

Links to Curriculum – Electric Motor

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Year 7	Year 8	Year 9	Year 10
	Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems		Energy conservation in a system can be explained by describing energy transfers and transformations
			The motion of objects can be described and predicted using the laws of physics
Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations	Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries
Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management	Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management	People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions	People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions
Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge	Formulate questions or hypotheses that can be investigated scientifically	Formulate questions or hypotheses that can be investigated scientifically
Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed	Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods	Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods
In fair tests, measure and control variables,	In fair tests, measure and control variables,	Analyse patterns and trends in data, including describing relationships	Analyse patterns and trends in data, including describing relationships

and select equipment to collect data with accuracy appropriate to the task	and select equipment to collect data with accuracy appropriate to the task	between variables and identifying inconsistencies	between variables and identifying inconsistencies
Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions	Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method	Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method	Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data	Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data
Use scientific knowledge and findings from investigations to evaluate claims	Use scientific knowledge and findings from investigations to evaluate claims	Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems	Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems
Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate	Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations

Years 11 and 12

Magnets, magnetic materials, moving charges and current-carrying wires experience a force in a magnetic field; this force is utilised in DC electric motors.

A changing magnetic flux induces a potential difference; this process of electromagnetic induction is used in step-up and step-down transformers, DC and AC generators, and AC induction motors.

Guidance

Stage	Demonstrated inquiry	Prescribed inquiry	Structured inquiry	Guided inquiry	Open inquiry
Formulate, question and predict	No question	Provided question	Sharpened question	Learner selects	Learner poses questions
Plan	No planning	Provided procedure	Discussion with teacher	Guided during planning	Learner determines plans
Conduct	Teacher conducts	Conducting and recording method told	Sharpened plan and conduct	Guided during conducting and recording	Learner conducts and records
Process and analyse	Teacher analyses	Analysis method told	Discussed analysis	Guided analysis	Learner analyses data studying trends
Reason, solve and link back	No problem solving	Teacher provides reasoning and links	Discussed reasoning and conclusion	Guided reasoning and formulating conclusion	Learner reasons to formulate conclusions
Communicate and justify	No conclusion	Teacher writes conclusion	Student writes	Guided justification and findings	Learner justifies findings and conclusions