Area Volume and Surface Area

Lesson 6 Volume with Fractional Edges

Standards 6.G.A.2

Learning target I can calculate prism volume with fractional edge lengths.

Materials Rulers, grid paper, unit cubes or paper cube models, paper and scissors for nets.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about volume with fractional edges. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. A rectangular prism has volume V = lwh = Bh, where B is base area. Fractional edge lengths still multiply. Use cubic units; surface area and volume measure different attributes. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: A rectangular prism has edges 3 1/2, 3, and 2 1/2 cm. Sketch it and find its volume. Show both lwh and Bh. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch perpendicular height, missing faces, and square versus cubic units.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learn and Discuss

A rectangular prism has volume V = lwh = Bh, where B is base area. Fractional edge lengths still multiply. Use cubic units; surface area and volume measure different attributes.

Example 1 A rectangular prism has edges 2, 3, and 5 cm. Sketch it and find its volume.
Solution 30 cm³. B = 2 × 3 = 6 cm²; V = B × 5 = 30 cm³.
Example 2 A rectangular prism has edges 4, 1, and 1 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.
Solution 6 cm³. B = 4 × 1 = 4 cm²; V = B × 3/2 = 6 cm³.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Volume with Fractional Edges

Name _____ Show calculations, models, and units.

1. A rectangular prism has edges 7, 1 1/2, and 5 cm. Sketch it and find its volume.

2. A rectangular prism has edges 2, 2 1/2, and 5 cm. Sketch it and find its volume.

3. A rectangular prism has edges 3, 1, and 5 cm. Sketch it and find its volume.

4. A rectangular prism has edges 1 1/2, 2 1/2, and 5 cm. Sketch it and find its volume.

5. A rectangular prism has edges 2, 2, and 2 cm. Sketch it and find its volume.

6. A rectangular prism has edges 3, 1, and 6 cm. Sketch it and find its volume.

7. A rectangular prism has edges 1 1/2, 2 1/2, and 1 cm. Sketch it and find its volume. Show both lwh and Bh.

8. A rectangular prism has edges 1, 3, and 1 cm. Sketch it and find its volume. Show both lwh and Bh.

9. A rectangular prism has edges 3 1/2, 2, and 1 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.

10. A rectangular prism has edges 3 1/2, 3, and 2 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.

Volume with Fractional Edges

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1. 105/2 cm³
Reasoning B = 7 × 3/2 = 21/2 cm²; V = B × 5 = 105/2 cm³.

2. 25 cm³
Reasoning B = 2 × 5/2 = 5 cm²; V = B × 5 = 25 cm³.

3. 15 cm³
Reasoning B = 3 × 1 = 3 cm²; V = B × 5 = 15 cm³.

4. 75/4 cm³
Reasoning B = 3/2 × 5/2 = 15/4 cm²; V = B × 5 = 75/4 cm³.

5. 8 cm³
Reasoning B = 2 × 2 = 4 cm²; V = B × 2 = 8 cm³.

6. 18 cm³
Reasoning B = 3 × 1 = 3 cm²; V = B × 6 = 18 cm³.

7. 15/4 cm³
Reasoning B = 3/2 × 5/2 = 15/4 cm²; V = B × 1 = 15/4 cm³.

8. 3 cm³
Reasoning B = 1 × 3 = 3 cm²; V = B × 1 = 3 cm³.

9. 21/2 cm³
Reasoning B = 7/2 × 2 = 7 cm²; V = B × 3/2 = 21/2 cm³.

10. 105/4 cm³
Reasoning B = 7/2 × 3 = 21/2 cm²; V = B × 5/2 = 105/4 cm³.