| Subject | Year 7 Threshold Concepts – Spring Term | How to support students' learning |
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| Photosynthesis and respiration | <u>Aerobic respiration</u><br>• Understand Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life<br>• Summarize aerobic respiration<br><br><u>Anaerobic respiration</u><br>• Differentiate aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life<br>• Describe the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration<br>• Explain the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism<br><br><u>Plant organisation, adaptation and reproduction</u><br>• Understand plants make carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots<br>• Describe the role of leaf stomata in gas exchange in plants<br>• Describe the adaptations of leaves for photosynthesis<br>• Explain reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms | Encourage your child to watch this video about how the periodic table is arranged (1525) KS3 - The Periodic Table - YouTube<br><br>Encourage your child to use BBC bitesize to read about elements, compounds and mixtures, watch a short video and complete the quiz<br>Elements, compounds and mixtures - BBC Bitesize<br><br>Here is a video to help summarise the difference between elements, compounds, mixtures and heir properties What Is An Element, Mixture And Compound? \| Properties of Matter \| Chemistry \| FuseSchool - YouTube<br><br>Here is a video summarising conservation of mass Conservation of mass - YouTube |

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| | <u>Plants and photosynthesis</u><br>• Name the reactants in, and products of, photosynthesis, and a word summary for photosynthesis<br>• Explain the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere<br><br><u>The respiratory system and breathing</u><br>• Describe the structure and functions of the gas exchange system in humans, including adaptations to function<br>• Explain the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume<br>• Describe the impact of exercise, asthma and smoking on the human gas exchange system<br><br><u>Effects of exercise on the respiratory system</u><br>• Explain the impact of exercise, asthma and smoking on the human gas exchange system<br><br><u>The skeleton, joints and muscles</u><br>• State the structure and functions of the human skeleton, to include support, protection, movement and making blood cells | Encourage your child to take this quiz to learn key terminology and facts for this topic KS3 Respiratory System - Quizizz<br><br>Encourage your child to read through the information here: Effects of training and exercise - Effects of exercise and training - GCSE Physical Education Revision - BBC Bitesize<br><br>Encourage your child to do this quiz to identify misunderstandings within this topic: Skeleton, Joints and Muscles - revise KS3 science with fun quizzes (educationquizzes.com)<br><br>Encourage your child to do this quiz to identify misunderstandings within this topic: Skeleton, Joints and Muscles - revise KS3 science with fun quizzes (educationquizzes.com) |

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| Energy | • Have an understanding of biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles<br>• Describe the function of muscles and examples of antagonistic muscles<br><br>• Explain reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms<br><br><u>Energy Stores and Transfers</u><br>• Describe the main energy stores<br>• Understanding the conservation of energy and apply it to energy transfers<br><br><u>Efficiency</u><br><br>• Recall the equation for efficiency<br>• Apply efficiency calculations to energy transfer diagrams<br>• Describe how to use a Sankey diagram to represent efficiency | Encourage your child to read through the information and compete the topic quiz: Respiration and gas exchange - KS3 Biology - BBC Bitesize - BBC Bitesize<br><br>Encourage your child to watch this BBC lesson on conservation of energy:<br>Conservation of Energy \| Physics – Wonders of Life - YouTube<br><br>Students can revise their knowledge of the energy stores using the information on this page:<br>Energy stores - Energy - KS3 Physics - BBC Bitesize - BBC Bitesize<br><br>Ask students to predict the efficiency of different objects in the home (e.g. television, light bulb, hair dryer, games console, etc)<br>Encourage students to then research the efficiency of these different devices to see if their prediction matches the information found. |

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| Electricity | • Discuss the advantages and disadvantages of non-renewable energy resources:<br>  ○ Coal<br>  ○ Oil<br>  ○ Gas<br>  ○ Nuclear<br><br><u>Renewable Energy Resources</u><br>• Discuss the advantages and disadvantages of renewable energy resources such as:<br>  ○ Solar<br>  ○ Wind<br>  ○ Geothermal<br>  ○ Wave<br>  ○ Tidal<br>  ○ Biomass<br><br><u>Electrical circuits and symbols</u><br>• Recognise and draw correct circuit symbols<br>• Select the correct equipment to measure current and voltage in a circuit<br>• Draw a circuit correctly<br><br><u>Series and Parallel Circuits</u><br>• Identify a series circuit<br>• Identify a parallel circuit<br>• Describe how current behaves in both series and parallel circuits | Students can revise their understanding of non-renewable energy resources using this website:<br>Non Renewable Energy Resources - Shalom Education (shalom-education.com)<br><br>Encourage your child to look at live information about the electricity being produced in the UK by visiting this website:<br>Dashboard - MyGridGB<br><br>Encourage your child to have a go at creating a carbon free electricity mix for the UK using this online game:<br>Net Zero Energy Challenge: EnergyMixer<br><br>Students can practise drawing circuit symbols and circuits correctly using this online lesson:<br>Drawing electrical circuits (thenational.academy)<br><br>Watch the videos below to understand the difference between a series and parallel circuit and how current moves around these circuits.<br>Series and parallel circuits - KS3 Physics - BBC Bitesize<br>Circuits - YouTube |

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| Earth Science | Resistance<br>• Describe how resistance effects current in a circuit<br>• Calculate resistance using voltage and current<br><br>The Earth's atmosphere<br><br>• Compare the earths early atmosphere to the atmosphere today<br>• Recall the proportions of gases in the atmosphere today<br>• Explain why carbon dioxide and oxygen levels changed in Earth's early history<br>Crude oil<br>• Describe the composition of crude oil<br>• Draw molecular diagrams of the first 5 alkanes<br>• Evaluate the extraction and use of crude oil<br>The carbon cycle<br>• Describe the main process involved in the cycling of carbon<br>The greenhouse effect and climate change<br>• Describe the greenhouse effect<br>• Explain the significance of an increased greenhouse effect<br>• State and describe some of the potential consequences of climate change<br>• Analyse data related to climate change<br>Types of materials<br>• Describe some of the properties of ceramics, polymers and composites<br>Recycling resources<br>• Explain the importance of reducing, reusing and recycling<br>• Compare methods of preserving natural resources<br>Mining and quarrying | Work through this online lesson with your child to help them understand resistance.<br>Lesson: Resistance \| Teacher Hub \| Oak National Academy (thenational.academy)<br><br>• Encourage your child to visit the Centre for Science education website to read about the gases in the atmosphere and atmospheric pollution What's In the Air? \| Center for Science Education (ucar.edu)<br><br>• Here is a quiz to check your child's understanding 20220714104317_the-carbon-cycle-6gtkac-exit-quiz-questions.pdf (ttsonline.net)<br><br>• Encourage your child to watch this video on air pollution Air Pollution \| Video for Kids \| Causes, Effects & Solution - YouTube<br>• Here is a stretch and challenge task for your child based on ways that we can reduce pollution Carbon Neutral Fuels (ttsonline.net)<br>Here is a stetch and challenge task for your child about recycling M06_EXSC_CM_Y8GBR_2506_UF.indd (ttsonline.net) |

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| Reproduction | <u>Reproduction</u><br>• Describe reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta<br><br><u>Pollinators</u><br>• Describe the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops<br>• Understand the importance of plant reproduction through insect pollination in human food security | Encourage your child to read through the information here, and take the relevant quiz to test their knowledge Human reproduction - Reproduction - KS3 Biology - BBC Bitesize - BBC Bitesize<br><br>Encourage students to complete the revision resources for plants here: What is pollination? Reproduction - KS3 Biology - BBC Bitesize - BBC Bitesize |