



Personalised Learning Checklist

WJEC Physics Separate from 2016 Unit 1

Topics 1.1 -1.4

Topic	Student Checklist	R	A	G
Topic 1.1 Electric circuits	Draw the symbols of components used in electrical circuits			
	Describe the pattern in current and voltage in both series and parallel circuits			
	Describe how to measure the voltage across and current in electrical components in electrical circuits			
	<i>Spec prac: Investigate how current changes with voltage for a component</i>			
	Use the equation: $[I = V/R]$			
	Describe how adding components in series and parallel changes the total resistance in a circuit			
	Calculate total resistance and total current in a series circuit			
	HT only: Calculate resistance and current in a parallel circuit and circuits consisting of combinations of series and parallel connections			
	Describe power in terms of energy and use the equation: $[E = Pt]$			
	Use the equation: Power = Voltage x Current $[P = VI]$			
	HT only: Use the equation: Power = Current² x Resistance $[P = I^2R]$			
Explain the design and use of circuits to explore the variation of resistance				
Topic 1.2 Generating electricity	Describe the advantages and disadvantages of renewable energy for generating electricity using secondary information			
	Describe the advantages and disadvantages of non-renewable energy technologies for generating electricity			
	Recall the processes involved in generating electricity in a fuel based power station			
	Draw Sankey diagrams to show energy transfers			
	Explain why the National grid is needed as an electricity distribution system			
	Describe the advantages and disadvantages of using different voltages of electricity at different points in the National Grid			
	Describe the use of step-up and step-down transformers in the transmission of electricity from the power station to the user			
	Compare different types of power stations in the UK including those fuelled by fossil fuels, nuclear fuel and renewable sources of energy			
Topic 1.3 Making use of energy	Describe how temperature differences lead to the transfer of energy thermally			
	<i>Spec prac: Investigate methods of heat transfer</i>			
	Use the equation: density = mass/volume $[\rho = m/v]$			
	Determine the density of liquids and solids using			
	Explain the differences in density between the three states of matter in terms of arrangement of atoms and molecules			

	HT only: Explain how conduction occurs using a model of molecular motion			
	HT only: Describe how the presence of mobile electrons increases conductivity			
	HT only: Describe convection in liquids and gases in terms of molecular behaviour and variations in volume and density			
	Describe how energy loss from houses can be restricted			
	Calculate cost effectiveness and efficiency of different methods of reducing energy loss from the home			
	Describe how data can be obtained and used to investigate the cost of using a variety of energy sources for heating and transport			
Topic 1.4 Domestic electricity	Recall the units used to measure power and energy			
	Calculate the cost of electricity using the equations: [units used (kWh) = power (kW) x time (h); cost = units used x cost per unit]			
	Calculate the cost of using electrical appliances			
	Explain the difference between alternating current (a.c.) and direct current (d.c.)			
	Describe the functions of fuses, miniature circuit breakers (mcb) and residual current circuit breakers (rccb)			
	Calculate appropriate fuse ratings			
	Describe the functions of the live, neutral and earth wires			
	Calculate the cost effectiveness of introducing domestic solar and wind energy equipment			
	Investigate energy transfers in a range of contexts to include energy output from a renewable source and efficiency of energy transfer			
Topic 1.5 Features of waves	Describe the difference between transverse and longitudinal waves			
	Describe a wave in terms of amplitude, wavelength, frequency and wave speed			
	Label wavelength and amplitude on a transverse wave			
	Draw diagram to show plane wave fronts being reflected or refracted			
	Describe refraction in terms of the speed of waves and the effect on the wavelength of the waves			
	Define the term "radiation" for both electromagnetic waves and to energy given out by radioactive materials			
	Describe the characteristics of radioactive emissions and short wavelength parts of the electromagnetic spectrum			
	Describe the difference between the different regions of the electromagnetic spectrum in terms of their wavelength and frequency			
	Recall that all regions of the electromagnetic spectrum transfer energy and some regions are commonly used to transmit information			
	Describe waves in terms of their wavelength, frequency, speed and amplitude			
	Use the equation; wave speed = wavelength x frequency			
	Investigate the speed of water waves in varying depths of water			
	Explain how we communicate using satellites in geosynchronous/geostationary orbit			
Topic 1.6 Total internal	<i>Describe the conditions needed for total internal reflection of light</i>			
	<i>Explain how optical fibres transmit information</i>			
	<i>Compare the use of optical fibres and geosynchronous / geostationary satellites for long distance communication</i>			

	Describe the use of optical fibres for remote imaging in medicine			
Topic 1.7 Seismic waves	Compare the properties of seismic P waves, S waves and surface waves			
	Recall that P waves are longitudinal and S waves are transverse			
	Use seismic records to identify the lag time between the arrival of the P and S waves			
	Use the seismic records from several stations to locate the epicentre of an earthquake			
	Describe the path of P and S waves through the Earth			
	Describe how the existence of the S wave shadow zone has led geologists to model the Earth			
Topic 1.8 Kinetic theory	Define the term pressure			
	Use the equation: Pressure = Force/area			
	Describe the behaviour of a fixed quantity of gas under conditions of varying pressure, volume and temperature			
	Describe how the behaviour of gases leads to the concepts of absolute zero and an absolute scale of temperature			
	Describe temperature as a measurement in kelvin			
	HT only: Use the relationship $[pV/T] = \text{Constant for gases}$			
	Describe the variation of the pressure of gases with volume and temperature by applying a model of molecular motion			
	Use the equations $[Q = mc\Delta\theta]$ and $[Q = mL]$			
	Spec prac and Phys only: Determine the specific heat capacity of a material			
HT only: Explain how of changes in temperature cause a change of state in terms of the behaviour of molecules				
Topic 1.9 Electromagnetism	Draw the magnetic field patterns of bar magnets, straight wires and solenoids			
	Describe how a magnet and a current carrying conductor exert a force on one another (the motor effect)			
	Use Fleming's left hand rule to predict the direction when two variables are provided			
	Use the equation: force (F) = the strength of the field (B) x current (I) x length of conductor (l) $[F = BIl]$			
	Predict the direction of rotation of a simple d.c. motor			
	Describe the effect increasing the current, magnetic field strength and number of turns on a d.c. motor			
	Describe how a current can be induced in a circuit using magnetic fields			
	Explain the operation of a simple a.c. electric generator including the factors upon which its output depends			
	Relate the direction of the current in a generator to the direction of the magnetic field and the direction of rotation of the coil			
	Describe the operation of a transformer			
	Spec prac and Phys only: Investigate the output of an iron-cored transformer			
	Describe how the output of a 100% efficient transformer depends upon the number of turns on the coils			