

Module 4: 'The 'so what?' of climate change' (Climate Change Impacts)

KS3 - Scheme of Work

Overview: This Module is based around investigations of climate change impacts, both in the North East and beyond, to help bring some of the consequences of climate change to life for students. Students will explore, in particular, issues surrounding possible mass migration/climate change 'refugees', flooding, the Arctic environment and DeBono's hats/problem-solving.

Most children will: understand key climate change impacts and provide examples of these; be able to understand the processes responsible for key climate change impacts; demonstrate creative abilities to problem-solving.

Some children will not have made so much progress and will: understand some climate change impacts and provide a few examples of these; be able to understand some of the processes responsible for climate change impacts; consider other ways of problem-solving.

Some children will have progressed further and will also: critically analyse different information on the impacts of climate change around the world; plan for or develop ideas about how living things may need to build resilience to climate change impacts.

Learning Objectives	Cross Curricular & Other	Key Resources:
<p>To understand the push and pull migration factors including factors directly & indirectly influenced by climate change.</p> <p>To understand that climate change impacts will be felt differently around the world.</p> <p>To become aware that climate change may lead to mass migration and millions of climate change refugees.</p> <p>To understand the damage of floods and how their increased frequency and severity may be linked to climate change.</p> <p>To design a flood-resilient house that will withstand flooding for the future generations.</p> <p>To consider global impacts of rapid climate change and possible adaptation mechanisms.</p>	<p>Subjects: Science, Geography, D & T, ICT, Art, Drama, English</p> <p>T4L: Diamond ranking, prioritising, pair work, group work, debating, creativity, researching, extended writing, ICT, literacy, numeracy</p>	<p>Internet and computers Atlas/maps Memory map Afsana Migration Mystery 'Fact or Fiction' sheets and answers UPD8 resources Art materials DeBono hats Powerpoint file De Bono Hats Group Summary Sheet</p> <p>ICT/internet usage is encouraged in this module – advance booking to gain access may be helpful.</p> <p>Overall Outcome: Students will gain an appreciation of possible climate change impacts, both in England and around the world. They will explore and discover ways to adapt to climate change and build resilience of local communities. They will also gain experience in developing innovative creative approaches to problem-solving.</p>
<p>To explain and explore the impacts that climate change is having on the Arctic environment.</p> <p>To name at least 4 possible impacts of climate change in the North East.</p> <p>To explain how these may impact everyday life using different viewpoints.</p> <p>To use different approaches for problem-solving.</p>	<p>Vocabulary: Words related to climate change: mass migration climate change refugees flood frequency resilience adaptation timescales problem-solving</p>	<p>Assessment: See individual sections.</p> <p>Unit Extension: See individual sections. Debating or 'hot seat' arguments about the bigger picture, e.g. 'what if everyone says 'so what?' to climate change?'; 'it won't impact me in my lifetime'; 'England won't be badly affected by climate change' etc. Students to take on particular roles or create a 'marketing campaign.' Conduct a survey and follow-up work.</p>

Learning Objectives	Key resources	Suggested Activities	Cross-curricular & other	Outcomes	Extension(s)
(1) Memory map					
<p>To understand the push and pull factors which relate to migration including factors directly & indirectly influenced by climate change.</p>	<p>Computer/internet/projector (teacher)</p> <p>Internet - Google images search Push/pull cards Migration card sort sheets</p> <p>Memory Map A3 paper and coloured pens/pencils</p>	<ul style="list-style-type: none"> - Starter: teacher to designate one side of the room as 'push' and the other as 'pull' – stick big letters made of card spelling either 'Push' or 'Pull' onto each wall. - Select and display suitable photograph(s) (low ability) or statement(s) (higher ability) to demonstrate migration 'push' or 'pull' factors. - Students must decide if they would be pushed to migrate into or pulled away/emigrating from a country based on these image(s)/text, and walk to the appropriate side of the room. <p>Or this activity could be used as a card sort.</p> <ul style="list-style-type: none"> - Main: teacher briefly describes the meaning of migration and links this to the push/pull starter. Introduce Memory map and show onscreen. The aim of the game is for the student's copies to look as much like the teacher's copy as possible. - Divide students into groups. Student 'thinking caps' e.g. how do you achieve successful group work? Student input. Teacher gives a HINT - "Those who work together succeed together!" - Each student in each group then takes a turn to look at the teacher's copy (time limit – 15 SECONDS MAX). Students go back to group and create 1 map copy all together after every student in the group has viewed teacher original (time limit – 5 MINUTES MAX). - Teacher collects group map copies and assesses the most accurate copy as students 	<p>Art Geography English Citizenship</p>	<p>All will be able to decide if an image illustrates a migration push or pull factor.</p> <p>Most will be able to demonstrate an understanding of what group work means.</p> <p>Some will be able to construct a memory map as a team.</p>	<p>Write short essay/ paragraph as to how climate change could cause population migration.</p> <p>Internet research- Has this occurred already? Consider 5W's (Who? What? Where? When? Why?) to answer question.</p>



