

ACET Junior Academies'

Scheme of Work for geography

Where does our energy come from?



**About this unit: This unit introduces the United Nations Sustainable Development Goals as a framing device for the whole of Y6 geography. The unit then examines the different types of energy and fuel that are available to humanity, the consequences of our use of them, and the kinds of decisions that must be made in a future of uncertain energy security.**

#### **Unit structure**

This unit is structured around the following geographical enquiries:

1. What are the United Nations Sustainable Development Goals
2. What are fossil fuels?
3. How do fossil fuels affect the environment?
4. What is renewable energy?
5. What about Nuclear?
6. What is the National Grid?
7. Should we allow fracking in the UK?

#### **National Curriculum unit:**

- physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes, and the water cycle
- human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

**Enquiry 1: What are the United Nations Sustainable Development Goals?**

Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
<p><b>Students may have a concept of sustainability from the fair trading unit in Y5.</b></p>	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p>What is sustainability?</p> <p>How do the UN Global Goals work together?</p> <p>How are the global goals connected to my life?</p> <p>What should a sustainable country look like?</p> <p>How can I make a difference?</p>	<p>use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied</p>	<p><b>Can your children:</b></p> <p>Explain that sustainability is about meeting everyone's needs while protecting the future.</p> <p>Identify several of the sustainable development goals</p> <p>Explain how they might make a contribution or commitment to sustainability</p> <p>Explain why sustainable development is important</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>
		<p><b>Locational Knowledge</b></p>		
		<p><b>Place Knowledge:</b></p>		
<p><b>Suggested activities:</b></p>		<p><b>Resources:</b></p>	<p><b>Useful links:</b></p>	
<p>This is a standalone lesson that introduces the concept of sustainability, and the UN sustainable development goals that frame the subsequent learning enquiries for the rest of year 6.</p> <p>As students enter the room have the following question displayed – ‘What are the biggest problems faced by people in our community/ country /worldwide?’ Encourage the children to think from the perspectives of others so for example you could say “we need you to think like you are the president!” In pairs, students try and identify some of the biggest problems facing their community, their country, or the world. Take some suggestions from the group. These could be written onto a board at the front.</p>		<p>Sustainable_Development_Goals.png</p> <p>Jigsaw.png</p> <p><a href="https://vimeo.com/138852758">https://vimeo.com/138852758</a></p> <p>world's largest lesson part 1</p> <p><a href="https://worldslargestlesson.globalgoals.org/map/index.html">https://worldslargestlesson.globalgoals.org/map/index.html</a></p>	<p><b>Vocabulary:</b></p> <p>Sustainability Development</p>	

Show students The Global Goals and “the world’s largest lesson” video, pointing out which goals relate to the problems they have identified. Compare their lists of problems with The Global Goals, displayed at the front. The jigsaw image can be used to develop the idea that each goal is interconnected.

Print or draw squares on paper of approx 12cm x 12cm. Give each student a blank square of paper and ask them to draw a single comic frame image showing themselves using their superpower. Ask them to add into a speech bubble their idea of how they can help with The Global Goals. Squares could be incorporated into a class display.

To further connect the Global Goals to their personal experience, ask students how old are they going to be in 2030? Why is the year 2030 important? At that time they might be of a working age. Ask students to think (individually) pair (talk to the person next to them) and share (talk to the whole class) about what they might be doing in 2030, what job might they have, what would they like to study or how will they spend their time? How do you think we could relate your future life to the Global Goals? – Ask students to think about what aspects of their prospective jobs would relate to the Global Goals. Eg. if students wanted to be a teacher that would help to achieve Goal 4.

Divide the class into groups of 3-5 students (dependent on size of the class) and explain that the main task today is to design a Global Goals country - where each group will draw their own vision of what a country would like in 2030 if the Goals are achieved. Ask the class to discuss in their groups what facilities and infrastructures a country might need to look after its population, environment and natural resources? E.g schools, hospitals, water sources, waste management systems, safe roads. Take some suggestions from different groups. Show students the large pieces of paper you have drawn earlier. Explain that each group will have a piece to draw their Global Goals country map on - these pieces will then be joined together at the end of the session to see the completed country as a whole - see the image in teacher support for an example of this.

