

Module 1: 'Climate Change nuts & bolts' (Climate Change Science)

Upper KS2 - Scheme of Work

Overview: Children will examine and investigate in greater detail the key scientific concepts and principles involved in climate change science in order to help them better understand the associated issues.

Most children will: understand the difference between the greenhouse effect, global warming and the ozone layer; understand that Earth is warming up and that this is related to climate change; and that although climate change has happened before, it has not previously been linked to human activity

Some children will not have made so much progress and will: understand that our climate is changing and that this is linked to human activity; that changes in the ozone layer do not cause global warming and climate change.

Some children will have progressed further and will also: explain the processes involved in key climate change science principles; be able to write about, make recommendations for, and discuss how we can all make changes to improve upon the climate change challenge.

Learning Objectives	Cross Curricular & Other	Key Resources:
<p>To consider how different parts of the world have different climates, and why living things have to adapt to where they live.</p> <p>To consider how climate change may move the location of different climates around the world.</p> <p>To understand that climate change has happened before.</p> <p>To appreciate timescales throughout Earth's history.</p> <p>To understand the details and importance of Earth's greenhouse effect, and the different types of gases involved.</p> <p>To understand the differences between Earth's natural and enhanced greenhouse effect, and linkages to current global warming and climate change.</p>	<p>Literacy- points of view, persuasive writing, action plans.</p> <p>Numeracy- data collection, weighing, presentation</p> <p>ICT- research, 'podcasts'</p> <p>Science - fair testing, light and radiation/reflection.</p> <p>Geography- rivers and coasts; island living</p>	<p>World map/atlas Computer/internet (NOTE: if internet usage for students unavailable, print relevant pages from sites and disseminate to children instead) Art materials Clothes, scraps of fabric etc. Television/projector Paper maché materials Small inflatable pool Play sand Small paint brushes Sticky labels and coloured pens/pencils Post-it notes Large orange(s) Lamp(s) Glass bowl/container Music/instruments Recording device</p> <p>Overall Outcome: Children will be able to understand the key scientific principles responsible for climate change and be able to confidently talk about their processes and implications.</p>
<p>To separate out the differences between the ozone layer and the greenhouse effect.</p> <p>To understand that changes in the ozone layer do not cause climate change.</p> <p>To appreciate how the science of climate change all links together.</p> <p>To understand that climate change is a global problem but that we can work locally and across countries to confront the challenges.</p>	<p>Vocabulary: Climate change and Global warming Climatic zones Mitigation and Adaptation Ozone and ozone layer Troposphere and Stratosphere CFCs and UV radiation Depletion Greenhouse gases Extinction Fossils Reflection/radiation/absorption Sea Ice retreat Evacuation Flood plain Drainage Coastal erosion</p>	<p>Assessment: Do all children understand what is meant by climate change, global warming, the greenhouse effect and ozone layer?</p> <p>Unit Extension: See specific extension activity 6 below.</p>



Learning Objectives	I can statements	Suggested Activities	Extension	Outcomes	Resources and web links
(1) Climates of the world 'fashion show'					
<p>To understand the difference between weather and climate.</p> <p>To consider how different parts of the world have different climates, and why living things have to adapt to where they live.</p> <p>To consider how climate change may move the location of different climates around the world.</p>	<p>I can explain what weather is and tell you the difference between weather and climate.</p> <p>I can explain the different climate zones on Earth, and living things are adapted to where they live.</p> <p>I can explain how the UK's climate is different to other parts of the world.</p>	<ul style="list-style-type: none"> - Class discussion/re-cap about the differences and linkages between weather and climate. Try using the Pod 'Degrees of Change' activity (KS2) http://www.jointhepod.org/ but you will need to register on the site first before you can access materials. - Teacher to introduce the idea of different parts of the world having different types of climate using a blown up world map, e.g. polar, tundra, temperate, tropical, desert and oceanic - Spilt class into 6 different groups and assign each one of the different climates mentioned above. - In these groups, children can research using the internet and other secondary sources to find out more about these particular parts of the world. (Teacher to ensure that each member of the group contributes). - Groups then to design: (1) a particular symbol to represent their designated climate and make these large enough to stick onto the blown up world map; (2) a costume for their particular climate which displays characteristics about the climate, landscape, plants and animals etc. - Ask groups to brainstorm what the word 'adaptation' means and how it links to the work they are doing on this activity (e.g. why is it important for living things). - Ask groups to explain how the costumes they've produced help PEOPLE to adapt to the climates in which they live. - Class may then have a fashion show! 	<p>Children to explore on the world map how these different climatic zones might move about due to climate change.</p>	<p>Understanding of the differences between weather and climate.</p> <p>Understanding the linkages between weather and climate.</p> <p>Appreciating the diversity of life on Earth in different climatic zones.</p>	<p>World map or atlas Computer/internet Secondary sources Art materials Clothes, scraps of fabric etc.</p>