		tidy up/ back to own seats. - Plenary: How can migration link to climate change? Could this affect population movement? What are the implications?			
(2) Afsana migration mystery					
<p>To understand that climate change impacts will be felt differently around the world.</p> <p>To become aware that climate change may lead to mass migration and millions of climate change refugees.</p>	<p>Instructions for Afsana migration mystery Afsana migration mystery cards</p> <p>Atlas or maps Internet & Google Earth Computer/internet/projector (for teacher)</p> <p>Afsana migration mystery Power Point Criteria levels guidance</p>	<p>- Teacher to prepare cards in advance and be familiar with the idea of the 'Mystery' set in 'Sudan' – read instructions for the mystery</p> <p>- Students to find where Sudan is located using an atlas or maps and discuss as a class what they know about the country, e.g. climate, landscape, people, politics, natural resources etc. See: www.climatechoices.org.uk/pages/cchange1.htm For climate change impacts around the world, including Sudan. (Website also good for other information!)</p> <p>- Use Afsana migration mystery Power Point to show to class and introduce mystery</p> <p>- Give class 'criteria levels' guidance sheet.</p> <p>- <u>Cards</u>: In pairs, students are given the 25 cards for the mystery and work in pairs or small groups. There are many card sorting possibilities which are ability depending, mainly by outcome.</p> <p>- They can sort cards into:</p> <ol style="list-style-type: none"> (1) Migration (2) <u>climate change/global warming</u> (3) <u>Afsana's details</u>. <p>- In their pairs, students then select the most and least important information for each category and write a short essay using the PEE method (from Power Point) and criteria levels - they must explain why they chose it, or</p>	<p>Pair work Group work Diamond ranking</p> <p>English – extended writing.</p> <p>Debating</p>	<p>Students will explain how they used the evidence to answer questions.</p> <p>Students will become aware that climate change may lead to mass migration and many 'climate change refugees'.</p> <p>Students to list 3 most important points that they learned.</p>	<p>Students may use the information to write an extended piece on:</p> <ul style="list-style-type: none"> - Afsana's life and what factors have affected it? - What will happen in Sudan in 2050 if we do nothing? - How might climate change refugees affect 'your town' in 2050? <p>They can then use the assessment criteria (given on the cards handout) to evaluate themselves and others.</p> <p>Or - this information could be produced in the format of Power Point presentations, essays, podcasts, videos etc.</p> <p>Ask students to read and research about other global climate change refugees,</p>



		<p>for the more able to justify their choice.</p> <ul style="list-style-type: none"> - This could lead to a class discussion or they can snowball their answers – from 1 person’s choice, to pairs, then 4’s. - <u>Timeline</u>. In their pairs, pupils can then try to put the events into a timeline. This will lead to a cause and effect discussion e.g. greenhouse gases emissions linked to climate change, leading to an increase in forced migration etc. Here students can pick out 3 causes and 3 effects and try to say what, why, who, where, when and how. - <u>Diamond ranking</u>. The pupils can rank cards in order of importance. They may use all of the cards – but it may be more constructive to use either causes or effect or Christian Aid report. Again this information maybe shared with the class. <p>Finish by using the Science Museum’s ‘Climate Report’ resource to help pupils further look at how climate change affects people around the world http://www.sciencemuseum.org.uk/educators/classroom_and_homework_resources/resources/climate_report.aspx</p>			<p>e.g. http://www.nature.com/news/2010/100726/full/news.2010.375.html</p> <p>In teams, ask students to make their own cards (similar to those in the Afsana mystery) about these climate change refugees and undertake same subsequent activities.</p> <p>OR – see http://www.coolplanet2009.org/news-environmental-issues/460.html and undertake a similar activity to the above, but based on the projected forced migration of 75 million climate change refugees in the Pacific Islands by 2050 (report published July 2009 by Oxfam)</p>
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(3) Designing a flood proof house

