Guided Practice

At A Glance

Students solve a set of volume problems involving fractional dimensions by applying the volume formula.

Step By Step

- Ask students to solve the problems individually.
- **Pair/Share** When students have completed each problem, have them Pair/Share to discuss their solutions with a partner or in a group.

Solutions

Example Solution: 4,500 cubic centimeters; Students could solve the problem by multiplying $\ell \cdot w \cdot h$ as follows: $20 \cdot 7.5 \cdot 30$.

16 Solution

$\frac{121}{2}$ or 60 $\frac{1}{2}$ cubic inches; Students could solve the problem by multiplying $\ell \cdot w \cdot h$ as follows: $2 \cdot \frac{11}{2} \cdot \frac{11}{2}$.

DOK 1

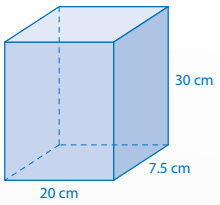
Practice Finding Volume

Study the example below. Then solve problems 16–18.

Example

A box of breakfast cereal is 20 centimeters long, 7.5 centimeters wide, and 30 centimeters high. What is the volume of the box?

Look at how you can use a drawing to display the given information.



$V = \ell \times w \times h$

$= 20 \times 7.5 \times 30$

$= 4{,}500$

Solution 4,500 cubic centimeters

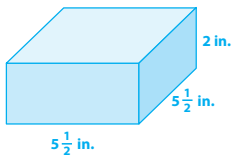
The student multiplied the length, width, and height to find the volume of the box.

Pair/Share
How could you estimate the volume?

16 The base of a jewelry box is a square with a side length of $5\frac{1}{2}$ inches. The box is 2 inches high. What is the volume of the box?

Show your work.

Possible student work using a diagram:



Solution $60\frac{1}{2}$ cubic inches

Sketching the prism is a good way to organize the given information.

Pair/Share
If the base is a square, which two dimensions do you know?

Teacher Notes

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17 A rectangular swimming pool is 10 meters long and 4.5 meters wide. If the volume of the water in the pool is 72 cubic meters, how deep is the water?

Show your work.

Possible student work using a diagram and equation:

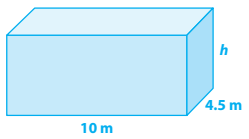
$V = \ell wh$

$72 = 10 \cdot 4.5 \cdot h$

$72 = 45 \cdot h$

$72 \div 45 = h$

$1.6 = h$



Solution 1.6 meters

What are you trying to find in this problem?

Pair/Share
How is this problem different from the previous two problems?

18 The volume of a rectangular prism is 10 cubic feet. What could the dimensions of the prism be?

A 100 ft, $\frac{1}{2}$ ft, $\frac{1}{2}$ ft

B 10 ft, $\frac{1}{2}$ ft, 2 ft

C 5 ft, $2\frac{1}{2}$ ft, $2\frac{1}{2}$ ft

D 10 ft, 10 ft, $\frac{1}{2}$ ft

Carla chose **C** as the correct answer. How did she get that answer?

Carla added the dimensions.

Will the formula for volume help answer the question?

Pair/Share
Explain why Carla's answer doesn't make sense.

Teacher Notes

Solutions

17 Solution

1.6 meters; Students could solve the problem by solving the equation $72 = 10 \cdot 4.5 \cdot h$.

DOK 1

18 Solution

B; Carla added the dimensions, which is an incorrect method.

Explain to students why the other two answer choices are not correct.

A is not correct because multiplying these values produces a volume of 25 cubic feet.

D is not correct because multiplying these values produces a volume of 50 cubic feet.

DOK 3

Ready Mathematics
PRACTICE AND PROBLEM SOLVING

Assign *Practice and Problem Solving* **pages 319–320** after students have completed this section.

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Independent Practice

At A Glance

Students solve a set of volume problems involving fractional dimensions that might appear on a mathematics test.

Solutions

1 Solution

C; Multiply $\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3}$.

DOK 1

2 Solution

B; Set up the equation $972 = 20 \cdot 10.8 \cdot w$. Next, divide both sides by 216 to solve for w.

DOK 2

3 Solution

a. True; **b.** False; **c.** True; **d.** True

DOK 2

Quick Check and Remediation

- Ask students to find the height of a prism with dimensions $V = 36$ cu ft, $w = 48$ in., and $\ell = 1\frac{1}{2}$ ft. [6 ft]
- For students who are struggling, use the chart to guide remediation.
- After providing remediation, check students' understanding. Ask students to explain their thinking in finding the height of a prism with dimensions $V = 24$ cu in., $\ell = 2$ in., and $w = 3$ in. [4 in.]
- If a student is still having difficulty, use *Ready Instruction, Grade 5,* Lessons 24–27.

If the error is . . .	Students may . . .	To remediate . . .
$\frac{1}{2}$ ft	not have converted 48 inches to 4 feet.	Have students practice doing word problems with mixed-unit measures to be able to identify instances where unit conversions need to be done. Stress that when working with measures, units need to be consistent.
30 ft	have subtracted 6 from 36 (rather than divide by 6) to solve for h.	Review the steps for solving one-step equations.
Any other answer.	have multiplied $4 \cdot 1.5$ incorrectly or divided $36 \div 6$ incorrectly.	Have students practice solving one-step equations requiring the operations of multiplication and division.

