Edexcel GCSE Physics

Topic 14.1-14.11 - Heating Matter

Flashcards

What is the definition of density? State the relevant equation with units.

What is the definition of density? State the relevant equation with units.

- The mass per unit volume of a material
- $\rho = m/v$
- Density (kg/m^3) = Mass (kg) / Volume (m^3)

What is meant by a state of matter?

What is meant by a state of matter?

A form in which matter can exist, based on the particle arrangement in a substance.

Give the different states of matter in order (least to most) of density of atoms.

State the different states of matter in order (least to most) of density of atoms.

- Least dense: Gas
- Liquid
- Most dense: Solid

Use kinetic theory to explain the structure of liquids.

Use kinetic theory to explain the structure of liquids.

The particles have some kinetic energy. They are free to move and can move around in random directions at very slow speeds.

Explain the movement of particles in a solid.

Explain the movement of particles in a solid.

The particles vibrate around a fixed position as they do not have enough kinetic energy to move freely.

Describe the structure of particles in a gas.

Describe the structure of particles in a gas.

Particles in a gas have almost no forces between them therefore they are completely free to move, and move at high speeds in random directions.

What is always conserved when a substance undergoes a change of state?

What is always conserved when a substance undergoes a change of state?

Mass

How does a change of state differ from a chemical change?

How does a change of state differ from a chemical change?

In a change of state, the material can return to having its previous properties if the change is reversed.

What is the internal energy of a substance?

What is the internal energy of a substance?

- The energy stored by the particles
- The sum of the total kinetic and potential energies that make up the system

What two things can heating a substance do?

What two things can heating a substance do?

1. Raise its temperature
2. Change the state of the substance

What three factors determine the temperature change of a system?

What three factors determine the temperature change of a system?

1. Mass of substance being heated
2. Type of material (Specific heat capacity)
3. Energy inputted into the system

What is sublimation?

What is sublimation?

When a solid turns directly into a gas.

What is the difference between physical changes and chemical changes in substances?

What is the difference between physical changes and chemical changes in substances?

Physical changes can be reversed.

Chemical changes cannot be easily reversed.

How does heating cause a substance to change state?

How does heating cause a substance to change state?

Heating matter gives particles more potential energy. This energy is used to break the bonds of attraction, leading to a change of state.

Why does heating increase the temperature of substance?

Why does heating increase the temperature of substance?

It increases the amount of thermal energy in that substance. It also gives the particles more kinetic energy, meaning they move faster and their temperature increases.

State the equation used to calculate the energy change when a substance is heated. Give appropriate units.

State the equation used to calculate the energy change when a substance is heated. Give appropriate units.

- $\Delta E = m\ c\ \Delta\theta$
- Energy (J), Mass (kg), Specific Heat Capacity (J/kg/°C), Temperature (°C)

Define specific heat capacity.

Define specific heat capacity.

The amount of energy needed to increase the temperature of 1kg of a substance by 1°C.

Define specific latent heat.

Define specific latent heat.

The amount of energy needed to change the state of 1kg of a substance **with no change in temperature**.

State the equation for the energy required to change state. Give appropriate units.

State the equation for the energy required to change state. Give appropriate units.

Energy (J) = Mass (kg) x Specific latent heat (J/kg)

$$E = mL$$