To understand the damage of floods and how their increased frequency and severity may be	Computers and internet Maps A3 paper/pens/pencils	- Class to consider that we are increasingly using up available land in the UK, population is increasing and flooding frequency may also increase due to climate change. What can we do to become more resilient? What does	Science Geography D&T ICT Art	To understand why floods occur and how they may be linked to climate change.	Students can build models of their flood resilient houses and present them to the class.
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<p>linked to climate change.</p> <p>To design a flood-resilient house that will withstand flooding for the future generations.</p> <p>To use a flood map to investigate local areas.</p>		<p>‘resilient’ mean? Use the following Royal Geographical Society resource to introduce the topic: http://www.rgs.org/OurWork/Schools/Teaching+resources/Key+Stage+3+resources/Are+you+flood+ready/Are+you+flood+ready.htm</p> <p>- Split students into pairs. Find an area to build a house in an area at risk of future flooding. Use maps to help locate areas at risk and the http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx for overall guidance on flood protection.</p> <p>- Have pairs use the internet and Environment Agency website to research areas affected by the 2007 floods in the UK and list characteristics that led to flooding. These may help to site the house.</p> <p>NOTE: Remind students that flooding can be linked to storm surges on coastlines, increased rainfall over a period of time, severe/intense rainfall from storms and storm drains/sewers overflowing (i.e. infrastructure maintenance issues). These factors mean that many different parts of England could be at risk of future flooding.</p> <p>- Pairs will then design a house that:</p> <ol style="list-style-type: none"> (1) is large enough for 5 people; (2) is on an estate with at least 50 other houses. (3) can withstand a flood. <p>- Students may conduct internet research on both flooding and flood defences. See: http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx</p>	<p>Creativity Pair work</p>	<p>To explain what ‘resilience’ means.</p> <p>To be able to explain the impacts of and solutions to flooding.</p>	<p>Students to design an even less costly version of a flood resilient house for LEDC’s. .</p>
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		http://www.reuters.com/article/2012/07/10/us-britain-floods-risk-idUSBRE8691IO20120710 http://www.shoothill.com/FloodMap/ - Houses should be designed on A3 paper and fully annotated (i.e. detailed labels which explain their ideas.) - Remind students to use a map – e.g. http://www.bing.com/maps/?FORM=MMREDIR to locate where the estate will be built – this may be printed out and attached to the A3 design.			
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(4) Fact or fiction - The day after tomorrow?					
<p>To identify the difference between climate change fact and fiction.</p> <p>To identify why some facts in films may be altered.</p> <p>To consider global impacts of rapid climate change and possible adaptation mechanisms.</p>	<p>'Fact or Fiction' sheets and answers Computer/internet/projector (for teacher) 'The Day After Tomorrow' film trailer</p> <p>UPD8 activities x2 based around the film (associated teacher notes, instructions, PDFs)</p> <p>Photostory is free to download from the Microsoft website: http://www.microsoft.com/downloads/details.aspx?FamilyID=92755126-a008-49b3-b3f4-6f33852af9c1&DisplayLang=en for Windows 7 Or MovieMaker can be used for later versions</p>	<p>- Pass out 'Fact or Fiction Day After Tomorrow Sheet' (based on information from the Sierra Club of Canada).</p> <p>- Students to watch 'The Day After Tomorrow' trailer http://www.imdb.com/title/tt0319262/trailers-screenplay-vi2374697241</p> <p>- Or – Show a longer clip from the DVD (Check with your geography and science departments to see if they may already have this).</p> <p>- Class discussion on (1) answers to 'Fact or Fiction' sheet (based on information from the Sierra Club of Canada) and (2) about what makes the trailer/film clip effective in its persuasion.</p> <p>- Students to undertake 'The Day After Tomorrow' activities available on the ASE's UPD8 website:</p> <p>'Prequel' activity: http://www.upd8.org.uk/activity/105/The-Day-After-Tomorrow-The-Prequel.html</p> <p>'Main' activity:</p>	<p>Geography Science English Drama Creative thinking</p>	<p>To examine scientific facts in the popular media.</p> <p>To understand that adaptation strategies are important when planning for climate change impacts.</p> <p>To relate learning back to flooding and climate change refugees in previous lessons.</p>	<p>Students to create a storyboard or drama using climate change refugees, political unrest etc. as their theme.</p> <p>Or - students may use their storyboard from above and produce a short film using Photostory to present in class or at a whole school assembly.</p>



	http://www.upd8.org.uk/activity/106/The-Day-After-Tomorrow.html			
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KS3 – Module 4 (SoW)

