



Medium Term Planning - Topic: Heating and Cooling

Curriculum Intent	In addition to working further on objectives from Year __, pupils will be taught, following National Curriculum guidelines, the following this topic:
Skills/National Curriculum Links	<ul style="list-style-type: none"> - heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators
Spiritual, moral, social, and cultural development	<p>SMSC: Safe working and using the forces model. The importance of energy in real life. Students will reflect on their experiences and apply their understanding to a range of issues. Students will be encouraged to be reflective about their own beliefs and those of others and compare different people's faiths, feelings and values in order to develop their own perspective on life. Students will explore how Science influences the next stage of their education and/or employment.</p> <p>PSHE/British Values: learn about everyday stores of energy and apply this to generating electricity, and chemical changes resulting in temperature change such as hand coolers and thermos flasks</p> <p>Skills Builder: Listening (Receiving, retaining and processing info), Speaking (The oral transmission of info and ideas), Problem solving (Find a solution to a situation or challenge), Creativity (imagination and generation of new ideas), Staying positive (The ability to use tactics and strategies to overcome setbacks), aiming high (Set clear and tangible goals), Leadership and teamwork</p>
Numeracy	drawing and interpreting graphs, using a formula, units
Literacy	<p>Vocabulary Tier 2: transferred, apparatus, minimise, patterns,</p> <p>Vocabulary Tier 3: temperature, solids, liquids, gases, equilibrium, energy, error, systemic error, random error, conduction, convection, particles, insulator, thermal conductors, infrared radiation, risks, radiation,</p> <p>Reading: Following a written method and read risk assessments. Students may be directed to the textbook; this could be in lesson or at home on Kerboodle.</p> <p>Writing: Describing and explaining scientific phenomenon, free response writing for describing precautions taken, use of word mat to promote sentence formation.</p> <p>Oracy: inclusion of BEST resources which are research evidence on common misunderstandings in science, effective diagnostic questioning and formative assessment, constructivist approaches to building understanding, and effective sequencing of key concepts that promote metacognitive talk and dialogue.</p>
Becoming future ready	<p>Careers/Employability:</p> <ul style="list-style-type: none"> - <i>Electrician</i> - <i>Builder</i> - <i>Politician</i> - <i>Environmental scientist</i>
Adaptation	Throughout this topic, quality first teaching will provide differentiation:



QFT/SEND Provision	<p>By product:</p> <p>By resource:</p> <p>By Intervention: by providing different levels of supervision and support</p> <p>By Progressive Questioning: exploring pupils' understanding through interactive dialogue.</p> <p>By Grouping: according to prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range.</p> <p>By Offering Optional Activities: In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.</p>	
Implementation Curriculum Delivery	To be able to:	
Learning Outcomes (Core Knowledge)	<p><i>Know</i></p> <ul style="list-style-type: none">- State how energy and temperature are measured.- Describe how energy is transferred through solids, liquids, and in air.- State what is meant by the term equilibrium.- Identify a source of error. <p><i>Apply</i></p> <ul style="list-style-type: none">- State the difference between energy and temperature.- Describe what happens when you heat up solids, liquids, and gases.- Explain what is meant by equilibrium.- Describe how to reduce error in experimental apparatus. <p><i>Extend</i></p> <ul style="list-style-type: none">- Give an example to show that energy and temperature are different.- Explain, in terms of particles, how energy is transferred.- Give examples of equilibrium.- Describe sources of error as systemic or random, and suggest ways to minimise these.	
	<p><i>Know</i></p> <ul style="list-style-type: none">- Describe simply what happens in conduction and convection.- State that thermal insulators reduce energy loss compared to thermal conductors.- State the pattern in conduction shown in results. <p><i>Apply</i></p> <ul style="list-style-type: none">- Describe how energy is transferred by particles in conduction and convection.- Describe how a thermal insulator can reduce energy transfer.- Describe the pattern in conduction shown by results, using numerical data to inform a conclusion. <p><i>Extend</i></p> <ul style="list-style-type: none">- Explain in detail the processes involved during heat transfers.- Explain why certain materials are good thermal insulators.- Explain the pattern in conduction shown by experimental results.	
	<p><i>Know</i></p> <ul style="list-style-type: none">- State some sources of infrared radiation.- State some properties of infrared radiation.- Identify some risks in an experiment. <p><i>Apply</i></p> <ul style="list-style-type: none">- Describe some sources of infrared radiation, and how energy is transferred.- Describe different ways to insulate in terms of conduction, convection and radiation.- Identify risks and explain why it is important to reduce them. <p><i>Extend</i></p> <ul style="list-style-type: none">- Explain how thermal equilibrium can be established.- Compare the different ways that energy is transferred.- Explain in detail how to reduce risks.	
Current learning to be developed in the future within:	Before: At KS2 you will have covered some common conductors and insulators, and associate metals with being good conductors.	Future: In GCSE physics you will also cover in more detail specific heat capacity, energy transfer and efficiency.
Assessment	Refer to assessment maps for formative and summative assessment opportunities.	
Impact	Attainment and Progress – Refer to assessment results / data review documentation.	