To complete their learning a commitment to sustainability the teacher may lead the class through adding themselves to the global record of classes that have completed the lesson. <https://worldslargestlesson.globalgoals.org/map/index.html>

Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>Why are they called Fossil Fuels?</b></p> <p><b>Where do they come from and how do they reach us?</b></p> <p><b>What do we use fossil Fuels for?</b></p>	<p>use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied</p> <hr/> <p><b>Locational Knowledge</b></p> <hr/> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>State that Coal, Oil and Gas are Fossil Fuels</p> <p>Connect the name of fossil fuels to the fact that they are the remains of plants and animals from millions of years ago</p> <p>Identify that they are all extracted from the ground</p> <p>Explain some of the ways that fossil fuels are used in everyday life</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	
<p>Students can be shown images of cars, factories, power plants, lightbulb, and other powered objects next to images of fossils and asked to see if they can make the link.</p> <p>Students watch a video introducing fossil fuels. An example is included in the resources. If the teacher has access to a lump of coal, an empty petrol can, or an example video of gas being used to cook they could ask students to give examples of when they have seen fossil fuels being used in their lives.</p> <p>Students create a storyboard of the journey of a fossil fuel. They illustrate/annotate the following sections. They can choose which fuel's journey they depict. Three sets of images for each stage could be provided for reference and inspiration.</p>		<p><a href="https://climatekids.nasa.gov/fossil-fuels-coal/">https://climatekids.nasa.gov/fossil-fuels-coal/</a></p> <p><a href="https://www.youtube.com/watch?v=iubWN1cnwls">https://www.youtube.com/watch?v=iubWN1cnwls</a></p> <p><a href="https://www.youtube.com/watch?v=JaslvS7oYw4">https://www.youtube.com/watch?v=JaslvS7oYw4</a></p>	<p><a href="https://kids.britannica.com/students/article/fossil-fuel/599853">https://kids.britannica.com/students/article/fossil-fuel/599853</a></p> <hr/> <p><b>Vocabulary:</b></p> <p>Fossil Fuel Natural Gas Oil Coal Extraction</p>	

1) The formation of the fuel underground, approximately 300mil years ago 2) The extraction of the fuel by mine or oil and gas drilling 3) The final use of the fuel in a power plant, or fireplace, or vehicle or similar		
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Enquiry 3: How do Fossil Fuels affect our environment?				
Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>How do we get energy from fossil fuels?</b></p> <p><b>What happens when we burn fossil fuels?</b></p> <p><b>Where does Carbon Dioxide go and what does it do?</b></p> <p><b>Is carbon dioxide the only cause of global warming?</b></p>	<p>use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied</p> <hr/> <p><b>Locational Knowledge</b></p> <hr/> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>State that fossil fuels and mostly carbon</p> <p>State that we burn fossil fuels for energy</p> <p>Explain that when we burn them they give off a gas made up of Carbon and Oxygen called Carbon Dioxide CO<sub>2</sub>.</p> <p>Explain that Carbon Dioxide causes global warming.</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	

