

# OCR (A) Physics GCSE

## PAG 01 - Determining the densities of a variety of objects, both solid and liquid

### Flashcards

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# Define density.



Define density.

Density is the mass per unit volume of an object/material.



Give the equation for density, including all SI units.



Give the equation for density, including all SI units.

density ( $\text{kg/m}^3$ ) = mass (kg) / volume ( $\text{m}^3$ )

$$\rho = m/V$$



# How is mass measured?



# How is mass measured?

Using a calibrated spring balance or  
Newton-meter.



How can you measure the volume of a regular solid?





How can you measure the volume of a regular solid?

- Take appropriate length measurements (eg. height, diameter)
- Apply an appropriate formula to calculate the volume



Give examples of regular solids.



Give examples of regular solids.

- Cube
- Prism (triangular, cylindrical, rectangular)
  - Pyramid
  - Cone
  - Sphere



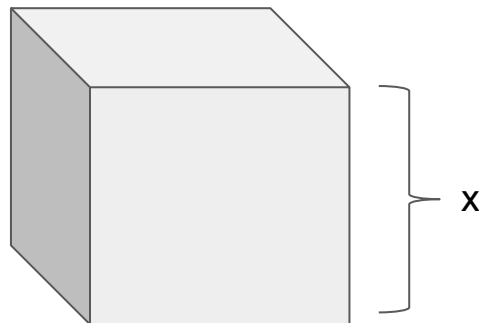
Give the formula for the volume of a cube.



Give the formula for the volume of a cube.

Volume = length<sup>3</sup>

$$V = x^3$$

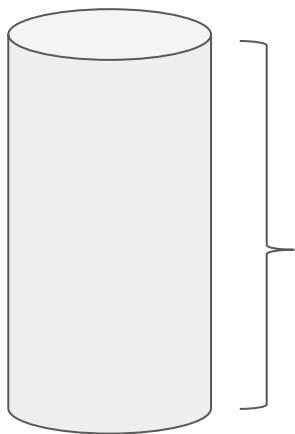


Give the formula for the volume of a prism.

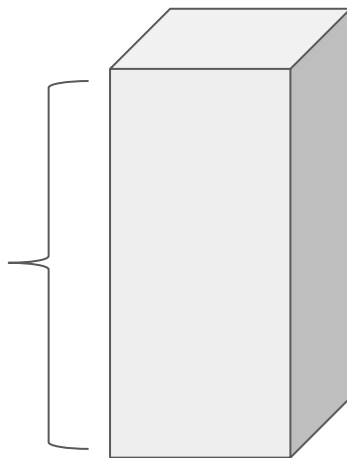


Give the formula for the volume of a prism.

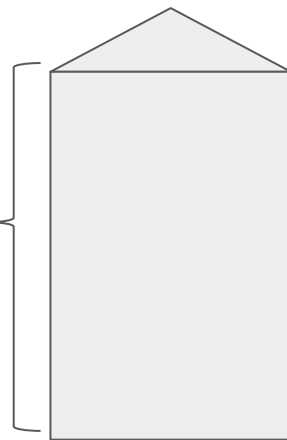
Volume = area of face x height



height



height



Give the formula for the area of a square.





Give the formula for the area of a square.

$$\text{Area} = \text{length}^2$$

$$A = x^2$$



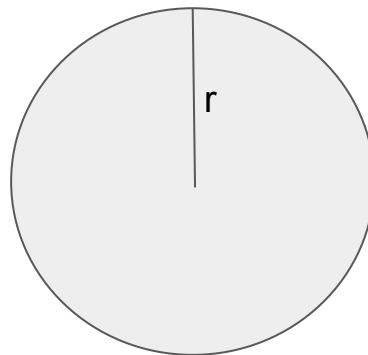
Give the formula for the area of a circle.



Give the formula for the area of a circle.

$$\text{Area} = \pi \times \text{radius}^2$$

$$A = \pi r^2$$



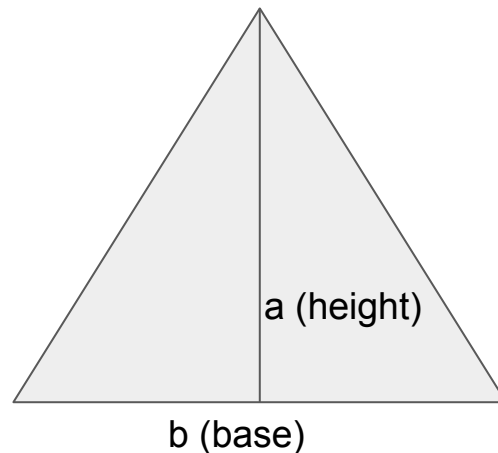
Give the formula for the area of a triangle.



Give the formula for the area of a triangle.

Area =  $\frac{1}{2}$  x base x height

$$A = \frac{1}{2}ab$$



Give the formula for the volume of a sphere.



Give the formula for the volume of a sphere.

$$\text{Volume} = \frac{4}{3} \times \pi \times \text{radius}^3$$

$$V = \frac{4}{3}\pi r^3$$



Describe how to work out the density of a regular solid object.





Describe how to work out the density of a regular solid object.

1. Use a scale/balance to measure its mass
2. Use a ruler to take appropriate length measurements
3. Use an appropriate calculation to calculate the volume
4. Use  $\rho = m/V$  to calculate the density



How would you find the volume of an irregular solid?



How would you find the volume of an irregular solid?

**By submersion.**



Describe how submersion is used to work out volume.



Describe how submersion is used to work out volume.

- Fill a beaker with water and read off the volume
  - Submerge the object in the water
  - Read off the new volume in the beaker
- The change in volume is equal to the volume of the object



What precaution must be taken when using submersion?



What precaution must be taken when using submersion?

No water may leave the beaker, so be careful to avoid splashing/spilling.



How can submersion be used if the object floats?





How can submersion be used if the object floats?

Hold the object down so it is just submerged (but take care that your fingers don't enter the water).



Describe how to work out the density of an irregular solid object.



Describe how to work out the density of an irregular solid object.

- Use a scale/balance to measure its mass
- Use submersion in a beaker of water to calculate its volume
- Use  $\rho = m/V$  to calculate the density



How can you work out the mass of a liquid?



How can you work out the mass of a liquid?

Place a beaker on a balance and zero the device. Pour the liquid into the beaker and read off its mass.



How can you work out the volume of a liquid?



How can you work out the volume of a liquid?

Pour it into a beaker/measuring cylinder  
and read off the volume.



How can you calculate the density of a liquid?





How can you work out the density of a liquid?

- Use a scale/balance to measure its mass
  - Read off the volume of liquid
- Use  $\rho = m/V$  to calculate the density

