

Module 6: 'Make the most of it!'
(Climate Change Adaptation)

KS3 - Scheme of Work

Overview – This Module can take many different directions. Use the activity 'What will your region be like 50 years into the future?' as a 'starter' to encourage a different way of thinking about climate change, and then continue to really get into the adaptation theme by referring to the KS2 Module 6 SoW (action-research adaptation projects to encourage your school as a 'hub' of positive climate change action in your local community). The KS2 SoW framework for the project can be used but at a higher level for KS3. (*This latter activity may be particularly helpful for Key Stage 4+ students*).

Most children will: understand what climate change adaptation means, and that it is important to find positive ways to adapt to the impacts of a changing climate at home, school and in their local communities.

Some children will not have made as much progress and will: understand what climate change adaptation means and identify some impacts of climate change relevant to their local area.

Some children will have progressed further and will also: have a solid understanding of the unique role they have on leading to prepare their local communities for the impacts of a changing climate, and they may begin to consider how adapting to climate change has wider social and economic benefits in their local area.

Learning Objectives	Cross Curricular	Key Resources:
<p>To understand the differences between climate change mitigation and climate change adaptation.</p> <p>To prepare a 'Travel Brochure' to promote your region of England in 50 years' time based on projected climate change impacts.</p> <p>To peer assess completed brochures.</p> <p>To use persuasive devices to influence other people.</p> <p>To research projected impacts of climate change and how they might affect the climate, agriculture, infrastructure and the local environment.</p>	<p>Literacy: Speaking and listening Reading, understanding texts Persuasive writing/argument</p> <p>Numeracy: Handling data/statistics</p>	<p>Internet access Digital Projector Peer assessment sheet</p> <p>*See also: (1) What_is_the_Adaptation_Challenge.ppt (2) What_is_climate_change_adaptation.ppt (3) Why_is_climate_change_adaptation_important.pdf (4) Adaptation_Challenge_projects</p> <p>ICT/internet use is encouraged in this Module – it may be helpful to book access in advance (or print relevant website pages and disseminate to students).</p> <p>Overall Outcome:</p> <p>To use a variety of activities and learning strategies to help young people understand what climate change adaptation means, why it is important, and what positive implications it has in their local communities.</p>
<p>To identify risks in the local area from the impacts of a changing climate.</p> <p>To be able to understand why we need to adapt to climate change in the future.</p> <p>To consider how the school can engage the local community to get involved in positive adaptation action.</p>	<p>Vocabulary:</p> <p>Words related to climate change: carbon dioxide (CO₂) greenhouse gases greenhouse effect global warming mitigation adaptation resilience adaptive capacity physical adaptation projections predictions modelling</p>	<p>Assessment:</p> <p>(1) Identify and research impacts of a changing climate relevant in your local area. (2) Influence new behaviour amongst your local area when thinking about helping others to respond to a changing climate (3) Peer assessment on Persuasive Presentation.</p> <p>Unit Extensions:</p> <p>(1) How can the local community get involved? Are there local businesses, community groups, council staff that you can liaise with, share ideas and resources, influence changes in behaviour when thinking about dealing with the impacts of climate change in your local area? (2) Invite travel agents into class to consider the viability of tourism in your region in future despite possible impacts of climate change.</p>



Learning Objectives	Key resources	Suggested Activities	Cross-curricular & other	Outcomes	Extension(s)
*INFORMATION FOR TEACHERS – WHAT IS CLIMATE CHANGE ADAPTATION?					
		Before launching any activities below, see: <i>What is the Adaptation Challenge.ppt</i> for your own understanding and information on climate change adaptation (available to download)			
(1) Climate change adaptation...so what is it?					
<p>To understand the differences between climate change mitigation and climate change adaptation.</p> <p>To apply this understanding in terminology to reflect actions that are either mitigation or adaptation.</p>	<p>what_is_climate_change_adaptation.ppt</p> <p>why_is_climate_change_adaptation_important.pdf</p> <p>Craft materials (paper, card, pens, pencils, scissors)</p>	<p>Review the definitions for:</p> <ul style="list-style-type: none"> Climate change mitigation: protecting the climate from us (e.g. reducing carbon footprints, becoming more energy efficient) Climate change adaptation: protecting us from climate (e.g. how can we cope with the impacts of a changing climate in positive ways?) <p>- Help pupils to understand why climate change adaptation is critical. That even with an instantaneous stop of ALL CO₂ emissions today (if that were possible!), we would have several decades worth of climate change impacts to live with, given the amount of extra greenhouse gases that humans have put into the atmosphere during the recent past.</p> <p>- Put students into small groups and ask them to identify a range of actions that fit the categories of mitigation and adaptation individually. Once they are happy with their ideas, they can put their actions onto cards, and then quiz other groups.</p>	<p>Science Geography Citizenship Literacy</p>	<p>Recognition of the differences between climate change mitigation and adaptation (and that some actions can be both - encourage debate).</p> <p>Using this understanding to identify a range of actions that are specific to mitigation and adaptation.</p> <p>Being able to communicate why climate change adaptation is important.</p>	<p>The quiz could be extended to assembly time when the whole school could get involved.</p> <p>Try 'Design a Species' activity from ARKive (11-14 years) http://www.arkive.org/education/teaching-resources-11-14</p>

