

**MENSURATION**

**08 SEPTEMBER 2014**



**Lesson Description**

In this lesson we:

- Consider the following aspects of Mensuration:
  - Volume
  - Total surface area



**Summary**

**Volume**

Volume is the three dimensional space occupied by an object, or the contents of an object. It is measured in cubic units.

$V = \text{Area of base} \times \text{height}$

**Surface Area**

Surface area is the total area of the exposed or outer surfaces of a prism.

$TSA = 2 \times \text{Area of base} + \text{Perimeter of base} \times Ht$

Tetrahedron (Triangular pyramid)	Square pyramid (Square-based pyramid)	Hexagonal pyramid
Cube	Cuboid	Triangular prism

notes for...


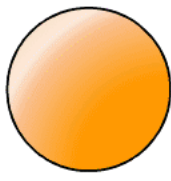
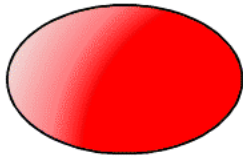
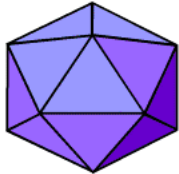
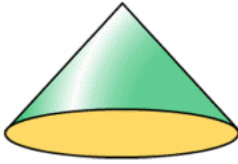
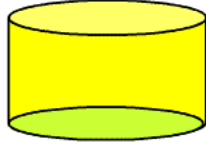



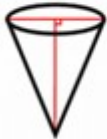


Octahedron	Pentagonal prism	Hexagonal prism
		
Dodecahedron	Sphere	Ellipsoid
		
Icosahedron	Cone	Cylinder

Figure	Shape	Volume	Total Surface Area
	CUBOID	$l b h$	$2lh + 2bh + 2lb$
	CUBE	$a^3$	$6a^2$
	CYLINDER	$\pi r^2 h$	$2\pi r(h + r)$
	CONE	$\frac{1}{3} \pi r^2 h$	$\pi r (l + r)$
	SPHERE	$\frac{4}{3} \pi r^3$	$4\pi r^2$
	HEMI-SPHERE	$\frac{2}{3} \pi r^3$	$3\pi r^2$

**Test Yourself****Question 1**

The diameter of a closed cylinder is reduced from 8 cm to 4 cm and the height from 30 m to 15 m. By what factor are the linear dimensions reduced?

- A) 0.3
- B) 0.5
- C) 1.5
- D) 1.3

**Question 2**

The diameter of a closed cylinder is reduced from 8 cm to 4 cm and the height from 30 m to 15 m. By what factor will the surface area of the cylinder be reduced?

- A) 0.09
- B) 2.25
- C) 0.25
- D) 1.09

**Question 3**

To make it more user-friendly, the surface area of a cubic dice is reduced by a scale factor of 0.25. By what scale factor will the length of an edge have to be reduced to meet these requirements?

- A) 0.5
- B) 0.3
- C) 1.3
- D) 1.5

**Question 4**

Calculate the volume of a cylindrical water tank with diameter of 2 m and a height of 3 m. Give the answer in terms of  $\pi$ .

- A)  $\pi$
- B)  $2\pi$
- C)  $3\pi$
- D)  $4\pi$



## Improve your Skills

### Question 1

Jam is sold in two sizes of cylindrical tins. The smaller tin has a diameter of 7 cm and a height of 12 cm. The bigger tin has the same height as the smaller tin, but double the diameter. According to the advert on the shelf, the bigger tin is the better buy at R37,99 than the smaller tin at R9,00.

- Calculate the volume of each tin.
- Calculate the price per  $\text{cm}^3$  of each can and state whether the advert is correct.
- Find the ratio  $\frac{\text{volume of big tin}}{\text{volume of smaller tin}}$
- What is a reasonable price for the big tin of jam?

### Question 2

Consider a rectangular prism with length  $l$ , breadth  $b$  and height  $h$ .

- Increase each dimension by a factor of 4.
- By what factor will the surface area of the prism increase?
- By what factor will the volume of the prism increase

### Question 3

Find the surface area of the following cone (correct to 1 decimal place):

