

Topic: GCSE 2.1: Climate Change - What Evidence is there to Suggest Climate Change is a Natural Process? Evidence		Composite: Unit test	
Key vocabulary:	Core knowledge Components	Powerful knowledge components crucial to commit to long term memory	Links to previous and future topics
Geological time periods, quaternary, ice age, glacial, interglacial, temperature, evidence, reliability, ice cores, glacial retreat, global temperature increase, sea ice cover, severity, seasons.	<ol style="list-style-type: none"> 1. The Earth is 4.5 billion years old – its history has been divided up into different time periods. We are presently in the Quaternary ice age period (started 2.6 million years ago). Although this period is considered to be an Ice Age, temperatures have fluctuated (increased and decreased). During temperature fluctuations, the colder periods are called glacial and these usually last around 100,000 years whilst the warmer periods in between are called interglacial and these usually last around 10,000 years. We are currently living in an interglacial period that began around 11,700 years ago. There has been a significant rise in temperature since 1880 – this is also the period where humans may have had the biggest effect on the temperature. 2. There are many forms of evidence in terms of detailing how our climate has changed over time, some are more reliable than others. For example: - Scientists often use ice cores to detect changes in temperatures. When snow falls it traps air into the ice. When scientists take a sample of ice it reveals the atmospheric gas concentrations at the time the snow fell. These provide evidence of temperature differences going back 400,000 years. Scientists that study the ice cores say there is clear evidence that there has been a rapid increase in temperature in the past decades. Glacier retreat - Over the past 50 to 100 years, satellite images show that the world's on-land glaciers have been melting, which has caused them to retreat. This is a sign of increases in global temperatures; Sea ice positions Arctic sea ice cover has got 13.3% smaller every 10 years. Changing seasons - In recent years- spring arrives earlier and winters tend to be less severe. Temperature data - On-going temperature recordings across the World have been taken since 1880 using thermometer. 3. On the other hand less reliable data includes diary entries and paintings as they are based on opinion and not scientific evidence. 4. Quantitative data (numbers) are provided by measuring and recording, qualitative data is based upon personal experience/opinion. Quantitative data is more reliable/credible. The most reliable data is provided by ice cores as it goes back 400,000 years. 	<ul style="list-style-type: none"> *Earth 4.5 billion years old. * Earths history can be broken down into different geological time periods – we are currently in the Quaternary ice age period that started 2.6 billion years ago. * Over time the temperature fluctuates. * These changes usually happen for around 100,000 years and the colder periods are called ice ages and the warmer periods interglacial. * Evidence for climate change varies in terms of reliability. *Scientific data tends to be more reliable than non-scientific sources. Data where ice core data has been analysed is more reliable than information from paintings. 	<ul style="list-style-type: none"> *Unit 1 – Global hazards: Increasing temperature. *Unit 3 – Distinctive Landscapes – Landscapes shaped by glaciers in the UK. *Unit 4 - Ecosystems – Polar Environments. *Unit 7 – UK in the 21st Century: Physical Geography of the UK

Topic: GCSE 2.1: Climate Change - What Evidence is there to Suggest Climate Change is a Natural Process? Argument

