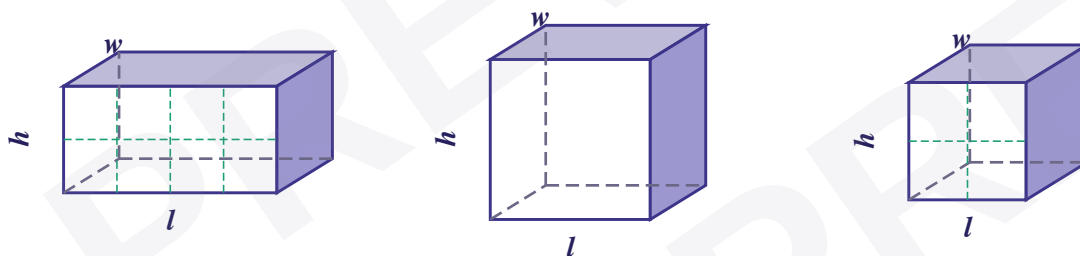


Volume of Rectangular Prisms with Fractional Edge Lengths

Packing Lab — Hands-On + Formula

GRADE 6 • CCSS 6.G.A.2



A complete 4-activity lab unit: hands-on packing, formula discovery, real-world application, and surface-area extension.

CCSS Alignment Chart

Standard 6.G.A.2: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Component-by-Component Alignment

Resource Component	6.G.A.2 Element	Math Practice (MP)	Evidence / What Students Do
Activity 1: Packing Lab	Pack with unit-fraction cubes	MP.4 Model, MP.5 Tools	Students assemble 1/2-in, 1/3-in, and 1/4-in cubes from nets and pack three prisms, counting cubes to find volume by counting.
Activity 2: Formula Discovery	Show $V =$ product of edge lengths	MP.7 Structure, MP.8 Repeated Reasoning	Students organize packing data in tables, observe that cube-count equals $l \times w \times h$ (scaled), and derive $V = lwh$ and $V = bh$.
Activity 3: Task Cards (1–20)	Apply $V = lwh$ and $V = bh$ to real-world problems	MP.1 Persevere, MP.2 Abstract	Twenty real-world contexts (fish tank, shipping box, concrete, planter) solved with both formulas and fractional arithmetic.
Activity 4: Volume vs Surface Area	Connect volume to related attributes	MP.3 Critique, MP.6 Precision	Students compute both V and SA for fractional-edge prisms, compare, and discuss unit differences (cubic vs square).
Vocabulary Foldable	Academic language for the standard	MP.6 Precision	Seven key terms defined, illustrated, and exemplified for student reference throughout the unit.
Anchor Chart	Visual reference for both formulas	MP.7 Structure	Side-by-side $V = lwh$ and $V = bh$ with labeled prism diagrams and worked examples for classroom display.
Exit Tickets (1–4)	Formative check of each element	MP.6 Precision	Two computational, one real-world, one conceptual exit ticket assessing the full standard.
Quiz (12 questions)	Summative assessment of 6.G.A.2	MP.1, MP.2, MP.3, MP.6	Six computational, four real-world, two conceptual items with point values totaling 30 points.

Why this alignment matters

The 6.G.A.2 standard is unique because it requires *both* a concrete packing experience *and* an abstract formula. Many resources jump straight to $V = lwh$ and skip the packing, leaving students without the conceptual foundation for why multiplying fractional edge lengths works. This unit sequence preserves the full intent of the standard: packing → discovery → application → extension, so students own the mathematics rather than borrowing it.

CLASSROOM DISPLAY

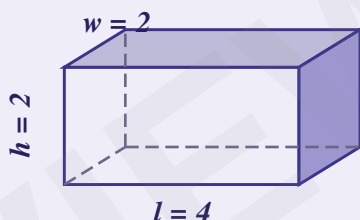
Anchor Chart — The Two Volume Formulas

Display this anchor chart in your classroom all year. Both formulas give the same volume; the choice depends on what information is given. When all three edge lengths are known, use $V = lwh$. When the area of the base is known (or easy to compute first), use $V = bh$.

FORMULA 1

$$V = l \times w \times h$$

Volume = length $\times$ width $\times$ height



Worked Example

A prism has $l = 4$ in, $w = 2$ in, $h = 2$ in.

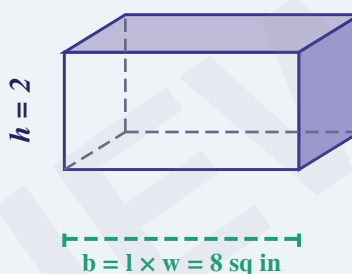
$$V = 4 \times 2 \times 2 = \mathbf{16 \text{ cubic inches}}$$

Use when: you know all three edge lengths (length, width, height).

FORMULA 2

$$V = b \times h$$

Volume = area of base $\times$ height



Worked Example

Base area $b = 8$ sq in, height $h = 2$ in.

$$V = 8 \times 2 = \mathbf{16 \text{ cubic inches}}$$

Use when: you know (or can easily find) the area of the base and the height.

