



## Year 9 Science Trilogy – Energy Knowledge - Summer Term 1 – KNOWLEDGE OVERVIEW 2

Year group:		Unit:		Date (from and to):	
Week beginning:	Big question / concept:	Learning intentions:	Resources		
			Offline:	Online including links on how to access these:	
12 <sup>th</sup> April	What is energy and how does it change?	<p><b>State</b> that a system is an object or group of objects.</p> <p><b>Describe</b>, for common situations, the changes involved in the way energy is stored when a system changes. For example:</p> <ul style="list-style-type: none"> <li>• an object <b>projected upwards</b>.</li> <li>• an object <b>accelerated</b> by a <b>constant force</b>.</li> <li>• a vehicle slowing down.</li> <li>• an electric kettle boiling water.</li> </ul>	<p><b>Read</b> slides 4 - 7 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 8.</p> <p><b>Mark</b> Answers using slide 9.</p>	<p>1) First watch the Types of Energy Stores Online lesson  <a href="https://classroom.thenational.academy/lessons/energy-transfers-64upac">https://classroom.thenational.academy/lessons/energy-transfers-64upac</a></p> <p>2) Complete Exam Questions</p> <ul style="list-style-type: none"> <li>• <a href="https://XYBOEOK.exampro.net">https://XYBOEOK.exampro.net</a></li> <li>• <a href="https://LUNIXOA.exampro.net">https://LUNIXOA.exampro.net</a></li> </ul> <p>3) Then watch the <b>GCSE Pod video</b> on ‘Energy Stores and Transfers’  <a href="https://members.gcsepod.com/shared/podcasts/title/10974/82969">https://members.gcsepod.com/shared/podcasts/title/10974/82969</a></p>	
12 <sup>TH</sup> April	How can we calculate energy?	<p><b>Calculate</b> changes in the way energy is stored when a system is changed by:</p> <ul style="list-style-type: none"> <li>• heating</li> <li>• work done by forces.</li> <li>• work done when charge flows.</li> </ul> <p><b>Use calculations</b> to show how the overall energy in a system is redistributed when the system is changed.</p>	<p><b>Read</b> slides 10 - 15 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 16 &amp; 17.</p> <p><b>Mark</b> Answers using slide 18 &amp; 19.</p>	<p>1) First watch the Online lesson on Kinetic Energy  <a href="https://classroom.thenational.academy/lessons/the-kinetic-energy-store-6thpad">https://classroom.thenational.academy/lessons/the-kinetic-energy-store-6thpad</a></p> <p>2) Then watch the Online lesson on Elastic Potential Energy  <a href="https://classroom.thenational.academy/lessons/the-elastic-potential-store-70u62t">https://classroom.thenational.academy/lessons/the-elastic-potential-store-70u62t</a></p> <p>3) Then watch the Online lesson on Gravitational Potential Energy  <a href="https://classroom.thenational.academy/lessons/the-gravitational-potential-store-crr6ar">https://classroom.thenational.academy/lessons/the-gravitational-potential-store-crr6ar</a></p> <p>4) Complete the Exam Questions</p> <ul style="list-style-type: none"> <li>• <a href="https://VIBATED.exampro.net">https://VIBATED.exampro.net</a></li> <li>• <a href="https://UOSEJUL.exampro.net">https://UOSEJUL.exampro.net</a></li> </ul> <p>5) Then watch the <b>GCSE Pod video</b> on ‘Elastic Potential Energy’ and ‘Gravitational Potential Energy’  <a href="https://members.gcsepod.com/shared/podcasts/title/10973/83171">https://members.gcsepod.com/shared/podcasts/title/10973/83171</a></p>	