(2a) 'What will this region be like 50 years into the future?' The brief					
<p>To explore projected changes to the local environment in the future due to the impacts of climate change.</p> <p>To understand the science behind these projected changes.</p> <p>To consider the travel and tourism industry and why changes may be important to their local environment.</p>	<p>Peer Assessment on Persuasive Presentation (downloadable from Lead Schools site)</p> <p>Range of newspapers surrounding particular climate change issues (http://www.bbc.co.uk/news/science_and_environment/ and http://www.thebigproject.co.uk/news/ are good places to start in general).</p> <p>Health impacts Health Protection Agency – www.hpa.org.uk (search site by climate change)</p> <p>http://www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Health-impacts-of-climate-change/Public-health-benefits-of-reducing-emissions/index.htm</p> <p>http://www.scidev.net/en/news/climate-change-to-hit-health-in-poor-nations-hard.html</p> <p>Tourism and Climate Change News article from The Independent: http://www.independent.co.uk/environment/mass-tourism-and-climate-change-could-</p>	<p>- Pose the questions: 'What do you think this region will look and feel like in 50 years' time due to climate change? Will it be hotter, colder, wetter, drier, more windy? Will climate change make it a different place to live and visit?'</p> <p>- Collate class views and use as comparison once the brief has been delivered.</p> <p>- Present the brief to the class:</p> <ul style="list-style-type: none"> ✓ Imagine that you work for travel companies and want to promote their region as 'THE place to be' for holidays in the year 2060. ✓ In groups of 4, produce a 4-page Travel Brochure for your region of England for 50 years into the future using Photoshop (or Power Point). ✓ Each group member is responsible for researching and producing at least one of topic areas for the travel brochure (see topics listed below). ✓ Two lessons will be allocated to research and preparation of your brochure. ✓ Your brochure must be completed and ready to pass around to the other groups for assessment and then added to the classroom display 30 minutes before the end of the third lesson. ✓ Teams will be assessed using Peer Assessment on Success Criteria (circulate this resource to students). ✓ At the end of the challenge, the class will refer back to their original thoughts about what their region might look and 	<p>Science Geography Citizenship Literacy Maths ICT</p>	<p>Learning to enhance persuasion and creativity skills.</p> <p>Learning to work effectively together in small teams.</p> <p>Learning how to delegate authority to others.</p> <p>Learning to critically evaluate scientific facts and issues.</p>	<p>Students can think about travel destinations that are currently popular and explore why these locations might be come unpopular later in the 21st Century due to climate change.</p> <p>How will changes to these locations elsewhere in the world compare with changes in your region?</p>

