

Grade 5 • Unit 1 Worksheet

Finding Volume

Name: _____

Date: _____

Part A • Volume by Counting Unit Cubes

These build the core idea that volume = number of unit cubes that fill a solid without gaps or overlaps.

1. A rectangular prism is built from unit cubes. Looking at one face, you can count 12 cubes. The prism has 4 layers stacked on top of each other.

What is the volume? _____ cubic units

Write a numerical expression that shows your reasoning.

If the face you see has dimensions 3 by 4, what are the THREE side lengths of the prism?

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2. Two students built different-shaped figures, each using exactly 18 unit cubes. One made a 1 by 2 by 9 prism; the other made a 2 by 3 by 3 prism.

Do they have the same volume? Yes / No. Why?

What is DIFFERENT about the two figures?

Part B • Volume = length x width x height

3. Find the volume of a rectangular prism with side lengths 6, 4, and 5 cm in TWO different ways.

Way 1. Multiply side lengths in one order:

Way 2. Multiply in a DIFFERENT order:

Did you get the same answer? Why does the order not matter?

4. A rectangular prism has a base of area 24 sq cm and a height of 7 cm.

What is the volume? _____ cubic cm

Explain HOW you can find volume from base area times height.

Give two different sets of side lengths the base could have had.

5. Write THREE different multiplication expressions that all give the volume of a prism with side lengths 2, 3, and 10.

Expression 1: _____ x _____ x _____ = _____

Expression 2: _____ x _____ x _____ = _____

Expression 3: (_____ x _____) x _____ = _____ (group two factors first)

What property of multiplication lets you do this?

Part C • Composite Figures

6. A solid figure is made of two rectangular prisms stuck together: Prism A is 4 x 3 x 2; Prism B is 5 x 3 x 2. The prisms do not overlap.

Volume of Prism A: _____

Volume of Prism B: _____

Total volume of the figure: _____

Why does ADDING the two prism volumes give the total?

7. A figure looks like an L-shape. The whole box if it were filled would be $8 \times 4 \times 3$. A corner piece of $3 \times 2 \times 3$ has been removed.

Show TWO different ways to find the volume:

a. Subtract the missing piece from the whole box.

b. Split into two prisms and add.

Final volume: _____ cubic units

Part D • Thinking Deeply

8. Mai says: "A $2 \times 3 \times 4$ prism and a $1 \times 4 \times 6$ prism have the same volume because $2 + 3 + 4 = 9$ and $1 + 4 + 6 = 11$." What is wrong with Mai's reasoning?

Find the actual volume of each:

$2 \times 3 \times 4 =$ _____ ; $1 \times 4 \times 6 =$ _____

What rule should Mai use instead?

9. Han needs to find the volume of a prism but the only measurements he has are: one face = 15 sq inches, height = 4 inches. Can he find the volume? Explain.

Volume: _____ cubic inches

10. Write a real-world story problem for a prism with volume 60 cubic feet.

My problem:

What side lengths could it have? Give one set.

11. Pat says: "To double the volume of a 2 x 3 x 4 prism, I just double one of the sides." Test this — show what happens if you double the side of length 2, then 3, then 4.

Double the 2: _____ x _____ x _____ = _____

Double the 3: _____ x _____ x _____ = _____

Double the 4: _____ x _____ x _____ = _____

Is Pat right? Why?
