Classroom 42

Triple Science, Higher Tier

P7 Magnetism and Electromagnetism Revision Checklist

Topic	Content	✓
Permanent and Induced Magnetism, Magnetic Forces and Fields	Describe how magnets exert forces of attraction and repulsion, depending on whether the poles are like or unlike. Explain that permanent magnets produce their own magnetic fields, while induced magnets become magnetised when placed in a field and lose their magnetism when removed.	
	Describe the region around a magnet where a force acts on another magnet or magnetic material. Explain how the strength of the magnetic field depends on the distance from the magnet and is strongest at the poles. Draw and interpret magnetic field patterns around a bar magnet, showing how field strength and direction change. Explain how a magnetic compass provides evidence that the Earth's core is magnetic.	
The Motor Effect	Describe how a current in a wire produces a magnetic field around it. Explain how the field strength increases when the wire is shaped into a solenoid and how adding an iron core creates an electromagnet. Draw and interpret magnetic field patterns for a straight wire and a solenoid, including the direction of the field.	
	Use Fleming's left-hand rule to determine the relative directions of force, current, and magnetic field in the motor effect. Recall and apply the equation F = BIl to calculate the force on a conductor in a magnetic field, using magnetic flux density, current, and length of wire.	
	Electric Motors - Explain how a current-carrying coil in a magnetic field rotates, forming the basis of an electric motor. Describe how the forces acting on the coil cause continuous rotation and how this principle is used in real-world applications.	
	Loudspeakers - Explain how loudspeakers and headphones use the motor effect to convert variations in electric current into sound waves. Describe how the coil and magnetic field interactions produce pressure variations in air.	
Induced Potential, Transformers and the National Grid	Describe how a changing magnetic field induces a potential difference across a conductor. Explain that if the conductor is part of a complete circuit, a current is induced (the generator effect). Describe how an induced current opposes the original change in motion or magnetic field.	
	Uses of the Generator Effect - Explain how the generator effect is used in alternators to produce alternating current (AC) and in dynamos to generate direct current (DC). Interpret graphs of potential difference against time for alternators and dynamos.	
	Describe how microphones use the generator effect to convert sound waves into electrical signals. Explain how a moving coil in a magnetic field induces a current that varies with the pressure changes of the sound waves.	
	Explain how transformers work using the principle of electromagnetic induction. Use the transformer equation Vp/Vs = Np/Ns to calculate the potential difference in the primary and secondary coils. Explain how a step-up transformer increases voltage for transmission, while a step-down transformer reduces voltage for safe domestic use.	
	Explain how the National Grid uses transformers to efficiently transmit electricity over long distances. Describe how power is transmitted at high voltages and low currents to reduce energy losses and improve efficiency.	

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Double Science, Higher Tier

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