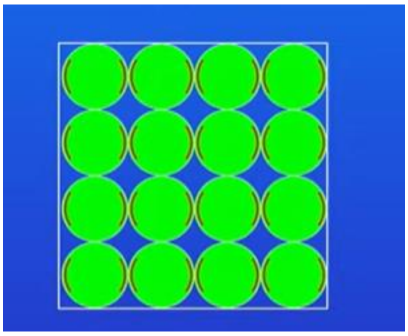
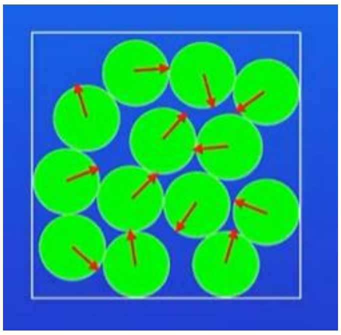
Density:

Solids:



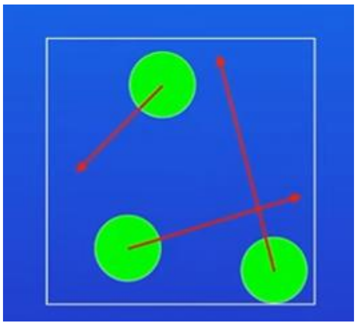
- Particles are very close together
- Arranged in a lattice
- Particles vibrate but not move from place to place
- Usually high density

Liquids:



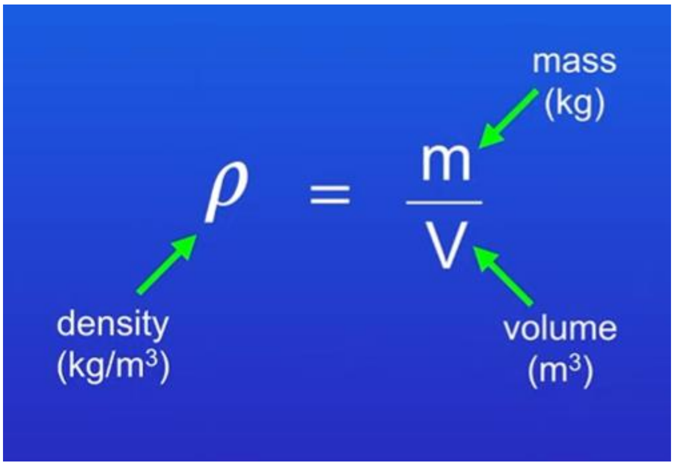
- Particles are close together
- Not arranged
- Particle can move over each other
- Usually high density

Gases:



- Particles are very far apart
- Not arranged
- Moving very rapidly
- Low density

The density tells us the mass of a given volume



Polystyrene has a low density because it has air spaces in between the particles

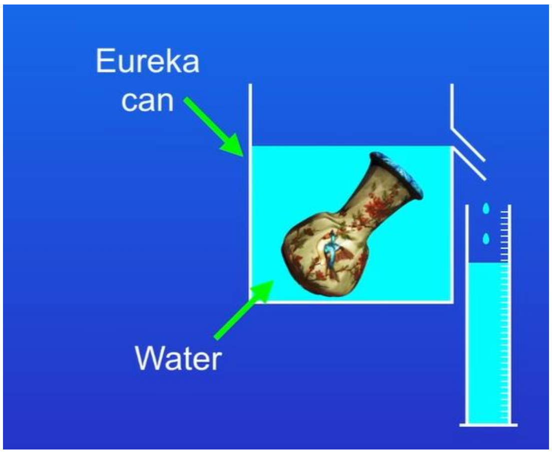
Required practical – Density:

How to perform (regular objects):

1. Determine the mass of the cube
2. Find the volume of the cube
3. Calculate the density

How to perform (irregular):

1. Find the mass of the object using a balance
2. Fill a eureka can with water until the water will flow out of the spout
3. Place a measuring cylinder below the spout
4. Place an object into the water very slowly. This will cause water to be displaced
5. Measure the volume of the water displaced
6. Calculate density



Internal Energy:

Internal energy is the energy stored in a system by the particles.

Internal energy is the total kinetic energy and potential energy (intermolecular forces and bonds) of all the particles that make up a system.

