

Lesson 9-4: Surface Area and Volume of a Sphere

Hands-on Activity: Volume of Sphere (2)



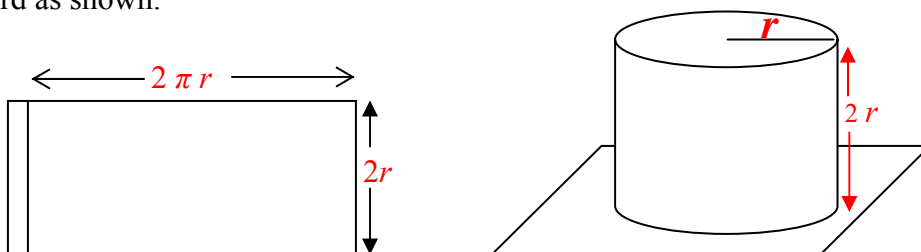
Objective: We will see how the formula for the volume of a sphere can be found by comparing the sphere volume to the volume of a cylinder with the same radius r and a height of $2r$.

Materials:

- tennis ball cut exactly in half
- small piece of poster board
- piece of string about 10 inches long
- Tape
- ruler
- Scissors
- Sand

Procedure to make a cylinder:

1. Measure and record the diameter of the tennis ball half to the nearest $1/8$ ". (It should be approximately $2\frac{1}{2}$ ".)
2. Using the string, find the circumference of the ball, then measure the string with the ruler.
3. Draw a rectangle on the poster board using the circumference from #2 as the length of a rectangle and the diameter ($2r$) from #1 as the width. Draw a $1/2$ " extension on the length of the rectangle as shown below. Cut this out.
4. Roll the rectangle into a cylinder and tape one width over the extension. Tape this cylinder to the poster board as shown.



Procedure to measure volume:

1. Fill the tennis ball half with sand and then pour the contents into the cylinder.
2. Repeat step 1.
3. Estimate what fraction of the cylinder is filled. This is the volume of the sphere.



Complete the blanks below:

Volume of the cylinder	Volume = BH	Volume = $(\pi r^2)(2r) = (2\pi r^3)$
Volume of the sphere	Volume = $\frac{?}{?}$ cylinder volume	Volume = $\frac{?}{?} (2\pi r^3)$

State the formula for finding the volume of a sphere with radius r . $V =$ _____