WAMC Lab Template

Math Concept(s): Area / Volume
Source / Text:
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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

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

This lab should be done after the lesson plan.

Lab Plan

Lab Title: Raised Garden Beds
Prerequisite skills: Students should have some knowledge of area, volume and measurements.
Lab objective: Students will be able to solve a real life problem using area and volume!

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

Mathematics K–12 Learning Standards:

- HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems
- HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects

Standards for Mathematical Practice:

- 1 Make sense of problems & persevere in solving them
- 2 Reason abstractly & quantitatively
- 4 Model with Mathematics
- 5 Use appropriate tools strategically
- 6 Attend to precision

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

- Speaking and listening. Comprehension and Collaboration.
- Work with peers to set rules for collegial discussions and decision making.
- Propel conversations by posing and responding to questions that relate to the current information.

Technology

- Computational Thinker. Students develop and employ strategies for understanding problems in ways that leverage the power of technology.
- Students collect data or identify relevant data, use digital tools to analyze them and represent data in various ways to facilitate problem solving and decision making.

Engineering

- HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost and reliability.

Leadership/21st Century Skills:

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

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ X Environmental Literacy

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

LEARNING AND INNOVATION
Creativity and Innovation
☐ Think Creatively
☐ X 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
☐ X Communicate Clearly
☐ X 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)
☐ X Apply Technology Effectively

LIFE & CAREER SKILLS
Flexibility and Adaptability
☐ Adapt to Change
☐ Be Flexible
Initiative and Self-Direction
☐ X 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
☐ X Manage Projects
☐ X 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

- Chromebook
- Pencil
- Attached lab instruction and worksheet
- Protractor
- Ruler
- Calculator
- Wood
- Dirt
- Nails
- Hammer
- Saws

Set-Up Required:

- None

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Work creatively with others
- Collaborate with group members
- Apply technology effectively
- Manage goals and time
- Manage products and produce results

Cooperative Learning:

- Each group of 4 will be assigned group member roles.
    - Project Manager (group speaker and leader)
    - Project Designer (in charge of design of raised garden bed)
    - Mathematician (in charge of calculations)
    - Review Manager (in charge of reviewing al information that group has)

Expectations:

- I expect all students to work on the entire project and participate in the creativity and math of everything. However, with the roles listed above, I expect those specific students to lead and be in charge of those specific parts.

Timeline:

- Students have 2 – 55 minute period to complete the lab.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Raised garden beds are popular and wanting to build one can be tough, but when you do the math and you can know and understand the costs and everything!

Career Applications

- Gardener - Landscaper

Optional or Extension Activities

- Could have each group review other groups and double check the math.
- Could have each group design one of each shape so that all groups get practice at all shapes.
- Could have each group present their design and math to the class
- Could have each group make a budget for the materials of a single truss and then figure out how many trusses you might need for the building.

For step by step guide on how to make a rectangular raised garden bed visit:
https://www.gardenary.com/blog/how-to-build-a-raised-garden-bed-for-just-100

Or, see below

Building a rectangular raised garden bed is a great way to grow plants in a controlled environment. Here's a step-by-step guide to help you get started:

1. Choose a suitable location: Select an area that receives ample sunlight and has good drainage.

2. Gather materials: You'll need the following materials:
   - Cedar or treated lumber boards (2x6 or 2x8) for the sides
   - Galvanized screws or nails
   - Level
   - Shovel
   - Weed barrier fabric or cardboard
   - Soil
   - Compost or organic matter

3. Determine the size: Decide on the dimensions of your raised bed. A common size is 4 feet wide by 8 feet long, but you can adjust according to your needs.

4. Prepare the ground: Clear the area of any existing vegetation, rocks, or debris. Use a shovel to loosen the soil and remove any grass.

5. Build the frame:
   - Cut the lumber boards to the desired lengths for the sides of your raised bed.
   - Assemble the frame by connecting the boards at the corners, ensuring they form a rectangular shape.
   - Use galvanized screws or nails to secure the boards together.

6. Level the frame: Use a level to ensure the frame is straight and level. Adjust the soil underneath if needed.

7. Install a weed barrier: Lay down a layer of weed barrier fabric or cardboard inside the frame. This will help prevent weeds from growing up into your raised bed.

8. Fill with soil: Fill the raised bed with a mixture of quality garden soil and compost or organic matter. Aim for a depth of at least 6-8 inches.

9. Smooth and level the soil: Use a rake or your hands to even out the soil surface, removing any large clumps or debris.

10. Start planting: Now that your raised bed is ready, you can start planting your desired plants or seeds according to their specific requirements.

Remember to water your garden regularly and provide proper care for your plants. Enjoy your new rectangular raised garden bed and the bountiful harvest it will provide!

For other shapes like hexagons, pentagons, octagons, or any other idea, use the same idea but area and volume for those shapes!