GSHPA

Scheme of Work

Colleges

Ages 16 – 18 Years

Level 1

Written by Andrea Ellison B.Ed (Hons)

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 students 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 students in Key Stages 1, 2, 3 and 4 plus a Sustainability one for College students aged 16 – 18 years at Level 1.

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Guidance on following the scheme of work for non-tutors:

The title of the module is Sustainability.

This is a 6 Session Programme of Study (POS) which, on average, is a half-term.

Expected Learning Outcomes – this is what you want the students to develop understanding of within the Session.

Method / Activity – this is how the tutor will divide the Session time of an hour.

Suggested Resources – these are resources suggested to the tutor that will allow him/her to deliver the Session. 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' Session aimed at the majority of the students in the group. The 'support' suggestions are for the less able students and the 'extension' suggestions are for the more able once they have completed the core activities.

Assessment Opportunities – tutors may choose to do a tutor assessment.

Extra Opportunities – these are ideas and suggestions for Extra activities to extend the Session with Extension activities.

Key Words / Phrases – these are subject specific to the Session and ones which are often unique to the topic.

Cross Curricular – these are other national curriculum subjects that are inclusive within the Session but not required to be recorded as this is a science / geography POS.

National Curriculum – the levels the topic is in within the National Curriculum for schools. Colleges will need to add their own targets.

Long Term Plan

Natural Resources, Renewable and Non-Renewable Energy, Sustainability

Session 1	**Sustainability**
Session 2	**Climate Change**
Session 3	**Introduction to Carbon Footprint**
Session 4	**Introduction to Air Quality, Climate Change within Global Warming**
Session 5	**Which Green Technology?**
Session 6	**Are Renewable Energies one of the Solutions to Climate Change and Global Warming?**

Week/Session 1 Sustainability

Medium Term Plan

Week/Session 1 Sustainability

	Expected Learning Outcome or Purpose of Session ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources ***See Week 1 Attachment***	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Summative and Formative Assessment Opportunities
Week / Session 1	Introduce students to sustainability. Recognise the importance of sustainability and the environment. Describe how this applies to their own environment.	Tutor to begin by finding and recording what sustainability means. Show David Attenborough clip https://www.theguardian.com/environment/video/2015/sep/16/david-attenborough-supports-clean-energy-plan-inspired-by-apollo-mission-video or something similar to instigate a group discussion with a focus on the importance of sustainability to the environment.	Definition of Sustainability David Attenborough clip https://www.theguardian.com/environment/video/2015/sep/16/david-attenborough-supports-clean-energy-plan-inspired-by-apollo-mission-video IT Resources to show clips and carry out research.	***Core*** As in method/activity. ***Support*** Tutor to make suggestions of examples in their environment. ***Extension / Extra*** Make a poster to display within the facility.	Direct and indirect questioning of group and individuals. Can the students record the information they have found? Feedback Methods

	Explain one thing they could do to help resolve climate change issues.	Small group work, using flip chart paper and mind map, of how sustainability applies to their own environment around them. Encourage them to consider fossil fuels against renewable energy sources. Collective discussion and collective tally charts to share and collate each group's information and discuss the most popular and least popular answers. Students to collectively decide on 2 things they have learned from the session.	Flip charts and pens **Key Words/Phrases** Sustainability Environment Renewable Non-Renewable Fossil Fuels	***Cross Curricular*** All naturally occurring areas of the curriculum to include: Written Skills Listening Skills Speaking Skills Digital Skills Personal Development	**Science** ***Students describe and understand key aspects of sustainability and the use of fossil fuels.*** **National Curriculum Level Descriptions** **Level 4** – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives. **Level 5** – Students describe the benefits and drawbacks of using fossil fuels. **Geography** ***Students describe and understand key aspects of the distribution of natural energy resources.*** **National Curriculum Level Descriptions** **Level 3** Students recognise that people seek to improve and sustain environments. **Level 4** Students understand that people can both improve and damage the environment. They offer reasons for their own views about environmental change and recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of

					sustainable development and recognise the range of views help about environmental interaction and change.

Medium Term Plan

Week/Session 2 Climate Change

	Expected Learning Outcome or Purpose of Session ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources ***See Week 1 Attachment***	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Summative and Formative Assessment Opportunities

<table>
<tr>
<td rowspan="3">Week / Session 2</td>
<td rowspan="3">Definition of climate change.

How climate change may affect them within their lifetime.

