

# GSHPA

## Teaching Scheme of Work

### Key Stage 3/4

### Year 9

### 6 Week/Lesson Programme

Include song "Where We Going to Go?" by David Todd within the scheme where teacher feels it to be appropriate- link below

<https://www.youtube.com/watch?v=Ax6O1Xun7cl&feature=youtu.be>

## The National Ground Source Heat Pump Association has compiled a Scheme of Work for Schools entitled

### 'Our Earth - Use It; Don't Abuse It.'

It is aimed at teaching pupils about the importance of using the earth as a renewable energy source - and not abusing it using non-renewable energy sources.

The collective schemes are aimed at school age pupils in Key Stages 1, 2, 3 and 4.

The rationale for selecting Year 9 was so that a career within this industry can be considered when making GCSE choices.

This is a 6 Lesson Programme of Work which can easily be expanded into other subject areas.

## **This Scheme of Work focuses on the following aspects of the English National Curriculum Guidance.**

**It can be adapted to the Welsh and Scottish Curriculum Guidance.**

### **Science 4**

#### **Energy, Forces & Space**

#### **The Sustainable Earth.**

**Organisms are affected by environment, including the accumulation of toxic materials.**

**Earth is a source of limited resources.**

### **Geography**

#### **The change in climate**

**How human & physical processes interact to influence and change landscapes**

#### **Environments and the climate**

**How human activity relies on effective functioning of natural systems.**

#### **The distribution of natural resources**

**How environments can change and that this can sometimes pose dangers to living things.**

### **Citizenship**

**The ways in which citizens work together to improve their communities.**






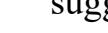






**The different ways in which a citizen can contribute to the improvement of his or her community.**

**It is not exhaustive and there are many more cross curricular links involved.**

**Visit <http://ypte.org.uk/lesson-plans/sustainable-development> and download the PowerPoint presentation for display materials.**

**Also found in Week 1 Resources attachment.**

## **Guidance on following the scheme of work for non-teachers:**

-  Each session can be taught within the geography or science national curriculum.
-  This is a 6 lesson Programme of Study (POS) which, on average, is a half-term.
-  Expected Learning Outcomes – this is what you want the children to develop understanding of within the lesson.
-  Method / Activity – this is how the teacher will divide the lesson time of an hour.
-  Suggested Resources – these are resources suggested to the teacher that will allow him/her to deliver the lesson. These are suggestions and staff may decide they have something more suitable for them. Follow links and some are within the attachments.
-  Differentiation – the main activity is the ‘core’ lesson aimed at the majority of the pupils in the group. The ‘support’ suggestions are for the less able pupils and the ‘extension’ suggestions are for the more able once they have completed the core activities.
-  ICT options are given as suggestions for both on-going activities throughout the POS and within each individual lesson.
-  Assessment Opportunities – teachers may choose to do a ‘teacher assessment’ on the levels the individual pupils are working within based on the area mentioned from within the lesson. They may also elect for pupils to carry out a self-assessment.
-  National Curriculum Level Descriptors – these are what levels the pupils are aiming to be working within at Key Stage 3 / Year 9.
- As guidance for you:
- |  |                                   |
|--|-----------------------------------|
| Level 2 is the average level for when pupils leave Year 2, or infants.   | (Key Stage 1 – ages 3 – 7 years)  |
| Level 4 is the average level for when pupils leave Year 6, or juniors.   | (Key Stage 2 – ages 7 – 11 years) |
| Level 6 is the average level for when pupils leave Year 9, lower senior. | (Key Stage 3 – ages 11-14 years)  |
| Level 8 is the average level for when pupils leave Year 11, G.C.S.E      | (Key Stage 4 – ages 14-16 years)  |
-  Homework Opportunities – these are ideas and suggestions for homework activities to extend the lesson.
-  Key Words / Phrases – these are subject specific to the lesson and ones which are often unique to the topic.
-  Cross Curricular – these are other national curriculum subjects that are inclusive within the lesson but not required to be recorded as this is a science / geography POS.



## **Long Term Plan**

### **Natural Resources, Renewable and Non-Renewable Energy, Sustainability**

**Week/Lesson 1** Types of Energy, How Energy Use Effects Air Quality and Human Health.

**Week/Lesson 2** Carbon Zero – What Does it Mean?

**Week/Lesson 3** Carbon Zero and Me – My Carbon Footprint.

**Week/Lesson 4** Decarbonisation of Heat.

**Week/Lesson 5** Heat Pumps as the Future for Providing Heating & Cooling.

**Week/Lesson 6** Renewable Energy and Industry.

**Extension:** Visit to Centre for Alternative Technology, Machynlleth, <https://www.cat.org.uk/come-to-cat/groups-and-learning>  
Aston Marina, Stone <https://www.astonmarina.co.uk> or The Crystal, London <https://www.thecrystal.org/exhibition/educational>  
or another local heat pump installation.

**Citizenship / Public Information:** Produce public information presentation for staff, governors and parents plus local authority, general public and businesses. Throughout this POS pupils are working within the National Curriculum Level Descriptors shown in Week/Lesson 6.

#### **Ongoing ICT:**

School time lapse video of an installation if one is being carried out within the school.

