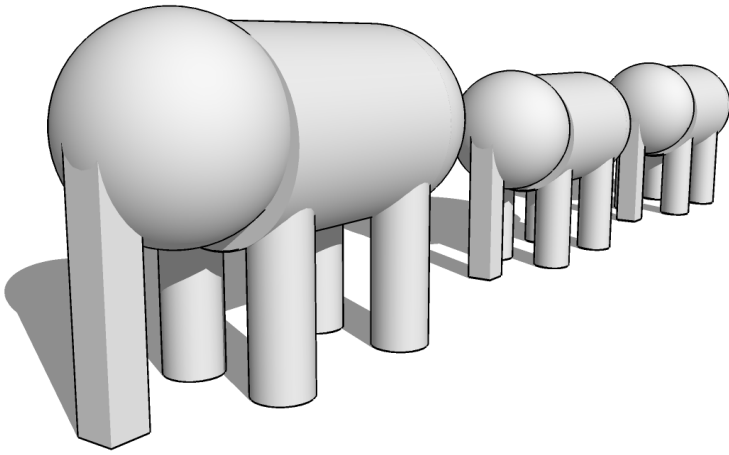


# Why do Elephants Have Big Ears?



Animals with a small surface area to volume ratio find it more difficult to keep cool in hot climates than animals with a higher surface area to volume ratio.

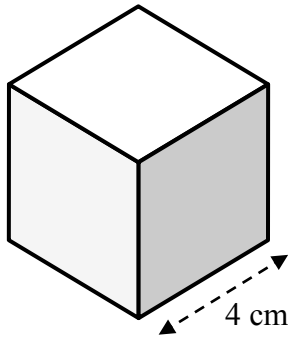
Animals with a high surface area to volume ratio find it more difficult to keep warm in cold climates than animals with a lower surface area to volume ratio.

This ratio is calculated using the following:

$$\text{Surface Area to Volume Ratio} = \frac{\text{Surface Area}}{\text{Volume}}$$

## Example

Calculate the surface area to volume ratio of a cube with sides of length 4 cm.

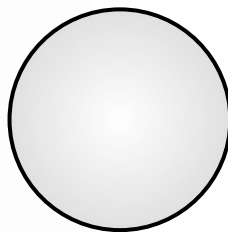
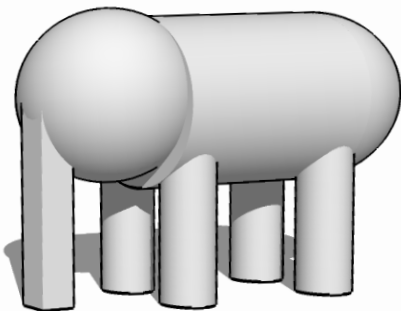


$$\begin{aligned} \text{Surface Area} &= 6 \times 4 \times 4 \\ &= 96 \text{ cm}^2 \end{aligned}$$

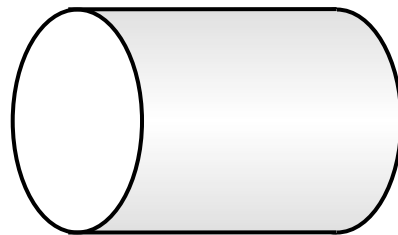
$$\begin{aligned} \text{Volume} &= 4 \times 4 \times 4 \\ &= 64 \text{ cm}^3 \end{aligned}$$

$$\text{Surface Area to Volume Ratio} = \frac{96}{64} = 1.5$$

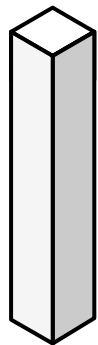
Consider the simple elephant model below, made from the following 3-dimensional solids:



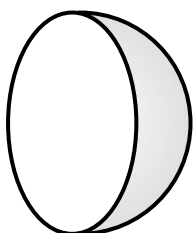
A sphere for the head



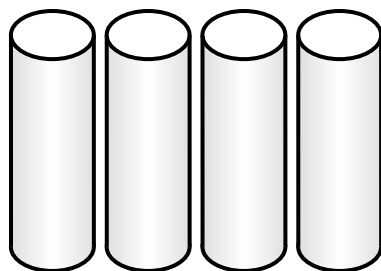
A cylinder for the body



A square prism for the trunk



A hemisphere for the back



Four cylinders for the legs

Note that some of these solids overlap. For example, the top of each cylinder which represents a leg is inside of the cylinder which represents the body.

Please email me for the rest of this file. My details can be found on the “Contact” page of [MrBertman.com](http://MrBertman.com).