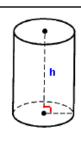
## **6.02 Applications of Volume**

Formula Review Video Click Here				
Volume of a <b>Cylinder or Prism</b> : $V = (B)(h)$	Volume of a <b>Cone or Pyramid</b> : $V = \frac{1}{3} (B)(h)$	Volume of a <b>sphere</b> : $V = \frac{4}{3} \pi r^3$		
Cylinder: $V = \pi r^2 h$	<b>Cone:</b> $V = \frac{1}{3}\pi r^2 h$	$V = \frac{1}{3} \pi r$		
Percent Change Review Video Click Here				
Totalit Stidings Novice Video Stick Field				

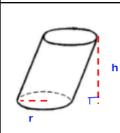
Percent Change Review Video Click Here		
We can write scale factors in terms of percents by multiplying by	<b>Example:</b> The dimensions of a cube are 75% of the original.	
Scale factor(k) = .80 Percent = $(.80)(100) = 80\%$ Scale factor(k) = 1.75 Percent = $(1.75)(100) = 175\%$	Scale Factor:	
A percent occurs when the size of a figure is increased by a certain percentage from its original size.	<b>Example:</b> Joe has a cube box, but wants to increase the dimensions by 25%. What is the percent of change of the dimensions?  Joe's new box's dimensions are% the size of the original.	
A percentoccurs when the size of a figure is decreased by a certain percentage.	Example: George has a cube box, but wants to decrease the dimensions by 25%. What is the percent of change of the dimensions?	
	George's next box dimensions are% the size of the original.	

Right versus Oblique Video Click Here			
Cylinders and cones can be considered	or	Let's look at the	

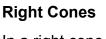
# **Right Cylinders** In a right cylinder, the height or \_\_\_\_\_ can be drawn so that it connects the \_\_\_\_\_ of the circular bases. **Oblique Cylinders Right Cones**



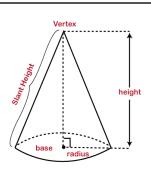
$$V = \pi r^2 h$$



in an oblique cylinder, the	neight or altitude	
	be drawn so that it	
connects the centers of the circular bases.		



In a right cone, the height or altitude can be drawn so that it connects the \_\_\_\_\_ of the cone with the center of the base.

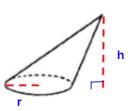




 $V = \pi r^2 h$ 

**Oblique Cones** 

In an oblique cone, the height or altitude be drawn so that it connects the tip of the cone with the center of the base.



 $V = \frac{1}{3}\pi r^2 h$ 

#### **Application of Volume Examples**

### Application Problem 1 Video Click Here

A cylindrical vase has a diameter of 8 inches. At the bottom of the vase, there are 6 marbles, each marble has a diameter of 4 inches. The vase is filled with water up to a height of 12 inches.

What is the volume of the water in the vase?

#### Application Problem 2 Video Click Here

The Great Pyramid of Khufu is a square pyramid. The lengths of the base edges are 755ft. The original height was 481 ft. Over time, the Great Pyramid of Khufu has gotten shorter. Its current height is 449 ft. How much volume has been lost over the years?

#### **Application Problem 3** Video Click Here

A farmer wants to fill his silo with grain. Find the volume of the silo pictured below. The radius of the cylinder is 10 feet and the height is 30 feet. The radius of the cone is 10 feet, and its height is 10 feet. Use 3.14 for pi, and round your answers to the nearest hundredth.

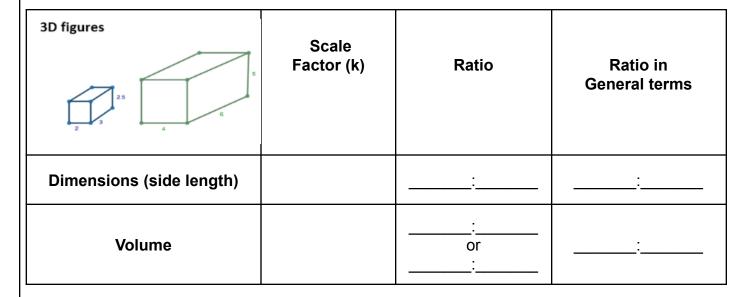
#### Application Problem 4 Video Click Here

Sheryl and Charlie are playing a game where you must fill up a large container with water. Sheryl has a cone shaped cup with a height of 8 inches and will hold volume of 95 inches cubed. If Charlie has a cylindrical cup with the same base area as Sheryl and will hold the same volume of water, what is the height of Charlie's cup?

Dimensional Change Video Click Here				
When we change the dimensions of a 2D or 3D figure, the area & volume also changes. When we				
multiply of a 2-D figure's dimensions by a, similar figures are formed.				
The dimensions change in a 1:1 ratio, however, the ratio for the areas will stay in a 1:1				
ratio.				
2D figures	Scale Factor(k)	Ratio	Ratio in General terms	
8 in 3 in				
16 in				
Dimensions (side length)		<u></u> :	:	
Perimeter		<u></u> :	:	
Area		or :	<u></u> :	
When ALL of a 2D figure's dir	nensions are multiplied	by a scale factor, we have	ve changed	
measurements on the figure. Therefore, the will change by the scale factor				
·				
Be careful with perimeter! Even though we are changing multiple dimensions, we are only, not multiplying, when we calculate perimeter. Therefore the scale factor stays in a 1:1 ratio for perimeter.				
•				

### Dimensional Change with 3D figures Video Click Here

When \_\_\_\_\_ of a 3D figure's dimensions are multiplied by a scale factor, we have changed \_\_\_\_\_ measurements on the figure. Therefore, the \_\_\_\_\_ will change by the scale factor \_\_\_\_\_.



#### In Summary:

Dimensions: a:b or  $\frac{a}{b}$ 

Area:  $a^2$ :  $b^2$  or  $\frac{a^2}{b^2}$ 

Volume:  $a^3$ :  $b^3$  or  $\frac{a^3}{b^3}$ 

**Dimensional Change (cont.)** 

### Dimensional Change (cont.) Video Click Here

A change in dimensions can be represented by a scale factor, a ratio, a proportion, or a

Remember, if we wanted our new shape to be 1.4 times larger, we would increase each dimension.

For example, the volume of a rectangular prism is

$$V = Iwh$$

The new volume after increasing each dimension is:

V = (1.4I)\*(1.4w)\*(1.4h)

 $V = (1.4^3) lwh$ 

V = (2.744)lwh

We can write this relationship as:

- Scale Factor: \_\_\_\_\_\_
- Ratio: \_\_\_\_\_: \_\_\_\_
- Percent: \_\_\_\_\_
- Proportion: \_\_\_\_\_\_\_

Practice:		
Question 1 Video Click Here	Question 2 Video Click Here	
A's dimensions were doubled. What is the volume of cylinder B?	Pyramid A is a square pyramid with a base side length of 10 inches and a height of 12 inches. Pyramid B has a volume of 2050 cubic inches. How many times bigger is the volume of pyramid B than pyramid A? Give your answer as a percent.	
Question 3 Video Click Here	Question 4 Video Click Here	
inches cubed. The dimensions of the original can will be increased by a scale factor of 1.2 to create a super sized frosting. How much more frosting will be in the	A decorative sphere has a diameter of 27 inches. An artist wants to make a clay sculpture modeling the sphere whose dimensions are 40% of the original sphere. What is the volume of clay needed for the sculpture? Use 3.14 for π and round your answer to the nearest tenth.	