others.

Formative Assessment:

Interact with each group to ensure they understand the task at the beginning of lab work time. Check with individuals to support accurate measurement and understanding of how to effectively use the tape measure. Then, check-in with groups to make sure they develop a plan to complete the drywall order list due at the end of the lab.

Cooperative Learning:

- Each student will work in a group of three students to accomplish the lab.
- Each student will be required to measure one of the three spaces and then will share information with their group members.
- Groups will make decisions together

Expectations:

- Each student will use a tape measure to measure the length of each wall and ceiling height in a different space than the other students in their group. Then, students will work in their groups to calculate the total area of each room's walls and the area of the ceiling (separately from the walls). Then, students will divide the total square area by 32

(4x8 drywall = 32 square feet) and add 10% (for waste) to determine a total number of 1/2" drywall sheets need to hanging all the walls and 5/8" drywall sheets needed for hanging the ceilings.

Timeline:

- This lab will require 10 minutes of instruction including how to use a tape measure to determine ceiling height (bending the tape trick), how to calculate area, and basic information about putting together an
- The lab can be completed with a single 50-minute class period.
- Each group will submit a drywall order list at the end of class that will serve as their **summative assessment**.

Post Lab Follow-Up/Conclusions:

- Review student drywall lists to determine if they have accomplished the task successful within reasonable margins
- Discuss with students how these skills would be applied to prepare material orders with different sheet goods
- Discuss the costs of over and under purchasing on job sites where profit is important

Useful link:

<https://www.thespruce.com/how-to-estimate-drywall-step-by-step-tutorial-844379>

<https://wa-appliedmath.org/>

Things you gotta know...

- 1) We will be covering every surface of the room with drywall except the floor.
- 2) The ceiling will get hung with 5/8" drywall (AKA rock) which we purchase in 4' x 8' sheets
- 3) All vertical surfaces will get hung with 1/2" rock which we purchase in 4' x 12' sheets
- 4) Plan for 12 percent waste (add 12% to the order)
- 5) You need to prepare a list that includes
 - a) The total number of 5/8" sheets of rock
 - b) The total number of 1/2" sheets of rock
 - c) If you finish early, you can calculate outside corner bead (how many 10' sticks)

What I got...

Walls – 2 @ 57' x 12', 2 @ 25' x 12'

= 1968 square feet

= 41 sheets (when divided by 48 square feet)

+ 5 sheets (12% of 41 = 4.92 sheets)

=46 total sheets of ½" 4' x 12' rock

Ceiling – 25' x 57' = 1425 square feet

=44.53 sheets (when divided by 32 square feet)

+5.34 (12% of 44.53 sheets)

=50 total sheets of 5/8" 4' x 8' rock