Practice Finding Volume

Solve the problems.

1 What is the volume of a cube with edge length $\frac{2}{3}$ yard?

A $\frac{4}{9}$ yd^3

B $\frac{8}{3}$ yd^3

C $\frac{8}{27}$ yd^3

D 2 yd^3

2 The volume of a box of soup broth is 972 cubic centimeters. The box is 20 centimeters high and 10.8 centimeters long. How wide is the box?

A 90 cm

B 4.5 cm

C 216 cm

D 48.6 cm

3 The cargo hold of a truck is a rectangular prism measuring 18 feet by 13.5 feet by 9 feet. The driver needs to figure out how many storage boxes he can load. Choose *True* or *False* for each statement.

a.	The truck driver can load up to 54 boxes with dimensions 3 ft by 3 ft by 4.5 ft.	☒ True	☐ False
b.	The truck driver can load up to 81 boxes with dimensions 3 ft by 3 ft by 3 ft.	☐ True	☒ False
c.	The truck driver can load up to 24 boxes with dimensions 4.5 ft by 4.5 ft by 4.5 ft.	☒ True	☐ False
d.	The truck driver can load up to 12 boxes with dimensions 9 ft by 4.5 ft by 4.5 ft.	☒ True	☐ False

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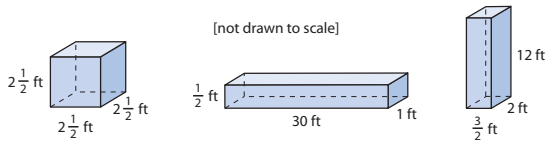
4 The three shipping boxes below have different volumes and are to be labeled Large, Medium, and Small based on their volumes. Write the appropriate label, Large, Medium, or Small, under each of the boxes.



Medium | Small | Large

5 The volume of a rectangular prism is 12 cubic inches. One of the dimensions of the prism is a fraction. What could the dimensions of the prism be? Give two possible answers.

Show your work.

Answer Possible answers: 3 in. × $\frac{2}{3}$ in. × 6 in., 10 in. × 2 in. × $\frac{3}{5}$ in.

6 A building supply company sells sand by the cubic foot and by the cubic yard. The price of one cubic yard of sand is $33.75. What do you think the price of one cubic foot of sand should be? Explain your answer.

Show your work.

Answer Possible answer: The volume of one cubic foot of sand is $\frac{1}{27}$ of the volume of one cubic yard of sand, so the price of one cubic foot should be $\frac{1}{27}$ the price of one cubic yard. $\frac{1}{27}$ × $33.75 = $1.25.

Self Check Go back and see what you can check off on the Self Check on page 243.

Solutions

4 Solution

Medium, Small, Large (from left to right); Multiply the length, width, and height of each prism to find the volume. The volume, from left to right, are 15.625 ft^3, 15 ft^3, and 16 ft^3.
DOK 1

5 Solution

Answers will vary. Find three numbers with a product of 12, at least one of which is a fraction.
Sample solutions: $3 \cdot \frac{2}{3} \cdot 6$ or $10 \cdot 2 \cdot \frac{3}{5}$.
DOK 3

6 Solution

Answers will vary. Sample solution: Because the volume of one cubic foot of sand is $\frac{1}{27}$ of the volume of one cubic yard of sand, the price of one cubic foot should be $\frac{1}{27}$ the price of one cubic yard. Price of one cubic foot $= \frac{1}{27} \times \$33.75 = \$1.25$.
DOK 3

▶ Hands-On Activity

Use connecting cubes to model volume.

Materials: 30 connecting cubes per group

- Organize students in small groups and distribute connecting cubes. Have students make 6 towers of 5 cubes each. Then, have them place the towers together to make a rectangular prism.
- Have students examine their rectangular prism. Ask: *What is the length? What is the width? What is the height? How many cubes did you use to make the rectangular prism?*
- Record the dimensions on the board. Write the volume formula $V = Bh = (\ell \times w) \times h$. Fill in the values for each variable and show that multiplying the dimensions yields the total number of cubes used.
- Repeat with other rectangular prism models.

▶ Challenge Activity

Which truck can fill the pools?

- Tell students that two water trucks pull up to the town swimming pool the week before Memorial Day to fill the big pool and the kiddie pool.
- The dimensions of the big pool are 40 ft long, 20 ft wide, and 4 ft deep. The kiddie pool is 25 ft long, 15 ft wide, and 18 in. deep.
- The dimensions of the water container on the first truck are 30 ft long, 8 ft wide, and 14 ft high.
- The dimensions of the water container on the other truck are 25 ft long, 6 ft wide, and 20 ft high.
- If both trucks are filled to capacity, would either truck hold enough water to fill *both* pools to 6 inches below the top? If not, how much water would be needed from the other truck?

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