

9: Energy and water

Syllabus ref.	Learning objectives	Suggested teaching activities
3.5 Energy	Describe the importance of non-renewable fossil fuels, renewable energy supplies, nuclear power and fuel wood, globally and in different countries at different levels of development	<p>Learners define key words 'non-renewable', 'renewable' and 'fossil fuels' and update key word glossary. Learners complete a card sorting activity to include characteristics of each and examples – show as a table.</p> <p>Provide learners with figures about each energy source and how it contributes to the world energy supply. Learners represent this information as a pie chart or divided bar graph and describe what it shows. (I)</p> <p>Extension activity: How are the figures likely to change in the future and why? Repeat this activity but for LEDCs and MEDCs – compare and contrast the two graphs. Learners can independently research and graph an example of a MEDC and LEDC to reinforce – can be used to introduce a case study later on. (I)</p> <p>Learners write up the similarities and differences between the graphs.</p> <p>Link to 3.7 – use of fuel wood as a cause of desertification and soil erosion.</p> <p>Learners research and take notes on how coal, oil and natural gas are obtained and write about the advantages and disadvantages of each as an energy source. (I)</p> <p>Learners discuss how fossil fuels are used to produce energy in a thermal power station and produce a fully annotated diagram. A card sorting activity with the good and bad points of thermal power stations.</p> <p>Introduce fuelwood as an energy source for LEDCs. Learners use data to produce a graph to show where fuelwood is used and how its use is increasing over time. (I) Link to deforestation and desertification – learners draw a traditional system in balance and out of balance – fully annotate to show the impact of the trees being removed for firewood. (I) Describe and explain the differences between the two. (Link to Unit 10 – causes of desertification.)</p> <p>The following link will be useful here: Energy: www.bbc.co.uk/schools/gcsebitesize/geography/energy_resources/energy_rev1.shtml</p>
	Evaluate the benefits and disadvantages of nuclear power and renewable energy sources	<p>Define 'nuclear power' and update key word glossary. Reinforce as a non-renewable resource. Learners produce a simple flow diagram to illustrate how nuclear power works. (I)</p> <p>Renewable energy sources: www.bbc.co.uk/schools/gcsebitesize/geography/energy_resources/energy_rev2.shtml</p>

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		<p>Sustainable resources: www.bbc.co.uk/schools/gcsebitesize/geography/sustainability/sustainable_resources_rev3.shtml</p> <p>Learners work in small groups to read viewpoints of different groups of people about nuclear power. Extract benefits and problems of each from the view points and discuss.</p> <p>Conduct whole class debate – ‘The future of nuclear power’. Write up both activities as a newspaper article – presenting the arguments for and against with relevant examples as well as justifying their own viewpoint. (I)</p> <p>Use photographs to introduce the different types of renewable energy. For each, briefly describe how it works – learners research background information about each energy source and include labelled diagrams/annotated photographs for each. (I)</p> <p>Place learners into small groups – each group researches the benefits and disadvantages of one type of renewable energy (from the list specified in the syllabus). They produce a presentation and revision/factsheet and present to their peers.</p> <p>Go through all presentations so all learners have a complete set of revision notes for the different types of renewable energy.</p> <p>Consolidate learning with a card sorting activity (learners have to place cards into categories). Peer evaluation – learners provide an evaluation of each presentation – what went well and anything else that needs to be added in.</p> <p>Extension activity: To what extent is renewable energy a solution to the world energy problems? Suggest why countries are looking to develop renewable sources. (I)</p> <p>Select one type of energy – a hydroelectric power station, for example, and present the facts about the proposal. Learners working in small groups decide whether the scheme should go ahead. Learners present the points in favour, points against, viewpoints of different groups of people and their final decision.</p> <p>Link to 3.7 – demonstrate the need for sustainable development – renewable energy and nuclear power as a solution to enhanced global warming.</p> <p>Link to 3.7 – understand the importance of resource conservation – learners brainstorm all of the ideas that they can think of to save energy. Design a poster to encourage energy efficiency at school or at home.</p> <p>Link to 3.7 – describe how economic activities may pose threats to the natural environment locally and globally –</p>

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		discussion of how tourism can cause noise, air, water and visual pollution – learners mind map ideas for each and then write up to develop/explain. Suggest solutions for each.
3.5 Case study	Know a case study of energy supply in a country or area	<p>Learners should know a case study of energy supply in a country or area.</p> <p>Learners locate a country or area with annotated sketch map and describe the location.</p> <p>Produce data tables and graph to show the percentage of energy from each source – describe and explain (link to level of development to recap).</p> <p>Provide named examples and details of schemes – one for each energy source to show how energy is produced in case study country or area – to provide place-specific reference. Could add to sketch map or show in a table.</p> <p>Recap benefits and disadvantages of each specific to the scheme and the country as appropriate – learners highlight the information and show in a table. Focus on each individual scheme to develop viewpoints.</p> <p>Learners write up as a case study.</p>
3.6 Water	Describe methods of water supply and the proportions of water used for agriculture, domestic and industrial purposes in countries at different levels of development	<p>Learners recap 'global water supply' and show as a pie chart or divided bar. (I) Reinforce the small amount of available fresh water. Discuss the difference between 'surface water' and 'ground water'. Mind map all the different uses of water.</p> <p>Learners graph data to show how water is used globally for different uses and describe the results. (I)</p> <p>Discuss the key users of water – for example, domestic, industrial, agricultural, tourism – learners work in pairs to give examples of how water is used in each and confirm in whole class discussion.</p> <p>Water usage: www.bbc.co.uk/schools/gcsebitesize/geography/water_rivers/water_usage_rev1.shtml</p> <p>Provide data for water use in LEDCs and MEDCs (include how it is used in different sectors) or compare two countries to illustrate – one of these countries could be developed as a case study. Graph the results and compare/contrast the two sets of data/graphs. Learners could keep a diary of water usage and research another country to compare. (I)</p> <p>Show learners photographs of different water supply schemes, e.g. dams/reservoirs, wells, boreholes and desalination. Whole class discussion of how each works and a brief description.</p> <p>Discuss the appropriateness of each scheme for different geographical areas/levels of development – for example, in relation to siting factors, climate and level of technological development. Learners present ideas as a table. (I) Discuss the results as a whole class – learners add additional ideas in a new colour to show additional learning.</p>