Blogs on School Website and/or in Newsletter

**Medium Term Plan**

**Week 1/ Lesson Types of Energy, How Energy Use Effects Air Quality and Human Health.**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 1 Attachment</i>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
Week / Lesson 1	<p><b><i>The definitions of Renewable and Non-Renewable Energy.</i></b></p> <p><b><i>The effects of our energy use on air quality.</i></b></p> <p><b><i>Climate Change</i></b></p> <p>Specifically try to include: Our heating systems; Medical conditions and how many illnesses &amp; deaths are linked directly to poor air quality; The transport we use for travel; Our food including diary and meat production; Delivery of items such as our food.</p> <p>Conclude: <b><i>How can we collectively and individually improve air quality?</i></b></p>	<p>Teacher led reminder of what the definitions of <b><i>non-renewable energy</i></b> and <b><i>renewable energy</i></b> are. Teacher to introduce the topic of air quality and question whether the pupils think that poor air quality could be affected by the various types of energy we use and how that could influence us as individuals. <b><i>(10 minutes)</i></b></p> <p>Pupils to work in pairs to investigate the effects of energy use on air quality and on humans. Record using 3 x PowerPoint slides using headings: <b><i>The effects of our energy use on air quality. This should include mention of climate change and greenhouse gases.</i></b></p> <p><b><i>The effects of energy use on individuals – for example medical conditions such as asthma.</i></b></p> <p><b><i>How can we as individuals improve air quality? (35 minutes)</i></b></p> <p>Teacher led whole class plenary of what the pupils have found out. Does the type of energy we use effect air quality? Do our choices have an effect on air quality? <b><i>(15 minutes)</i></b></p>	<p><a href="https://www.who.int/airpollution/news-and-events/how-air-pollution-is-destroying-our-health">https://www.who.int/airpollution/news-and-events/how-air-pollution-is-destroying-our-health</a></p> <p><a href="https://climatekids.nasa.gov/air-pollution">https://climatekids.nasa.gov/air-pollution</a></p> <p><a href="http://ypte.org.uk">http://ypte.org.uk</a></p> <p><a href="https://ec.europa.eu/programmes/erasmus-plus/project-result-content/8c19b0e3-11a4-485f-b3b9-b06e9fc4986b/05-air-IT-Type%20of%20household%20heating%20and%20its%20impact%20on%20air%20pollution-CLIL.pdf">https://ec.europa.eu/programmes/erasmus-plus/project-result-content/8c19b0e3-11a4-485f-b3b9-b06e9fc4986b/05-air-IT-Type%20of%20household%20heating%20and%20its%20impact%20on%20air%20pollution-CLIL.pdf</a> Pages 5 – 7 most useful</p> <p><a href="https://www.eco-schools.org.uk/wp-content/uploads/2016/11/Air-Pollution-Teachers-Pack.pdf">https://www.eco-schools.org.uk/wp-content/uploads/2016/11/Air-Pollution-Teachers-Pack.pdf</a> (Key Stage 2 pack but informative)</p> <p><a href="https://www.healthyair.org.uk/documents/2013/02/healthy-air-education-pack-2012.pdf/">https://www.healthyair.org.uk/documents/2013/02/healthy-air-education-pack-2012.pdf/</a> (Key Stage 2 pack but informative)</p> <p><a href="https://www.nationalgeographic.com/environment/global-warming/pollution">https://www.nationalgeographic.com/environment/global-warming/pollution</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://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/">https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/</a></p>	<p>Core - as in method/activity.</p> <p><b><i>Support</i></b> – guiding pupils to relevant information links when researching. Focus on KS2 materials. <b><i>Providing partly populated slides.</i></b></p> <p><b><i>Extension</i></b> – List the gases which cause air quality issues.</p> <p><a href="https://ww2.rspb.org.uk/ourwork/teaching/resources/science/air_pollution.aspx">https://ww2.rspb.org.uk/ourwork/teaching/resources/science/air_pollution.aspx</a></p> <p><b><i>ICT sessions could include:</i></b> <b><i>Ongoing:</i></b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems. Could be a time lapse for School website.</p> <p>Blogs on School website</p> <p>Begin to develop a presentation for governors, staff and parents.</p> <p><b><i>Lesson specific:</i></b> Research and presentation.</p>	<p>Can the pupils explain the effects of poor air quality and the reasons for it?</p> <p>Can the pupils recognise that people's influence and actions have impact on their environment?</p> <p>Can pupils explain why non-renewable energy is not good for the future of the earth?</p> <p><b>Science 4 Energy, Forces &amp; Space</b> <b>National Curriculum Level Descriptions</b></p> <p><b><i>The Sustainable Earth.</i></b> <b><i>Organisms are affected by environment, including the accumulation of toxic materials.</i></b> <b><i>Earth is a source of limited resources.</i></b></p> <p><b>Level 6</b> – Pupils explain the importance of the responsible use of unsustainable sources of energy.</p> <p><b>Level 7-</b> Pupils describe and explain the importance of the need to conserve limited energy resources.</p>

