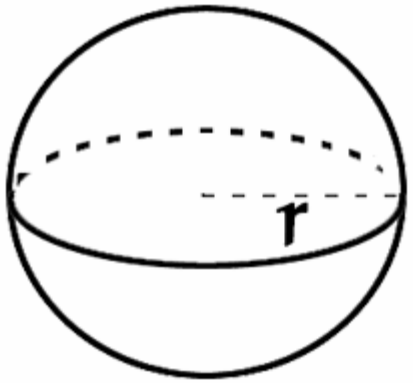
Unit 3 Circles and Spheres

Surface Area of a Sphere

Lesson 18

Definition of a Sphere



A sphere is a space (3-D) figure having all of its points the same distance from its center. The distance from the center to the surface (edge) of the sphere is called its radius. The diameter is twice the radius. Any cross-section of a sphere is a circle. A cross-section through the center of the sphere is called a great circle.

Brainstorming

- List as many real life examples of spheres as you can in one minute.

Let’s see who comes up with the most!

Brainstorming

Let's look at this ORANGE

- What are some mathematical terms that we can we examine with the orange?

Answers should include radius, diameter, surface area, volume, circumference, great circle, etc.

- Discuss these characteristics with respect to the orange (the peeling represents the surface area)

Discovery of Surface Area

Let's focus specifically on SURFACE AREA

- What do we mean by surface area?
- Show the size of a sq. cm, sq. in, sq. ft, sq. yd, sq. meter
- Show a prism & remind students that the surface area is found by adding the areas of each face (demonstration)

Discovery of Surface Area

<u>Orange You Glad</u> Discovery Activity-

In this activity, the students will use a "hands-on" approach to explore & generate the formula for the surface area of a sphere.

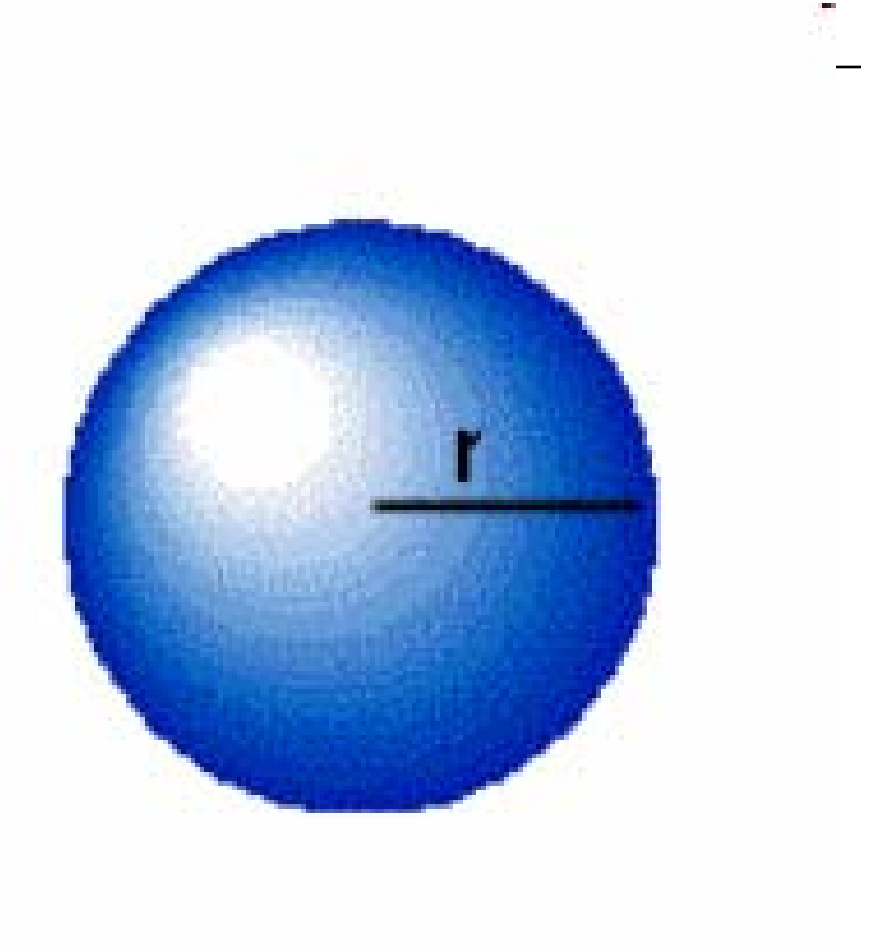
(See handout entitled <u>Orange You Glad…?</u>)

Surface Area of a Sphere Formula

Surface Area = 4π(r)2

or

Surface Area = π(d)2



Finding the surface area of a sphere given the radius.

<u>Example 1</u>: Given the radius r = 3 ft.

$$SA = 4\pi r^2$$
$$= 4(\pi)(9\ ft^2)$$
$$= 36\pi\ ft^2 \text{ (in terms of } \pi)$$
$$= 113.0\ ft^2.$$

Finding the surface area of a sphere given the diameter

Example 2: **Given diameter (d) = 20 m**

First, find the radius: 20 / 2 = 10

$$SA = 4\pi(r)^2$$
$$= 4(\pi)(10\ m)^2$$
$$= 4(\pi)(100\ m^2)$$
$$= 400\pi\ m^2 \text{ (in terms of } \pi)$$
$$= 1256\ m2$$

Finding the surface area of a sphere given the circumference

Example 2: Given circumference C = 8π ft

Remember C = 2πr

8π = 2πr (divide by 2π)

4 = r

$$SA = 4\pi(r)^2$$
$$= 4(\pi)(4)^2$$
$$= 4(\pi)(16)$$
$$= 64\pi \text{ ft}^2 \text{ (in terms of } \pi)$$
$$= 200.96 \text{ sq. ft}$$

Homework

- McDougal Littell textbook

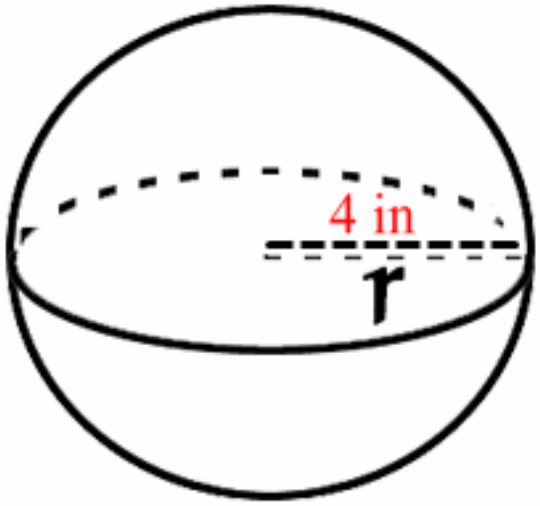
  p. 239 1-8

  p. 241 1-10

Ticket out the door

- **Find the surface area of the spheres.**

A)



B) Given

Diameter = 14.8 ft

C) Given

Circumference = 100π