



Learning Journey – 7C Energy, Fuels and Efficiency

What have I done previously in my learning journey?			
Previously....	You have learnt previously about properties and changes in materials. This has involved: - Comparing and grouping everyday materials based on their thermal properties and suitability for different purposes. - Identifying materials that are good thermal conductors and materials that act as insulators. - Investigating how materials can be used to reduce unwanted energy transfers, for example in clothing, packaging and buildings. - Observing that heating and cooling can cause changes in materials and affect temperature. - Working scientifically to plan simple tests, make observations and use evidence to answer questions about materials and their uses.		
In this topic...	You will learn about energy and how it is transferred and used in everyday life. This will involve learning about: - different energy stores and transfer pathways power, dissipation and efficiency - how thermal energy is transferred by conduction and radiation - how scientists investigate insulating materials - how fossil fuels and renewable energy resources are used to generate electricity - how evidence can be used to compare and evaluate different energy resources As part of developing your working scientifically skills, you will plan, carry out, analyse and evaluate an investigation into thermal insulation.		
We will develop our learning by studying the following each lesson:		British Values	Skills in Science checklist
7C.01 Energy Stores - Identify examples of different energy stores in everyday situations. - Describe how energy can be transferred between stores. - Explain simple energy changes using energy store and transfer diagrams.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.02 Transferring Energy - Identify energy stores and transfer pathways in a range of situations. - Describe energy transfers using scientific vocabulary. - Explain how energy is transferred in everyday devices and systems.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.03 Power - Describe what is meant by an appliance power rating. - Compare the power ratings of different appliances. - Explain why appliances with different power ratings transfer energy at different rates.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.04 Dissipation - State that energy is conserved during transfers. - Describe what is meant by energy dissipation. - Explain why some energy becomes less useful during energy transfers.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.05 Efficiency - Describe what is meant by an efficient device. - Compare the efficiency of different energy transfers using energy diagrams. - Explain why some devices are more efficient than others.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills



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7C.06 Comparing Efficiency - Compare the efficiency of a range of household appliances. - Explain how efficiency affects energy use in the home. - Evaluate the suitability of different appliances using evidence provided.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.07 Energy Transfer by Conduction - Describe how thermal energy is transferred by conduction. - Explain conduction using the particle model. - Explain why gases are poor thermal conductors and describe thermal equilibrium.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.08 Investigating Insulators (Planning) - Identify independent, dependent and control variables. - Design a valid investigation to compare insulating materials. - Justify decisions made when planning an investigation.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.09 Investigating Insulators (Results) - Follow a method safely to investigate thermal insulation. - Collect and record data accurately. - Present results appropriately.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.10 Investigating Insulators (Analysis) - Analyse data to identify the most effective insulator. - Explain results using particle theory and conduction. - Evaluate the quality of the investigation and suggest improvements.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.11 Transferring Energy by Radiation - Describe how thermal energy is transferred by radiation. - Explain how colour affects absorption and emission of thermal radiation. - Apply this knowledge to real-life situations.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.12 Energy from Fossil Fuels - Identify the main fossil fuels and describe how they are formed. - Explain how energy stored in fossil fuels is used to generate electricity. - Evaluate the advantages and disadvantages of fossil fuels.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.13 Energy from Other Sources - Describe how renewable energy resources generate electricity. - Compare the advantages and disadvantages of different renewable resources. - Explain why different resources may be suitable in different locations.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
7C.14 Choosing Resources - Compare different energy resources for a range of locations. - Evaluate the advantages and limitations of each resource. - Justify recommendations using scientific evidence.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills



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Key Words									
Chemical store	Elastic store	Energy store	Gravitational store	Kinetic store	Electrical pathway	Heating pathway	Mechanical pathway	Pathway	Transfer
Appliance	Kilowatt	Power rating	Watt	Work done	Conservation	Dissipated	Efficiency	Useful energy	Wasted energy
Energy diagram	Energy input	Energy output	Efficient	Inefficient	Consumption	Domestic appliance	Evaluate	Suitability	Thermal loss
Conductor	Conduction	Particle collision	Thermal equilibrium	Thermal transfer	Control variable	Dependent variable	Independent variable	Method	Prediction
Accuracy	Observation	Repeatability	Results	Table	Analysis	Conclusion	Evaluate	Reliability	Uncertainty
Absorb	Emitter	Radiation	Reflect	Surface colour	Combustion	Electricity generation	Fossil fuel	Non-renewable	Turbine
Biogas	Geothermal	Hydroelectric	Renewable	Solar	Environmental impact	Sustainability	Tidal	Wave	Wind turbine

Future Learning	At GCSE students will build on their knowledge of energy stores, transfers and efficiency by calculating energy, power and efficiency in a range of real-world situations. Students will develop their understanding of thermal energy transfer by studying conduction, convection and radiation in greater depth. They will also compare renewable and non-renewable energy resources, evaluating their environmental impacts and suitability for future energy generation. Students will apply mathematical relationships and scientific evidence to explain energy changes, improve efficiency and make decisions about energy use in the modern world.
In careers	Understanding energy, efficiency and energy resources is important in many scientific, engineering and environmental careers. Energy engineers design systems that generate, transfer and use energy efficiently, helping to reduce energy waste and meet growing energy demands (average salary £35,000–£70,000+). Renewable energy engineers develop technologies such as wind turbines, solar panels and hydroelectric systems that transfer energy from renewable energy stores into electrical energy for homes, businesses and industry (average salary £30,000–£60,000+). Environmental scientists investigate the impact of energy production on the environment and help develop solutions to reduce pollution and carbon emissions (average salary £28,000–£50,000+). Building services engineers use knowledge of thermal energy transfer, insulation and efficiency to design energy-efficient homes, schools and workplaces (average salary £30,000–£65,000+). Understanding energy also supports careers in physics, manufacturing, sustainability and transport engineering, where professionals use scientific evidence to improve efficiency, reduce costs and develop technologies for the future.