

# OCR A Physics GCSE

## 1.3 - Pressure

### Flashcards



Describe the motion of molecules in a gas.



Describe the motion of molecules in a gas.

They are in constant random motion.



What is the unit used for pressure?



# What is the unit used for pressure?

Pascal (Pa).



How can the pressure of a gas be increased whilst kept at constant temperature?



How can the pressure of a gas be increased whilst kept at constant temperature?

The volume can be decreased (when the gas is compressed).



How can the pressure of a gas be decreased whilst kept at constant temperature?





How can the pressure of a gas be decreased whilst kept at constant temperature?

The gas can be expanded (the volume is increased).



What effect does increasing temperature have on the pressure of a gas when held at constant volume?



What effect does increasing temperature have on the pressure of a gas when held at constant volume?

Pressure of the gas will increase as the temperature increases.



Why does pressure increase as temperature increases (at a constant volume)?



Why does pressure increase as temperature increases (at a constant volume)?

- Kinetic energy of molecules increases
- Collisions between molecules becomes more frequent
- Greater rate of change of momentum
- Greater force and therefore pressure



If gas A is at a low pressure, and gas B is at a high pressure, what can be said about the rate of collisions in each gas?



If gas A is at a low pressure, and gas B is at a high pressure, what can be said about the rate of collisions in each gas?

- There are more collisions per second in gas A than in gas B
- The rate of collisions is higher in A



Describe the force that the pressure of a gas exerts on the walls of its container.





Describe the force that the pressure of a gas exerts on the walls of its container.

- The net force acts at right-angles to the container's surface
- The magnitude of the force increases as pressure increases



Explain how increasing the volume of a gas results in a decrease of pressure.



Explain how increasing the volume of a gas results in a decrease of pressure.

- Molecules become more spread out so collisions become less frequent (more time between them)
- This reduces the rate of collisions
- Rate of change of momentum decreases, and so force exerted on container decreases, resulting in a lower pressure



What can be said about the product of pressure and volume for a fixed mass of gas at a constant temperature?  
(Higher)



What can be said about the product of pressure and volume for a fixed mass of gas at a constant temperature?

It is constant.

$$p V = \text{constant}$$



What increases when you do work on a  
gas?  
(Higher)



What increases when you do work on a gas? (Higher)

- The internal energy of the gas
- This can also lead to an increase of temperature



Why does the temperature of air inside a bike pump increase when it is pumped?  
(Higher)





Why does the temperature of air inside a bike pump increase when it is pumped? (**Higher**)

- Work is done on a gas when it is compressed
- Doing work on a gas increases its internal energy, so also increases the average kinetic energy of the molecules
- Temperature increases with an increase of average kinetic energy



Why does atmospheric pressure decrease as you move higher above the Earth's surface?



Why does atmospheric pressure decrease as you move higher above the Earth's surface?

- As you move higher, the quantity of air above you decreases, meaning the force (weight) acting on you decreases.
- This results in a lower pressure.



What does an object in a fluid experience as a result of pressure?



What does an object in a fluid experience as a result of pressure?

Forces at right angles to all of its surfaces.



Pressure in a fluid \_\_\_\_\_ with depth.  
Why? (Higher)



Pressure in a fluid \_\_\_\_\_ with depth. Why?  
(Higher)

- Increases, because it is caused by the gravitational force on the fluid above that point.
- The deeper you go, the greater the weight of water above you, and so a higher force and pressure.



What equation is used to calculate the pressure at a given depth of liquid?  
(Higher)





What equation is used to calculate the pressure at a given depth of liquid? (Higher)

pressure = depth x liquid density x  
gravitational field strength

$$p = h\rho g$$



# What is upthrust? (Higher)



## What is upthrust? (Higher)

The upwards force that an object experiences in a fluid as a result of a greater pressure below the object than above it.



Under what circumstances will an object float? (Higher)



Under what circumstances will an object float?  
(Higher)

When the object's upthrust equals its weight.



Under what circumstances will an object sink? (Higher)



Under what circumstances will an object sink?  
(Higher)

When the object's upthrust is less its weight.



When you submerge an object in a liquid, what is the upthrust acting on the object equal to? **(Higher)**





When you submerge an object in a liquid, what is the upthrust acting on the object equal to? **(Higher)**

The weight of the volume of liquid displaced as it is submerged.



What can be said about the density of an object that sinks in water? **(Higher)**



What can be said about the density of an object that sinks in water? (**Higher**)

The object's density is greater than the density of water.

