



The Sutton Academy

Knowledge Rich Curriculum Plan

SCIENCE- Physics Year 10

Energy Transfers



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: Energy Changes	- Students will know that materials can be good or poor conductors <i>Students will be able to compare the thermal conductivities of different materials</i> <i>Students will know that conductivity is a measure of how well a material conducts energy when heated</i> <i>Students will know how to describe the changes to the particles when a material is conducting heat</i>			<i>Tier 3: Conductivity: A measure of how well a material conducts heat</i>
Lesson: Specific Heat Capacity	- Students will know that the amount of energy stored in/ released from a system as its temperature changes can be calculated using the equation: $\text{change in thermal energy} = \text{mass} \times \text{specific heat capacity} \times \text{temperature change}$ - Students will know that the unit of thermal energy is Joules - Students will know that the unit of specific heat capacity is $\text{J/kg } ^\circ\text{C}$ - Students will know that the specific heat capacity of a substance is the amount of energy required to raise the temperature of one kilogram of a substance by one degree Celsius - Students will know how to use the equation to calculate change in thermal energy, mass, specific heat capacity and temperature change Students will know how to practically determine the specific heat capacity of a substance	<i>Students will already know that the unit of mass is kg</i>	<i>Using formula from the equation sheet</i>	<i>Tier 2</i> <i>Tier 3</i> Specific heat capacity: The energy required to change the temperature of 1kg of a substance by 1°C
Lesson: Specific Heat Capacity required practical	Students will know how to practically measure the specific heat capacity	<i>Students need to already know that a balance is used to measure mass</i> <i>Students need to already know that a thermometer is used to measure temperature</i>	Measuring mass and temperature Recording data accurately.	
Lesson: Changes of state and specific latent heat	- Students will know that the energy needed for a substance to change state without increasing the temperature is called the "latent heat" - Students will know that the specific latent heat of a substance is the amount of energy required to change the state of one kilogram of the substance without changing the temperature - Students will know that the symbol for specific latent heat is L	<i>Students need to already know that energy is measured in joules, J</i> <i>Students need to already know that mass is measured in kilograms, kg</i>		<i>Tier 2</i> Compressed: squashed <i>Tier 3</i> Internal Energy: The energy stored within a system by the particles. Internal energy = kinetic energy + potential energy System: a portion of the Universe that is being studied for the changes that take place within it.

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	- Students will know that the unit for specific latent heat is joules per kilogram, J/kg - Students will know that specific latent heat of fusion refers to the change of state from solid to liquid - Students will know that the specific latent heat of vaporisation refers to the change of state from liquid to vapour. - Students will know how to use the equation: Energy for a change of state = mass x specific latent heat $E = m L$ - Students will know how to interpret heating and cooling graphs that include changes of state - Students will know how to distinguish between specific heat capacity and specific latent heat			
Lesson: Conservation of energy	- Students will know that energy can't be created or destroyed - Students will know that energy that has dissipated has been transferred into a non-useful energy store, normally thermal energy of the surroundings - Students will know that energy can be transferred usefully - Students will know that when energy is transferred in a closed system, there is no net change in the total energy Students will know that there are methods for reducing unwanted energy transfers, such as through the use of lubrication	<i>Students need to already know the different stores of energy</i>		Tier 2 Tier 3 Mechanical Energy: Energy stored by an object depending on its position and motion Closed system: A system where no matter can transfer in or out of Lubricant: A substance used to reduce friction
Lesson: Reducing energy loss in a building	- Students will know that thermal energy can be transferred through conduction, convection and radiation - Students will know that the higher the thermal conductivity, the higher the rate of energy transfer - Students will know that the rate of cooling of a building is affected by the thickness and the thermal conductivity of its walls - Students will know that insulation can be used to slow down the rate of cooling, as insulation is a poor thermal conductor	<i>Students will already know that some materials are better at conducting heat than others</i>	Interpreting data	Tier 2 Insulation: Material used to insulate something Cavity: a hole or empty space between two materials Tier 3 Convection: the transfer of heat by the circulation or movement of the heated parts of a liquid or gas



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	Students will know that methods used to reduce energy loss in a home include using double glazing, installing cavity-wall insulation, installing insulation in the roof and through draught proofing			
Lesson: Insulation Practical (Triple only)	<i>Students will practically investigate insulating materials</i>		<i>Using apparatus correctly</i> <i>Taking measurements: temperature, volume</i>	