(5) Melting Arctic and plight of the polar bears					
<p>To explain and explore the impacts that climate change is having on the Arctic environment.</p> <p>To understand the importance about adaptation of living things and timescales.</p> <p>To consider climate change impacts on polar bear populations e.g. ecology, endangerment and extinction issues.</p>	<p>Computer/internet/projector (for teacher) Polar Bear Power Point</p> <p>Internet Printer Art materials</p> <p>UPD8 activity (teacher's notes, instructions, Power Point)</p> <p>Agony Aunt template Paper/pens/pencils Star</p> <p>http://science.howstuffworks.com/environmental/global-warming-videos-playlist.htm</p> <p>Polar Bears forced to swim longer distances/ polar bear cubs in big trouble</p>	<p>- Students to view polar bear Power Point <u>TO SLIDE 4 ONLY.</u></p> <p>- In small groups, students to then research climate change impacts in the Arctic using the sites below, in addition to the ones suggested on the Power Point (ensure that everyone has a responsibility in the group): http://www.greenfacts.org/en/arctic-climate-change/ http://nsidc.org/data/seaice_index/ http://news.bbc.co.uk/2/hi/americas/7401940.stm</p> <p>- Groups to print images/create drawings and make a 3-D 'wall-hanging' representing recent changes in the Arctic environment due to climate change that they think are most critical. (NOTE: remind students that climate change impacts can happen on land, in the atmosphere, in the sea, on ice etc.)</p> <p>- 3-D 'wall-hangings' can be displayed in the classroom. NOTE: raise the question that if climate change is happening so quickly in the Arctic, will plants and animals have time to adapt?</p> <p>- As a class, help students to undertake UPD8 'Polar bear' activity using the link to the website: http://www.upd8.org.uk/activity/94/Endangered-Polar-bears.html</p> <p>- RETURN TO POWER POINT STARTING AT SLIDE 5:</p>	<p>Geography Drama Science English Citizenship</p>	<p>Students demonstrate an understanding why climate change is exacerbated in the Arctic.</p> <p>Students will express empathy for living things.</p> <p>Students understand climate change impacts on polar bears.</p> <p>Students to seek positive action to help tackle climate change.</p>	<p>Report back a response from Pam the Penguin that states how the polar bear can seek help to tackle climate change (e.g. write letters to local MPs, compose 'letter to the editor' of local newspapers etc).</p> <p>Research the issues about adaptation and timescales – have plants and animals in the past been able to adapt to climate change? How did they adapt? How much time did they have to adapt? Report findings back to class.</p>



		<p>Students then need to use their imaginations, after independent and group learning above, to imagine that they are a polar bear and are writing to Pam the Penguin in an 'Agony Aunt' style letter about how the Arctic is changing due to climate change and your concerns about the future. Ask a specific question and submit your request to Pam the Penguin. Provide students with 'Agony Aunt' template (downloadable from Lead Schools site).</p> <ul style="list-style-type: none"> - Collect these into a journal and ensure that students all have access to read through. <p>Teacher to select 'star letter' and pin to classroom notice board.</p>			
(6) DeBono's Hats – Problem-solving climate change 'outside the box'					
<p>To name at least 4 possible impacts of climate change in the North East.</p> <p>To explain how these may impact everyday life using different viewpoints.</p> <p>To use different approaches for problem-solving.</p>	<p>Internet De Bono Hats PowerPoint file De Bono Hats Group Summary Sheet</p> <p>Art materials to create coloured hats (red, yellow, black, white, green and blue) Sticky labels</p>	<ul style="list-style-type: none"> - Split students into at least 4 groups of up to 6 children each and ask each group to decide on 1 possible impact of climate change in England. - Have students, in their groups, research their selected impact using the sites below and others they might discover (remind them to record their information): <ul style="list-style-type: none"> - CBBC News http://news.bbc.co.uk/cbbcnews/hi/specials/climate_change/default.stm - Royal Geographical Society: http://www.yourclimateyourlife.org.uk/1_impacts.html - Back together as a class, go through the De Bono Hats PowerPoint file (downloadable from Lead Schools site) to help explain the tool/theory (teacher may also like to use http://www.mindtools.com/pages/article/newTED_07.htm for information). - Reinforce that: <ul style="list-style-type: none"> - white hat = facts and figures 	<p>Science ICT Art Citizenship Geography Group work Creative thinking</p>	<p>To explore other ways of thinking and problem-solving.</p> <p>To consider other points of view.</p> <p>To consider climate change impacts in my own backyard.</p> <p>To use creative approaches to solving problems, such as those linked to climate change.</p>	<p>In same groups, students to swap hats and facilitate same discussion but using new assigned thought process.</p> <p>Make collage of novel solutions and ideas related to hats for other climate change impacts in different parts of the world.</p>



		<ul style="list-style-type: none"> - red hat = emotional thinking - yellow hat = positive thinking - black hat = critical thinking - purple hat = problem solving - green hat = creative/ future thinking <p>- In their original groups, students to create 6 different coloured hats (white, red, yellow, black, purple & green). Students to select a colour and wear hat.</p> <p>Students also to make sticky labels to wear, in addition to their hat, to remind themselves and others what their colour means.</p> <ul style="list-style-type: none"> - Pass out De Bono Hats Group Summary Sheet - As a whole class, facilitate the process of 'DeBono's Hats' one group at a time to explore different approaches to considering possible climate change impacts and ways to increase the region's resilience to these impacts in the North East – keep students on track with using only their assigned hat thought process (as defined by their hat colours and labels). <p>Ask class to vote after each group discussion as to which hat was most persuasive and interesting. Were novel solutions and ideas thought of or discussed?</p>			
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