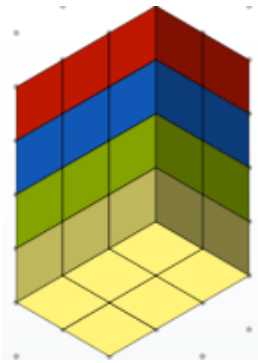
Minecraft Building Inspection

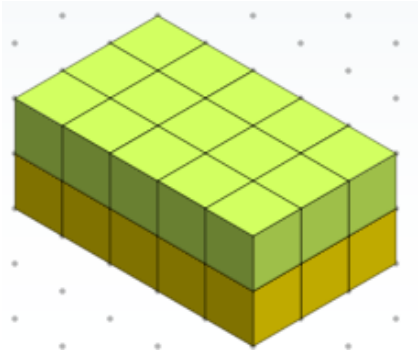
The Story: You are the Lead Structural Engineer in a block-building video game. You must audit these 3D shapes to ensure they have the correct number of cargo unit cubes.

Tasks



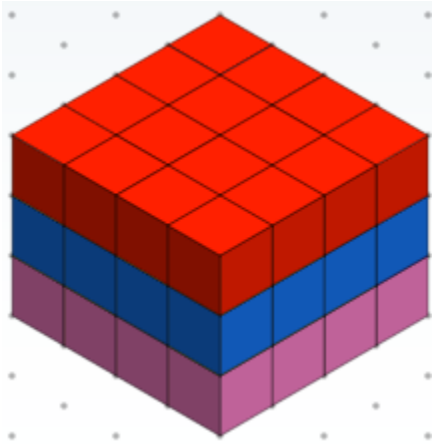
1. **The Storage Box:**

   Prompt: Count the base layer cubes, then multiply by the layers. Total Volume = ____ cubic units.



2. **The Gold Vault:**

   Total Volume = ____ cubic units.



3. **The Tower Base:**

   Prompt: Total Volume = ____ cubic units.
   (Answer: 48)

Part 2: Independent Practice

Directions: Read each scenario carefully and calculate the total volume. Write your answer using cubic units (e.g., units^3 or cubic centimeters).

Section A: Counting the Layers

4. A rectangular box is filled tightly with unit cubes. The bottom layer has 5 rows of 4 cubes. The box is exactly 3 layers high.
    a. How many cubes are in the base layer? _____
    b. What is the total volume of the box? _____

5. Maya builds a tower using wooden unit blocks. The footprint of her tower takes up a space 6 blocks long and 2 blocks wide. She builds it up to be 5 blocks high.

    What is the volume of Maya's tower? _____

6. A clear plastic storage bin is packed with 1-inch starter cubes for a science experiment. The bottom layer fits 8 cubes along the front and 4 cubes along the side. The bin holds 4 total layers of cubes.

    What is the volume of the storage bin? _____

Section B: Fractional and Missing Parts

7. A standard rectangular prism is completely filled with 36 unit cubes. If the bottom layer contains 12 cubes, how many layers high is the prism?

8. A shipping box has a total volume of 60 cubic feet. It is filled with boxes that are 1 cubic foot each. If the box is 5 feet long and 3 feet wide, how many layers tall is the shipping box?

Section C: Transitioning to the Formula

9. Instead of counting every single cube, we can use the formula:
   Volume = (length) · (width) · (height) or V = lwh.
   Use the formula to find the volume of a rectangular prism with the following dimensions:

   Length = 7 cm

   Width = 3 cm

   Height = 4 cm

   Total Volume: _____

Part 3: Brain Teaser / Challenge Question

10. Leo builds a solid rectangular prism out of unit cubes that is 3 cubes wide, 3 cubes long, and 3 cubes tall.

    a. What is the total volume of Leo's prism? _____

    b. If Leo decides to hollow out the exact center by removing just 1 unit cube from the very inside, what is the new volume of the structure? _____