P5: Electricity In The Home Knowledge Organiser PT26.1

Direct current , d.c.	•Current that flows in one direction only in a circuit. •Current from a battery is usually d.c.
Alternating current, a.c.	•Current that repeatedly flows in one direction then the other (reverses) •Mains electricity is a.c. • Mains a.c. has a frequency of 50 cycles per second or 50 Hz. •Frequency of an a.c. supply = 1 ÷ the time taken for one cycle
Live wire	•The brown wire in a plug •In mains electricity, it carries a p.d. that alternates between -325V and +325V
Neutral wire	•The blue wire in a plug •Carries 0V p.d.
Earth wire	•The green and yellow striped wire in a plug •Connected to the longest pin •Stops the metal case of an appliance becoming live
Fuse	•Melts if too much current passes through it which breaks the circuit •A safety device •Can be 3A, 5A or 13A depending on the appliance •To decide what fuse to use, divide the power of the appliance by the p.d.
Power, P	•The energy in Joules transferred to a device per second •Measured in Watts, W •Can be calculated in many different ways! →
Charge, Q	•The electrons that flow in a circuit •Measured in Coulombs, C •Charge flow through a resistor causes it to become hotter because the electrons collide with the ions in the resistor. The ions gain KE and so vibrate faster. This increases their thermal energy store.

Electrical work	•The battery does work in a circuit to make the electrons move. •The work done by the battery is equal to the energy transferred to the resistor
Oscilloscope	•A device that shows how an alternating p.d. changes with time. •The Y-gain control changes how tall the waves are •The time base control changes how many waves fit on the screen. •The peak p.d. is the difference in volts between the highest and the middle level of the waves. If the p.d. of an a.c. Supply is higher, the waves (peak p.d.) get higher.

Key Equations To Learn	
Energy, E	Energy = Charge x Potential Difference $E = Q \times V$
Charge, Q	Charge = Current x Time $Q = I \times t$
Power, P	Power = Energy ÷ Time $P = E \div t$
Power, P	Power = Current x Potential Difference $P = I \times V$
Power, P	Power = Current^2 x Resistance $P = I^2 \times R$

P6 Molecules and Matter Knowledge Organiser PT31.1

Density, ρ	•The mass per unit of volume of a substance •Measured in kg/m^3 •Dense materials are heavy for their size, i.e. Lead •To calculate the density, you need to measure the mass and the volume
Measuring volume	• For a regular object (like a cube), measure the dimensions using the right tool and use them to calculate the volume (e.g. l x w x h) •For an irregular object (like a stone), find out the volume of water it displaces using a Eureka can and measuring cylinder
Solid	•Particles are held next to each other in fixed positions •Particles have the lowest energy •Fixed shape and volume •Doesn't flow •Much higher density than a gas
Liquid	•Particles move around randomly and are in contact with each other •Particles have more energy than a solid •Fixed volume •Takes shape of container •Flows •Much higher density than a gas
Gas	•Particles move randomly, rapidly and are far apart •Particles have the highest energy •Volume can change as it spreads out to fill container •Flows •Low density
Melting point	•The temperature a pure substance melts at •A substance will solidify at the same temperature
Boiling point	•The temperature a pure substance boils at •A substance will condense at the same temperature •Boling happens throughout all of a liquid and only happens at the boiling point.
Evaporation	•Happens at the surface of a liquid below the boiling point

Internal Energy	•The energy stored by the particles of a substance •The particles have energy due to their individual motion and positions •Internal energy = KE due to individual motion relative to each other + PE due to their positions relative to each other •Higher temperature = higher internal energy •This is because the KE increases when temp increases •The PE of a substance increases if it melts or boils
Latent heat	•The energy needed for a substance to change state without changing the temperature
Specific Latent Heat of Fusion, L_f	•The energy needed to melt 1kg of a substance without changing the temperature •Measured in J/kg •E = mass x Specific Latent Heat of fusion •This is the same amount of energy if the substance is going from a liquid to a solid. •The particles need energy to break free from each other and this energy is the latent heat of fusion
Specific Latent Heat of Vaporisation, L_v	•The energy needed to boil 1kg of a substance without changing its temperature •Measured in J/kg •E mass x Specific Latent Heat of Vaporisation
Gas pressure	•This is caused by the particles of a gas colliding randomly with the walls of the container •In a sealed container, pressure increases if temperature increases because the particles move faster because they have more KE and so and hit the surfaces with more force and more times per second •Smoke particles move unpredictably because gas particles collide with them (Brownian motion)

Key Equations To Learn	
Density, ρ	Density = mass ÷ volume ρ = m ÷ V

Year 10 – Physics / Molecules and Matter – HT2