

## Unit of Work – Summative Information – Science Unit 8K – Year 8

| Year /Group                | Unit or Activity    | Focus – skills and knowledge development | Science KS3 Programme of Study Reference     | Curriculum, learning opportunities  | PLTS       | Number of lessons |
|----------------------------|---------------------|--|--|---|------------|-------------------|
| 8                          | 8K Energy Transfers | See below.                               | Edexcel Science 9 – 1<br>8K Energy Transfers | Pupils will have 7 lessons per unit and will learn through a mix of theory and practical lessons. | See below. | 7                 |
| <b>Learning Intentions</b> |                     |  |  | <b>Cross Curricular Objectives</b>  |            |                   |

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## Skills and knowledge:

1. **Temperature changes** – Explain the difference between internal energy and temperature.
2. **Transferring energy** – State and explain using the particle model how energy is transferred by heating.
3. **Controlling transfers** – Plan an investigation into insulation and heat loss.
4. **Controlling transfers part 2** – Gather results, conclude and evaluate.
5. **Power and efficiency** – Calculate energy efficiencies and interpret Sankey diagrams.
6. **Paying for energy** – Calculate payback times and explain how energy companies charge for energy used.

## Content: The unit looks at energy transfers by heating in the context of homes.

The unit covers the following statements from the UK National Curriculum for Science (2013):

- comparing power ratings of appliances in watts (W, kW);
- comparing amounts of energy transferred (J, kJ, kWh);
- domestic fuel bills, fuel use and costs
- 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;
- energy as a quantity that can be quantified and calculated;
- the total energy has the same value before and after a change;
- comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with temperatures;
- using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.

## Literacy:

- correct spelling of scientific keywords;
- correct use of scientific key terms;
- and using language appropriate to a given audience.

## Numeracy:

- substituting values in simple formulae and solving resulting equations;
- using percentages;
- drawing and interpreting scale drawings;
- and choosing and using a suitable level of accuracy for measurements.

## Thinking Skills:

- problem-solving – assessed skills task
- practical tasks – paying attention to objectivity and concern for accuracy, precision, repeatability and reproducibility;
- linking ideas together – lessons inform understanding of subsequent concepts;
- and productive thinking – evaluating evidence.

## ICT: Research and in-class models

## Communication:

- using language appropriate to a given audience;
- effective way of organising notes;
- and questioning.

## SMSC:

- paired practical work;
- group work;
- consequences of heat transfer;
- building and appliance design and its impact on people and the environment;
- ethics of how human cope with living in different environments.

## PLTS:

See 'thinking skills' above.

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| <b>Assessment Criteria / Expectations – including formative and feedback</b><br>(How: method / criteria. When : i.e. timing By whom : )  | <b>Resources</b>   | <b>Continuity and Progression</b><br>(link/development of previous learning objectives/units/achievements)   |
|--|--|--|
| <p>Extended homework task: All 8K tasks set on Activelearn and automatically marked. Students will have two weeks to complete these.</p> <p>Additional homework: as required by class teacher.</p> <p>Recommended practical task: Investigating insulation – planning the experiment and considering results to draw conclusions.</p> <p>Formative assessment: 8K data analysis, bar chart and conclusion task.</p> <p>Summative assessment: One hour long, taken as part of a combined unit test approximately every 7 weeks.</p> | <p>Resources from Pearson<br/>                     Activeteach Section 8K Energy Transfers</p> <p>Located on Drive:<br/>                     Science Schemes of Learning/Science 9 – 1 planning/Year 8/8K Energy Transfers</p> | <p><b>From previous units, most students will be able to:</b></p> <ul style="list-style-type: none"> <li>• use the particle model to explain the properties of solids, liquids and gases (7G);</li> <li>• recall some ways in which energy is transferred and stored (7I);</li> <li>• recall the law of conservation of energy, and that the efficiency of a machine tells us how much energy is transferred as wasted energy (7I).</li> </ul> |

