Geometry B Live Lesson Class

U6L7 – Areas and Volumes of Similar Solids

(Chapter 11-7 in textbook)

CONNECTIONS ACADEMY®

Agenda

1. Review topics and problems from U6L7 – Areas and Volumes pf Similar Solids.

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template

1. Announcements/To Do's	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information	What to do
1. Complete 1 math lesson per day.	1. Go to your Planner in Connexus to find the math lesson for the day
2. Check your WebMail every day	2. Go to Connexus to find WebMail
3. Be prepared to spend 4 - 6 hours per day on schoolwork.	3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Remind your Learning Coach to take daily attendance	4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	
6. Contact Mr. Elizondo for math questions. Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered. Make an appointment at: https://elizondo.youcanbook.me Send a WebMail

U6L7 – California Common Core State Standards

- HSG-MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- HSG-MG.A.2: Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

U6L7 – Vocabulary

- similar solids

U6L7 – Objectives

- To compare and find the areas and volumes of similar solids

U6L7 – Introduction

You can use ratios to compare the areas and volumes of similar solids.

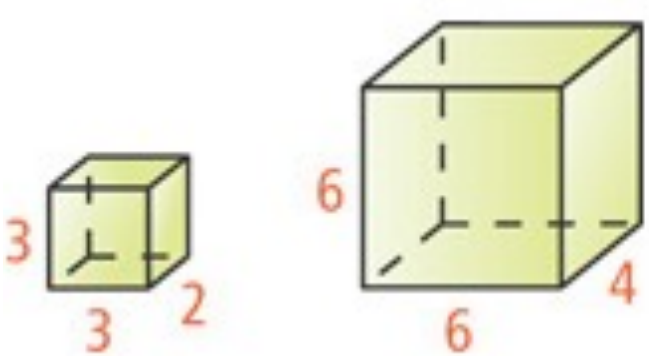
Similar solids have the same shape and all of their corresponding dimensions are proportional.

The ratio of corresponding linear dimensions of two similar solids is the scale factor.

Any two cubes are similar, as are any two spheres.

U6L7 – Identifying Similar Solids

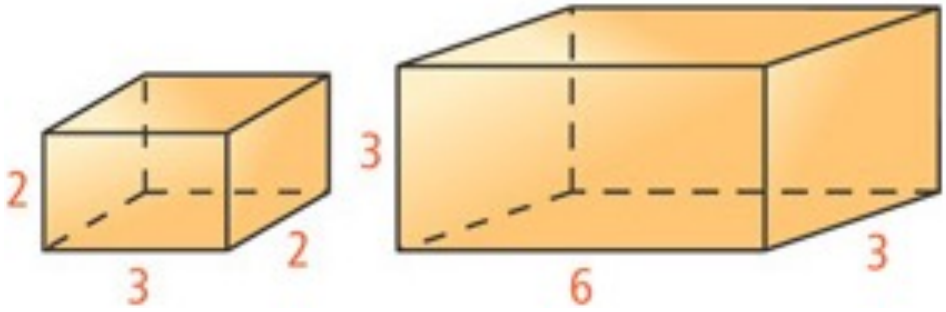
Are the two rectangular prisms similar. If so, what is the scale factor of the first figure to the second figure?



$$\frac{3}{6} = \frac{2}{4} = \frac{3}{6}$$

The prisms are similar because the corresponding linear dimensions are proportional.

The scale factor is $\frac{1}{2}$.



$$\frac{2}{3} = \frac{2}{3} \neq \frac{3}{6}$$

The prisms are not similar because the corresponding linear dimensions are not proportional.

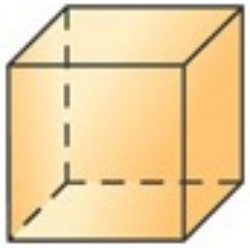
U6L7 – Areas and Volumes of Similar Solids (Theorem 11-12)

If the scale factor of two similar solids is a : b, then:

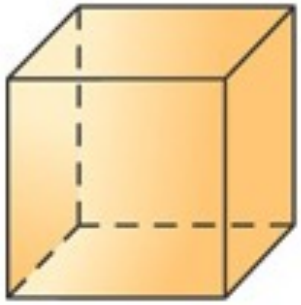
- the ratio of their corresponding areas is $\boldsymbol{a^2 : b^2}$
- the ratio of their volumes is $\boldsymbol{a^3 : b^3}$

U6L7 – Finding the Scale Factor

The square prisms are similar. What is the scale factor of the smaller prism to the larger prism?



$V = 729 \text{ cm}^3$



$V = 1331 \text{ cm}^3$

$$\frac{a^3}{b^3} = \frac{729}{1331}$$

$$\sqrt[3]{\frac{a^3}{b^3}} = \sqrt[3]{\frac{729}{1331}}$$

$$\frac{a}{b} = \frac{9}{11}$$

The scale factor is 9 : 11

U6L7 – Using a Scale Factor

The lateral areas of 2 similar paint cans are 1019 cm^2 and 425 cm^2. The volume of the smaller can is 1157 cm^3. What is the volume of the larger can?

$$\frac{a^2}{b^2} = \frac{1019}{425}$$

$$\sqrt{\frac{a^2}{b^2}} = \sqrt{\frac{1019}{425}}$$

$$\frac{a}{b} = \frac{\sqrt{1019}}{\sqrt{425}}$$

$$\frac{V_{large}}{V_{small}} = \frac{\left(\sqrt{1019}\right)^3}{\left(\sqrt{425}\right)^3}$$

$$\frac{V_{large}}{1157} = \frac{\left(\sqrt{1019}\right)^3}{\left(\sqrt{425}\right)^3}$$

$$V_{large} = \frac{\left(\sqrt{1019}\right)^3}{\left(\sqrt{425}\right)^3} \cdot 1157$$

$$\boldsymbol{V_{large} \approx 4295.48\ cm^3}$$

U6L7 – Using a Scale Factor to Find Capacity

The volumes of two similar figures are given. The surface area of the smaller figure is given. Find the surface area of the larger figure.

V = 27 in^3

V = 125 in^3

S.A. = 63 in^2

$$\frac{a^3}{b^3} = \frac{27}{125}$$

$$\frac{a}{b} = \frac{3}{5}$$

$$63 = 3^2 \cdot 7$$

$$x = 5^2 \cdot 7$$

$$x = 25 \cdot 7 = 175$$

$S.A. of\ the\ larger\ figure\ is\ 175\ in^2$

U6L6 – Summary of all formulas

Shape	Lateral Area	Surface Area	Volume
Prism	$LA = ph$	$SA = LA + 2B$	$V = Bh$
Cylinder	$LA = 2\pi rh$	$SA = 2\pi rh + 2\pi r^2$	$V = \pi r^2 h$
Pyramid	$LA = \frac{1}{2}pl$	$SA = LA + B$	$V = \frac{1}{3}Bh$
Cone	$LA = \pi rl$	$SA = LA + B$	$V = \frac{1}{3}\pi r^2 h$
Sphere	n/a	$SA = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$

Questions?

- Check the Message Board first
- Send a WebMail
- You can also make an appointment at https://elizondo.youcanbook.me
- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.