As we heat a solid, we increase the internal energy (solid > liquid > gas)

As we freeze a gas, we decrease the internal energy (gas > liquid > solid)

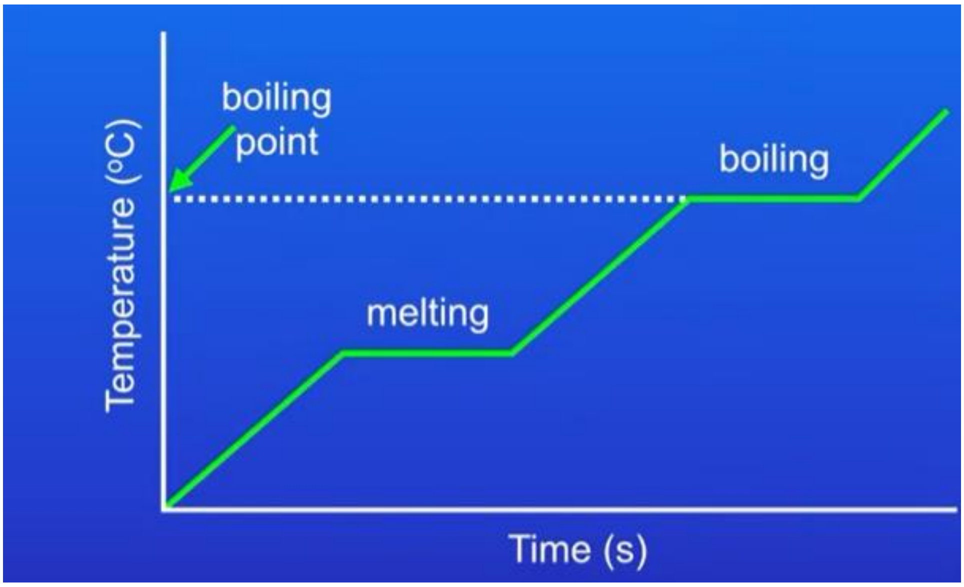
Sublimation – Solid can turn straight into a gas

Mass is always conserved when we change the state

Evaporation is when the liquid turns to a gas but only on the surface because only the particles have enough energy to change state

Heating and cooling graphs:

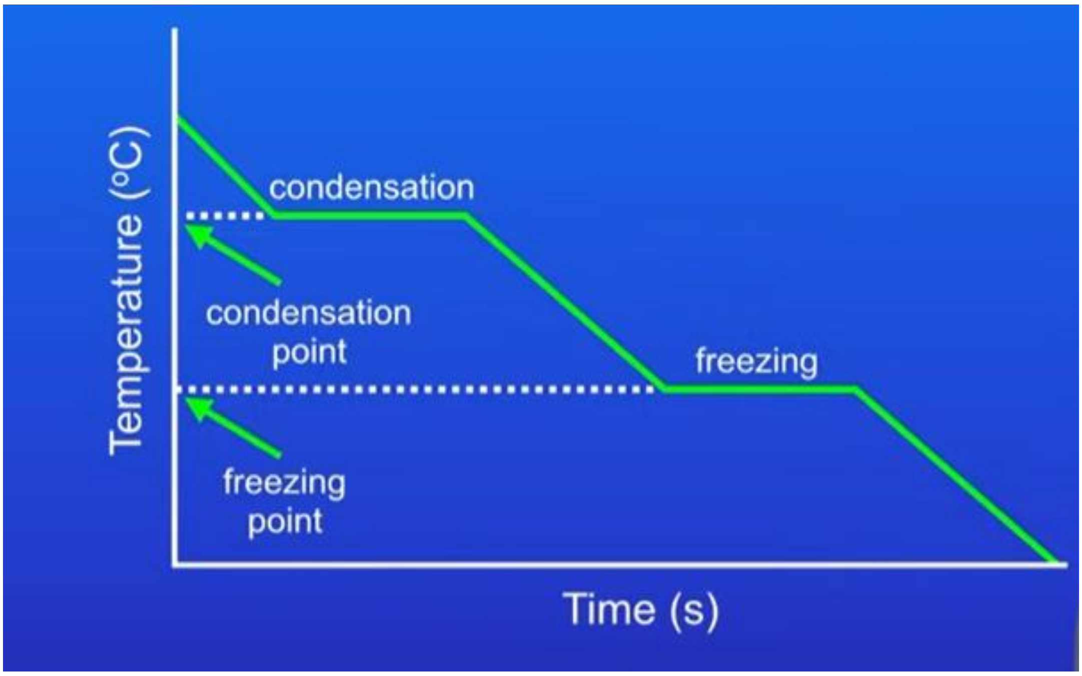
Heating graphs:



1. The temperature of the solid rises as we are increase the energy of the particles
2. The temperature stops rising, the solid is changing state from a solid to a liquid. The energy that we are adding is weaking or breaking the forces of attraction between the particles. (You are increasing the internal energy store)
3. The temperature starts to increase as we are increasing the energy of the particles

4. The substance is boiling, the energy we are adding is weakening or breaking the forces between the particles

Cooling graphs:

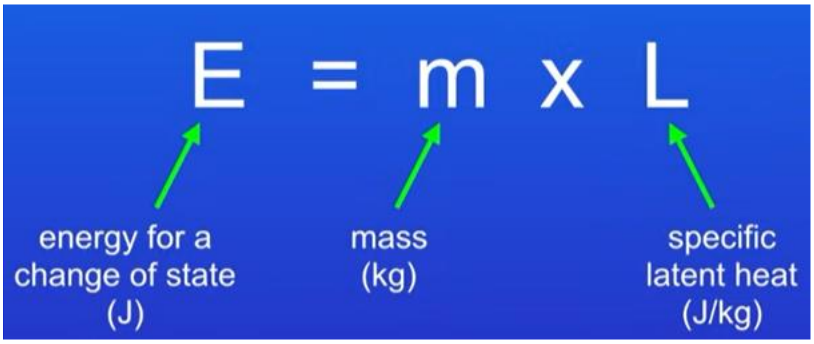


<u>Specific latent heat:</u>

Specific latent heat of a substance is the amount of energy required to change the state of 1kg of the substance with no change in temperature

Specific latent heat of fusion is the energy required to change a 1kg substance from a solid to a liquid

Specific latent heat of vaporisation is the energy required to change a 1kg of a substance from a liquid to a vapour



Particle motion in gases:

The pressure of a gas is due to the particles colliding with the walls of the container that the gas is held in

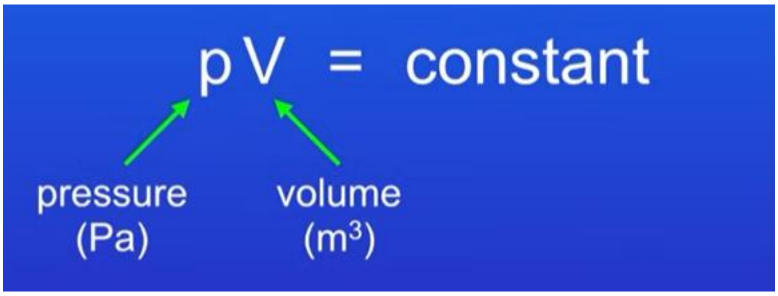
If the gas has a lower temperature then it will have a low kinetic energy. This means that there are less collisions per second. This makes it have a low pressure

If the gas has a high temperature, then the gas will have a high kinetic energy. This means that there are more collisions per second. This means that the gas has a high pressure.

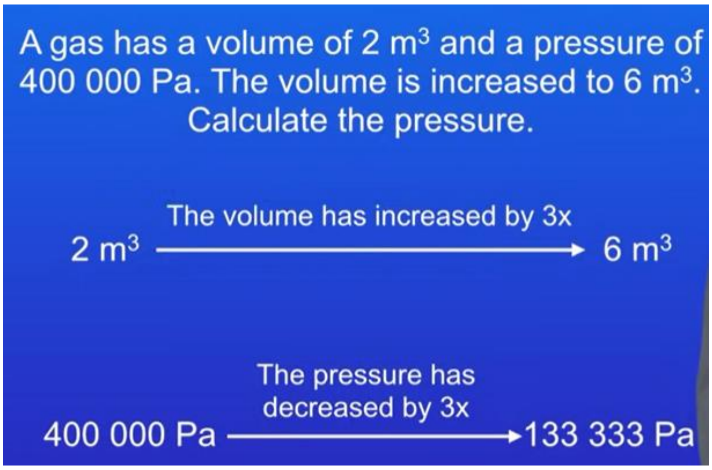
Pressure in gases:

The particles collisions,s in the container. This force causes the pressure.

If we increase the volume but keep the temperature the same, then we reduce the pressure. Particles have much fewer collisions.



If we double the pressure, then we halve the volume: (if one decreases the other increases by the same factor)



<u>Work done in gases:</u>

Work is the transfer of energy by a force.

If you have a syringe filled with gas, if you push the piston then we are applying a force on the gas, we have transferred energy to the particles. (internal energy)