(2) Fossil finds!*

<p>To understand that climate change has happened before.</p> <p>To appreciate timescales throughout Earth's history.</p>	<p>I can tell you about Earth's climate history.</p> <p>I can relate fossils from extinct species to climates from the past.</p> <p>I can understand that Earth's climate is always changing.</p>	<ul style="list-style-type: none">- Allow children to watch some/all of the film 'Ice Age' (may need to purchase a copy of the DVD, or alternatively, ask if any of the children own a copy that the class could borrow...undoubtedly someone will have a copy!)- Ask the class if there is evidence for climate change happening before? Something very special, that we find hidden in the ground, can tell us about the history of Earth's climate changes...FOSSILS! Discussion about what fossils are/how they are formed/where we might find them...- Place children in pairs and allow them to research about fossils using the internet and other secondary sources.- Children to create 'real' fossils using paper maché and paint (can use rock-paint for added effects!) They can create dinosaur, Ice Age etc. fossils of all different sizes!- Before subsequent class, bring in a small inflatable pool (or other container) and fill with play sand. Collect the children's fossils and hide them in the sand.- Allow children to become 'archaeologists' and uncover the fossils using small paintbrushes to help uncover. (NOTE: use selected children as class monitors to help ensure order when others excavating). Discuss their finds and explore what Earth's climate was like at the time when these fossils were 'alive.' <p><i>*adapted from workshop activity at Our Dynamic Earth, Edinburgh</i></p>	<p>Children can create stickers of their fossils and place onto a blown-up timeline to help them better understand timescales and climate change.</p>	<p>Understanding that Earth's climate is always changing.</p> <p>Using fossils as a record of Earth's past climates.</p>	<p>'Ice Age' DVD Television/projector Internet/computers Secondary sources Paper maché and other art materials Small inflatable pool (or other container) Play sand Small paint brushes Sticky labels and coloured pens/pencils</p>
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(3) What is causing the ice caps to melt?

<p>To investigate the relationship between sunlight, reflection and absorption.</p> <p>To link these effects to sea ice melting in the Arctic.</p>	<p>I can tell you the difference between reflection and absorption of light.</p> <p>I can tell you why the Arctic sea ice is melting so rapidly.</p>	<ul style="list-style-type: none"> - Ask children if they can explain what happens when light shines on a dark coloured surface and on a light coloured surface. (reflection & absorption). - Demonstrate the difference in temperature by asking a child to put a black sock on one hand and a white sock on the other and then place both hands under a lamp for 5-10 minutes. What do they notice? - Explain that ice reflects a lot of light and heat because it is white, but currently because the Arctic sea ice is melting so rapidly in our warmer longer summers, there is a greater amount of dark coloured sea surrounding the remaining ice. - Children must then hypothesise what impact they think this will have on the remaining sea ice. - They will investigate this by weighing 2 ice cubes separately and noting their weight. Each ice cube will be placed on different sides of a tray (one half white, the other half black) for 5 minutes with a lamp shining onto them. Point out similarities to lamp as sun and ice cubes as sea ice. - After 5 minutes weigh the ice cubes again being careful not to mix them up. Write up results. Children to conclude which ice cube melted most quickly. - Link this conclusion to loss of Arctic sea ice (Print if necessary). Show children image and initiate discussion: http://news.bbc.co.uk/cbbcnews/hi/animals/newsid_2644000/2644845.stm 	<p>If they could invent anything they wanted, what invention would they make to stop sea ice retreating? Ask children to sketch their inventions.</p>	<p>Children will be able to appreciate the different processes between reflection and absorption of light on a surface.</p> <p>Children will begin to understand why prolonged summer sea ice retreat has a compound effect on overall melting rates.</p>	<p>Computer & internet (for teacher), projector and whiteboard</p> <p>Black socks and white socks Lamps Ice cubes Trays with one half painted white and the other half painted black Electronic scales</p>
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