	<p>What is specific heat capacity?</p>	<p><b>State</b> the specific heat capacity of a substance is the amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius.</p> <p><b>Calculate</b> the energy stored in or released from a system using the equation:</p> <p><i>Change in thermal energy</i> =</p> <p><i>mass x</i> <i>specific heat capacity x</i> <i>temperature change</i></p> <p><math>[\Delta E = m c \Delta\theta]</math></p> <p>change in thermal energy, <math>\Delta E</math>, in joules, J</p> <p>mass, m, in kilograms, kg</p> <p>specific heat capacity, c, in joules per kilogram per degree Celsius, J/kg°C.</p> <p>temperature change, <math>\Delta\theta</math>, in degrees Celsius, °C</p>	<p><b>Read</b> slides 22 – 23 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions and mark answers using slides 24 - 30.</p>	<p>1) First watch the Types of Energy Stores Online lesson <a href="https://classroom.thenational.academy/lessons/specific-heat-capacity-chhp6r">https://classroom.thenational.academy/lessons/specific-heat-capacity-chhp6r</a></p> <p>2) Complete Exam Questions</p> <ul style="list-style-type: none"> <li>• <a href="https://BECEKED.exampro.net">https://BECEKED.exampro.net</a></li> <li>• <a href="https://OACEBAB.exampro.net">https://OACEBAB.exampro.net</a></li> </ul>
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19 <sup>th</sup> April	What is mechanical power?	<p><b>State</b> Power is defined as the <b>rate at which energy is transferred</b> or the rate at which work is done.</p> <p><b>Calculate</b> power:</p> $Power = \frac{energy\ transferred}{Time}$ $[P = E / t]$ $Power = \frac{work\ done}{Time}$ $[P = W / t]$ <p>Power, P, in watts, W  Energy transferred, E, in joules, J  Time, t, in seconds, s  Work done, W, in joules, J  An energy transfer of one joule per second is equal to a power of 1 watt.</p>	<p><b>Read</b> slides 32 – 33 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 34 - 37.</p> <p><b>Mark</b> Answers using slide 38 - 39.</p>	<ol style="list-style-type: none"> <li>1) First watch the Online lesson on Power  <a href="https://classroom.thenational.academy/lessons/power-crvk4c">https://classroom.thenational.academy/lessons/power-crvk4c</a></li> <li>2) Complete Exam Questions <ul style="list-style-type: none"> <li>• <a href="https://EESABEN.exampro.net">https://EESABEN.exampro.net</a></li> <li>• <a href="https://YYJILIQ.exampro.net">https://YYJILIQ.exampro.net</a></li> </ul> </li> <li>3) Then watch the <b>GCSE Pod video</b> on ‘Power’  <a href="https://members.gcsepod.com/shared/podcasts/title/10973/83171">https://members.gcsepod.com/shared/podcasts/title/10973/83171</a></li> </ol>
	What happens when energy is transferred?	<p><b>State</b> that energy can be transferred usefully, stored or <b>dissipated</b>, but cannot be created or destroyed.</p> <p><b>Describe</b> examples where there are energy transfers in a closed system, that there is no net change to the total energy.</p>	<p><b>Read</b> slides 42 - 44 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 45 - 49.</p> <p><b>Mark</b> Answers using slide 50.</p>	<ol style="list-style-type: none"> <li>1) First watch the Online lesson on Conservation of Energy  <a href="https://classroom.thenational.academy/lessons/conservation-of-energy-71gk6c">https://classroom.thenational.academy/lessons/conservation-of-energy-71gk6c</a></li> <li>2) Complete exam questions. <ul style="list-style-type: none"> <li>• <a href="https://SADYBOO.exampro.net">https://SADYBOO.exampro.net</a></li> <li>• <a href="https://WYZUYUY.exampro.net">https://WYZUYUY.exampro.net</a></li> </ul> </li> </ol>

		<p><b>Describe</b> how unwanted energy transfers can be reduced.</p> <p><b>Describe</b> how the rate of cooling of a building is affected by the thickness and thermal conductivity of its walls.</p>		<p>3) Then watch the <b>GCSE Pod video</b> on 'Insulation'  <a href="https://members.gcsepod.com/shared/podcasts/title/10974/82969">https://members.gcsepod.com/shared/podcasts/title/10974/82969</a></p>
26 <sup>th</sup> April	What is efficiency?	<p><b>Describe</b> the higher the <b>thermal conductivity</b> of a material, the higher the rate of energy transfer by <b>conduction</b> across the material.</p> <p><b>Investigate</b> ways of <b>reducing</b> the <b>unwanted energy transfers</b> in a system.</p>	<p><b>Read</b> slides 52 – 53 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 54 – 58.</p> <p><b>Mark</b> Answers using slide 59.</p>	<p>1) First watch the Online lesson on Efficiency and Reducing unwanted energy transfers  <a href="https://classroom.thenational.academy/lessons/efficiency-and-reducing-unwanted-energy-transfers-61jker">https://classroom.thenational.academy/lessons/efficiency-and-reducing-unwanted-energy-transfers-61jker</a></p> <p>2) Complete Exam Questions</p> <ul style="list-style-type: none"> <li>• <a href="https://KIYOVIY.exampro.net">https://KIYOVIY.exampro.net</a></li> <li>• <a href="https://BUWOCEX.exampro.net">https://BUWOCEX.exampro.net</a></li> </ul> <p>3) Then watch the <b>GCSE Pod video</b> on 'Efficiency'  <a href="https://members.gcsepod.com/shared/podcasts/title/10974/82969">https://members.gcsepod.com/shared/podcasts/title/10974/82969</a></p>
3 <sup>RD</sup> May	What energy resources do we have?	<p><b>Describe</b> the main energy resources available for use on Earth. These include:</p> <ul style="list-style-type: none"> <li>• fossil fuels (coal, oil and gas)</li> <li>• nuclear fuel</li> <li>• bio-fuel</li> <li>• wind</li> <li>• hydro-electricity</li> </ul>	<p><b>Read</b> slides 62 - 70 from the Home learning pack and make notes on the key points.</p> <p><b>Answer</b> exam questions on slide 71 - 73.</p> <p><b>Mark</b> Answers using slide 74 - 76.</p>	<p>1) First watch the Online lessons on Renewable and Non-Renewable Energy Stores.</p> <ul style="list-style-type: none"> <li>• <a href="https://classroom.thenational.academy/lessons/renewable-energy-resources-ccu6cr">https://classroom.thenational.academy/lessons/renewable-energy-resources-ccu6cr</a></li> <li>• <a href="https://classroom.thenational.academy/lessons/non-renewable-energy-resources-6rupcd">https://classroom.thenational.academy/lessons/non-renewable-energy-resources-6rupcd</a></li> </ul>

- geothermal
- the tides
- the Sun
- water waves.

**Distinguish between** energy resources that are renewable and energy resources that are non-renewable.

**Compare** the ways that different energy resources are used. The uses to include **transport, electricity generation and heating.**

2) Complete Exam Questions

- <https://RUWERIT.exampro.net>
- <https://QERISOX.exampro.net>