	<p>lead-to-destruction-of-worlds-wonders-417052.html</p> <p>Construction Eco-Building Design – http://www.ecoarc.co.uk/case-study2_Findhorn.html http://www.sustainablebuild.co.uk/</p> <p>“Zero carbon” house design news story http://news.bbc.co.uk/2/hi/business/6735715.stm</p> <p>Possible climate change impacts and adaptations necessary in Great Britain http://ukclimateprojections.metoffice.gov.uk/21709</p> <p>How the Environment Agency is working in England and Wales on climate change adaptation: http://www.environment-agency.gov.uk/research/planning/108355.aspx</p>	<p>feel like in 50 years’ time – compare initial thoughts with researched brochures.</p> <p>- To produce this brochure, students will need to research what the climate in their region might be like in 50 years’ time. Their brochure should address topic areas such as:</p> <ul style="list-style-type: none"> ✓ Have parts of their region benefited from the impacts of a changing climate? ✓ Pictures of holiday homes that have been adapted to meet the needs of a changing climate. ✓ Facilities which should be found in hotels to meet the needs of a changing climate. ✓ Information on care/guidance needed for sun-bathing. ✓ Information on injections needed to travel to England? (tropical diseases). ✓ Information on insects and how to avoid bites/stings. ✓ Local area information about employment, education and agriculture (how these areas have changed as a result of climate change). <p>- Permit students to assemble in their groups in the time remaining to delegate tasks and start brainstorming ideas. (See Module6 student challenge sheet.doc)</p>			
(2b) ‘What will your region be like 50 years into the future?’ Research rules!					
To create a persuasive presentation.	Google images are a great place to look for photos to use in students’ brochures.	- Refresh memories regarding topic areas that each brochure should address (from list in above in previous activity).	Science Geography Citizenship Literacy Maths	Learning to enhance persuasion and creativity skills.	
To research and	Explore CBCs news website:	- Additionally, review the skill of creative		Learning to work	

<p>create a realistic and interesting travel brochure.</p>	<p>http://news.bbc.co.uk/cbbcnews/hi/specials/climate_change/default.stm</p> <p>North East England Climate Change Adaptation Study – download PDF www.climatenortheast.com</p> <p>The Climate Change Action Plan for North East England: http://www.climatenortheast.com/contentControl/documentControl/The%20Climate%20Change%20Action%20Plan%20for%20North%20East%20England.pdf</p>	<p>thinking in terms of ‘Specific Observable Behaviours (SOBs)’ which entails:</p> <ul style="list-style-type: none"> ✓ Each brochure must aim to persuade its audience to book a holiday with their company. ✓ Each brochure must include some pictures/diagrams to engage your audience. ✓ Each brochure must be at an appropriate level for your target audience. ✓ Each brochure gives good quality information (it is easy to read, interesting and informative). ✓ Each brochure has visual impact. 	<p>ICT</p>	<p>effectively together in small teams.</p> <p>Learning how to delegate authority to others.</p> <p>Learning to critically evaluate scientific facts and issues.</p> <p>Using imagination to consider how their local community might change in their lifetimes due to global warming.</p>	
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(2c) What will my region be like in 50 years’ time?

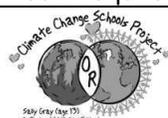
<p>To conduct peer assessment and understand why this is an important process.</p> <p>To appreciate giving and receiving feedback.</p>	<p>Peer Assessment on Persuasive Presentation (downloadable from Lead Schools site)</p>	<ul style="list-style-type: none"> - Students to make any final amendments to brochures and print (i.e. like going through a ‘proof’ process). - 30 minutes prior to end of class, students to swap brochures amongst different groups and conduct peer assessment. - Last 10 minutes of the class, students to add all brochures to one large classroom display. - At the end of the challenge, ask the class to refer back to their original thoughts about what their region might look and feel like in 50 years’ time – compare initial thoughts with researched brochures - Vote on best travel brochures – who is going to book their holiday now? 	<p>Literacy Art & Design ICT</p>	<p>Pupils will peer assess persuasive presentations to class and take a class vote.</p>	<p>Photocopy brochures for children to take home and market their new holiday destination to family and friends.</p>
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(3) Action-research on climate change adaptation

