# S&S C4 - Volume

Determine the volume, using SI and Imperial units, of right cones, right cylinders, right pyramids, right prisms and spheres

Determine a missing dimension when given the volume, using SI and Imperial units, of right cones, right cylinders, right pyramids, right prisms and spheres

Solve problems, using SI and Imperial units, that involve the volume of right cones, right cylinders, right pyramids, right prisms and spheres

# Volume of Prisms

What is a prism?

A prism has the same cross section along its entire length.

A prism has opposing bases that are the same shape and size.

# Volume of a Rectangular Prism

- Think of a stack of paper.
- Area of one sheet = lw
- Stack them all up and get Volume = lwh

# Volume of a Cyclinder

- Think of a stack of CD's.
- Area of one CD = $\pi r^2$
- Stack them all up and get Volume = $\pi r^2 h$

# Volume of a Triangular Prism

- Think of a stack of triangles (Toblerone Bar?).
- Area of one triangle = $\frac{1}{2}bh$
- Stack them all up and get Volume = $\frac{1}{2}bh_1h_2$

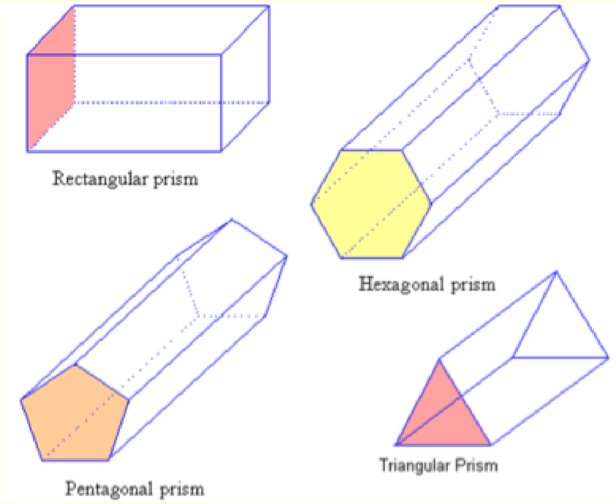


# Volume of Prisms

In general the volume of a prism is:

## Volume = Bh

where B = area of base
h = height of prism





Practice: Text pg. 29: 1ab, 3ad

# Volume of Pyramids

Geo Solids Investigation → Cone & Cylinder

→ Square Based Pyramid & Cube

Foldable Demonstration

The volume of a pyramid is one third the volume of its related prism.

In general the volume of a pyramid is: **Volume = 1/3Bh**

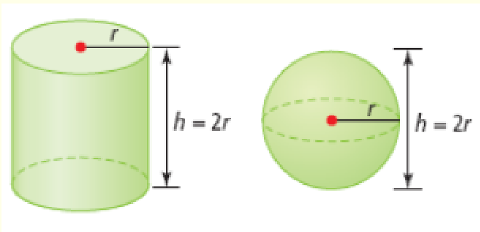
where B = area of base
h = height of pyramid

Practice: Text pg. 29: 2ab, 3c

# Derive Volume of a Sphere

Start: Use geosolids to show relationship between cone and semi-sphere.

$$V_{semi\text{-}sphere} = V_{cone}$$
$$= \frac{1}{3}\pi r^2 h$$

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$$V_{sphere} = \frac{2}{3}\pi r^2 h$$

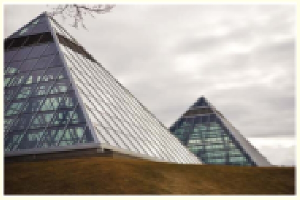
sub $h=2r$

$$= \frac{2}{3}\pi r^2(2r)$$
$$= \boxed{\frac{4}{3}\pi r^3}$$

Practice: Text pg. 29: 1c, 3b

# Practice: Volume of Pyramids (Board Work)

Many of the operating costs of a greenhouse depend on its volume. For example, the energy used to heat a building depends on the volume of the building. The two large greenhouses at the Muttart Conservatory have square bases measuring 26 m on each side. The apex of each greenhouse is 24 m high. What is the volume of each greenhouse, to the nearest cubic metre?



If instead the large greenhouses had been designed as right rectangular prisms with the same size base, what would their height have to be in order for the each greenhouse to have the same volume?

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Practice: Text pg. 29: 5, 9 - 11, 18

# Applying Assignment: "Holes"

1. Watch Video Clip

2. What are we interested in knowing?

3. What do we need to know?

4. Extension: Express your answer in more meaningful units. (Truckloads?)