			<p>Homework Opportunities  <i>Pupils could:</i>  <i>Record what they can do at home to:</i>                  Quickly help to improve air quality around them.                  For example, use the car less, cycle more, consider what they eat, where it comes from and how it is packaged, consider their choice of heating.</p> <p><i>Or</i></p> <p>Research history of air quality.</p>	<p>Cross Curricular  <i>English</i>                  Researching, Recording, Oracy, subject specific vocabulary                  Maths 1 -Using &amp; Applying                  Maths 4 - Statistics  <i>ICT</i>                  Research &amp; Recording                  Key Skills                  Citizenship                  PSE                  Developing Thinking                  Developing Communication                  Developing ICT                  Developing Number</p>	<p>Geography                  National Curriculum Level Descriptions  <i>The change in climate</i>  <i>How human &amp; physical processes interact to influence and change landscapes, environments and the climate.</i>  <i>How human activity relies on effective functioning of natural systems.</i>                  Level 6 – Pupils recognise that conflicting demands upon the environment may arise and compare different approaches to managing environments.                  Level 7 – Pupils recognise that human actions, including their own, may have unintended environmental consequences. They understand that many factors influence the decisions made about sustainable and other approaches to developing places and environments, and use this understanding to explain the resulting changes.                  Level 8 - They understand how the interaction between people and environments can result in complex and unintended change.</p>
			<p>Key Words / Phrases                  Air Quality                  Climate Change                  Energy                  Environment                  Environmental                  Greenhouse Gases                  Non-Renewable                  Renewable                  Sustainable</p>		

**Week / Lesson 2 Carbon Zero – What Does it Mean?**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 2 Attachment</i>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
<p>Week / Lesson 2</p>	<p><b><i>The meaning of Carbon Zero.</i></b> <i>Net zero:</i> Net zero means that any carbon dioxide released into the atmosphere from the company's activities is balanced by an equivalent amount being removed.</p> <p><b><i>The meaning of Carbon Neutral.</i></b> <i>Carbon neutral:</i> Carbon neutral is slightly different, allowing companies to measure the amount of carbon they release and offset that with a reduction in emissions or a removal of carbon. This can include buying <a href="#">carbon credits</a> to make up the difference, making it appealing to companies that produce a lot of emissions.</p> <p><b><i>The meaning of Carbon Negative.</i></b> <i>Carbon negative:</i> Becoming carbon negative requires a company to remove more carbon dioxide from the atmosphere than it emits.</p> <p><b><i>How businesses can reduce and remove their carbon emissions.</i></b></p> <p><b><i>Why 2050 is important.</i></b></p>	<p>Recap last lesson and how air quality is a cause for global concern. Pupils to be asked what they think Carbon Zero, Carbon Neutral and Carbon Negative mean and watch You Tube clip explaining Carbon Neutrally. <a href="https://www.youtube.com/watch?v=9pPso2acew">https://www.youtube.com/watch?v=9pPso2acew</a></p> <p><b>(10 minutes)</b></p> <p>Pupils to research and record the carbon reduction definitions.</p> <p>Pupils to examine ways that large multinational businesses can reduce their carbon impacts on the globe.</p> <p>Pupils to give an example of what one multinational business is doing towards 2050. For example, BP, HSBC, Starbucks, Amazon, MacDonalds.</p> <p><b>(35 minutes)</b></p> <p>Teacher led whole class plenary recording the definitions and compiling a list of bullet points of what pupils have discovered the businesses have to do to work towards 2050. Pupils to record the definitions and list.</p> <p><b>(15 minutes)</b></p>	<p><a href="https://www.youtube.com/watch?v=9pPso2acew">https://www.youtube.com/watch?v=9pPso2acew</a></p> <p><a href="https://greennetworkenergy.co.uk/blog/net-zero-vs-zero-carbon-what-is-it-and-how-do-we-reach-it">https://greennetworkenergy.co.uk/blog/net-zero-vs-zero-carbon-what-is-it-and-how-do-we-reach-it</a></p> <p><a href="https://www.bbc.co.uk/bitesize/articles/zfw4f4j">https://www.bbc.co.uk/bitesize/articles/zfw4f4j</a></p> <p><a href="http://ypte.org.uk">http://ypte.org.uk</a></p> <p><a href="https://www.bp.com/en/global/corporate/who-we-are/reimagining-energy.html?gclid=CjwKCAjw_qb3BRAVEiwAvwq6Vj_UrDqoKn5TrYlKSyVaAx6w2eN14T-teUqLa254EwjedOhwQgh8xoCx1QQAvD_BwE">https://www.bp.com/en/global/corporate/who-we-are/reimagining-energy.html?gclid=CjwKCAjw_qb3BRAVEiwAvwq6Vj_UrDqoKn5TrYlKSyVaAx6w2eN14T-teUqLa254EwjedOhwQgh8xoCx1QQAvD_BwE</a></p> <p><a href="https://www.hsbc.com/our-approach/building-a-sustainable-future/sustainable-operations">https://www.hsbc.com/our-approach/building-a-sustainable-future/sustainable-operations</a></p> <p><a href="http://www.starbucks.com.bn/responsibility/environment/climate-change">http://www.starbucks.com.bn/responsibility/environment/climate-change</a></p> <p><a href="https://sustainability.aboutamazon.com/carbon-footprint">https://sustainability.aboutamazon.com/carbon-footprint</a></p> <p><a href="https://corporate.mcdonalds.com/corpmcd/scale-for-good/climate-action.html#actions">https://corporate.mcdonalds.com/corpmcd/scale-for-good/climate-action.html#actions</a></p> <p><a href="https://www.tes.com/teaching-resource/climate-change-wordsearch-6035179">https://www.tes.com/teaching-resource/climate-change-wordsearch-6035179</a></p> <p><a href="https://www.tes.com/teaching-resource/ks3-global-footprint-11-carbon-and-ecological-footprint-11490712">https://www.tes.com/teaching-resource/ks3-global-footprint-11-carbon-and-ecological-footprint-11490712</a></p>	<p>Core - as in method/activity.</p> <p><b>Support – guiding pupils to relevant information links when researching. Examine definitions only.</b></p> <p><b>Extension – What are Microsoft hoping for by 2030.</b> <a href="https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/">https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/</a></p> <p><b>ICT sessions could include:</b> <b>Ongoing:</b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems. Could be a time lapse for School website.</p> <p>Blogs on School website</p> <p>Continue to develop a presentation for governors, staff and parents.</p> <p><b>Lesson specific:</b> Research and presentation. Producing information posters within home-work. Global Warming crossword <a href="https://www.esolcourses.com/content/exercises/crossword/s/weather/global-warming-crossword.html">https://www.esolcourses.com/content/exercises/crossword/s/weather/global-warming-crossword.html</a></p>	<p>Can the pupils explain the effects that carbon zero will have on the earth? (<i>Sustainable Earth</i>)</p> <p>Can the pupils recognise that people's influence and actions have impact on their environment? (<i>Sustainable Earth</i>)</p> <p>Can pupils explain how human activity influences the environment and climate? (<i>The Change in Climate</i>)</p> <hr/> <p>Science 4 Energy, Forces &amp; Space National Curriculum &amp; Level Descriptors <i>The Sustainable Earth.</i> <i>Earth is a source of limited resources.</i> <i>The production of carbon dioxide by human activity and the impact on the climate.</i> <i>Organisms are affected by environment, including the accumulation of toxic materials.</i> <i>The potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate.</i> Level 6 – Pupils explain the importance of responsible use of unsustainable sources of energy. Level 7- Pupils describe and explain the importance of the need to conserve limited energy resources. They explain the importance of some applications and implications of science, such as the need to consider the availability of resources, and environmental effects, in the production of energy and materials.</p>