Global, national and local issues faced from climate change.

Resolving climate change issues.</td>
<td rowspan="3">Ask students to record their definition of what they consider climate change means.

Students to record their understanding of how they consider climate change may affect them using a maximum of 2 sentences.

Work individually or in pairs to identify and research one area of each the global, national and local issues faced. Encourage examining the use fossil fuels and heating systems.

Share findings with group.

Explain one thing they could do to help resolve climate change issues. Encourage the use of renewables to replace fossil fuels in their responses.</td>
<td>IT Resources to carry out research.</td>
<td>Core
As in method/activity.

Support
Tutor to guide students towards heating articles.

Extension / Extra
Make a poster to display within the facility.</td>
<td>Direct and indirect questioning of group and individuals.

Can the students record the information they have found?

Feedback Methods</td>
</tr>
<tr>
<td rowspan="2">Cross Curricular
All naturally occurring areas of the curriculum to include:
Written Skills
Listening Skills
Speaking Skills
Digital Skills
Personal Development</td>
<td>Science
Students describe and understand key aspects of sustainability and the use of fossil fuels.

National Curriculum Level Descriptions
Level 4 – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives.
Level 5 – Students describe the benefits and drawbacks of using fossil fuels.</td>
</tr>
<tr>
<td>Key Words/Phrases

Climate Change
Environment
Renewable
Non-Renewable
Fossil Fuels
Local
National
International
Worldwide</td>
<td>Geography
Students describe and understand key aspects of the distribution of natural energy resources.

National Curriculum Level Descriptions

Level 3 Students recognise that people seek to improve and sustain environments.
Level 4 Students understand that people can both improve and damage the environment. They offer reasons for their own views about environmental change and</td>
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					recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of sustainable development and recognise the range of views help about environmental interaction and change.

Medium Term Plan

Week / Session 3 Introduction to Carbon Footprint

	Expected Learning Outcome ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources ***See Week 3 Attachment***	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Assessment Opportunities

Week / Session 3	The meaning of Carbon Footprint. *The amount of CO2 released into the atmosphere because of your own energy needs is called your "carbon footprint'.* How to Reduce their Carbon Footprint. What a carbon calculator is Misuse of Energy	Introduce Carbon Footprints using https://www.youtube.com/watch?v=8q7_aV8eLUE Re-watch and pause where there can be discussion about the areas that their own carbon footprints could be reduced. Use online calculator. Examples are: Can students walk or cycle instead of using the car or bus? Could they grow food at home rather than going to the supermarket and buying food from abroad? Could they alter their heating systems at home and in college? Issue large and smaller footprints. On the larger foot template note what they do now, e.g. use the car, burn gas, buy food from abroad. On the smaller templates note what they can do to reduce their footprint, e.g.	https://www.youtube.com/watch?v=8q7_aV8eLUE https://www.twinkl.co.uk/teaching-wiki/carbon-footprint Online calculator: https://www.carbonfootprint.com/calculator.aspx Choose from variety of online footprint templates.	***Core*** As in method/activity. ***Support*** Guide students through carbon footprint calculators ***Extension / Extra*** Calculate carbon footprint https://www.carbonfootprint.com/calculator.aspx Examine the packaging of 5 -10 items of fruit or vegetables items in their homes or in the supermarket and record the countries they have travelled from.	Can the students show understanding of what Carbon Footprint Means? Mind map ideas of climate change ideas. **Geography** ***Students describe and understand key aspects of the distribution of natural energy resources.*** **National Curriculum Level Descriptions** **Level 3** Students recognise that people seek to improve and sustain environments.

		walk to college, use renewable heating systems, buy British food. Tutor led whole plenary listing 3 ways students found they could reduce their carbon footprints in each area.	**Key Words/Phrases** Coal Electricity Environment Food Miles Gas Non-Renewable Oil Renewable Solar Tidal Turbine Wind	**Cross Curricular** Written Skills Listening Skills Speaking Skills Digital Skills Personal Development	**Level 4** Students understand that people can both improve and damage the environment. They offer reasons for their own views about environmental change and recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of sustainable development and recognise the range of views help about environmental interaction and change. **Science** ***Students describe and understand key aspects of sustainability and the use of fossil fuels.*** **National Curriculum Level Descriptions** **Level 3** – Students recognise and explain the purpose of a variety of scientific and technological developments in everyday lives. **Level 4** – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives. **Level 5** – Students describe the benefits and drawbacks of using fossil fuels.

