

**Module 3: 'Climate change all around me'
(Indicators of Climate Change)**

KS3 - Scheme of Work

Overview: This Module is designed to help students better understand the many different indicators around the world which provide evidence that climate change is happening now. It will also bring to life the indicators of climate change in the student's 'own backyard.' Additionally, the Module encourages students to address both the problems linked to these climate change indicators, as well as potential 'action plans' to help deal with the impacts of these issues. The Module culminates with an 'exhibition' allowing students to showcase their understanding of various climate change indicators, their potential real-life impacts and thoughtful plans of action.

Most children will: gain an understanding of the variety of indicators that show climate change is taking place now and work as part of a team effectively; explore how some of these indicators show climate change is already happening in their 'own backyards'; consider how creative solutions or proactive planning may help ease the impacts of the problems associated with these indicators of climate change.

Some children will not have made so much progress and will: work as part of a group and contribute to the exhibition; gather some facts and information about a climate change indicator; demonstrate some understanding of how these indicators show climate change is already happening close to home.

Some children will have progressed further and will also: have a clearly identified role within the group and demonstrate good research skills and the ability to evaluate sources of information for reliability; produce an attractive and stimulating exhibition which holds the attention of the target audience and uses a variety of presentation methods.

Learning Objectives	National Curriculum & Cross Curricular	Key Resources:
<p>To enhance understanding of climate change indicators, both globally and locally.</p> <p>To work cooperatively towards an agreed goal.</p> <p>To suggest creative ways that the impacts of these climate change indicators may be dealt with.</p> <p>To prepare an exhibition to inform their audience.</p> <p>To be able to communicate with an audience effectively.</p>	<p>- Geography: weather and climate, including the change in climate from the Ice Age to the present</p> <p>- Science - Chemistry: the production of carbon dioxide by human activity and the impact on climate</p> <p>- Citizenship: Developing key skills: enquiry and communication Debating a global issue People and the Environment</p> <p>- Maths: Handling data/statistics</p> <p>- Enterprise Managing resources Working as a team.</p> <p>- Literacy: Speaking and listening Reading, understanding texts Persuasive writing/argument</p>	<p>ICT Computers Video Camera</p> <p>ICT/internet usage is encouraged in this module, booking access in advance may be helpful.</p> <p>Overall Outcome: Effective and informative exhibition surrounding an indicator of climate change using scientifically valid facts. Can students suggest creative solutions and effective planning measures to help ease impacts related to these climate change indicators?</p>
	<p>Vocabulary:</p> <p>Words related to climate change: carbon dioxide (CO₂) greenhouse gases greenhouse effect global warming</p> <p>Words related to climate change indicators: sea level rise flooding glaciers ice sheets sea-ice peat bogs phenology</p>	<p>Assessment: Peer assessment on exhibition.</p> <p>Unit Extension The exhibition could be put together as part of a wider school event, either during school time or as a showcase event after school (inviting parents, governors, Local Authority staff, media etc.)</p>



Learning Objectives	Key resources	Suggested Activities	Cross-curricular & other	Outcomes	Extension(s)
(1) Setting the Scene					
<p>To appreciate that various types of indicators around the world support that climate change is already happening.</p> <p>To consider how these impacts may affect local communities.</p>	<p>Computer/internet/projector (for teacher)</p> <p>Activity from UPD8 website (ASE) – ‘Glacial Meltdown’</p> <p>Internet/computers Maps Aerial photographs (via internet)</p>	<p>- Pose the question: ‘How can we tell climate change is taking place?’ ‘Is it happening elsewhere or is there evidence of it happening closer to home, too?’ Class can present ideas. Show video clips to inspire discussions:</p> <p>e.g. http://uk.youtube.com/watch?v=wD0IWb2w-jM – melting Himalayan glaciers.</p> <p>- Use the following UPD8 resource: Glacial Meltdown: http://www.upd8.org.uk/activity/51/Glacial-meltdown.html</p> <p>-OR- use the Royal Geographical Society’s resource on glacial environments, climate change and sea-level rise http://www.rgs.org/OurWork/Schools/Teaching+resources/Key+Stage+3+resources/Glacial+environments/Glacial+environments.htm</p> <p>- The activity should be used to introduce the Module’s main theme – ‘Indicators’ that climate change is already taking place. In this activity the groups of students should gain further understanding of the effects of global warming – however the teacher needs to emphasise the fact that glacial retreat is an ‘Indicator’ of the wider issue of climate change.</p> <p>- After the activity the teacher should introduce the rest of the Module and what it will entail. e.g. Students in teams will prepare a 5 to 10 minute presentation on one climate change indicator and the evidence to support that it</p>	<p>Science Geography Citizenship Literacy</p>	<p>Appreciation that we are responsible for changes happening in other parts of the world.</p> <p>Appreciation that everyone has a part to play in helping to lessen the impact of the climate change indicators.</p>	<p>Students can also undertake the UPD8 activity ‘Secrets from the ice’ to help them review the indicators of past climate change preserved in ice cores.</p> <p>http://www.upd8.org.uk/activity/97/Secrets-from-the-ice.html</p>



