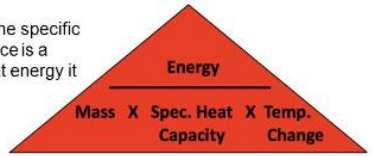
1	**The three states of matter are solid, liquid and gas.**
2	In **solids** the **forces of attraction** hold particles close together, the particles vibrate but cannot move freely. Solids have a fixed shape, do not flow and usually cannot be **compressed**.
3	In **liquids** the **forces of attraction** between particles is less than solids, the particles are free to move and can **flow**. Liquids take the shape of their container but usually cannot be **compressed**.
4	In gases the particles are far apart and moving very fast. The forces of attraction between particles is very small. Gases are **compressible** and expand to fill their container.
5	A **change of state** is where a substance changes the arrangement of particles e.g. solid to a liquid. Mass is **conserved**. This is **physical change** that can easily reversed.
6	Density (ρ) is the mass of substance (number of particles) in a given volume. Units are Kg/m3. Solids are usually denser than liquids.
7	Energy transferred to a substance is stored in the movement of the particles, called **thermal energy**.
8	**Temperature** is a measure of how fast particles move in a substance.
9	The amount of **thermal energy stored** in an object depends on its temperature, mass and the material it is made from. **Specific heat capacity (c)** is the amount of energy it takes to increase the Temperature of 1kg of the substance by 1°C.
10	**Heating curves** show temperature changes over time. Where the temperature stays constant the energy being given to the substance is being used to overcome the forces between particles.
11	Flat parts (**plateaux**) of a heating curve show a **change of state** occurring.

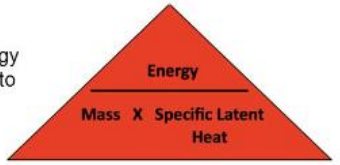
Specific heat capacity. The specific heat capacity of a substance is a measure of how much heat energy it can hold

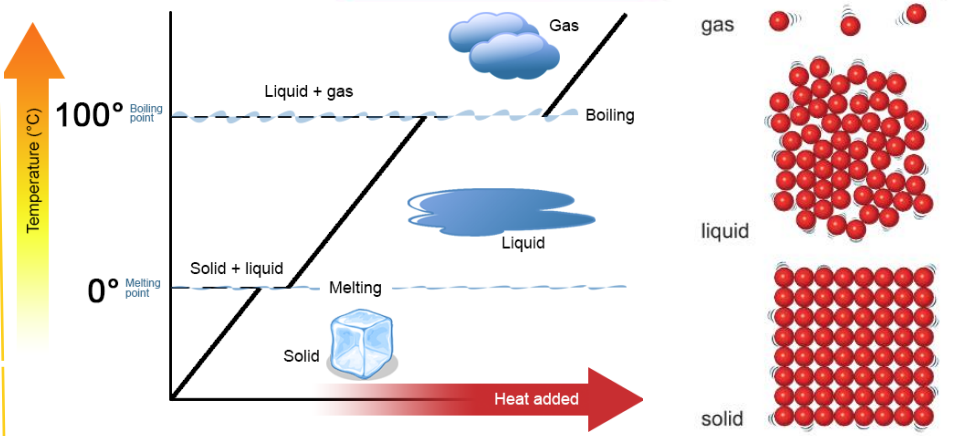


$$\rho = \frac{m}{V}$$

density = mass / volume

Specific Latent Heat is the energy needed for a specific substance to change state





16	**Specific latent heat is the energy taken to make 1Kg of substance change state.**
17	**Specific latent heat of melting** is the energy taken to make 1kg of solid change into liquid.
18	**Specific latent heat of evaporation** is the energy taken to make 1kg of liquid change into a gas.
19	**Temperature** of a gas is a measure of the **average kinetic energy (KE)** of the particles of a gas

1	**Pressure of a gas is due to the gas particles colliding (hitting) the sides of the container.**
2	**Heating** a gas increases the KE of the gas particles, this increases the temperature of the gas.
3	For a fixed mass of gas in a fixed volume, pressure increases when the temperature increases. As the gas particles move faster, hitting the sides of the container more, with more force.
4	**Pressure** is **force** per unit **area**. Its units are **pascals** (**Pa**) 1Pa =1**Nm^2**
5	**Gas pressure** decreases as the temperature of a gas decreases. **Absolute zero** is the temperature at which a gas would not exert a pressure as the particles are no longer moving. **Absolute zero = -273^{O}C or 0 K** (kelvin)
6	The **kelvin temperature scale** measures temperatures relative to absolute zero. Convert **Celsius (C)** to **Kelvin (K)** by subtracting 273. Convert from Kelvin to degrees Celsius add 273.
7	**Average kinetic energy** of particles is directly proportional to the kelvin temperature of a gas.
8	Decreasing the volume of a gas (fixed mass) at a fixed temperature will increase the pressure as there will be more collisions on the sides of the container.
9	Increasing the volume of a gas (fixed mass) at a fixed temperature will decrease the pressure.
11	To calculate the pressure or volume for gases of fixed mass at constant temperature we use: **$P_1 \times V_1 = P_2 \times V_2$** P=pressure V = Volume
12	When force is transferring energy to a gas e.g. using a bicycle pump, the energy is called **work done**. The energy transferred increases the energy of gas particles so increases the temperature of the gas. (the temperature of bicycle pump will go up as it is used).