

## Physics: 4.3 Particle Model of Matter

1 Key Terms		3. Equations		
1. States of matter	The form in which a substance can take, e.g. solid, liquid or gas	Density	Density = mass/volume	$P=m/V$
2. Density	A substance's mass per unit volume	Specific Heat Capacity	Change in thermal energy= mass x specific heat capacity x temperature change	$\Delta E= mc\Delta\theta$
3. Melting	Change of state from solid to liquid	Specific Latent heat	Thermal energy for change of state=mass x specific latent heat	$E=mL$
4. Freezing	Change of state from liquid to solid	<b>4. Particle Motion in Gases</b>		
5. Boiling	Change of state from liquid to gas	Gas	Molecules in a gas are in constant motion	
6. Evaporating	Change of state from liquid to gas	Temperature	The temperature of a gas is related to the average kinetic energy of the molecules	
7. Condensing	Change of state from gas to liquid	Changing temperature	Changing the temperature of a gas, held at a constant volume changes the pressure exerted by the gas	
8. Sublimation	Change of state from solid to gas without passing through the liquid stage	Motion of a gas	The motion of a gas is related to both its temperature and pressure	
9. Kinetic Energy	Movement energy in the particles of a substance	<b>5. Pressure in gases (PH only)</b>		
10. Potential energy	Stored energy in the particles in a substance	Pressure	A gas can be compressed or expanded by pressure changes. The pressure produces a net force at right angles to the wall of the gas container (or any surface).	
11. Internal energy	The total kinetic energy and potential energy of all the particles that make up the system	$PV=Constant$	$P=$ Pressure- pascals-pa $V=$ volume- $m^3$	
12. Specific Heat Capacity (SHC)	The amount of energy required to raise the temperature of 1Kg of substance by 1°C	Work	The transfer of energy by a force.	
13. Specific Latent Heat (SLH)	The amount of energy required to change the state of 1Kg of substance with no change in temperature	Work on a gas	Doing work on a gas increases the internal energy of the gas and can cause an increase in the temperature of the gas.	
14. Specific Latent Heat of Fusion	Change of state from solid to liquid	Volume	Increasing the volume in which a gas is contained, at constant temperature, can lead to a decrease in pressure.	
15. Specific Latent Heat of vaporisation	Change of state from liquid to vapour			
<b>2.0 Units</b>				
1. Density	Kilograms per metre cubed (Kg/M3)			
2. Mass	Kilograms (Kg)			
3. Volume	Metres cubed ( $M^3$ )			
4. Thermal energy	Joules (J)			
5. Temperature	Degrees Celsius (°C)			
6. SHC	Joules per kilogram per degree Celsius (J/Kg°C)			
7. SLH	Joules per kilogram (J/Kg)			

  

**Diagram 1**

**Diagram 2**

Changes of state – cooling curve

