



The Sutton Academy

Knowledge Rich Curriculum Plan

SCIENCE- Physics Year 11

Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Working Scientifically	Tiered Vocabulary and Reading Activity
Lesson: Circuits Recap	- Students will know that in a series circuit current is the same at all points - Students will know that in a series circuit potential difference is split between each component - Students will know that in a series circuit the total resistance of the circuit is the sum of the individual resistors - Students will know that in a parallel circuit the current is split between the branches - Students will know that in a parallel circuit the potential difference is the same across each branch - Students will know that in a parallel circuit the total resistance of the circuit is smaller than the smallest individual resistor - Students will know how to use the equations $Q = It$ and $V = IR$	<i>Students need to already know the circuit symbols for each component in an electrical circuit</i> <i>Students need to already know that current is the rate of flow of charge</i> <i>Students need to already know that potential difference is the amount of energy transferred per unit charge</i>	Using formula from the equation sheet	<i>Tier 3</i> <i>Current – the rate of flow of charge</i> <i>Potential Difference – amount of energy transferred per unit charge</i>
Lesson: Energy transfers	- Students will know that everyday electrical appliances bring about energy transfers - Students will know that the amount of energy transferred depends on how long the appliance is switched on for and the power of the appliance. - Students will know how to describe energy transfers within appliances. - Students will know that work is done when charge flows in a circuit - Students will know that the energy transferred in a circuit can be calculated by: - energy transferred = power x time - Energy transferred = charge flow x potential difference - Students will know how to use the equations to calculate energy, power, time, charge and potential difference.	<i>Students need to already know that the unit of energy is J, the unit of power is W, the unit of time is s, the unit of charge is C and the unit of potential difference is V</i>	Using formula from the equation sheet	<i>Tier 2</i> <i>Appliance – A piece of equipment designed for a particular task</i>

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Lesson: Power	- Students will know that the power that is transferred in a device is related to the potential difference across it and the current through it - Students will know the equation for calculating power as: $\text{power} = \text{potential difference} \times \text{current}$ $\text{Power} = \text{current squared} \times \text{resistance}$ - Students will know that power is measured in Watts - Students will know how to use the equations to calculate power, current, resistance and potential difference	<i>Students need to already know that the unit of potential difference is V, the unit of current is A and the unit of resistance is ohms</i>	Using formula from the equation sheet	<i>Tier 2</i> <i>Tier 3</i> Electric power is the rate, per unit time, at which energy is transferred by an electric circuit. Watt: The SI unit of power is the watt, one joule per second.
Lesson: Domestic Uses and Safety	- Students will know that mains electricity is an ac supply. - Students will know that in the UK, domestic electricity supply has a frequency of 50 Hz and is about 230 V - Students will know that direct potential difference produces a current that travels in one direction (direct current) - Students will know that alternating potential difference produces a current that constantly changes direction (alternating current) - Students will know that most appliances are connected to mains through a three-core cable - Students will know that the live wire is brown, the neutral wire is blue and the earth wire is green and yellow - Students will know that the live wire carries the potential difference from the supply - Students will know that the neutral wire completes the circuit - Students will know that the earth wire is a safety wire that stops the appliance becoming live.	<i>Students need to already know that current is the flow of charge.</i>		<i>Tier 3</i> <i>Alternating current</i> – current that flows in constantly changing direction <i>Direct current</i> – current that flows in one direction <i>Earth</i> – A direct physical contact for current to flow to the Earth

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	- Students will know that the potential difference between the live wire and earth is about 230 V. Students will know that the neutral wire and the earth wire have a potential of 0 V. - Students will know how to explain why a live wire is dangerous even when a switch in the circuit is open - Students will know how to explain the dangers of providing any connection between the live wire and earth			
Lesson: Efficiency	- Students will know that efficiency is a measure of how much energy is transferred usefully - Students will know that efficiency is calculated using the equation: $\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$ or $\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$ - Students will know how to calculate energy efficiency, energy input and energy output using the equation - Students will know that efficiency doesn't have a unit - Students will know that efficiency can also be given as a percentage	<i>Students need to know that some energy transfers are useful</i>	Using formula from the equation sheet	Tier 2 Tier 3 Efficiency: A measure of the amount of energy transferred usefully Conservation of energy: Energy cannot be created or destroyed, only transferred from one type to another
Lesson: The National Grid	- Students will know that the National Grid is a system of cables and transformers linking power stations to consumers. - Students will know that step-up transformers are used to increase the potential difference from the power station to the transmission cables - Students will know that step-down transformers are used to decrease, to a much lower value, the potential difference for domestic use.	<i>Students need to already know that electrical power is generated in power stations.</i>		Tier 2 Tier 3 Dissipation: Energy that is transferred to the surroundings Transformer: device used to change the potential difference of an electrical supply

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	Students will know that the National Grid is used as an efficient way to transfer energy Students will know that the National Grid is used to reduce the amount of energy lost through dissipation.			