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| Energy 2 (16 lessons) – in this unit, you will build on your knowledge of energy stores and transfers from Year 7 Physics to discuss the ways we generate energy in the UK. We will analyse pie charts on the types of energy resources used in the UK and how they have changed over the last 2 decades. After we have analysed these pie charts, we will look at the impact on the environment after the changes have been made to the types of energy resources in the UK. We will look at renewable and non-renewable energy resources, and the benefits and drawbacks of each of the energy resources. We will look at wind turbines as a means of generating electricity, and which number of turbine blades makes a wind turbine most efficient. After this, we will discuss why this specific number of turbine blades makes it the most efficient.  We will then look at how this energy is used in the home, in the form of ‘power’. We will look at which appliances in your homes are more ‘powerful’ than others, and the reason why they are more powerful. Finally, we will look at the power of a kettle, and use calculations to see how much energy is transferred from the kettle to the specific mass of water boiled. | | | | |
| **Core Questions for the Unit** | **1 – What are the different sources of energy?**   1. State the different sources of energy. 2. Describe how they are used. 3. Compare renewable and non-renewable   **2- What do we use energy for?**   1. State what energy is used for in society 2. Describe why energy consumption is increasing 3. Explain how the demand is being met   **3- What are the advantages and disadvantages of each energy source?**   1. Recall the different sources of energy 2. Evaluate each resource 3. Present a balanced argument   **4- What is power and how does it link to energy?**   1. Define power 2. Use the power equation 3. Rearrange the power equation 4. Convert the units for power.   **5- How can you measure power?**   1. Investigate the amount of energy transferred in a kettle 2. Conclude what kettles are transferring the most energy 3. Link the power of the kettle to it’s efficiency. | | | |
| **Links to other subjects** | Y7 Electricity - Electrical energy.  Maths – Numeracy section.  Geography – Energy resource. | | | |
| **Development of new knowledge** | * comparing power ratings of appliances in watts (W, kW) * comparing amounts of energy transferred (J, kJ, kW hour) * fuels and energy resources | | **Strengthening of prior**  **knowledge** | * Other processes that involve energy transfer: change motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels * Comparing the starting with the final conditions of a system and describing increases and decreases in the amount of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in in chemical compositions. * Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes |
| **Vocabulary:** | **Tier 2 Words:**  Evaluate  Conclude  Calculate  Rearrange  Resource  Compromise  Judgment  Covert  Link  Decide  Efficiency  National | **Tier 3 Words:**  Energy  Power  Renewable  Non- renewable  Reliable (in this context)  Watt  Joule | **Reading Opportunities**  **Numeracy Opportunities** | <https://www.businessgreen.com/analysis/4012998/coronavirus-falling-power-demand-impacting-green-energy>  Link between Coronavirus and energy  <https://www.energy.gov/science-innovation/energy-sources>  Innovative energy sources  <https://www.theguardian.com/environment/2020/mar/25/worlds-wind-power-capacity-up-by-fifth-after-record-year>  Rise in renewable energy.  Converting units  Table drawing  Graph drawing  Pie charts  Rearranging equations |
| **The activities you are likely to do in lesson.** | **1 What are the different sources of energy?**   * Retrieval practice –Do it now questions on types of energy and units for energy based on Y7 energy. * Decode it now: Source - Pupils write the definition, explore the etymology of the word and create their own sentence * Introduce different sources of energy, pupil research on each source of energy. Thinking map -bubble map on these. * Think, pair, share on the different energy resources. * Video questions on renewable and renewable energy sources/ * Active reading and pupil’s discussion about renewable and non-renewable sources and the balance between reliability and sustainability. Pupils should use a dictionary to find the definitions of any new key words. * Walk the line different statements regarding electricity to assess pupil viewpoints. * Retrieval practice Review it now checkpoint quiz on the lesson.   **2- What do we use energy for?**   * Retrieval practice –Do it now questions on types of energy and units for energy based on Y7 energy. * Think, pair share on supply and demand, link to geography and population numbers * DART on rising energy demand of energy <https://www.businessgreen.com/analysis/4012998/coronavirus-falling-power-demand-impacting-green-energy> - Link to context of COVID and how that affected energy consumption * Creative writing on reducing energy consumption, where pupils will persuade a government to reduce energy usage * SMSC opportunity on false news regarding energy consumption during the pandemic. * Assessment – Problem solver on pie chart of sources of energy, maths opportunity on % here. * Review it now checkpoint quiz on the previous lessons/ 2 stars and a wish on work/ exam style question/ review of learning.   **3- What are the advantages and disadvantages of each energy source? (long term 2/3 lesson project)**   * Retrieval practice – Do it now questions based on previous Y8 lesson and from the Y7 energy unit. * Decode it now: Evaluate * Evaluation of energy sources based on method of generation and environmental impact. This can be linked to careers as there is going to be a rising demand in renewable. * Thinking map – Cause and effect map on the energy sources/ flow chart on how to plan a research presentation. * Pupils research different energy sources such as solar power using computers, this can be built on at home. * Presentation on energy sources with a justified conclusion based on collected evidence (computing skills and research skills). * Pupils deliver their preferred choice of energy resources to the class. Oracy skills opportunity * Pupils give feedback on other presentations (enrichment opportunity on providing constructive feedback). * Review it now checkpoint quiz on the previous lessons/ 2 stars and a wish on work/ exam style question/ review of learning.   4**- What is power and how does it link to energy?**   * Retrieval practice – Do it now questions based on previous Y8 lesson and from the Y7 energy unit. * Decode it now: Power * Think pair share on appliances and what makes them mover powerful, link to a faster car converting CE into KE more quickly. * Active reading on appliances and their different power ratings and how this links to energy and time j/s * Maths opportunity – Unit conversion of the watt, build on Y7 work by bringing in standard form for units for higher groups. * Review it now checkpoint quiz on the previous lessons/ 2 stars and a wish on work/ exam style question/ review of learning.   **5- Calculating power**   * Retrieval practice – Do it now questions based on previous Y8 lesson and from the Y7 energy unit. * Show pupils power equation – See if they can follow it and ask them to try and rearrange it. * Maths opportunity – Rearranging equations or energy, power and time. Discuss the two methods of doing this. * Thinking map – Flow diagram on how to rearrange an equation. * Give pupils many differentiated questions on the power calculation including different units of power, energy and time (depending on progress from previous lesson). * Review it now checkpoint quiz on the previous lessons/ 2 stars and a wish on work/ exam style question/ review of learning.   **6 – Investigating the power of a kettle.**   * Retrieval practice – Do it now questions based on previous Y8 lesson and from the Y7 energy unit. * Show pupils 2 kettle and ask them to discuss which on is more powerful and how they could tell. * Link this back to the equation p = e/t, hopefully pupils will realise it’s hard to calculate power as the energy is hard to calculate * Give the pupils a kettle with the power given to them and use this to now calculate the energy transferred by using e = p xt * Depending on ability, the pupils could be given SHC equation to work out the energy and then the power. * Link back to efficiency, the pupils could calculate the % efficiency based on how much energy the kettle should have transferred etc. * Opportunity after practical to use visualiser to look at modelling graphs. * Review it now checkpoint quiz on the previous lessons/ 2 stars and a wish on work/ exam style question/ review of learning. | | | |
| **How you will be assessed.** | You will be assessed by:   * A retrieval quiz during the Do It Now of every lesson. * Mini quizzes and challenges during lesson. * A progress assessment in the middle of the unit – Here we will reflect and improve on key areas and complete DIRT work.   An end of unit assessment that assesses your knowledge and skills that you have built in this unit and previous units that we link back to. | | | |