			<p>Homework Opportunities  <i>Pupils could:</i>                  Complete Word search in Week 2 pack or at <a href="https://www.tes.com/teaching-resource/climate-change-wordsearch-6035179">https://www.tes.com/teaching-resource/climate-change-wordsearch-6035179</a>                  Design a poster for what they think the aims of school should be by 2050.  <i>Or</i>                  Research and graph data in relation to current carbon emissions. They could compare countries, compare companies, compare industries.</p>	<p>Cross Curricular  <i>English</i>                  Researching, Recording, Oracy, subject specific vocabulary                  Maths 1 -Using &amp; Applying                  Maths 4 - Statistics</p> <p><i>ICT</i>                  Research &amp; Recording                  Key Skills                  Citizenship</p> <p>PSE                  Developing Thinking                  Developing Communication                  Developing ICT                  Developing Number</p>	<p>Geography                  National Curriculum Level Descriptions  <i>The change in climate</i>  <i>How human &amp; physical processes interact to influence and change landscapes, environments and the climate. How human activity relies on effective functioning of natural systems.</i>                  Level 6 –Pupils recognise how conflicting demands on the environment may arise and compare sustainable and other approaches to managing environments. They appreciate that different values and attitudes result in different approaches to environmental interaction and change.                  Level 7 –Pupils understand that many factors influence the decisions made about sustainability and use this understanding to explain the resulting changes. They appreciate that the environment in a place and the lives of the people who live there are affected by actions and events in other places. They recognise that human actions may have unintended environmental consequences.                  Level 8 - They understand how the interaction between people and environments can result in complex and unintended changes. They understand and describe a range of views about environmental interaction. They describe and explain the importance of the need to conserve limited energy resources.</p>
			<p><b>Key Words / Phrases</b>                  Air Quality                  Carbon                  Carbon Credits                  Carbon Dioxide                  Carbon Emissions                  Carbon Gases                  Carbon Negative                  Carbon Neutral                  Carbon Zero                  Sustainable</p>		



