**?**

**W**

**2K**

**Use** either the

or diameter measures.

**Apply** the formula

to find the volume of a sphere.

**Determine** the formula for the volume of a

sphere.

**Lesson Goals**

**Investigate** a relationship between

and cylinder volumes.

**Words to Know**

*Fill in this table as you work through the lesson. You may also use the glossary to help you.*

**Lesson Question**

|  |  |
| --- | --- |
|  | a line segment connecting any two points on a sphere and passing through the center |
|  | the measure of the amount of space occupied by a three- dimensional solid object |
|  | to explain or show the similarities or differences between items or ideas |
|  | set of all points in space a given distance from a fixed point |
|  | a segment that extends from the center of a sphere to any point on the sphere |

## Volume of a Cylinder

What is the **volume** of this cylinder?

*V* = *Bh*

4 in.

9.5 in.

*V* = *Bh V* =

*V* = π(42)( )

*V* = π(16)(9.5)

*V* = in.3

**2**

**4**

in.

6 in.

3 in.

**Relating a Sphere to a Cylinder**

Consider a sphere and a cylinder with the same radius and height.

3 in.

**Slide**

**Parts of a Sphere**

Examine the diagram of a **sphere**.

* Center
* **Radius of a sphere**
* **Diameter of a sphere**
* Great circle

circle

of a sphere

diameter of a

sphere

**Slide**

than the volume of

the cylinder is still the sphere.

*r*

*h*

the same height and the same radius, the volume of

and the cylinder have

Even though the

*r*

**Comparing Spheres and Cylinders**

**Compare** the volumes of a sphere and a cylinder with the same radius and height.

**4**

(Volume of cylinder)

*V*Sphere 

 2 3

**Slide**





 

  *r*3

*V* 

The base area *B* = π*r*2 and the height is the diameter:

*h* = 2*r* =

)

2

*r* (

3

2

*V*  

2

*V*  3 *Bh*

2

**Volume of a Sphere**  3 **(Volume of a Cylinder)**

**Determining a Formula for the Volume of a Sphere**

**EXAMPLE**

The volume of a cylinder is represented by the formula *V* = *Bh*, where *B* is the area of the circular base and *h* is the height.

**6**

**8**

 cm3

3

)

*V* 

*V*  4 (

3

*V*  4 (64) 3

3

4 cm

4

*V*  *r*3

What is the volume?

The sphere has a 4 cm radius.

**Finding Volume When Given the Radius**

**EXAMPLE**

**Slide**

## Finding Volume When Given the Diameter

**EXAMPLE**

This sphere has a diameter of 1 cm. What is the volume?

*r*  cm

4 3

*V*  3 *r*

1 cm

4 13

*V*  3 2

**11**

 

4  

*V*   

3

 

4

*V*  24 

*V*  cm3


# **Summary** Introduction to the Volume of a Sphere

**?**

How can you find the volume of a sphere?

**Lesson Question**

**Answer**

*Use this space to write any questions or thoughts about this lesson.*