

Parent Newsletter

Chapter 8: Surface Area and Volume

Students will...

- Draw three dimensional figures.
- Find the number of faces, edges, and vertices of solids.
- Use nets to represent prisms.
- Find the surface area of prisms.
- Use nets to represent pyramids.
- Find the surface area of pyramids.
- Find the volume of prisms with fractional edge lengths by using models.
- Find the volume of prisms by using formulas.
- Solve real-life problems.

Standards

Common Core:

6.G.2: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.4: Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Key Terms

A **solid** is a three-dimensional figure that encloses a space.

A **polyhedron** is a solid whose *faces* are all polygons.

A flat surface of a polyhedron is called a **face**.

A line segment where two faces intersect is called an **edge**.

A point where three or more edges intersect is called a **vertex** of a solid.

The **surface area** of a solid is the sum of the areas of all of its faces.

A two-dimensional representation of a solid is called a **net**.

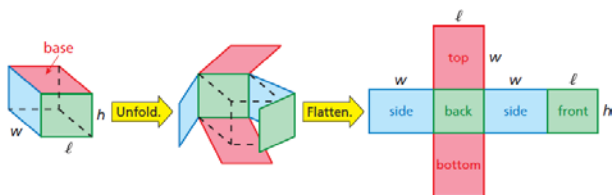
The **volume** of a three dimensional figure is a measure of the amount of space that it occupies.



Key Ideas

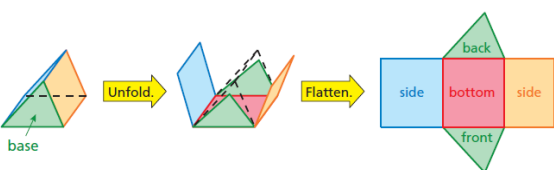
Net of a Rectangular Prism

A *rectangular prism* is a prism with rectangular bases.



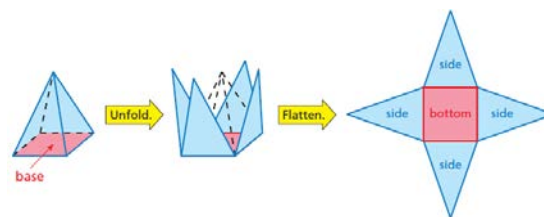
Net of a Triangular Prism

A *triangular prism* is a prism with triangular bases.



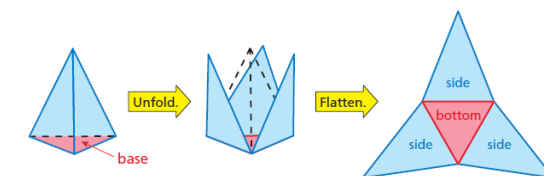
Net of a Square Pyramid

A *square pyramid* is a pyramid with a square base.

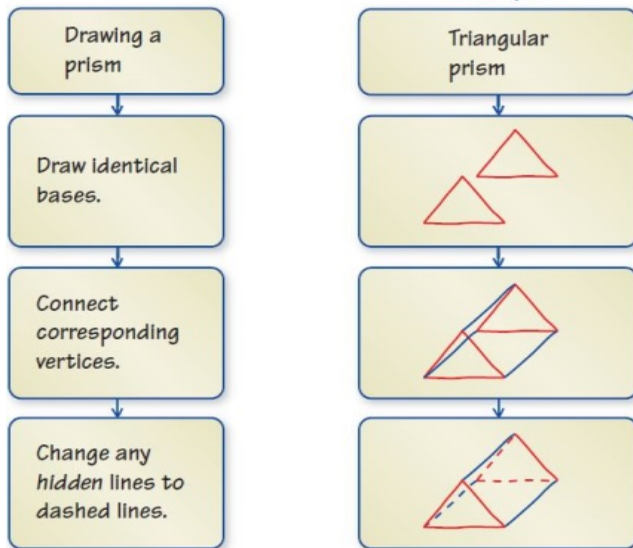


Net of a Triangular Pyramid

A *triangular pyramid* is a pyramid with a triangular base.



Reference Tools



A **Process Diagram** can be used to show the steps involved in a procedure. Process diagrams are particularly useful for illustrating procedures with two or more steps, and they can have one or more branches. As shown, process diagrams can have two parallel parts, in which the procedure is stepped out in one part and an example illustrating each step is shown in the other part. Or, the diagram can be made up of just one part, with example(s) included in the last “bubble” to illustrate the steps that precede it.

Essential Questions

How can you draw three-dimensional figures?

How can you find the area of the entire surface of a prism?

How can you use a net to find the surface area of a pyramid?

How can you find the volume of a rectangular prism with fractional edge lengths?

Quick Review

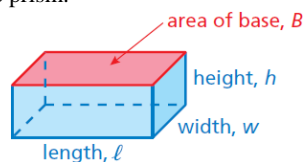
- Area is always measured in square units, and volume is always measured in cubic units.
- Square units are used to label surface area.
- It is traditional to consider the *top and bottom* faces of a rectangular prism as the bases.
- A pyramid with a regular base has congruent lateral faces.
- When asked to find the surface area of a prism or pyramid, the base is included.

Key Ideas

Volume of a Rectangular Prism

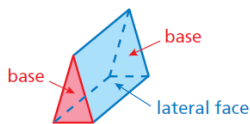
The volume V of a rectangular prism is the product of the area of the base and the height of the prism.

$$V = Bh \text{ or } V = \ell wh$$



Prisms

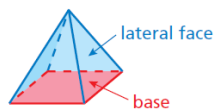
A prism is a polyhedron that has two parallel, identical *bases*. The *lateral faces* are parallelograms.



Triangular Prism

Pyramids

A pyramid is a polyhedron that has one base. The lateral faces are triangles.



Rectangular Pyramid

The shape of the base tells the name of the prism or the pyramid.

What's the Point?

The ability to find surface area and volume is very useful in real life for situations like packaging materials. Ask your student to find the amount of cereal that can fit in two different boxes. Then ask them to find the surface area of the boxes. Which box can hold more cereal? Why do they think the cereal company uses the dimensions that they do?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 8: Packaging Design STEM Video is available online at www.bigideasmath.com.