Week / Lesson 3 **Carbon Zero and Me - My Carbon Footprint**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 3 Attachment</i>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
Week / Lesson 3	<p><b><i>What a carbon footprint is. How to determine and calculate individual carbon footprints.</i></b></p>	<p>Recap last lesson on the effects of carbon on the environment and businesses. Introduce Carbon Footprints using <a href="https://www.youtube.com/watch?v=IptlCX4vmgY">https://www.youtube.com/watch?v=IptlCX4vmgY</a> Or <a href="https://www.youtube.com/watch?v=AGRIo87oAUg">https://www.youtube.com/watch?v=AGRIo87oAUg</a></p> <p>Issue foot templates to individuals – one large and one smaller. (15minutes)</p> <p>Pupils to research and record their own current carbon footprints using 2 items from each heading within <a href="https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp">https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp</a></p> <p>On the larger foot template and ways in which they could reduce it on the smaller templates.</p> <p>Encourage pupils to calculate both their footprint using an online calculator as well as the guidance in the calculation pack in week 3 attachment. (30 minutes)</p> <p>Teacher led whole class plenary listing 10 ways pupils can reduce their own carbon footprints. (15 minutes)</p>	<p><a href="https://www.youtube.com/watch?v=AGRIo87oAUg">https://www.youtube.com/watch?v=AGRIo87oAUg</a></p> <p><a href="https://www.youtube.com/watch?v=IptlCX4vmgY">https://www.youtube.com/watch?v=IptlCX4vmgY</a></p> <p><a href="https://www.youtube.com/watch?v=92-0mQhP7AM">https://www.youtube.com/watch?v=92-0mQhP7AM</a></p> <p><a href="http://ypte.org.uk">http://ypte.org.uk</a></p> <p><a href="https://www.wwf.org.uk/sites/default/files/2016-10/WWF_KS3_Lesson3_Presentation_v3.pdf">https://www.wwf.org.uk/sites/default/files/2016-10/WWF_KS3_Lesson3_Presentation_v3.pdf</a></p> <p><a href="https://climatecare.org/50-ideas-shrinking-carbon-footprint/">https://climatecare.org/50-ideas-shrinking-carbon-footprint/</a></p> <p><a href="https://www.pinterest.co.uk/pin/213498838557896992/">https://www.pinterest.co.uk/pin/213498838557896992/</a></p> <p>Calculating pack within Week 3 attachment.</p> <p><a href="https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp">https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp</a></p> <p>Online calculator: <a href="https://www.carbonfootprint.com/calculator.aspx">https://www.carbonfootprint.com/calculator.aspx</a></p> <p>Choose from variety of online footprint templates.</p>	<p>Core - as in method/activity.</p> <p><b>Support – guiding pupils within</b> <a href="https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp">https://www.smead.com/hot-topics/reducing-your-carbon-footprint-1846.asp</a> <b>To record one change within each heading.</b></p> <p><b>Extension –</b> Extend the number of headings to include school.</p> <p><b>ICT sessions could include:</b> <b>Ongoing:</b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems. Could be a time lapse for School website.</p> <p>Blogs on School website</p> <p>Continue to develop a presentation for governors, staff and parents.</p> <p><b>Lesson specific:</b> Research and use of web links. Producing collective display of footprints.</p>	<p>Can the pupils explain the collective effects that reducing their own carbon footprints will have on the earth? (Sustainable Earth)</p> <p>Can the pupils recognise that people’s influence and actions have impact on their environment? (Sustainable Earth)</p> <p>Can pupils explain how their own activity influences the environment and climate? (The Change in Climate)</p> <hr/> <p><b>Science 4 Energy, Forces &amp; Space</b> <b>National Curriculum &amp; Level Descriptors</b> <b>The Sustainable Earth.</b> <i>Earth is a source of limited resources.</i> <i>The production of carbon dioxide by human activity and the impact on the climate.</i> <i>Organisms are affected by environment, including the accumulation of toxic materials.</i> <i>The potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth’s climate.</i> <b>Level 6 –</b> Pupils explain the importance of the responsible use of unsustainable sources of energy.</p>

					<p><b>Level 7-</b> Pupils describe and explain the importance of a wide range of applications and implications of science, such as the need to conserve limited energy resources. They explain the importance of the need to consider the availability of resources, and environmental effects, in the production of energy and materials.</p> <p><b>Level 8 –</b> Pupils describe and explain the importance of the need to conserve limited energy resources.</p>
			<p><b>Homework Opportunities</b> <i>Pupils could:</i></p> <p>Examine the carbon footprint of a food product. Example a sandwich: <a href="https://www.youtube.com/watch?v=jRQEI-C5GDg">https://www.youtube.com/watch?v=jRQEI-C5GDg</a></p> <p style="text-align: center;"><i>or</i></p> <p>Calculate the carbon footprint of the family and / or home.</p>	<p><b>Cross Curricular</b> <i>English</i> Researching, Recording, Oracy, subject specific vocabulary Maths 1 -Using &amp; Applying Maths 2 – Number <i>ICT</i> Research &amp; Recording <b>Key Skills</b> Citizenship PSE Developing Thinking Developing Communication Developing ICT Developing Number</p>	<p><b>Geography</b> <b>National Curriculum Level Descriptions</b> <i>The change in climate</i> <i>How human &amp; physical processes interact to influence and change landscapes, environments and the climate. How human activity relies on effective functioning of natural systems.</i></p> <p><b>Level 6 –</b>Pupils recognise how conflicting demands on the environment may arise and compare sustainable and other approaches to managing environments. They appreciate that different values and attitudes, including their own, result in different approaches to environmental interaction and change.</p> <p><b>Level 7 –</b>Pupils understand that many factors influence the decisions made about sustainability and use this understanding to explain the resulting changes. They appreciate that the environment in a place and the lives of the people who live there are affected by actions and events in other places. They recognise that human actions, including their own, may have unintended environmental consequences.</p> <p><b>Level 8 -</b> They understand how the interaction between people and environments can result in complex and unintended changes. They understand and describe a range of views about environmental interaction.</p>
			<p><b>Key Words / Phrases</b> Carbon Calculator Carbon Footprint Sustainability</p>		