Key Insight — The formulas are the same!

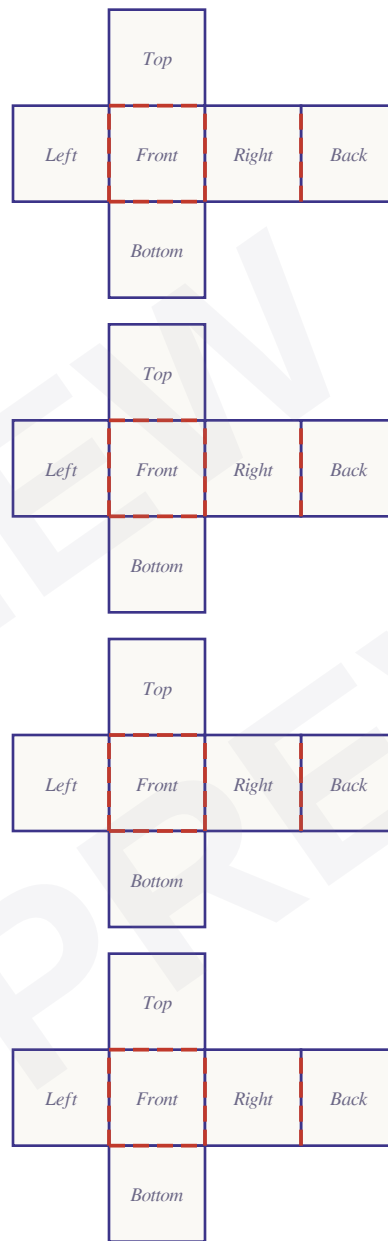
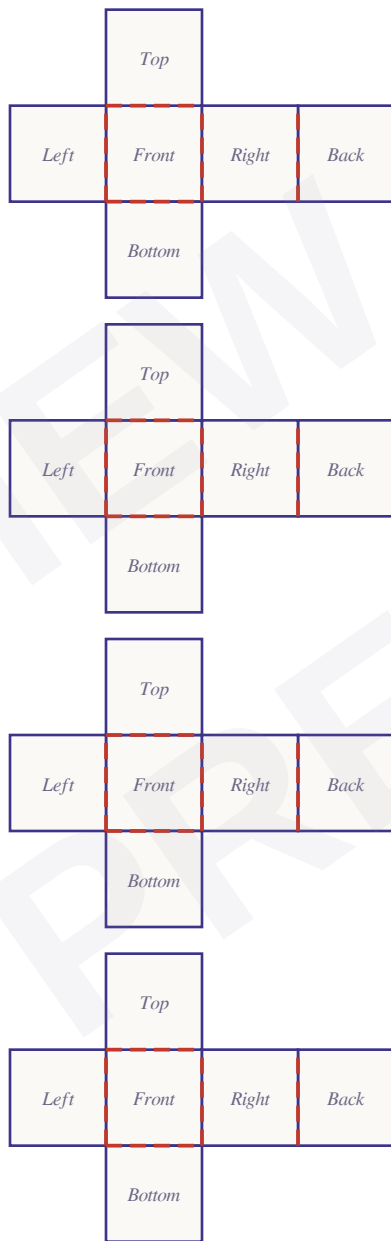
Notice that $b = l \times w$ (the area of the base equals length times width). So $V = bh = (l \times w) \times h = lwh$. The two formulas are mathematically identical — they simply group the multiplication differently. This means students can always check their work by computing volume both ways when possible. When edge lengths are fractions, the formulas still work because the number of unit cubes scales exactly with the product of the edge lengths (see Activity 2 for the full derivation).

Units Reminder: Volume is always measured in **cubic units** (cu in, cu ft, cu cm, etc.). The base area is in **square units** (sq in, sq ft). Multiplying square units by a linear unit (height) gives cubic units: sq in $\times$ in = cu in.

ACTIVITY 1 • PRINT ON CARD STOCK • CUT & FOLD

Printable Cube Nets — 1/2-Inch Cubes

Each net folds into a 1/2-inch unit cube. Cut along the solid indigo lines. Fold along the dashed red lines (fold away from you). Tape the open edges to close the cube. Each cube has volume $(1/2)^3 = 1/8$ cubic inches.



Legend:

— Solid indigo = CUT

- - - Dashed red = FOLD

Teacher Tip

For a class of 30 students in groups of 4, print 8–10 copies of this page. Each group needs 2–3 1/2-inch cubes. Pre-fold a sample cube. Card stock (65 lb+) makes cubes sturdy enough to reuse.

REAL-WORLD PROBLEMS • $V = lwh$ & $V = bh$

Activity 3 — Formula Application: Task Cards 1–8

Solve each problem using $V = lwh$ or $V = bh$. Show your work in the space provided. Remember to include units (cubic inches or cubic feet) in your answer.

