

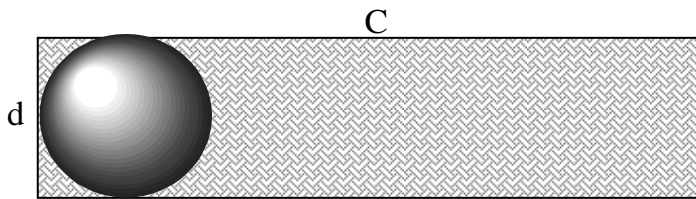
COUNTDOWN Challenge

Unwrapping the Earth



To think about the surface area of a sphere, consider how much wrapping paper you would need to cover it.

Here is an illustration of a ball (a sphere) and a piece of wrapping paper. Notice that the paper's width is equal to the diameter of the ball. The paper's length is equal to the ball's circumference. Let's find the surface area of the ball.



First, remember the formula for surface area of the paper: length x width

We can substitute to find the formula for the surface area of the ball: Circumference x diameter

When we expand our formulas for circumference and diameter we have:

$$C = 2 \pi r \quad d = 2r$$

When we multiply these together we find our formula:

$$2 \pi r \times 2r \rightarrow 4 \pi r^2 = \text{surface area of a sphere}$$

Use a calculator and round to the nearest hundredth to fill in the chart and discover the surface area of some familiar spheres.

Type of Sphere	Radius (r)	Diameter (2r)	Circumference (2 π r) or (πd)	Surface Area (4πr ²)
Baseball	1.45 in.			
Basketball			29.5 in.	
Moon	1,080 miles			
Earth	3,963 miles			

Here's a picture of our earth's surface spread out like a piece of wrapping paper. You could call this a surface area map.

Notice that the earth's surface has been divided evenly into 24 time zones.

Take the earth's surface area from the table above and divide by 24 to find the approximate surface area of each time zone:

Earth's surface area: _____

divided by 24 =

_____ approximate surface area of each time zone