**Medium Term Plan**

**Week / Lesson 4 Decarbonisation of Heat**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 4 Attachment</i>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
Week / Lesson 4	<b>Heat decarbonisation</b>	<p>Teacher to introduce the topic using the statement: <b>Decarbonising heat means</b> reducing and eliminating the greenhouse gases emitted during its generation and use. Is it essential to tackling climate change? Teacher to spider diagram 5 pupils' responses as to what this could mean. <b>(10minutes)</b></p> <p>Pupils to research decarbonisation of heat – including watching GSHPA video. Need to record 5 ways in which decarbonisation can occur. <b>(30 minutes)</b></p> <p>Teacher led whole class plenary examining what they have discovered. Show of hands for pupils who think heat decarbonisation is essential or not essential. Watch final GSHPA video Perhaps include song 'Where We Going' by David Todd <a href="https://www.youtube.com/watch?v=Ax6O1Xun7cI&amp;feature=youtu.be">https://www.youtube.com/watch?v=Ax6O1Xun7cI&amp;feature=youtu.be</a> <b>(20 minutes)</b></p>	<p><a href="https://energysavingtrust.org.uk/blog/decarbonisation-heat--crossroads">https://energysavingtrust.org.uk/blog/decarbonisation-heat--crossroads</a></p> <p><a href="https://www.energy-uk.org.uk/our-work/new-energy-services-and-heat/decarbonisation-of-heat.html">https://www.energy-uk.org.uk/our-work/new-energy-services-and-heat/decarbonisation-of-heat.html</a></p> <p><a href="http://ypte.org.uk">http://ypte.org.uk</a></p> <p>Week 4 attachment. <a href="https://youtu.be/_hBNqpKqXyQ">https://youtu.be/_hBNqpKqXyQ</a> <a href="https://www.youtube.com/watch?v=Ax6O1Xun7cI&amp;feature=youtu.be">https://www.youtube.com/watch?v=Ax6O1Xun7cI&amp;feature=youtu.be</a></p> <p>Doodly Video Decarbonistaion of Heat</p>	<p>Core - as in method/activity.</p> <p><b>Support</b> – help pupils to record relevant information.</p> <p><b>Extension</b> – Survey 10 people of how they heat their homes and produce charts and graphs to show the information. Consider what is the most popular and the least popular.</p> <p>Discover what Fuel Poverty means.</p> <p><b>ICT sessions could include: Ongoing:</b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems.</p> <p>Could be a time lapse for School website.</p> <p>Blogs on School website Continue to develop a presentation for governors, staff and parents.</p> <p><b>Lesson specific:</b> Research and presentation.</p> <p>Producing display poster to encourage others to consider how to decarbonise their heating systems. Could be for school or home.</p>	<p>Can pupils form a reasonable argument for decarbonisation of heat? <i>(Sustainable Earth)</i></p> <p>Can the pupils recognise that people's influence and actions have impact on their environment? <i>(Sustainable Earth)</i></p> <p>Can pupils explain how human activity influences the environment and climate? <i>(The Change in Climate)</i></p> <hr/> <p><b>Science 4 Energy, Forces &amp; Space</b> <b>National Curriculum &amp; Level Descriptors</b></p> <p><b>The Sustainable Earth.</b> <i>Earth is a source of limited resources.</i> <i>The production of carbon dioxide by human activity and the impact on the climate.</i> <i>Organisms are affected by environment, including the accumulation of toxic materials.</i> <i>The potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate.</i></p> <p><b>Level 6</b> – Pupils explain the importance of the responsible use of unsustainable sources of energy.</p>



					<p><b>Level 7-</b> Pupils describe and explain the importance of the need to conserve limited energy resources. They explain the importance of some applications and implications of science, such as the need to consider the availability of resources, and environmental effects, in the production of energy and materials.</p>
		<p><b>Homework Opportunities</b>  <i>Pupils Could:</i>                  Survey 10 people of how they heat their homes and produce charts and graphs to show the information. Consider what is the most popular and the least popular.  <i>or</i>                  Pupils to find out the economic costs of their heating systems at home per annum.  <i>or</i>                  Pupils to record whether their heating is provided from renewable or non-renewable energy sources or a mixture of both.</p>	<p><b>Cross Curricular</b>  <b>English</b>                  Researching,                  Recording,                  Oracy, subject specific vocabulary                  Maths 1 -Using &amp; Applying  <b>ICT</b>                  Research &amp; Recording  <b>Key Skills</b>                  Citizenship                  PSE                  Developing Thinking                  Developing Communication                  Developing ICT                  Developing Number</p>	<p><b>Geography</b>  <b>National Curriculum Level Descriptions</b>  <i>The change in climate</i>  <b>How human &amp; physical processes interact to influence and change landscapes, environments and the climate. How human activity relies on effective functioning of natural systems.</b>  <b>Level 6</b> –Pupils recognise how conflicting demands on the environment may arise and compare sustainable and other approaches to managing environments. They appreciate that different values and attitudes, including their own, result in different approaches to environmental interaction and change.  <b>Level 7</b> –Pupils understand that many factors influence the decisions made about sustainability and use this understanding to explain the resulting changes. They appreciate that the environment in a place and the lives of the people who live there are affected by actions and events in other places. They recognise that human actions, including their own, may have unintended environmental consequences.  <b>Level 8</b> - They understand how the interaction between people and environments can result in complex and unintended changes. They understand and describe a range of views about environmental interaction.</p>	
		<p><b>Key Words / Phrases</b>                  Greenhouse Gases                  Heat Decarbonisation</p>			