<p>To identify risks in the local area from the impacts of a changing climate.</p>	<p>See:</p> <p>Key Stage 2 Module 6 SoW</p>	<p>For teacher: See KS2 Module 6 SoW especially for activity ‘What am I preparing for?’ (and associated downloadable resources) – uses UK Climate Projections ’09</p>	<p>Science Geography Citizenship Maths</p>	<p>Students will be able to understand local issues related to the impacts of a</p>	<p>How can the local community get involved in these pupil-led projects?</p>
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<p>To be able to understand why we need to adapt to climate change in the future.</p> <p>To consider how the school can engage the local community to get involved in positive adaptation action.</p>	<p>'Key Resources' in KS3 Module 6 overview page + 'WISWAC' film (all from the Lead Schools site)</p> <p>UK Climate Impacts Programme http://www.ukcip.org.uk/</p> <p>http://ukclimateprojections.metoffice.gov.uk/21709 (use the menu on the left of the screen to navigate between key findings, maps and graphs)</p>	<p><i>(UKCP09) to underpin activities, and this is especially relevant to Secondary school pupil abilities, as can be taken even farther than what is suggested at primary.</i></p> <p>Overall: (1) What are the impacts that your local area faces from a changing climate (e.g. flooding, heatwaves, extreme weather, wind, coastal erosion etc.)? (2) and how can we cope with these impacts in positive ways (e.g. raise awareness of the risks from these impacts, inspire behavioural changes to help people respond to the risks, put in place physical measures, such as sun shades for south facing classrooms, create outdoor classrooms, design flood kits etc.)?</p> <p>STARTER: Class 'thought shower' possible topics that might be considered when thinking about the impacts of a changing climate in their local area: (1) How might behaviours at school change if hotter/wetter? (2) How might we prepare the school for extreme weather? Shade? Air flow? Outdoor classrooms? Flood kits? (3) How might travel to and around school change? (4) What might be the effect on food production/consumption? (Do we need to change our habits and eat /grow food that copes better in a more extreme climate?) (4) How might energy use/sources of energy in buildings have to change? (e.g. if hotter, is there a better way to increase natural ventilation? Is there enough natural light to reduce the amount required from electricity?)</p>	<p>Literacy Art & Design ICT</p>	<p>changing climate.</p> <p>Students may influence changes in behaviour within school and across the wider community when addressing the impacts of a changing climate.</p> <p>Students will become empowered by taking action now to ensure they and their local community is resilient to the risks faced from a changing climate.</p>	<p>Contact local businesses, community groups, council staff that you can liaise with, and share ideas and resources.</p>
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(5) How might we help biodiversity help to cope with a changing climate?

- For More Able students: ask students to visit UK Climate Projections site to review:
(1) key findings (explanatory statements)
(2) maps
(3) and graphs
showing projected climate impacts in England to 2080. This information can be used to really examine closely how climate in the region may change due to climate change. It should also help the MA students to identify key potential risks in their own local areas from a changing climate (and provide a more scientific basis for their adaptation projects).

***Note 1:** These projections are based on computer modelling of the climate by the Met Office. Computer modelling recreates our physical understanding of the world using complicated mathematics and statistics – these models are first run to see if they can recreate climate from the past (known from observed meteorological data over a long-period), and if the model succeeds in doing so, then they are run forwards in time to create a **projection** of possible climates for a given area (e.g. the UK).

***Note 2:** **projection** is a more appropriate term when speaking of climate modelling, as it means a ‘range of possibilities’. **Prediction** is often used which is a less appropriate term, as it implies that the model will produce a scenario that is either ‘right or wrong.’ As we do not yet know how CO₂ emissions will change over time (i.e. ‘**low**’ = drastic reductions in the amount of CO₂ emissions;



'medium' = some cut in CO₂ emissions; 'high' = business as usual, or lack of cuts in CO₂ emissions), models will never be able to be predictors. **Rather, projections imply a whole range of possibilities.**

KEY VOCABULARY:

Review the definitions for:

- **Adaptive capacity:** raising awareness and understanding of how to cope with the impacts of a changing climate (e.g. communications, flood kits, flooding action plans etc.)
- **Physical adaptation:** implementing physical measures to help infrastructure cope with a changing climate (e.g. sun canopies, sustainable urban drainage systems, planting trees to absorb more water/provide shade to hot buildings etc.)

MAIN ACTIVITY:

- Use the framework for the action-research project outlined in the KS2 Module 6 SoW to help your students take part in an adaptation project.

This can be undertaken at a higher level for KS3:

- (1) how do projects help to raise the adaptive capacity of the local community?
- (2) what physical adaptation measures can be taken within and around the school to help cope with the impacts of a changing climate?
- (3) can students share their expertise and understanding from the outcomes of the project to help inform the wider community? (i.e. if the school monitors south facing



		<p>classrooms once a sun canopy is installed and finds this helps to reduce temperatures on hot days, can they advise other organisations that may suffer from the same impacts and impart their good practice?)</p>			
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FOLLOW UP:

Ask pupils to think about changes (adaptations) they would like to see in their region in the future i.e. identifying opportunities that climate change will present. Students could work in groups/as a class to make models/posters of what they hope their school/village/city will look like in the future. Display this model/poster in a prominent place to inspire others with your positive vision.