

What We Are Learning

Volume

Vocabulary

These are the math words we are learning:

base face used to name a polyhedron

cone a solid figure with one vertex and one circular base

cylinder has two parallel, congruent circular bases connected by a curved lateral surface

edge place where two faces meet on a three-dimensional figure

face a flat surface of a polyhedron

polyhedron a three-dimensional object or solid figure

prism a polyhedron that has two congruent, polygon-shaped bases, and other faces that are rectangles

pyramid a polyhedron with a polygon base and triangular sides that all meet at a common vertex

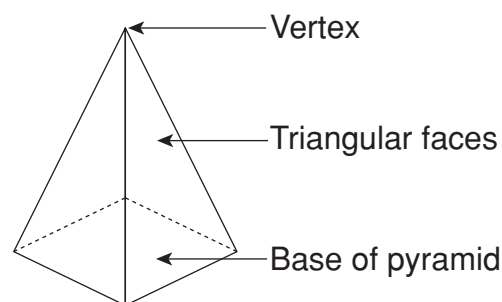
vertex point where three or more edges on a polyhedron meet

volume the number of cubic units needed to fill a given space

Dear Family,

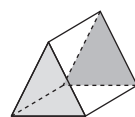
The student will learn to study three-dimensional objects from all sides and determine what the object looks like by studying drawings of different views of the object, from the front, top, and side.

In this section, the student will learn how to identify three-dimensional figures. He or she will learn the difference between prisms and pyramids, and cones and cylinders.



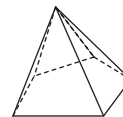
This is a square pyramid. It has a square base and all its other faces are triangles that meet at a common vertex.

Describe the type of base of each prism or pyramid. Then tell the name of the prism or pyramid.



There are two bases and they are both triangles. The other faces are parallelograms.

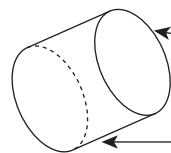
This is a triangular prism.



There is one base, and it is a pentagon. The other faces are triangles.

This is a pentagonal pyramid.

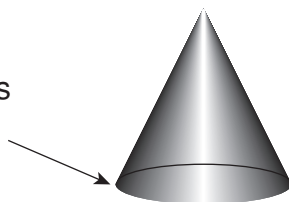
In this section your child will also learn to find the volume of prisms, cylinders, pyramids, cones and spheres. The **volume** of an object measures how much the object can hold.



This is a **cylinder**. It has two circular bases.

The curved surface is the lateral surface.

This is a **cone**. It has a circular base.



Solid Figure	Words	Volume Formulas
Prism	the area of the base times the height	$V = Bh$
Cylinder	the area of the base times the height	$V = Bh$ $= \pi r^2 h$
Pyramid	one-third the area of the base times the height	$V = \frac{1}{3}Bh$
Cone	one-third of the area of the circular base times the height	$V = \frac{1}{3}Bh$ $V = \frac{1}{3}\pi r^2 h$

Help the student to memorize these important formulas.

Sincerely,

What We Are Learning

Surface Area

Vocabulary

These are the math words we are learning:

hemisphere half of a sphere

lateral area the sum of the areas of the lateral faces

lateral face a side of a prism that connects the bases, or a triangular face of a pyramid

lateral surface the curved surface of a cylinder that connects the bases, or the curved surface of a cone

slant height the distance from the base of a cone or a pyramid to its vertex, measured along the lateral surface or a lateral face

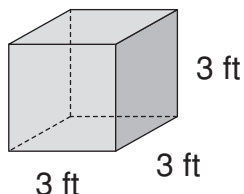
sphere a solid figure formed in space by all of the points that are the same distance from a given point, called the center

surface area the sum of the areas of each face of a solid figure

Dear Family,

In this section, the student will learn how to find the area of three-dimensional figures, including prisms, cylinders, and spheres.

Find the surface area of the prism to the nearest tenth.



The formula for finding the surface area of a prism is

$$S = 2\ell w + 2\ell h + 2wh$$

$$S = (2 \cdot 3 \cdot 3) + (2 \cdot 3 \cdot 3) + (2 \cdot 3 \cdot 3) \quad \text{Substitute.}$$

$$S = 18 + 18 + 18 \quad \text{Simplify.}$$

$$S = 54 \text{ ft}^3$$

These are the formulas for finding surface area.

Solid Figure	Words	Surface Area Formulas
Prism	the area of the bases plus the area of the lateral faces, which is the perimeter of the base times the height of the prism	$S = 2B + F$ $= 2B + ph$
Cylinder	the area of the bases plus the area of the lateral surface area, which is the circumference of the base times the height of the cylinder	$S = 2B + L$ $= 2\pi r^2 + 2\pi rh$

The student will also learn about **spheres**. Spheres are formed in space by all of the points that are the same distance from a given point. Have the student find examples of spheres at home.

The formula for the volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$, and the surface area of a sphere is given by the formula $V = 4\pi r^2$. In both formulas, r is the length of a radius of the sphere.

Find the volume and surface area of a sphere with radius 9 cm, both in terms of π , and as a decimal rounded to the nearest hundredth. Use 3.14 for π .

Volume	Surface Area
$V = \frac{4}{3}\pi r^3$	$S = 4\pi r^2$
$= \frac{4}{3}\pi(9^3)$	$= 4\pi(9^2)$
$= \frac{4}{3}\pi(729)$	$= 4\pi(81)$
$= 972\pi \text{ cm}^3 \approx 3052.08 \text{ cm}^3$	$= 324\pi \text{ cm}^2 \approx 1017.36 \text{ cm}^2$

The student will learn how to use scale factors to find the volume and surface area of similar figures.

Given the scale factor, find the surface area of the similar cylinder.

The scale factor of two similar cylinders is 3. The surface area of the smaller cylinder is 100.53 in^2 .

$$S = 100.53 \cdot 3^2 \quad \text{Multiply the surface area of the smaller cylinder by the square of the scale factor.}$$

$$S = 100.53 \cdot 9 \quad \text{Simplify.}$$

$$S = 904.77 \text{ in}^2$$

The surface area of the larger cylinder is 904.77 in^2 .

Practice finding surface area with the student to help reinforce these important geometric concepts.

Sincerely,