

Volume with Whole Number Edges Flagship

Lesson 10-1-flagship

Name: _____ Date: _____ Class: _____

CLASS LEGACY MISSION

Seal the Time Capsule

You are the lead builder for the school's 50-year time capsule project. Every memory must fit inside rectangular containers, and the principal needs to know exactly how much each one holds before they are buried. Master volume and the capsule gets sealed for the future.

Key Vocabulary Level 1 support

Picture first, then the word, then a plain-language meaning. Say each word out loud.

A box $3 \times 2 \times 4$ holds 24 unit cubes, so $V = 24$ cubic units

Volume

How much space is inside a solid shape.

A cereal box or shoe box — it has length, width, and height

Rectangular prism

A solid box shape with six flat rectangle sides.

A tiny cube that is $1 \text{ in} \times 1 \text{ in} \times 1 \text{ in} = 1 \text{ in}^3$ (one cubic inch)

Cubic units

The units used to measure space inside, like cubic inches.

$V = l \times w \times h$: for a box $5 \times 3 \times 2$, volume = 30 cubic units

Length, width, height

How long, how wide, and how tall a box is.

A cross-shaped pattern of 6 rectangles folds into a rectangular box

Net

A flat shape that folds up into a solid.

A cube has 12 edges — 4 along the top, 4 along the bottom, 4 vertical

Edge

The line where two flat sides of a solid meet.

Key Ideas & Notes

- Your team is building time capsule containers to store class memories.
- Each container is a rectangular prism, and you need to figure out how much each one can hold.
- That means calculating the volume using whole number dimensions!
- Calculate the volume of each time capsule container. Use $V = l \times w \times h$.

Think About It

- What three measurements do you need to find the volume of a box?
- What does volume tell us about a container?
- How is volume different from the area of one face?

My Notes

Guided Examples

Example 1

What is the volume of a rectangular prism with $l = 7$ in, $w = 3$ in, $h = 4$ in?

Solution: $V = l \times w \times h = 7 \times 3 \times 4 = 84$ cubic inches.

Answer: A. 84 in^3

Example 2

A time capsule box has a volume of 120 cm^3 . Its length is 10 cm and width is 4 cm. What is its height?

Solution: $V = l \times w \times h \rightarrow 120 = 10 \times 4 \times h \rightarrow 120 = 40h \rightarrow h = 3$ cm.

Answer: A. 3 cm

Example 3

Which unit is used for volume?

Solution: Volume measures 3D space, so it uses cubic units like in^3 . Square units (in^2) are for area, and inches are for length.

Answer: A. Cubic inches (in^3)

Write About the Math

The Writing Revolution

I can explain my work using the words volume, rectangular prism, cubic units, and edge.

1. Kernel Sentence subject + verb

Model: Volume is how much space is inside a solid shape.

Volumen es cuánto espacio hay dentro de una figura sólida.

Write a kernel sentence about volume. Use a subject and a verb.

Escribe una oración base sobre volumen. Usa un sujeto y un verbo.

2. Sentence Expansion because · but · so

Kernel: Volume matters in math

Volumen importa en matemáticas

Expand the kernel three ways. Add a reason, a contrast, and a result.

because
porque

Volume matters in math because ____.

Volumen importa en matemáticas porque ____.

but
pero

Volume matters in math, but ____.

Volumen importa en matemáticas, pero ____.

so
entonces

Volume matters in math, so ____.

Volumen importa en matemáticas, entonces ____.

3. Sentence Types 4 ways to write a math idea

Statement
Afirmación

Tell one true fact about volume.
Di un hecho verdadero sobre volume.

Volume ____.

Question
Pregunta

Ask a question about volume.
Haz una pregunta sobre volume.

How does ____ ?
¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about volume.
Muestra entusiasmo sobre volume.

Wow, ____ !
¡Guau, ____ !

Command
Mandato

Tell a partner what to do with volume.
Dile a un compañero qué hacer con volume.

First, ____ .
Primero, ____ .

4. Explain Your Reasoning use a sentence starter

I know ____ **because** ____ .
Sé que ____ *porque* ____ .

First I ____ , **then I** ____ .
Primero ____ , *luego* ____ .

This is important because ____ .
Esto es importante porque ____ .

Try It

Solve on your own. Check the answer key when you are done.

1. Which unit is used for volume?

- A. Cubic inches (in^3)
- B. Square inches (in^2)
- C. Inches (in)
- D. Degrees ($^\circ$)

Show your work:

2. Two storage bins: Bin A is $8 \times 6 \times 5$ inches. Bin B is $9 \times 4 \times 7$ inches. Which holds more and by how much?

- A. Bin B by 12 in^3
- B. Bin A by 12 in^3
- C. Bin B by 24 in^3
- D. They hold the same

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

A box needs to hold exactly 60 cubic inches. Give three different sets of whole-number dimensions that work. Which set would make the box closest to a cube shape? Why might that matter?

*Sentence starter: Option 1: $\underline{\quad} \times \underline{\quad} \times \underline{\quad}$. Option 2: $\underline{\quad} \times \underline{\quad} \times \underline{\quad}$. Option 3: $\underline{\quad} \times \underline{\quad} \times \underline{\quad}$.
The $\underline{\quad}$ option is closest to a cube because $\underline{\quad}$. This matters because $\underline{\quad}$.*

Show your work:

Reflect — Exit Ticket

A rectangular prism has $l = 11$ in, $w = 5$ in, $h = 4$ in. What is the volume?

- A. 220 in^3
- B. 55 in^3
- C. 220 in^2
- D. 200 in^3

Your answer:

Answer Key & Teacher Guide

- 1. Try It 1:** A. Cubic inches (in^3) — *Volume measures 3D space, so it uses cubic units like in^3 . Square units (in^2) are for area, and inches are for length.*
- 2. Try It 2:** A. Bin B by 12 in^3 — *Bin A: $8 \times 6 \times 5 = 240 \text{ in}^3$. Bin B: $9 \times 4 \times 7 = 252 \text{ in}^3$. Bin B holds 12 in^3 more.*
- 3. Exit Ticket:** A. 220 in^3 — *$V = 11 \times 5 \times 4 = 220$ cubic inches. Remember: volume uses cubic units (in^3).*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Volume is how much space is inside a solid shape.
- **Expansion:** *because* gives a reason, *but* shows a contrast or exception, *so* shows a result. Answers vary; each must keep the kernel idea and add the correct kind of detail.
- **Sentence types:** Statement ends with a period, question with "?", exclamation with "!", and a command starts with an action verb (a "bossy" verb).