		<p>is already having an impact. They will also need to include creative and positive ways they people can plan for their impacts.</p> <p>- This team-led project can be flexible based on the resources available in schools. Ultimately, an exhibition will be set up and students will use a variety of means to demonstrate what they have found (Video, PowerPoint, PhotoStory, Posters, drama, models etc.)</p> <p>- Explain also that teams will be assessed by their peers. They will begin their team work and presentation planning in the next session.</p>			
--	--	--	--	--	--

(2) Presentation preparation

<p>To prepare a well-planned, 1 page brief to provide a framework for presentation completion and success.</p>	<p>Pens/pencils/paper Computers (optional)</p> <p>Module 3 Peer Assessment on Climate Change Indicators (downloadable)</p>	<p>- Assign students into 6 teams and give each a topic that they will need to research and present as part of a whole class exhibition event.</p> <p>- Topics may include the following climate change indicators: extreme weather events & changing weather, glacier/ice sheet & sea-ice retreat, coral reef extinction/conservation, peat bog conservation, sea level rise, phenological changes.</p> <p>- Ask teams to consider how they will tackle their project, including assigning a team leader and tasks for each team member. They will need to produce a 1 page project plan including:</p> <ul style="list-style-type: none"> - title (the 'catchier' the better, as they use in the media!) - research question: What are the key facts about [CLIMATE CHANGE INDICATOR] and how might we plan to cope with its impacts? - aims (what messages do students want to get across? e.g. 'To present key information about [CLIMATE CHANGE 	<p>Literacy L2L</p>	<p>Learning to work effectively together in small teams.</p> <p>Learning how to work cooperatively</p> <p>Learning to prepare a helpful framework/plan to achieve a goal.</p>	<p>Once plans are prepared, teams can 'buddy up' with another team and share their 1 page briefs – this may help bounce ideas off one another and help them consider alternative/additional ideas.</p>
--	--	--	-------------------------	---	--



		<p>INDICATOR] which provides evidence that climate change is already taking place.’ ‘To demonstrate that there may be creative and positive ways that we can plan for the impacts of [CLIMATE CHANGE INDICATOR”)</p> <ul style="list-style-type: none"> - Methodology (how will they research their project topic/who is responsible for each component? Remember that there are 2 overall components to the project – (1) to show evidence that their given topic supports that climate change is already happening; (2) to suggest solutions/action plans to help cope with these changes). - Results (how will they collate their findings?) - Outcome(s) (how will they interpret their findings? how can their interpretations and findings be presented in a stimulating exhibit?) <p>- Provide teams with their peer assessment criteria sheets so they understand how their projects will be examined. Students should be aiming to demonstrate the excellence of their research, their understanding of the project topic and their creativity in terms of both presentation style and solutions to impacts associated with their assigned indicator.</p>			
--	--	--	--	--	--

(3) Research and presentation assembling

To successfully put a presentation together about their assigned topic in an efficient, collaborative , creative and well-researched manner.	Internet Maps Modelling materials Library (other secondary sources) ICT Equipment – video cameras, laptops etc. Poster stationary and other	- Give teams ample time to conduct their research and to put their presentations together. 2 lessons for research and 2 lessons for preparation would be helpful. Or , have students work on their projects over the longer-term (with regular brief ‘catch-up’ meetings) especially in relation to the team tackling phenological indicators (see below).	Science Geography Citizenship Literacy Literacy L2L	Learning to enhance creativity skills. Learning to work effectively together in small teams. Learning how to work	Students can be as creative as they wish with the planning and final product of their work – ranging from posters to television programmes!
---	--	---	--	---	---



	<p>art materials Venue for exhibition</p> <p>Extreme Weather http://www.upd8.org.uk/activity.php?actid=334</p> <p>Flooding - Environment Agency http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx</p> <p>Glaciers http://www.pbs.org/wgbh/nova/earth/secrets-beneath-ice.html</p> <p>http://www.meltfactor.org/blog/?p=556&preview=true</p> <p>http://www.bbc.co.uk/news/world-europe-18896770</p> <p>http://www.bbc.co.uk/news/uk-wales-12950246</p> <p>http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=530&ArticleID=5760&l=en</p> <p>www.telegraph.co.uk/earth/earthpicturegalleries/5851014/Greenpeace-in-Greenland-The-Arctic-Sunrise-surveys-the-Petermann-glacier.html</p>	<p>- To give teams a head-start, provide them with the following ideas (though emphasise that these ideas are only SUGGESTIONS, and that they may take whatever tack they think appropriate to meet their project brief).</p> <p>e.g. extreme weather events & changing weather leading to increased frequency of flooding – students to research Ordnance Survey maps of where they live and identify possible sites at risk of flooding, i.e. river banks, storm drains/sewers etc. They might like to use locations where severe flooding has recently occurred, e.g. Somerset, Berkshire, Kent etc. Then make a 1-2 page plan (or even a poster) for the local community to protect against these events (as if they were the ‘Local Authority planners’ or ‘Environment Agency engineers’). Or design a simple model of the local environment and new flood protection works.</p> <p>e.g. glacier/ice sheet & sea-ice retreat – Revisit case study of Himalayan communities that heavily depend on meltwater from the glaciers to live. (Or investigate Alpine communities in Europe who are also having to cope with declining meltwater supplies from their glaciers). How could these communities cope with disappearing glaciers and lack of water resource? How do they need to plan for floods from the glacier meltwater lakes? What about the loss of Arctic sea-ice? How do we conserve marine mammals and indigenous Arctic human populations if sea-ice is disappearing?</p> <p>e.g. coral reef extinction/conservation – They are dying largely due to climate change and pollution, so how could communities living in the</p>		<p>cooperatively</p> <p>Learning to critically evaluate scientific sources of information.</p>	
--	---	--	--	--	--