**Week / Lesson 5 Heat Pumps as the Future for Providing Energy**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 5 Attachment</i>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
Week / Lesson 5	<p><b><i>What a heat pump is.</i></b></p> <p><b><i>How a heat pump works.</i></b></p> <p><b><i>How the use of heat pumps will reduce carbon emissions – focus on homes.</i></b></p>	<p>Teacher to recap last session explain that around 20% of the UK’s carbon emissions are generated by domestic heating. Show some or all of video clip of the options of decarbonisation of heat can be achieved. <a href="https://www.eti.co.uk/insights/heat-insight-decarbonising-heat-for-uk-homes">https://www.eti.co.uk/insights/heat-insight-decarbonising-heat-for-uk-homes</a> or introduce the types of heating that have been suggested as alternatives to gas and fossil fuels. <a href="https://www.bbc.co.uk/bitesize/guides/zxc2sg8/revision/3">https://www.bbc.co.uk/bitesize/guides/zxc2sg8/revision/3</a> Show pack of posters that include biomass, wind turbines, tidal power, solar power, hydroelectric power and geothermal. Explain that this session will focus on heat pumps. <b><i>(15minutes)</i></b></p> <p>Use GSHPA video , and booklet to explain: The difference between ground source and geothermal; How the heat pump works; <a href="https://www.youtube.com/watch?v=gaV-F7X_2vc">https://www.youtube.com/watch?v=gaV-F7X_2vc</a> Methods of abstracting heat; How heat pumps are powered; Why heat pumps are the future of all heating systems – not just</p>	<p><b>NEEDS GSHPA RESOURCES. Many are individual companies and we must be impartial.</b></p> <p><a href="https://www.youtube.com/watch?v=gaV-F7X_2vc">https://www.youtube.com/watch?v=gaV-F7X_2vc</a></p> <p><a href="https://www.eti.co.uk/insights/heat-insight-decarbonising-heat-for-uk-homes">https://www.eti.co.uk/insights/heat-insight-decarbonising-heat-for-uk-homes</a></p> <p><a href="https://www.bbc.co.uk/bitesize/guides/zxc2sg8/revision/3">https://www.bbc.co.uk/bitesize/guides/zxc2sg8/revision/3</a></p> <p>Use GSHPA Doodly video in attachments.</p> <p>Pack of simple posters of types of power. <i>(Included in attachments as Posters)</i></p> <p>GSHPA Video and associated booklet to include : <i>Difference between ground source and geothermal;</i> <i>How the heat pump works ;</i> <i>Methods of abstracting heat;</i> <i>How heat pumps are powered;</i> <i>Why heat pumps are the future of all heating systems – not just domestic.</i></p> <p>Adventures of Iggy – GSHPA version for this age group or use this one.</p>	<p>Core - as in method/activity.</p> <p><b>Support</b> – Use Iggy booklet and Doodly video.</p> <p><b>Extension</b> –Complexity of information on poster.</p> <p><b>ICT sessions could include:</b> <b>Ongoing:</b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems. Could be a time lapse for School website.</p> <p>Blogs on School website</p> <p>Complete a presentation for governors, staff and parents.</p> <p><b>Lesson specific:</b> Research and presentation.</p> <p>Further research on heat pumps being the replacement for fossil fuels and some other renewables.</p>	<p>Can pupils provide an argument for why heat pumps will help with heat decarbonisation and get to the goals of 2050? <i>(Sustainable Earth)</i></p> <p>Can the pupils recognise that people’s influence and actions have impact on their environment? <i>(Sustainable Earth)</i></p> <p>Can pupils explain how human activity influences the environment and climate? <i>(The Change in Climate)</i></p> <hr/> <p><b>Science 4 Energy, Forces &amp; Space National Curriculum &amp; Level Descriptors</b></p> <p><b><i>The Sustainable Earth.</i></b> <b><i>Earth is a source of limited resources. The production of carbon dioxide by human activity and the impact on the climate.</i></b> <b><i>Organisms are affected by environment, including the accumulation of toxic materials. The potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth’s climate.</i></b></p> <p><b>Level 6</b> – Pupils explain the importance of some applications and implications of science, such as the responsible use of unsustainable sources of energy.</p> <p><b>Level 7-</b> Pupils describe and explain the importance of a wide range of applications and implications of science, such as the need to conserve</p>

