LESSON MAKER PRO

# One Third Space

*Compare matching triangular solids.*

**GRADE 7 · TEKS 7.8.B**

**7.8.B** "explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; and"

NAME _____ DATE _____

## THE VOLUME LINK

When a triangular prism and triangular pyramid have congruent bases and equal heights, the pyramid has 1/3 the prism's volume. $V_{prism} = Bh$ and $V_{pyramid} = 1/3Bh$, so $V_{pyramid} = V_{prism}/3$.

## WORKED EXAMPLE

A matching prism and pyramid have B = 12 square units and h = 5 units. Find both volumes.

1. $V_{prism} = Bh = 12 \times 5 = 60$.
2. $V_{pyramid} = 1/3Bh = 1/3 \times 12 \times 5$.
3. $V_{pyramid} = 20$, which is 1/3 of 60.

**Answer: Prism: 60 cubic units; pyramid: 20 cubic units.**

## PRACTICE 5 problems

**1** Matching solids have B = 9 square cm and h = 4 cm. Find both volumes.

**ANSWER** _____

**2** A triangular prism has volume 72 $in^3$. A matching pyramid has the same base and height. Find the pyramid's volume.

**ANSWER** _____

**3** A matching triangular pyramid has volume 18 $m^3$ and height 6 m. Find the base area and the prism's volume.

**ANSWER** _____

**4** Matching solids have triangular bases with base 10 cm and triangle altitude 3 cm. Their solid height is 8 cm. Find both volumes.

**ANSWER** _____

**5** A triangular prism has volume 3x cubic units. Write the volume of a matching pyramid.

**ANSWER** _____

## APPLY IT Show your work

**1** A skate park designer compares a triangular-prism ramp and a triangular-pyramid display. Each has B = 18 square feet and h = 4 feet. Find each volume.

WORK SPACE

**ANSWER** _____

**2** At a game convention, a triangular-pyramid prize case has volume 35 cubic inches. A triangular-prism case has a congruent base and the same height. Find its volume.

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

A triangular prism has volume 168 $cm^3$. Its triangular base has base 14 cm, and the prism height is 4 cm. A matching pyramid has the same base and height. Find the triangle's altitude and the pyramid's volume.

WORK SPACE AND ANSWER

**ANSWER KEY**

# One Third Space

**GRADE 7 · TEKS 7.8.B**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Matching solids have B = 9 square cm and h = 4 cm. Find both volumes. | **Prism: 36 $cm^3$; pyramid: 12 $cm^3$.** |
| 2 | A triangular prism has volume 72 $in^3$. A matching pyramid has the same base and height. Find the pyramid's volume. | **24 $in^3$** |
| 3 | A matching triangular pyramid has volume 18 $m^3$ and height 6 m. Find the base area and the prism's volume. | **Base area: 9 $m^2$; prism: 54 $m^3$.** |
| 4 | Matching solids have triangular bases with base 10 cm and triangle altitude 3 cm. Their solid height is 8 cm. Find both volumes. | **Prism: 120 $cm^3$; pyramid: 40 $cm^3$.** |
| 5 | A triangular prism has volume 3x cubic units. Write the volume of a matching pyramid. | **x cubic units** |

## PART 2 · APPLY IT

1. **Prism: 72 $ft^3$; pyramid: 24 $ft^3$.** Use Bh for the prism: 18 x 4 = 72. The pyramid is 1/3 of 72, or 24.
2. **105 $in^3$** The prism is three times the pyramid's volume. Multiply 35 by 3.

## CHALLENGE

**Triangle altitude: 6 cm; pyramid volume: 56 $cm^3$.**

Accept equivalent equations that show the pyramid volume is 1/3 of the prism volume. Accept cubic-unit notation written as cm3, m3, in3, or ft3.