

YEAR 9 PHYSICS SEMESTER 1

ENERGY

Lesson	Title	Objectives	Check your progress		
			MEG 2	MEG 5	MEG 8
1	Potential energy	<ul style="list-style-type: none"> <li>-Consider what happens when a spring is stretched</li> <li>-Describe what is meant by gravitational potential energy</li> <li>-Calculate the energy stored by an object raised above ground level</li> </ul>	Describe how energy can be stored by raising an object up or by stretching or compressing it	Use the equations for gravitational potential energy and elastic potential energy	Apply the equations for gravitational potential energy and elastic potential energy in a variety of contexts, and change the subject of these equations
2	Investigating kinetic energy	<ul style="list-style-type: none"> <li>-Describe how the kinetic energy store of an object changes as its speed changes</li> <li>-Calculate kinetic energy</li> <li>-Consider how energy is transferred</li> </ul>	Describe how a moving object has kinetic energy	Know that kinetic energy is related to mass and velocity squared and use the equation to calculate it	Use the equation for kinetic energy to solve problems, including changing the subject of the equation
3	Work done and energy transfer	<ul style="list-style-type: none"> <li>-Understand what is meant by work done</li> <li>-Explain the relationship between work done and force applied</li> <li>-Identify the transfers between energy stores when work is done against friction</li> </ul>	Recognise that when a force moves an object along the line of action of the force, work is being done	Calculate the work done By a force, from the size Of the force and the distance moved	Use the equation for work done to solve problems, including changing the subject of the equation
4	Understanding power	<ul style="list-style-type: none"> <li>-Define power</li> <li>-Compare the rate of energy transfer by various machines</li> <li>-Calculate power</li> </ul>	State that various devices do work and, in doing so, transfer energy		
5	Specific heat capacity	<ul style="list-style-type: none"> <li>-Understand how things heat up</li> <li>-Find out about heating water</li> <li>-Find out about specific heat capacity</li> </ul>	State that some materials require more energy than others to increase a	Describe what is meant by the specific heat capacity of a material and use the equation	Calculate temperature changes, masses or specific heat capacities given the other values

			certain mass by a certain temperature rise	for SHC	
6	Required practical: investigating specific heat capacity	<ul style="list-style-type: none"> <li>-Use theories to develop a hypothesis</li> <li>-Evaluate a method and suggest improvements</li> <li>-Perform calculations to support conclusions</li> </ul>		Plan an experiment to measure the SHC of a material	Evaluate an experiment to measure the SHC of a material
7	Dissipation of energy	<ul style="list-style-type: none"> <li>-Explain ways of reducing unwanted energy transfer</li> <li>-Describe what affects the rate of cooling of a building</li> <li>-Understand that energy is dissipated</li> </ul>	Recognise that some energy transfers are unwanted	Describe how some energy transfers are more useful than others	Explain how thermal conductivity affects the rate of energy transfer across a material and affects the rate of cooling of a building
8	Energy efficiency	<ul style="list-style-type: none"> <li>-Explain what is meant by energy efficiency</li> <li>-Calculate the efficiency of energy transfers</li> <li>-Find out about conservation of energy</li> </ul>		Calculate energy efficiency	Recognise that in a closed system there may be energy transfers that change the way that energy is stored, but there is no net change to the total energy
9	Required practical: investigating ways of reducing unwanted energy transfers in a system	<ul style="list-style-type: none"> <li>-Use scientific ideas to make predictions</li> <li>-Analyse data to identify trends</li> <li>-Evaluate an experimental procedure</li> </ul>		Describe how lubrication and insulation can be used to reduce unwanted energy transfers	
10	Using energy resources	<ul style="list-style-type: none"> <li>-Describe the main energy sources available for use on Earth</li> <li>-Distinguish between renewable and non-renewable sources</li> <li>-Explain the ways in which the energy resources are used</li> </ul>	State that various resources are used as fuels and to generate electricity	Describe the advantages and disadvantages of fossil fuel, nuclear and renewable energy resources	Evaluate and justify the use of various energy resources for different applications
11	Global energy	-Analyse global trends in energy use			

	supplies	-Understand what the issues are when using energy resources			
12	Energy transfer	-To understand why energy is a key concept in Science -To use ideas about stores and transfers to explain what energy does -To understand why accounting for energy transfers is a useful idea			
<u>Key term list</u>					
<p>Energy transfer, elastic potential energy, gravitational potential energy, gravitational field strength            Energy store, kinetic energy            Energy transfer, force, work, power            Specific heat capacity            Conduction, energy dissipation, radiation, thermal conductivity            Conservation of energy, energy efficiency, insulation, thermal radiation            Non-renewable resources, renewable resource            Chemical, dissipate, energy, store, thermal, transfer</p>					
<u>Math Skills this Semester</u>					
<p>-Calculating changes in gravitational potential energy            -Calculating elastic potential energy            TIP – always put values into an equation using SI units. If the values are not in SI units, you have to change the values to SI units before starting the calculation.            -Calculating kinetic energy            -Calculating work done            -Energy calculations            -Calculating power            -Calculating specific heat capacity            -Using collected data to calculate a value for specific heat capacity (SHC)            -Calculating energy efficiency            -Analysing results            -Analyse trends in global data            -Calculating changes in energy</p>					

-Significant figures

-Two-step problems

Handling data

-Tables and frequency tables

-Using scatter diagrams, bar charts and histograms

-Mean, median and mode