Further investigations:
Cut open a cereal or cracker box to form a flat shape with six rectangles. Find the area of each rectangle and total the areas to find the box's surface area.
Cut open an empty frozen orange juice can to make a flat shape with two circles (lids) and a rectangle. Find areas of each flat shape and add results to find the total surface area.
Use a ruler to measure the diameters and heights of cans in the pantry. Calculate the volumes and surface areas of the cans using formulas.
Use a ruler to measure the length, width, and height of boxes or box-shaped objects such as a desk, a TV, or a refrigerator. Calculate the volumes and surface areas of the boxes and other rectangular prisms.
Ask your student to show you how to fold nets (patterns) to make solid figures.

Terminology:
Base: Flat circular part of a cone or polygonal region of a pyramid that does not intersect with other faces at the apex.
Bases: Two parallel and congruent regions of a prism or cylinder. Bases are circular in a cylinder and polygonal in a prism.
Cone: A 3-D figure with one circular or elliptical base and one vertex.
Cube: A regular polyhedron whose six faces are congruent squares.
Cylinder: A 3-D object with two parallel, congruent circular bases.
Edge: The intersection of a pair of faces in a 3-D object.
Face: one of the sides of a polyhedron.
Net: A 2-D figure that, when folded, forms the surfaces of a 3-dimensional object.
Polyhedron: A 3-D figure that has polygons as faces.
Polygon: A closed figure formed by three or more line segments.
Prism: A polyhedron with two parallel and congruent faces called bases, and other faces that are parallelograms.
Pyramid: A polyhedron with one base and the same number of triangular faces as there are sides of the base.
Surface area: Total area of the 2-D surfaces that make up a 3-D object.
Volume: The amount of space occupied by an object.

Solids
Students will:
- Name and compare properties of simple geometric solids
- Estimate volumes and surface areas of basic solid figures
- Apply formulas to compute volumes and surface areas of solids
- Interpret and sketch various views of solids
- Construct nets for prisms, cylinders, pyramids, and cones

Classroom Cases:
1. For each figure below, state its mathematical name, estimate its volume and its surface area, then use formulas to compute volume and surface area.

   ![Figure 1](image1.png)

   Case Closed - Evidence:
   A. This is a prism.
   Its estimated volume is 5×6×8 = 240 ft³ and its estimated surface area is 2×40 +2×48 + 2×30 = 2 (40+30+48) = 237 ft²
   By formula, the volume is \( V = \text{lw} \times \text{h} = 8.3 \times 4.7 \times 6.1 = 237.961 \text{ ft}^3 \)
The surface area is \( S = 2\text{lw} + 2\text{lh} + 2\text{wh} = 2 (39.01+50.63+28.67) = 236.62 \text{ ft}^2 \)

   B. This is a cylinder. Its estimated volume is 3×4×4×6=288 m³, and its estimated surface area is 2×3×4×4 + 3×8×6 = 240 m²
   The volume is \( V = \pi r^2 h = 3.14×4.1^2×5.8 = 306.144 \text{ m}^3 \)
The surface area is \( S = 2\pi r^2 + 2\pi rh = 2×3.14×4.1×12 + 2×3.14×4.1×5.8=254.9 \text{ ft}^2 \)

2. For each figure below, state its mathematical name, estimate its volume, and then use formulas to compute its volume.

   ![Figure 2](image2.png)

   Case Closed - Evidence:
   C. This is a cone. Its estimated volume is 28 in³.
   By formula, \( V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \times 3.14 \times 2.2 \times 2.2 \times 7=35.46 \text{ in}^3 \)

   D. This is a pyramid. Its estimated volume is 4 cm³.
   By formula, \( V=\frac{1}{3} \times lwh = \frac{1}{3} \times 2\times3\times4 = 8 \text{ cm}^3 \)

3. Draw nets for each of the figures in cases 1 and 2.

4. Sketch the figures described:
   A. A right rectangular prism 2 cm x 3 cm. x 2 cm
   B. A cylinder with diameter of 4 cm and height 3 cm
   C. A pyramid with square base 3 cm x 3 cm and height 4 cm
   D. A cone with radius 2 cm and height 5 cm

   Case Closed - Evidence:
   A. 2 cm
   B. 4 cm
   C. 3 cm
   D. 5 cm

Related Files:
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