	<p>http://extremeicesurvey.org/types-of-glaciers-and-how-they-behave/</p> <p>Sea-ice formation/retreat http://climate.nasa.gov/ClimateTimeMachine/ClimateTimeMachine.cfm</p> <p>http://www.teachersdomain.org/asset/ess05_int_ice_melt/</p> <p>http://nsidc.org/data/seaice_index/</p> <p>http://aquarius.umaine.edu/cgi/ed_act.htm?id=12</p> <p>http://www.realclimate.org/index.php/archives/2010/07/an-icy-retreat/</p> <p>http://planetearth.nerc.ac.uk/news/story.aspx?id=1203&cookieConsent=A</p> <p>Coral reefs http://smithsonianscience.org/2012/07/coral-reef-emergency-2600-scientists-call-for-worldwide-rescue/</p> <p>http://www.reefrelief.org/</p> <p>http://coralreefwatch.noaa.gov/satellite/education/tutorial/crw02_coralbleaching.php</p>	<p>vicinity of coral reefs and tourists alike help to better protect them? Students may design a 'new' kind of tourist brochure that promotes conservation project/eco-tourism.</p> <p>e.g. peat bog conservation – the UK has a LOT of peat bogs that, if they dry out due to climate change (or are increasingly disturbed for agricultural purposes), have the potential to release vast amounts of CO₂ which would exacerbate climate change impacts. There are some excellent and really beautiful parts of Northumberland and County Durham, just to name a couple of places, that showcase peat landscapes, so students could produce a brief for a field trip as a school, or one that they could take with their family/friends, to learn more about the landscape and its relationship with climate change, its ecological value, and how to help conserve them.</p> <p>e.g. sea level rise – students could research a case study of Bangladesh or a particular Pacific Island to show how local communities are affected by/trying to protect themselves from rising sea levels.</p> <p>e.g. phenological changes – Point students in the direction of Spring/Autumnwatch and encourage them to access previously collected data or even participate in recording phenological changes in their own backyards/school grounds. They could do this as a 'club' before or after school, or as a class during the school day. Have students consider ways of helping to protect wildlife that is 'indigenous' to the North East, such as making green spaces more attractive to wildlife, bird</p>			
--	---	--	--	--	--



	<p>http://www.scidev.net/en/news/climate-change-to-hit-health-in-poor-nations-hard.html</p> <p>Peatscapes Project (North Pennines) http://www.youtube.com/watch?v=pQCoNGNomSQ</p> <p>Peat bogs http://news.bbc.co.uk/2/hi/science/nature/6502239.stm</p> <p>http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1007241.aspx</p> <p>Sea level rise http://planetearth.nerc.ac.uk/news/story.aspx?id=1254&cookieConsent=A</p> <p>http://www.teachersdomain.org/asset/ipy07_int_icesimulate/</p> <p>http://flood.firetree.net/</p> <p>http://www.skepticalscience.com/sea-level-rise.htm</p> <p>http://climate.nasa.gov/climate_reel/NASA360JoshAndBill</p> <p>Phenological changes and implications</p>	<p>feeders etc. – this could then become an actual whole school project for them to take part in.</p>			
--	--	---	--	--	--



	http://www.naturescalendar.org.uk/ http://www.bbc.co.uk/news/uk-10925016 http://www.bbc.co.uk/springwatch/ http://www.bbc.co.uk/programmes/b0079t1p http://www.climatenewsnet.work.net/tag/natural-history-museum/				
(4) Exhibition & peer assessment					
<p>To conduct peer assessment and understand why peer review is an important process.</p> <p>To appreciate giving and receiving feedback.</p>	Peer Assessment on Climate Change Indicators	<ul style="list-style-type: none"> - Groups to make any final amendments to their presentation. - Allow time for each group to make their presentations to the class (this may run over into another lesson). - Class to use peer assessment form to assess each group's presentation (give them a few minutes after each presentation to make their assessment notes, especially if they need to refer back to if run over into another lesson). - Vote on best presentation and discuss as a class why they selected the group that was the winner – encourage class to discuss criticism positively. 	Literacy Art & Design ICT	Pupils will peer assess presentations to class and take a class vote.	The exhibition could be put together as part of a wider school event, either during school time or as a showcase event after school (inviting parents, governors, Local Authority staff, media etc.)