<p>Students are asked to recall the information they have learned about fossil fuels, then they are prompted to explain how we get energy from them.</p> <p>After watching an introductory video students complete a diagram. See page 13 of climate chaos resource</p> <p>Students can add this diagram storyboards from last lesson, with an extra stage explaining that the burning of fossil fuels produces CO2 which leads to an increase in global temperature. Tying together the whole story of fossil fuels.</p> <p>Greenhouse effect in a jar. (See page 10 of climate chaos resource). Making sure that students make the link between the greenhouse effect and the insulating blanket of Greenhouse gases.</p>	<p><a href="https://www.youtube.com/watch?v=Vh8XVksn1Y">https://www.youtube.com/watch?v=Vh8XVksn1Y</a></p> <p><a href="https://www.youtube.com/watch?v=Y3ggoDUtmt4">https://www.youtube.com/watch?v=Y3ggoDUtmt4</a></p> <p>WWF Climate Chaos.pdf</p> <p>Glass jars</p> <p>Thermometers</p>	<p><b>Vocabulary:</b></p> <p>Global Warming Carbon Dioxide Atmosphere Heat energy Greenhouse gas</p>
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Enquiry 4: What is renewable energy?				
Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
<p><b>Climate Sustainability</b></p>	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>Will fossil fuels run out?</b></p> <p><b>What can we use instead?</b></p> <p><b>What types of renewable energy are there?</b></p> <p><b>What types of renewable energy does the UK use?</b></p> <p><b>Why don't we use renewable energy for everything?</b></p> <p><b>Which of the Sustainable Development Goals does this link to?</b></p>	<p><b>Locational Knowledge</b></p> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>Explain that we do not know exactly how long fossil fuels will last, but that they will run out eventually.</p> <p>Explain that we need to stop using them long before they run out because they cause global warming,</p> <p>Explain that renewable energy means energy</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>

			<p>sources that do not run out, and they do not give off carbon dioxide.</p> <p>Explain how renewable energy is linked to the concept of sustainability.</p> <p>Explain the important of wind energy to the UK.</p>	
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	
<p>Students watch a video (in folder) that argues that while we will run out of fossil fuels eventually, they may last for a while yet. Students should be prompted to use their prior knowledge to explain why we should try to stop using fossil fuels anyway.</p> <p>Students create a poster/display of the advantages of four types of renewable energy: wind, solar, hydro, geothermal. In the center of the display could be advantages common to all renewables, e.g. they do not run out and do not give off greenhouse gasses (sustainable), and then have sections around that</p> <p>Students could design a house that takes advantage of renewable energy e.g. solar panels, wind turbine, waterwheel, and heating pipes that run down to heat underground. Students should reflect on whether it is easier to equip everybody's houses this way, or make large renewable power stations.</p> <p>Students can race to label the offshore wind farms on a map of the UK or use the met office wind speed map to choose a location for potential wind farm.</p> <p>Students can look at the interactive map on <a href="https://www.carbonbrief.org/mapped-how-the-uk-generates-its-electricity">https://www.carbonbrief.org/mapped-how-the-uk-generates-its-electricity</a> and compare the locations of solar and wind energy. Teacher can prompt with questions exploring why wind power might be useful for more of the UK than solar. Link to climate</p>		<p><a href="https://www.youtube.com/watch?v=jjfs_7kwRks">https://www.youtube.com/watch?v=jjfs_7kwRks</a></p> <p><a href="https://www.bbc.co.uk/bitesize/topics/zshp34j/articles/zntxgwx">https://www.bbc.co.uk/bitesize/topics/zshp34j/articles/zntxgwx</a></p> <p><a href="https://en.wikipedia.org/wiki/List_of_offshore_wind_farms_in_the_United_Kingdom">https://en.wikipedia.org/wiki/List_of_offshore_wind_farms_in_the_United_Kingdom</a></p> <p><a href="https://www.carbonbrief.org/mapped-how-the-uk-generates-its-electricity">https://www.carbonbrief.org/mapped-how-the-uk-generates-its-electricity</a></p> <p>met office wind speed UK map</p>	<p>Advantages/disadvantages of <b>Wind</b>  <a href="https://theswitch.co.uk/energy/guides/renewables/wind-power#advantages">https://theswitch.co.uk/energy/guides/renewables/wind-power#advantages</a></p> <p><b>Solar</b>  <a href="https://solarmagazine.com/solar-energy-advantages-and-disadvantages/">https://solarmagazine.com/solar-energy-advantages-and-disadvantages/</a></p> <p><b>Geothermal</b>  <a href="https://www.nationalgeographic.com/environment/global-warming/geothermal-energy/">https://www.nationalgeographic.com/environment/global-warming/geothermal-energy/</a></p> <p><b>hydroelectric</b>  <a href="https://energyinformative.org/hydroelectric-energy-pros-and-cons/">https://energyinformative.org/hydroelectric-energy-pros-and-cons/</a></p> <p>Renewable homes:  <a href="https://en.wikipedia.org/wiki/BedZED">https://en.wikipedia.org/wiki/BedZED</a></p> <p><b>Vocabulary:</b></p> <p>Renewable  Hydro-electric  Solar  Geothermal  Wind</p>	