Medium Term Plan

Week / Session 4 Introduction to Air Quality, Climate Change within Global Warming.

	Expected Learning Outcome ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources ***See Week 4 Attachment***	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Assessment Opportunities
Week / Session 4	What Air Quality means and how we can improve it. What Climate Change means and how we can control it. What Global warming means and how we can control it.	Ask students what they think that delivering food from great distances via road, ship and aeroplanes would do to the air quality / atmosphere of the world? Ensure that pollution, air quality and atmosphere are introduced here. Students to volunteer other ways they think the air quality could be damaged. Students to write one sentence 'How I think air pollution affects humans.' Students to write one sentence 'How I think air pollution affects the planet.' Can students offer explanations about what they think global warming is? Ask students why the earth has changed so much in the last 200 years. (*Overuse of fossil fuels)* Students to record on whiteboards what fuel/s they think would improve air quality, slow down climate change and slow down global warming. Hold up whiteboards so tutor can see the results to use in next Session. ***(10 minutes)***	https://www.youtube.com/watch?v=sAKyhfxxr7s https://www.youtube.com/watch?v=v8unGCTWUWI White boards and pens Prompt cards in week 4 folder Extra Opportunities How do cows and / or aerosols contribute to global warming?	***Core*** As in method/activity. ***Support*** Help with writing their ideas in sentences quickly in introduction. Encourage students to volunteer their responses ***Extension*** How do cows and aerosols contribute to global warming? **Cross Curricular** Written Skills Listening Skills Speaking Skills Digital Skills Personal Development	Can the students explain how we can improve air quality? Take the quiz https://study.com/academy/Session/air-pollution-Session-for-kids-definition-facts.html#Session Can students explain how air quality contributes to climate change and global warming? **Geography** ***Students describe and understand key aspects of the distribution of natural energy resources.*** **National Curriculum Level Descriptions**

			Key Words & Phrases Air Quality Atmosphere Climate Change Fossil Fuels Global Warming Greenhouse Gases Pollution Drought Fires Floods Global		**Level 3** Students recognise that people seek to improve and sustain environments. **Level 4** Students understand that people can both improve and damage the environment. They offer reasons for their own views about environmental change and recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of sustainable development and recognise the range of views help about environmental interaction and change. **Science** ***Students describe and understand key aspects of sustainability and the use of fossil fuels.*** **National Curriculum Level Descriptions** **Level 3** – Students recognise and explain the purpose of a variety of scientific and technological developments in everyday lives. **Level 4** – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives. **Level 5** – Students describe the benefits and drawbacks of using fossil fuels.

Medium Term Plan

Week / Session 5 Which Green Technology?

	Expected Learning Outcome ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources ***See Week 5 Attachment***	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Assessment Opportunities
Week / Session 5	The benefits of using Renewable Energy Sources when addressing Global warming and Climate change. How we can produce clean energy for use in everyday life. The advantages and disadvantages of various renewable energy types. How this links into a plumbing course.	Recap previous Sessions where students have examined fossil fuels as non-renewable resources and their effects on the earth and human health. Recap where fossil fuels come from and that this cannot be sustainable. Recap that the climate change and global warming issues have come about due to human activity, particularly over the last 200 years. Students to do Speed Activity found at https://www.twinkl.co.uk/resource/t3-sc-527-renewable-energy-speed-dating plus GSHPA sheet to represent heat pumps– all found in Week 5 folder. Each pupil to complete the sheet of advantages and disadvantages of: Biomass, Geothermal, Heat Pumps, Hydroelectric, Solar, Tidal and Wind Power. Think about locations being appropriate for type of energy chosen. Also look at GSHPA Heat Pump Doodly short video on Week 5 attachment. Students to record which type of renewable is the one they would be most likely to use to replace a fossil fuel at home, and their reasons why. Could be more than one if pupil can provide a reason for their answers – example a heat pump with solar.	https://www.twinkl.co.uk/resource/t3-sc-527-renewable-energy-speed-dating GSHPA Heat Pump Doodly short video in Week 5 folder.	***Core*** As in method/activity. ***Support*** Select a reduced number of energy types. Help with recording information and conclusions. ***Extension*** Students to consider whether different geographical areas would be more likely to use certain renewables? Example solar in a sunny climate, tidal near the coast etc. Which renewable/s do students think would work on their homes and what would they replace – example gas or oil for a heat pump and solar panels?	Can students provide appropriate and valid reasons for selecting a renewable energy to replace a fossil fuel in their home. **Geography** ***Students describe and understand key aspects of the distribution of natural energy resources.*** **National Curriculum Level Descriptions** **Level 3** Students recognise that people seek to improve and sustain environments. **Level 4** Students understand that people can both improve and damage the environment. They offer reasons for their own views about environmental change and recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of sustainable development and recognise the range of views help about environmental interaction and change.