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## Week by Week SCHEME OF WORK & ASSESSMENT for (Science – 8K – Year 8)

| Date/Week   | Subject content/Topic | Knowledge base – link to previous learning   | Skills in focus   | Students’ programme of study and activities                             | Assessment: method, feedback and improvement – shared with all  | Resources: hyperlink or physical location for all   | Homework               |
|---|-----------------------|--|---|---|---|---|------------------------|
| <b>Week 1</b><br><br>Number of lessons: 3<br><br>Unit: 8K<br><br>Dates: Term 3/4 (rotation)                         | 8K Energy Transfers   | <ul style="list-style-type: none"> <li>use the particle model to explain the properties of solids, liquids and gases (7G);</li> <li>recall some ways in which energy is transferred and stored (7I);</li> </ul>  | <b>Literacy skills</b> <ul style="list-style-type: none"> <li>correct spelling of scientific keywords;</li> <li>correct use of scientific key terms;</li> <li>using language appropriate to a given audience.</li> </ul> <b>Practical skills</b> <ul style="list-style-type: none"> <li>Investigating conduction and radiation</li> </ul>   | Lessons 1-3 (see overview)  | Formative:<br>Plenary activities to summarise learning and inform subsequent adjustments to planning.   | Active learn website<br><a href="http://www.activeteachonline.com">www.activeteachonline.com</a><br><br>Drive:<br><a href="https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM">https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM</a> | Extended homework task |
| Resources and general notes: Powerpoints completed for each lesson with LI, success criteria and notes on delivery. |                       |  |   |   |   |   |                        |
| Date/Week   | Subject content/Topic | Knowledge base – link to previous learning   | Skills in focus   | Students’ programme of study and activities                             | Assessment: method, feedback and improvement – shared with all  | Resources: hyperlink or physical location for all   | Homework               |
| <b>Week 2</b><br><br>Number of lessons: 3<br><br>Unit: 8K<br><br>Dates: Term 3/4 (rotation)                         | 8K Energy Transfers   | <ul style="list-style-type: none"> <li>use the particle model to explain the properties of solids, liquids and gases (7G);</li> <li>recall some ways in which energy is transferred and stored (7I);</li> <li>recall the law of conservation of energy, and that the efficiency of a machine tells us how much energy is transferred as wasted energy (7I).</li> </ul> | <b>Practical skills</b> <ul style="list-style-type: none"> <li>Investigating insulation</li> <li>Planning experiments</li> <li>Recording results</li> <li>Drawing conclusions</li> <li>Considering accuracy and precision</li> </ul> <b>Mathematical skills</b> <ul style="list-style-type: none"> <li>substituting values in simple formulae and solving resulting equations;</li> <li>using percentages.</li> </ul> | Lessons 4-6 (see overview)  | Formative:<br>Plenary activities to summarise learning and inform subsequent adjustments to planning.   | Active learn website<br><a href="http://www.activeteachonline.com">www.activeteachonline.com</a><br><br>Drive:<br><a href="https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM">https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM</a> | Extended homework task |
| Resources and general notes: Powerpoints completed for each lesson with LI, success criteria and notes on delivery. |                       |  |   |   |   |   |                        |
| <b>Week 3</b><br><br>Number of lessons: 3<br><br>Unit: 8K<br><br>Dates: Term 3/4 (rotation)                         | 8K Energy Transfers   | <ul style="list-style-type: none"> <li>recall the law of conservation of energy, and that the efficiency of a machine tells us how much energy is transferred as wasted energy (7I).</li> <li>recall some ways in which energy is transferred and stored (7I);</li> </ul>  | <b>Mathematical skills</b> <ul style="list-style-type: none"> <li>substituting values in simple formulae and solving resulting equations;</li> <li>using percentages;</li> </ul> <b>Literacy skills</b> <ul style="list-style-type: none"> <li>correct spelling of scientific keywords;</li> <li>correct use of scientific key terms.</li> </ul>  | Lesson 7 (see overview)<br><br>Summative assessment<br><br>Intervention | Formative:<br>L7- Quick Quiz to assess learning from unit.<br>End of unit test by informing subsequent intervention lesson.<br><br>Summative:<br>End of unit test | Active learn website<br><a href="http://www.activeteachonline.com">www.activeteachonline.com</a><br><br>Drive:<br><a href="https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM">https://drive.google.com/drive/folders/0B0GpYbW9N03nSUtVlIFRTEzTXM</a> | Extended homework task |
| Resources and general notes: Powerpoints completed for each lesson with LI, success criteria and notes on delivery. |                       |  |   |   |   |   |                        |

(Plan in intervention time to each unit)