- 1 Fish Tank.** A rectangular fish tank measures $10\frac{1}{2}$ inches long, $6\frac{1}{4}$ inches wide, and 8 inches high. What is the volume of water needed to fill it?

Show your work:

- 2 Shipping Box.** A shipping carton is 12 inches long, $9\frac{1}{2}$ inches wide, and $5\frac{1}{3}$ inches high. Find the volume of the carton.

Show your work:

- 3 Concrete Foundation.** A concrete foundation for a shed is $4\frac{1}{2}$ feet long, $3\frac{1}{3}$ feet wide, and $2\frac{1}{4}$ feet deep. How many cubic feet of concrete are needed?

Show your work:

- 4 Planter Box.** A wooden planter box is $2\frac{1}{2}$ feet long, $1\frac{1}{4}$ feet wide, and $1\frac{1}{3}$ feet deep. How much soil does it hold?

Show your work:

- 5 Jewelry Box.** A jewelry box has length $6\frac{1}{2}$ inches, width 4 inches, and height $2\frac{1}{2}$ inches. Find its volume.

Show your work:

- 6 Ice Block.** A rectangular ice block measures $5\frac{1}{4}$ inches by $3\frac{1}{2}$ inches by $2\frac{1}{4}$ inches. What is its volume?

Show your work:

- 7 Storage Bin.** A storage bin is 15 inches long, $10\frac{1}{2}$ inches wide, and $7\frac{1}{4}$ inches tall. What is the volume?

Show your work:

- 8 Brick.** A construction brick measures 8 inches long, $3\frac{3}{4}$ inches wide, and $2\frac{1}{4}$ inches high. Find the volume.

Show your work:

NAME: _____ DATE: _____ / 30 POINTS
Volume of Rectangular Prisms — Unit Quiz

Directions: Solve each problem. Show your work for full credit. Include units in every answer. Use $V = lwh$ or $V = bh$ as appropriate.

Part 1 — Computational (2 points each)

1. Find the volume of a rectangular prism with length 4 in, width 3 in, and height $2\frac{1}{2}$ in.

2. Find the volume: length $5\frac{1}{2}$ in, width 2 in, height 3 in.

3. Find the volume: length $3\frac{3}{4}$ in, width 2 in, height 2 in.

4. Use $V = bh$. The base area is 6 sq in and the height is $2\frac{1}{2}$ in. Find the volume.

5. Use $V = bh$. The base area is $10\frac{1}{2}$ sq in and the height is 3 in. Find the volume.

6. Find the volume: length $1\frac{1}{2}$ ft, width $1\frac{1}{3}$ ft, height 2 ft.

Part 2 — Word Problems (3 points each)

7. Word problem: A fish tank is 12 inches long, $5\frac{1}{4}$ inches wide, and 8 inches high. What is the volume?

8. Word problem: A gift box is $6\frac{1}{2}$ in by 4 in by 3 in. What is the volume?

What's Inside the Full Resource

A page-accurate overview of the complete 34-page Grade 6 resource.

$$V = lwh$$

fractional edge lengths

34

PAGES

4

ACTIVITIES

20

TASK CARDS

4

EXIT TICKETS

12

QUIZ QUESTIONS

01

FOUNDATION & SETUP

pp. 1–6

Cover; Teacher Notes & How to Use; learning objectives; materials; suggested 5-day pacing; differentiation; CCSS 6.G.A.2 alignment; vocabulary foldable; anchor chart.

02

ACTIVITY 1 — PACKING LAB

pp. 7–13

Teacher lesson script; student recording sheets; three packing investigations using 1/2-inch, 1/3-inch, and 1/4-inch unit cubes; printable cube nets.

03

ACTIVITY 2 — FORMULA DISCOVERY

pp. 14–17

Teacher script and student sheet that use packing data to connect the cube-counting model to $V = lwh$ and $V = bh$, including a structured derivation.

04

ACTIVITY 3 — FORMULA APPLICATION

pp. 18–22

Twenty real-world volume problems (task cards 1–20), followed by the detailed teacher answer key on pages 21–22 with setup, computation, units, and common-error notes.

05

ACTIVITY 4 — VOLUME VS. SURFACE AREA

pp. 23–26

Teacher script and student sheet comparing volume and surface area for fractional-edge prisms, including unit distinctions and discussion questions.

06

ASSESSMENT & CLOSING

pp. 27–34

Four exit tickets with answer key; a 30-point, 12-question unit quiz with detailed answer key; and the final feedback/review page.

What the teacher receives: teacher-facing lesson scripts, standards/alignment support, student-facing recording sheets, printable cube nets, task cards, answer keys, exit tickets, and a unit quiz.

Suggested sequence: Day 1 — vocabulary + anchor chart; Day 2 — packing lab; Day 3 — formula discovery; Day 4 — task cards; Day 5 — surface-area extension, exit tickets, and quiz.