



Composite Buildings

Mission: City planners need the volume of oddly-shaped buildings to plan heating and cooling. Split each building into boxes, or start with a big box and subtract, and prove both strategies give the same answer.

Big question: How can we find the volume of a figure made of two rectangular prisms?

★ Warm-up: Quick sketch

Draw an L-shape out of squares. Answer:

Show two different ways to split the L into rectangles. ✓ **Any two valid splits.**

If the L is a 4×3 rectangle with a 2×1 corner missing, what is its area? ✓ **10.**

Key vocabulary

Composite figure	A shape made from two or more simpler shapes.
Decompose	Break into smaller parts.
Rectangular prism	A box shape.
Strategy	A plan for solving a problem.

1 Box 1

Subtract instead

In the simulator: Choose **Big box minus the gap.**

The big box is $6 \times 4 \times 3 = 72$. The empty gap is $4 \times 4 \times 1$. What is the library's volume?

Answer: _____ cubes ✓ **56**

Show your thinking:

2 Box 2

Same answer?

Both strategies gave 56. Why must they match?

- ☐ They count the same cubes, just grouped differently ☐ Coincidence
☐ The subtraction strategy is always bigger

✓ **They count the same cubes, just grouped differently**

3 Box 3

Community center

In the simulator: Split the community center into 2 boxes.

Front box $5 \times 3 \times 2$, back box $5 \times 2 \times 4$. Total volume?

Answer: _____ cubes ✓ **70**

Show your thinking:

4 Box 4

Clock tower shop

In the simulator: Look at the clock tower shop with any strategy.

The base is $4 \times 4 \times 1$. The tower is $2 \times 2 \times 5$ but its bottom cube layer is inside the base. What is the total volume?

Answer: _____ cubes ✓ **32**

Show your thinking:

5 Box 5

Error detective

What mistake did Sam make?

☐ He counted the 4 cubes where the tower overlaps the base twice ☐ He multiplied wrong ☐ Nothing, 36 is right

✓ **He counted the 4 cubes where the tower overlaps the base twice**

6 Box 6

Legend: design Legend only

Design your own building from two boxes with a total volume of exactly 50 cubes. Give both boxes' dimensions.

Look for: Gives dimensions; Totals 50; a number from the simulator

7 Box 7

Planner memo

Explain two strategies for finding the volume of an L-shaped building.

Look for: Split-and-add strategy; Big-box-minus-gap strategy

Exit ticket: answer the big question in your own words

How can we find the volume of a figure made of two rectangular prisms?

Look for: A composite figure can be split into rectangular prisms. Find each prism's volume and add. Another strategy: find a big box around the figure and subtract the missing part. Different strategies give the same volume.

Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	5DQ-E

 Investigator

16B-I

 Legend

65G-L

 Watch for these misconceptions

- "Volume and area are the same." Area is 2-D square units; volume is 3-D cubic units.
- "Add the dimensions." Volume multiplies them.
- "Composite figures: multiply all the numbers you see." Split into separate prisms first.