		Discussions about what students have found out, concluded and how that may affect the course of their working life.	**Key Words & Phrases** Air Source Air Quality Atmosphere Biomass Climate Change Fossil Fuels Geothermal Global Warming Greenhouse Gases Ground Source Heat Pumps Hydroelectric Pollution Solar Tidal Wind Power.	**Cross Curricular** Written Skills Listening Skills Speaking Skills Digital Skills Personal Development Careers	**Science** ***Students describe and understand key aspects of sustainability and the use of fossil fuels.*** **National Curriculum Level Descriptions** **Level 3** – Students recognise and explain the purpose of a variety of scientific and technological developments in everyday lives. **Level 4** – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives. **Level 5** – **Students describe the benefits and drawbacks of using fossil fuels.** Students describe processes and phenomena relating to the properties of rocks and sediment in the earth.

Medium Term Plan

Week / Session 6 Are Renewable Energies one of the Solutions to Climate Change and Global Warming?

	Expected Learning Outcome ***To develop understanding of:***	Method/activity ***Assume 1 hour per Session***	Suggested Resources	Differentiation *Throughout this module tutor encouragement for students to make increasingly independent contributions.*	Assessment Opportunities
Week / Session 6	The benefits of using Renewable Energy Sources when addressing Global warming and Climate change. Consider the advantages and disadvantages within all energy types. How to gather information to present a point of view.	Explain how the government are now having to include renewables in their building programmes and refer to latest legislation. Remind students of last session considering whether they think different geographical areas could be more likely to use certain renewables. Offer examples of solar in a sunny climate, tidal near the coast etc. Associate with where students live and whether world-wide considerations could made. Would solar work in most places including the Arctic? *(Sun and not temperature?)* Would heat pumps work in all areas? *(Yes as they need ground, air or water and at least 2 are available everywhere).* Students to work as a whole group to discuss the scenario task cards.	**Up to date government legislation** **Scenario Task Cards** **Key Words & Phrases** Air Source Air Quality Atmosphere Biomass Climate Change Fossil Fuels Geothermal Global Warming Greenhouse Gases Ground Source Heat Pumps Hydroelectric Pollution Solar Tidal Wind Power.	***Core*** As in method/activity. ***Support*** Grouping of students and staff support. ***Extension*** Students to include what types of employment opportunities they think working in the renewable industry could bring such as the manufacturers of the equipment, installers of the equipment, the drillers and ground workers for heat pumps etc. **Cross Curricular** Written Skills Listening Skills Speaking Skills Digital Skills Personal Development Careers	Students to produce a letter which can be sent to parents, governors, local education office, national officials & Ministers etc providing an argument for replacing fossil fuels used in heating systems in schools for renewable energy. Students need to include why fossil fuels and non-renewable energy should be replaced. They must include the advantages of renewables in as many ways as they can to include air quality, greenhouse gas emissions, climate change and health. They could also include that it would be cheaper to use free resources such as the ground, air, water and sun than buy oil, coal and gas. **National Curriculum Geography** ***Students describe and understand key aspects of the distribution of natural energy resources.*** **National Curriculum Level Descriptions** **Level 3** Students recognise that people seek to improve and sustain environments. **Level 4** Students understand that people can both improve and damage the environment. They offer reasons for their own views

					about environmental change and recognise that other people might hold different views. **Level 5** Students understand some ways that human activities cause environments to change. Students demonstrate an awareness of sustainable development and recognise the range of views help about environmental interaction and change. **Science** ***Students describe and understand key aspects of sustainability and the use of fossil fuels.*** **National Curriculum Level Descriptions** **Level 3** – Students recognise and explain the purpose of a variety of scientific and technological developments in everyday lives. **Level 4** – Students recognise that reversible and irreversible changes affect sustainability in their everyday lives. **Level 5** – Students describe the benefits and drawbacks of using fossil fuels. Students describe processes and phenomena relating to the properties of rocks and sediment in the earth.