		Extraction
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Enquiry 5: What about Nuclear Energy?				
Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>What is a nuclear power station?</b></p> <p><b>What are the advantages and disadvantages of Nuclear power?</b></p> <p><b>Is it safe and do I live near a nuclear power station?</b></p> <p><b>Why is Nuclear power controversial?</b></p>	<p><b>Locational Knowledge</b></p> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>Explain that nuclear energy comes from uranium radiation in power plants</p> <p>Explain that although it produces no carbon dioxide, it does produce radioactive waste, which we do not know how to store.</p> <p>Explain that Nuclear energy is controversial because it is linked to nuclear weapons, and can be dangerous.</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	
Students take a virtual trip through a Nuclear power station using EDF virtual tour. Student's should take notes/answer questions as they watch.		<p><b>EDF virtual tour</b>  <a href="https://www.edfenergy.com/virtual-tours/what-is-nuclear-power">https://www.edfenergy.com/virtual-tours/what-is-nuclear-power</a></p>	<p>Advantages and disadvantages of Nuclear  <a href="https://www.bbc.co.uk/bitesize/guides/zh7hvcw/revision/2">https://www.bbc.co.uk/bitesize/guides/zh7hvcw/revision/2</a></p> <p><a href="https://cnduk.org/campaigns/no-nuclear-power/">https://cnduk.org/campaigns/no-nuclear-power/</a></p>	
			<b>Vocabulary:</b>	



<p>Students watch the safety video produced by EDF. They should consider whether they feel safe, and do they trust the safety procedures/systems described.</p> <p>Students should identify the location of the school on the map, and the closest Nuclear power station.</p> <p>Students should consider the available information on the advantages and disadvantages of Nuclear power, especially considering the UK, and decide whether they are for or against it. This could take the form of a class debate, or letter writing exercise.</p> <p>Alternatively students could take on roles (in groups or individual) of different interested parties and give their opinions from their perspective on a fictitious proposal for a new nuclear plant. (in DME folder)</p>	<p><a href="https://www.edfenergy.com/virtual-tours/nuclear-safety#below_paragraph">https://www.edfenergy.com/virtual-tours/nuclear-safety#below_paragraph</a></p> <p><a href="https://www.youtube.com/watch?v=91XW8AkiG2Y">https://www.youtube.com/watch?v=91XW8AkiG2Y</a></p> <p><a href="https://www.youtube.com/watch?v=rcOFV4y5z8c&amp;t=191s">https://www.youtube.com/watch?v=rcOFV4y5z8c&amp;t=191s</a></p> <p><a href="https://www.youtube.com/watch?v=HEYbgyL5n1g">https://www.youtube.com/watch?v=HEYbgyL5n1g</a></p> <p><a href="https://www.youtube.com/watch?v=pVbLlnmxlbY">https://www.youtube.com/watch?v=pVbLlnmxlbY</a></p>	<p>Uranium Radioactive Contaminated Fission</p>
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Enquiry 6: What is the national grid?				
Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>What is the national grid?</b></p> <p><b>What devices at home and in school use the most energy from the grid?</b></p>	<p><b>Locational Knowledge</b></p> <hr/> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>Explain that the national grid is the name of all the network of connections between sources of power and consumers of power.</p> <p>That the national grid is switching to renewable energy.</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	