		<p>domestic. Pupils to design a poster to complete the pack of posters for heat pumps. Have pack on display as example templates. <i>(35 minutes)</i></p>	<p><a href="https://www.renewableenergyhub.co.uk/main/heat-pumps-information/ground-source-heat-pumps">https://www.renewableenergyhub.co.uk/main/heat-pumps-information/ground-source-heat-pumps</a></p>		<p>limited energy resources. They explain the importance of some applications and implications of science, such as the need to consider the availability of resources, and environmental effects, in the production of energy and materials.</p>
		<p>Summary briefing with teacher to record why pupils think heat pumps are being suggested as the alternative to gas and oil as well as other renewables such as biomass. Show of hands to show whether pupils think that heat pumps could be the future. <i>(10 minutes)</i></p>	<p><b>Homework Opportunities</b> <i>Pupils could:</i></p> <p>Design a home of the future using renewable, carbon friendly sources of energy and heat. Try to include more than one renewable working together such as a heat pump and solar.</p> <p><i>Or</i></p> <p>Find out what Passive Housing means. <i>Or</i></p> <p>Produce an Iggy style information booklet.</p>	<p><b>Cross Curricular</b> <b>English</b> Researching, Recording, Oracy, subject specific vocabulary <b>ICT</b> Research &amp; Recording <b>Key Skills</b> Citizenship PSE Developing Thinking Developing Communication Developing ICT</p>	<p><b>Geography</b> <b>National Curriculum Level Descriptions</b> <i>The change in climate</i> <i>How human &amp; physical processes interact to influence and change landscapes, environments and the climate. How human activity relies on effective functioning of natural systems.</i></p> <p><b>Level 6</b> –Pupils recognise how conflicting demands on the environment may arise and compare sustainable and other approaches to managing environments. They appreciate that different values and attitudes, including their own, result in different approaches to environmental interaction and change.</p> <p><b>Level 7</b> –Pupils understand that many factors influence the decisions made about sustainability and use this understanding to explain the resulting changes. They appreciate that the environment in a place and the lives of the people who live there are affected by actions and events in other places. They recognise that human actions, including their own, may have unintended environmental consequences.</p> <p><b>Level 8</b> - They understand how the interaction between people and environments can result in complex and unintended changes. They understand and describe a range of views about environmental interaction.</p>
			<p><b>Key Words / Phrases</b></p> <p>Air Source Carbon Friendly Ground Source Water Source Heat Pump Passive House Renewable Sustainable</p>		

**Medium Term Plan**

**Week / Lesson 6 Heat Pumps and Industry**

	Expected Learning Outcome <i>To develop understanding of:</i>	Method/activity <i>Assume 1 hour per lesson</i>	Suggested Resources <i>See Week 6 Attachment</i> <b>WE NEED GSHPA PRODUCED ITEMS</b>	Differentiation Throughout this module teacher encouragement for pupils to make increasingly independent contributions.	Assessment Opportunities
Week / Lesson 6	<b><i>The industry and career opportunities provided within the heat pump industry.</i></b>	<p><i>Teacher to invite careers advisor as a guest to this session.</i> Careers advisor to explain that this session is about discovering career opportunities within the heat pump industry. <i>(5 minutes)</i></p> <p>Board led PowerPoint presentation with following headings: After care Design Education Installation Manufacture Office Management Product research Sales <i>(30 minutes)</i></p> <p>Pupils to decide where they think they might like to work within the industry and complete their own spider diagrams of areas that interest them. Include recording reasons why. <i>(10 minutes)</i></p> <p>Careers advisor to tally one answer from each pupil and consider most and least popular choices and whether the heat pump / renewable sector provides a wide range of employment opportunities. <i>(15 minutes)</i></p>	<p>Careers Advisor</p> <p>Spider diagram templates</p> <p><b>GSHPA information film needs to be produced.</b></p> <p>GSHPA produced Key Phrases and Industry suggestions PowerPoint in Week 6 attachments attached as <b>Key Phrases and Industry</b></p>	<p>Core - as in method/activity.</p> <p><b>Support</b> – help pupils to complete spider charts.</p> <p><b>Extension</b> –Research what local colleges / training is available.</p> <p><b>ICT sessions could include:</b> <b>Ongoing:</b> Making a recording of the installation of the ground source systems going into school which would include the external drilling work and the internal heating systems. Could be a time lapse for School website.</p> <p>Blogs on School website</p> <p>Present their presentation to governors, staff and parents.</p> <p><b>Lesson specific:</b> Research GSHPA and local colleges for training courses and programmes available.</p>	<p>Pupils <i>examine choices and give reasons for their choices.</i></p> <hr/> <p><b>National Curriculum</b> <b>Throughout this POS pupils have worked in Citizenship</b> <b>Citizenship</b></p> <p><b>Level 6</b> - Pupils research strategies to investigate issues affecting society. They interpret different sources of information and begin to assess these for validity. They develop structured and balanced arguments, challenging others' assumptions or ideas and they present a persuasive argument for a particular course of action, giving reasons for their view. They work with others to negotiate, plan and carry out actions aimed at improving or influencing the community and, after reflecting on the extent of their success, suggest what they might do next.</p> <p><b>Level 7</b> - Pupils use a range of research strategies and sources with confidence to explore issues affecting society. They select and evaluate relevant evidence to question different ideas and views including their own. They make reasoned and persuasive arguments, representing the different viewpoints, including those they do not agree with.</p>

					<p>They begin to evaluate the roles citizens can take in shaping decisions and holding those in power to account. They analyse the reasons for change in UK society and its diversity, over time. They work with others to initiate, negotiate, plan and carry out appropriate courses of action in the local and wider community to bring about change for the common good. They evaluate the impact of their actions and suggest alternate approaches.</p> <p><b>Level 8</b> - Pupils carry out different types of research into a range of issues, problems and events and analyse how these affect groups and communities in different parts of the world. They make connections between information derived from different sources and their own experience in order to make perceptive observations and coherent arguments. They hypothesise alternative courses of action exploring the different implications of each. They work with others to put courses of action to the test and evaluate the impact and limitations of these for the wider community.</p>
			<p><b>Homework Opportunities</b>  <i>Pupils should:</i></p> <p>Discuss subject options for GCSE study with parents/guardians.                  Discuss potential career paths with parents/guardians</p>	<p><b>Cross Curricular</b>  <b>Key Skills</b>                  Citizenship                  Careers</p>	