AQA GCSE **– Combined Science** – Physics Paper 1 Learning Pathway

Equations you need to learn for paper 1:

$\rho = \frac{m}{V}$	$W = F\ s$	$F = k\ e$	$E_k = \frac{1}{2} m\ v^2$	$E_p = m\ g\ h$	$P = \frac{E}{t}$
$W = m\ g$	$Q = I\ t$	$V = I\ R$	$P = V\ I$	$P = I^2\ R$	$E = Q\ V$

Learning objectives for paper 1:

P1	Conservation and dissipation of energy		Revised	Understood
P1.1	Changes in energy stores	List the ways energy can be stored. List the ways energy can be transferred. Describe the energy changes that take place when an object falls.		
P1.2	Conservation of energy	State the conservation of energy. State what a closed system is. Apply the conservation of energy to different situations.		
P1.3	Energy and work	State what work done is. State the equation for work done by a force. Calculate the work done by a force.		
P1.4	Gravitational potential and energy stores	State the equation for gravitational potential energy. Calculate the change in GPE when the height of an object changes.		
P1.5	Kinetic energy and elastic energy stores	State the equation for kinetic energy. Calculate the kinetic energy of a moving object. Calculate the elastic potential energy in a system.		
P1.6	Energy dissipation	Describe what useful and waste energies are. Explain how waste energy is dissipated.		
P1.7	Energy and Efficiency	State the equation for efficiency. Calculate the efficiency of a machine. Describe how a machine can be made more efficient.		
P1.8	Electrical appliances	State how energy is supplied to the home. Describe why electrical devices are useful.		
P1.9	Energy and Power	Define Power as rate of energy transfered. State the equation for power. Calculate the power of an object. Calculate the efficiency of an object using power.		
P2	Energy transfer by heating			
P2.1	Energy transfer by conduction	State which materials make the best conductors and insulators. Describe how thermal conductivity affects the rate of energy transfer. Describe how thickness affects the rate of energy transfer.		
P2.4	Specific heat capacity	Define specific heat capacity. Use the equation for specific heat capacity. Describe how to carry out an experiment to find the specific heat capacity of an object.		
P2.5	Heating and insulating buildings	State how to reduce the rate of energy transfer from the home. Describe four methods of reducing energy transfer from the home.		

P3	Energy resources			
P3.1	Energy demands	List the energy resources used to generate electricity. Describe the advantages and disadvantages of nuclear power.		
P3.2	Energy from wind and water	Describe the advantages and disadvantages of wind power, wave power, tidal power, hydroelectric power.		
P3.3	Power from the Sun and Earth	Describe the advantages and disadvantages of photovoltaic solar power, Solar heating, Geothermal power.		
P3.4	Energy and the environment	Describe the advantages and disadvantages of Fossil fuels. State what is meant by Renewable energy resource.		
P3.5	Big energy issues	Describe how the demand for electricity changes during a day. Explain how different resources can be used to supply demand.		
P4	Electric circuits			
P4.2	Current and charge	Define current. Calculate electrical current from charge flow and time. Identify and draw circuit symbols.		
P4.3	Potential difference and resistance	Define potential difference. State Ohm's Law. Describe what resistance is and state it's unit.		
P4.4	Component characteristics	Identify the VI graph for a lamp and explain its shape in terms of resistance and current. Identify the VI graph for a diode and LED and explain its shape in terms of resistance and current. Identify the VI graph for a thermistor or LDR and explain its shape in terms of resistance and current.		
P4.5	Series circuits	State that the current around a series circuit is the same throughout. Describe how the potential difference is split across components in a series circuit. Calculate resistance in a series circuit.		
P4.6	Parallel circuits	State that the current in a parallel circuit is split across branches. State that the potential difference is the same across branches in a parallel circuit. State that the total resistance in a parallel circuit is lower than the resistance of the smallest branch.		
P5	Electricity in the home			
P5.1	Alternating current	State what alternating and direct current are. State the frequency of UK mains electricity as 50Hz. Describe the purpose of the live and neutral wire. Explain what the national grid is.		
P5.2	Cables and plugs	State the materials used in cables and the plug and explain their use. State the colours of the live, neutral and earth wires. Explain how a fuse and earth pin work.		
P5.3	Electrical power and potential difference	State the equation for electrical power in terms of current and potential difference. State the equation for electrical power in terms of current and resistance. Calculate the power of an object from its current and potential difference or resistance. Identify which fuse should be fitted to a device and explain why.		
P5.4	Electrical currents and energy transfer	Calculate the amount of charge that flows through a component in a certain time using the current. Describe the energy transfers taking place as charge flows through a component.		
P5.5	Appliances and efficiency	Calculate the energy transferred to a component using the potential difference, current and time. Calculate the useful output of a device from the efficiency and input.		

P6	Molecules and matter			
P6.1	Density	State the equation for density and give its units. Use the density equation to calculate density, mass, or volume. Describe how to find the density of a regular or irregular object using a Eureka can.		
P6.2	States of Matter	State the properties of solids, liquids, and gases. Describe the arrangement of particles in solids, liquids, and gases.		
P6.3	Changes of state	Identify the melting and boiling point of a material from its cooling or heating curve. Explain the difference between boiling and evaporation.		
P6.4	Internal energy	Define internal energy. Explain what happens to the internal energy of an object when it is heated.		
P6.5	Specific latent heat	Define specific latent heat as the energy required to change the state of an object without a change in temperature. Use the equation for specific latent heat to calculate energy transferred, mass, or specific latent heat. Describe how to carry out an investigation to find the specific latent heat of fusion for ice.		
P6.6	Gas pressure and temperature	Describe the motion of particles in a gas . Explain how a gas exhorts pressure on a surface with reference to particles and force. Explain how the pressure of a gas in sealed container changes with temperature.		
P7	Radioactivity			
P7.1	Atoms and radiation	List three types of ionising radiation. Describe what a radioactive substance is.		
P7.2	The discovery of the nucleus	Describe the nuclear model of the atom. Describe the alpha particle scattering experiment. Explain how observations from alpha particle scattering provided evidence to support the nuclear model.		
P7.3	Changes in the nucleus	State what an alpha particle is. Describe the changes in the nucleus when it undergoes alpha or beta decay. Complete decay equations for alpha and beta decays.		
P7.4	More about alpha, beta and gamma	State how far alpha, beta and gamma travel in air. State which materials can be used to absorb alpha, beta and gamma. Describe the ionising power of alpha, beta and gamma radiation. Explain the dangers of ionising radiation.		
P7.5	Activity and half-life	Define Half-life for a radioactive substance. Identify the half-life of a substance from a graph. Calculate count rate of a radioactive substance after a given number of half-lives.		

Topic:	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Recall score (%) :							
Test score (%):							