Volumes of Geometric Solids

**CORE STANDARDS**

HSG.GMD.A.3

LESSON

**6-4**

OBJECTIVE **1. SWBAT use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.**

Volume of a Sphere



Volume of a Cylinder



Volume of a Cone



Volume of a Pyramid



NOTES

 Definitions of variables: *V*: volume *r*: radius *h*: height *B*: area of base

EXAMPLES

**1.** Find the volume of a sphere with a radius of 5cm. **2.** Find the volume of a cylinder with radius = 2cm

 and height = 15cm.

**3.** Find the height of a cone with volume = 80cm3 and **4.** A pyramid has a square base with a perimeter

 radius = 2cm. of 40cm. If the volume = 600cm3, find the height.

**5.** The radius of the Earth is 3.67 times longer than the **6.** A cylinder's radius is 8cm more than its height.

 radius of the moon. How many times larger is the Find the equation for the volume of this cylinder

 Earth than the moon in terms of volume? In terms of height, *h*.

**7.** Find the volume of the figure below. **8.** Find the volume of the square-based pyramid below.

*h* = 90ft

80ft

5ft

9ft

6ft

PRACTICE **6-4** NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 [SHOW YOUR WORK]

Calculate the volume of each solid described below. Round answers to the nearest hundredth.

1. Sphere with *r* = 8cm
2. Cylinder with *r* = 5cm and *h* = 7cm
3. Cone with *r* = 12in and *h* = 14in
4. Rectangular-based pyramid with *h* = 10in and base dimensions 4in by 6in.

Use the given information to find the measure of each indicated part. Round answers to the nearest hundredth.

1. For a sphere, *V* = 345cm3; find *r*.
2. For a cylinder, *V* = 220cm3 and *h* = 50cm; find *r*.
3. For a cone, *V* = 165in3 and *r* = 5in; find *h*.
4. For a square-based pyramid, *V* = 312in3 and *h* = 26in; find perimeter of base.

Find the volume of each figure shown below. Round answers to the nearest hundredth.

1. 10. *ABCD* is a square with center *E*. 11. Semi-cone

7ft

15ft

 *FG* = 10cm *EG* = 6cm

18ft

20ft

*A*

*B*

*C*

*D*

*E*

*F*

*G*

1. Suppose a certain sphere and cylinder have the same volume and the same radius. Find the height of the cylinder in terms of its radius.



1. An ice cream cone measures 4.5cm in diameter across the top and has a height of 11cm, as shown. A spherical ball of ice cream will be placed on top. Suppose the customer waits for the ice cream to melt into the cone without eating or spilling any ice cream. Find the initial radius of the ice cream ball so that the melted ice cream will completely fill the cone.
2. A cylinder has a radius equal to  and a height equal to . Find the volume of the cylinder in

terms of *x*. Write your answer in simplified polynomial form.