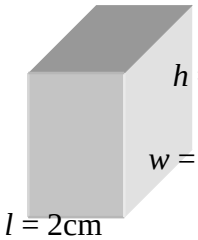
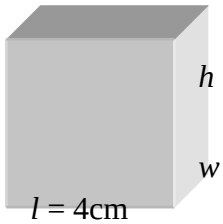
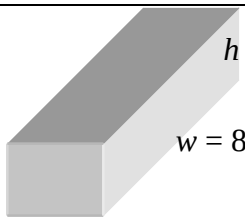
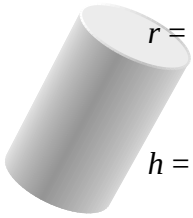
Maximum Volume for a Given Surface Area

RECTANGULAR PRISM	SURFACE AREA	VOLUME
		
		
		
	Make the surface equal to the other rectangular prisms	
	What if the rectangular prism is a cube?	

CYLINDER	SURFACE AREA	VOLUME
 h = 4.6cm r = 5cm		
 r = 2cm h = 22 cm		
 h = 8cm r = 4cm		
 h = ?cm r = 3cm	Make the surface equal to the other cylinders	

SUMMARY

The **rectangular prism** with the **maximum volume** for a given **surface area** is a _____.

Surface Area =

Volume =

The **cylinder** with the **maximum volume** for a given **surface area** has a _____ equal to its _____.

Surface Area =

Volume =

Example: The student council sells popcorn in square-based prisms and cylinders. Both packages are made from 600.0 cm^2 of card stock. Meredith wants to ensure it is priced fairly. How can Meredith determine the **maximum volume** of each package?

Homework

1) Determine, to one decimal place, the dimensions of the rectangular square-based prism that would have the greatest volume for each surface area.
   a. 210 cm^2 b. 490 cm^2

2) What is the greatest volume for an open-topped rectangular prism with a surface area of 101.25 cm^2?

3) What is the greatest volume that a can of vegetable soup with each of the following surface areas can hold (1mL = 1cm^3)?
   a. 245 cm^2 b. 500 cm^2

4) What is the maximum volume for a cylinder container which has no top if the surface area available for packaging is 360 cm^2?