WAMC Lab
Math Concept(s): Area, Surface Area, Rounding, Estimating
Source / n/a
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Attach the following documents:

- Lab Instructions/Student Hand out

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

Students will take measurements of objects/locations in the school and calculate the area and surface area of the two and three dimensional figures to cover in 3x3 in sticky notes. This lesson is in a sequence at the end of a short unit where students learn how to calculate surface area, round, estimate and determine the cost of a project.

Lab Plan
Lab Title: Stick It to Em!

Prerequisite skills:

- Using a Ruler, and other possible tools to measure distance.
- Convert units of measurement.
- Estimate and round based on units of measurement.
- Understand how to calculate the cost of material needed.
- Estimate the time needed to complete a project.
- Work as a contributing member of a group.

Lab objective:
Students will perform measurements in two and three-dimensional objects to determine the number of 3x3 in sticky notes to cover the object measured. Students will also be able to determine the cost and the time needed to cover the object(s) measured.

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*
Mathematics K–12 Learning Standards:

- G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve problems and solve problems.

- G-MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Use appropriate tools strategically.
- Attend to precision.

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- RST.9-10.3 Follow precisely a complex multi step procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed verbally or mathematically into words.

Technology

- 1.2.1 Communicate and collaborate to learn with others.
- 2.2.1 Develope skills to use technology effectively.
- 2.4.1 Formulate and synthesize new knowledge.

Engineering

- HS-ETS1-2 Design a solution to a complex real-world problems by breaking it down into s,all, more manageable problems that can be solved through engineering.

Leadership/21st Century Skills:

21st Century Skills
Check those that students will demonstrate in this course:

LEARNING & INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS
Creativity and Innovation ☐Think Creatively ☐Work Creatively with Others ☐ Implement Innovations **Critical Thinking and Problem Solving** X- Reason Effectively ☐ Use Systems Thinking X- Make Judgments and Decisions ☐ Solve Problems **Communication and Collaboration** X - Communicate Clearly X - Collaborate with Others	**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	**Flexibility and Adaptability** X - Adapt to Change X - Be Flexible **Initiative and Self-Direction** X - Manage Goals and Time ☐ Work Independently ☐ Be Self-Directed Learners **Social and Cross-Cultural** X - Interact Effectively with Others X - Work Effectively in Diverse Teams **Productivity and Accountability** X - Manage Projects X - Produce Results **Leadership and Responsibility** X - Guide and Lead Others X - Be Responsible to Others

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

Materials:

- Implements to measure two and three-dimensional figures, ruler, plastic tape measure.
- Writing Utensil (Each Member)
- Sticky Notes
- Calculator
- Lab Sheet (Each Member)
- Location or object to be covered
- Timing device

Set-Up Required:

- Gather materials in groups and assign members of the group to measure items, record findings and select a timer.
- Locate item(s) or location to cover in sticky notes

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- The item(s) /locations that are measured and covered are divided among the students in each group. Each student is responsible to the other members in the groups to be attentive, communicate and contribute efficiently in a timely manner.

Cooperative Learning:

- All members of the group will need to determine how to divide the roles and responsibilities of measuring, recording and timing of the targeted item(s)

Expectations:

- Each member of the group is expected to complete a Lab Sheet and determine the amount of time and cost to complete cover the targeted item(s) prior to executing the prank.

Timeline:

- The Lab can be completed in the duration of a 45 min class period. It will be helpful to review the areas of two-dimentional futures and composite figures. Also review the rounding and estimating as determine when over and underestimating is necessary.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- What other materials can be used?
- How can the process be done faster, more efficiently, number of people need to change?
- Is it worth the time and cost?
- How can it be done cheaper?

Career Applications

- Trades: Painting, flooring, tiling, construction etc.

Optional or Extension Activities

- Remodeling a room.
- Take in consideration the areas that are not needed to be painted or cover with material

- Total cost comparison of materials/labor?
- Estimate the cost of a remodel/addition to home or project.

STICK IT TO EM

Mission: To pull a prank on a teacher of your choosing by selecting an item or items to be covered in sticky notes in as little time as possible.

Objective: To identify an item(s) to be covered in 3 x 3in. sticky notes with a minimal calculated time and cost.

Part 1: Decide

Identify the item(s) to be covered:_____

_____

Part 2: Measure

Determine the surface area of the item(s) you will cover with sticky notes. In the space below, sketch the item(s) as a net, labeling each side of the dimension to figure to the nearest square inch.

Item 1	Item 2
Total Area:	Total Area:

Part 3: Calculate

Determine the amount of 3 x 3 in. sticky notes you will need to cover the item(s) you are targeting.

Item 1	Item 2
I need:	I need:

Part 4: Cost

Determine the cost needed to cover the item(s) you have targeted. Remember to search for more than one vendor to find the most cost effective place to purchase your sticky notes.

Location 1

Item 1	Item 2
Total Cost:	Total Cost:

Location 2

Item 1	Item 2
Total Cost:	Total Cost:

Part 5: Time

Determine the time needed to cover the item(s) in as little time as possible.

- Select a sample small area on a wall and measure the dimensions.
- Estimate the number of sticky notes it will take to complete covering the area.
- Time one, two and three people covering the area.

Dimension of sample area:_____
Estimated number of sticky notes:_____
TIme: One Person_____
Two Persons_____
Three Persons_____

Part 6: Finalize

Determine the total cost and time it will take your groups to Stick It To Em

Total Number of Sticky Notes:_____
Estimated Cost: $_____
Estimated Time:_____