<p>Students recap what fossil fuels, renewable energy and nuclear power are and how they generate electricity. They are then told they will now learn how that electricity reaches their homes, as well as natural gas.</p>	<p><a href="https://www.youtube.com/watch?v=cLdJ6MxEXy8">https://www.youtube.com/watch?v=cLdJ6MxEXy8</a></p>	<p><a href="https://www.bbc.co.uk/bitesize/guides/zcfm8mn/revision/1">https://www.bbc.co.uk/bitesize/guides/zcfm8mn/revision/1</a></p>
<p>Teacher should register at <a href="http://jointhepod.org">jointhepod.org</a> . There are numerous free resources and interactive games to support learning about the national grid.</p>	<p><a href="https://www.youtube.com/watch?v=FlxSaUXfbyM">https://www.youtube.com/watch?v=FlxSaUXfbyM</a></p>	<p><b>Vocabulary:</b></p>
<p>After modeling by the teacher students play the “power the UK game” on the board collaboratively or individually.</p>	<p><a href="https://www.youtube.com/watch?v=Mm5khEUIBx0">https://www.youtube.com/watch?v=Mm5khEUIBx0</a></p>	<p>Infrastructure National grid Efficient</p>
<p>Students can complete an energy audit of their school and identify ways to make the school more energy efficient.</p>	<p><a href="https://jointhepod.org/games/power-the-uk/index.html">https://jointhepod.org/games/power-the-uk/index.html</a></p>	
	<p><a href="https://jointhepod.org/teachers/other/energy-audit-sheet">https://jointhepod.org/teachers/other/energy-audit-sheet</a></p>	
	<p><a href="https://jointhepod.org/games/power-patrol/index.html">https://jointhepod.org/games/power-patrol/index.html</a></p>	

Enquiry 7: Should we Allow Fracking in the UK?				
Links to previous learning	Knowledge and second order concepts	Geographical skills:	Assessment criteria:	Curriculum Links:
	<p><b>Substantive knowledge:</b> <i>(What the children should know.)</i></p> <p><b>What is fracking and how does it work?</b></p> <p><b>Why was fracking proposed?</b></p> <p><b>Why was it banned?</b></p> <p><b>Should fracking be allowed in the UK?</b></p>	<p><b>Locational Knowledge</b></p> <hr/> <p><b>Place Knowledge:</b></p>	<p><b>Can your children:</b></p> <p>Explain that fracking is a new way of getting oil and gas from shale rock</p> <p>Explain that it works by forcing liquid into the rock, cracking it open to release the trapped fossil fuels.</p> <p>Explain that it was banned in the UK because it caused small</p>	<p><b>Horizontal:</b></p> <p><b>Vertical:</b></p>

			earthquakes, however it may be a solution to energy needs in the UK.	
<b>Suggested activities:</b>		<b>Resources:</b>	<b>Useful links:</b>	
<p>This lesson is an opportunity for students to pull together all their knowledge from the previous lessons.</p> <p>Students should be presented with information about fracking in to the UK. They should be asked to make justified decisions about whether Fracking should be allowed in the UK. This should be tied back to renewable vs fossil fuels, sustainability, and other elements learned through the previous lessons.</p> <p>Students should be brought back the UN sustainable development goals and consider if fracking supports any of those goals, and whether we should focus on other energy sources.</p>		<p><a href="https://www.youtube.com/watch?v=ipQedj6do7E">https://www.youtube.com/watch?v=ipQedj6do7E</a></p> <p><a href="https://www.youtube.com/watch?v=Tudal_4x4F0">https://www.youtube.com/watch?v=Tudal_4x4F0</a></p> <p><a href="https://www.bbc.co.uk/newsround/23513694#:~:text=Fracking%20works%20by%20drilling%20straight,brought%20up%20to%20the%20surface.">https://www.bbc.co.uk/newsround/23513694#:~:text=Fracking%20works%20by%20drilling%20straight,brought%20up%20to%20the%20surface.</a></p> <p><a href="https://www.bbc.co.uk/news/topics/cm6pvw8wnmpt/fracking-in-the-uk#:~:text=Fracking%20halted%20in%20England&amp;text=The%20indefinite%20suspension%20comes%20after,unless%22%20extraction%20is%20proved%20safe.">https://www.bbc.co.uk/news/topics/cm6pvw8wnmpt/fracking-in-the-uk#:~:text=Fracking%20halted%20in%20England&amp;text=The%20indefinite%20suspension%20comes%20after,unless%22%20extraction%20is%20proved%20safe.</a></p>	<p><b>Vocabulary:</b></p> <p>Fracking Controversy</p>	