

Dear Family,

Your child is learning how to solve problems with cylinders, cones, and spheres.



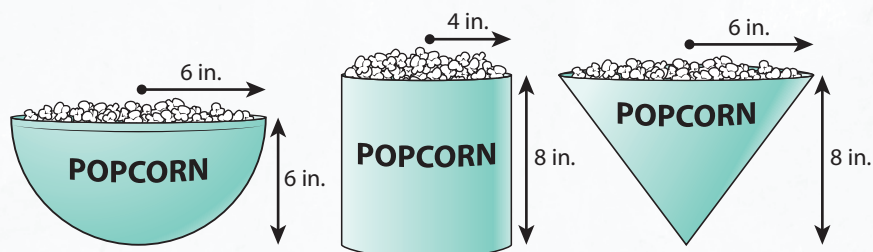
You can describe the shape of certain containers in terms of cylinders, cones, and spheres. Popcorn is served in containers that can be described using geometric figures.

- If you ever had popcorn served in a bowl, you were eating out of a half-sphere. A sphere is a circular figure like a ball.
- A bucket of popcorn from a movie theater may have the shape of a cylinder: the top and bottom are circles and the side is curved.
- Individual servings of popcorn can be served at a party in cone-shaped paper cups. A cone is a circle with sides tapering to a point.

Suppose you had containers shaped like a half-sphere, a cylinder, and a cone and want to know which would hold the most popcorn. You could find the volume of each container to figure that out.

Consider the following example:

Michaela wants to give out popcorn at the town movie night. All three containers cost the same amount, so she wants to buy the one that will hold the most. Which container should she buy?



The next page shows one way in which your child could use formulas to find the container that holds the most popcorn.

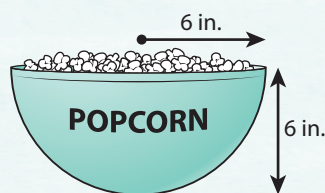


Solve Problems with Cylinders, Cones, and Spheres: Sample Solution

Michaela is choosing between three containers. One container is in the shape of a half-sphere with radius 6 in. and height 6 in. The second container is in the shape of a cylinder with radius 4 in. and height 8 in. The third container is in the shape of a cone with radius 6 in. and height 8 in. Which container holds the most?

Half-sphere: Find the volume of a sphere and multiply by $\frac{1}{2}$, because it is only half of the sphere.

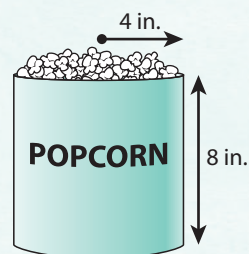
$$\begin{aligned} V &= \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right) \\ &= \frac{2}{3} \pi (6^3) \\ &= \frac{2}{3} \pi (216) \\ &= 144\pi \end{aligned}$$



The volume of the half-sphere is 144π cubic inches.

Cylinder:

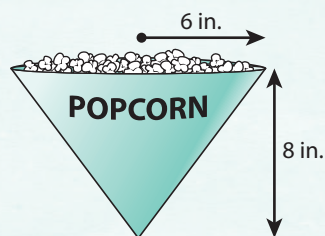
$$\begin{aligned} V &= \pi r^2 h \\ &= \pi (4)^2 (8) \\ &= \pi (16)(8) \\ &= 128\pi \end{aligned}$$



The volume of the cylinder is 128π cubic inches.

Cone:

$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \pi (6)^2 (8) \\ &= \frac{1}{3} \pi (36)(8) \\ &= \frac{1}{3} \pi (288) \\ &= 96\pi \end{aligned}$$



The volume of the cone is 96π cubic inches.

Answer: All of the volumes are given in terms of π , so you can compare the volumes. The half-sphere has the greatest volume. Michaela should choose the container shaped like a half-sphere.