Composite: Unit test

Key vocabulary:	Core knowledge Components	Powerful knowledge components crucial to commit to long term memory	Links to previous and future topics
<p>Natural, man-made, Milankovitch Cycle, sun spots, volcanic eruption, greenhouse gases, methane, carbon dioxide, nitrous oxide, natural greenhouse effect, enhanced greenhouse effect, emissions</p>	<p>1. Natural causes - Humans were not around for many of the periods of climate change, in which case climate change must be at least partly natural.</p> <p>Milankovitch Cycles - Climate change can be linked to how the Earth moves around (orbits) the sun. The three key ideas are eccentricity - the shape of the orbit changes from circular to oval so the Earth is closer/further away from the sun; obliquity (tilt) when Earth is tilted towards the sun it is warmer; tilted away from the sun it is cooler (think seasons!) and finally precession (wobble) as the Earth spins, it wobbles, which affects the severity of the temperature during seasons.</p> <p>Sun Spots - Temporary dark spots on the sun's surface increase the amount of energy Earth receives from the sun and increases Earth's temperature.</p> <p>Volcanic Eruptions - During a volcanic eruption dust, ash and carbon dioxide are released into the atmosphere. The dust blocks sunlight and results in cooler temperatures</p> <p>2. Earth is naturally kept warm by a layer of greenhouse gases (e.g. methane, carbon dioxide and nitrous oxide) which trap the sun's energy and reflect it back to Earth. Without this 'blanket' of gases, the average temperature would be -18, compared with the +15 it is (Natural Greenhouse Effect)</p> <p>3. Some human activities* cause/emit greenhouse gases, which add to the natural blanket. This means more heat from the sun is trapped and results in an increase in temperatures. This is called the enhanced greenhouse effect.</p> <p>*Transport: road and air transport;</p> <p>*Agriculture: deforestation (tree removal) to make way for farms; use of chemical pesticides and fertilisers</p> <p>*Dumping of waste at landfill sites (decomposing waste produces methane)</p> <p>*Changing lifestyles: as people have more £ to spend, they buy technology/gadgets that run off electricity</p>	<p>*Some of the natural causes are :-</p> <p>* Milankovitch Cycle – the way the Earth moves around the Sun.</p> <p>*Sun spots - dark spots on the Sun mean the Earth receives more energy from it.</p> <p>* Volcanic eruptions – Dust/ash etc can block the amount of sun getting to the Earth so can reduce temperatures.</p> <p>*Natural greenhouse effect – this is the layer of greenhouse gases (CO2, methane and nitrous oxide) that blanket the earth. These mean that the Earth is warmer.</p> <p>* Enhanced greenhouse effect -some gases that humans emit add to this blanket meaning the temperature is warmer.</p> <p>* There are many human activities that contribute to this including transport and agriculture.</p>	<p>*Unit 1 – Global hazards: Increasing temperature.</p> <p>*Unit 3 – Distinctive Landscapes – Landscapes shaped by glaciers in the UK.</p> <p>*Unit 4 - Ecosystems – Polar Environments.</p> <p>*Unit 7 – UK in the 21st Century: Physical Geography of the UK</p>

Topic: GCSE 2.1: Climate Change - What Evidence is there to Suggest Climate Change is a Natural Process? Consequences		Composite: Unit test	
Key vocabulary:	Core knowledge Components	Powerful knowledge components crucial to commit to long term memory	Links to previous and future topics
Retreating glacier, sea level rise, tropical crops, yields, energy consumption, global warming, droughts, floods, demand, energy,	<p>1 – There are many different forms of impact as a result of climate change these can be broken down into positive and negative impacts and SEE impacts.</p> <ul style="list-style-type: none"> • retreating glaciers (ENV) • sea level rise will affect 80 million people (SOC) Climate Change Refugees from Tuvalu a country which is expected to disappear under the sea by 2050. 10,000 citizen migrating to New Zealand. • species in affected areas (eg Arctic) may become extinct (ENV) <p>There are also some positive impacts of a warmer climate around the world:</p> <ul style="list-style-type: none"> • energy consumption may decrease due to a warmer climate (ENV & ECON) • longer growing season for agriculture (ENV) • frozen regions such as Canada may be able to grow crops (ENV) <p>2 - Global warming can have negative impacts on the UK:</p> <ul style="list-style-type: none"> • sea levels could rise, covering low lying areas, in particular east England (ENV) • Scottish ski resorts may have to close due to lack of snow (ECON) • droughts and floods become more likely as extreme weather increases (SOC, ENV, ECON) UK Drought 2012. • increased demand for water in hotter summers puts pressure on water supplies (ENV) <p>Positive impacts from a warmer UK climate.</p> <ul style="list-style-type: none"> • crops such as oranges, grapes and peaches can be grown in the UK (ENV) • winter heating costs will be reduced as winters will be milder (ECON) • accidents on the roads in winter will be less likely to occur (SOC) 	<p>* Many different forms of impact as a result of climate change some positive and some negative. Examples of positive impacts: *Reduced energy costs *Longer growing season for crops *New tourism destinations Examples of negative impacts: *Changing ecosystems *Tuvalu, may disappear under the sea.</p> <p>* The UK will also have a range of impacts again some positive and some negative: - Positive impacts *Different crops could be grown in the UK. *Warmer summers.</p> <p>Negative impacts *East of England threatened as a result of rising seas. *Possible closure of some Scottish ski resorts. *More droughts and floods.</p>	<p>*Unit 1 – Global hazards: Increasing temperature. *Unit 3 – Distinctive Landscapes – Landscapes shaped by glaciers in the UK. *Unit 4 - Ecosystems – Polar Environments. *Unit 7 – UK in the 21st Century: Physical Geography of the UK</p>

Topic: GCSE 1.1 – How can the Weather be Hazardous? (A)

Duration: 7 weeks

Key vocabulary:	Core knowledge Components	Powerful knowledge components crucial to commit to long term memory	Links to previous and future topics
<p>Global Circulation System, Hadley, Ferrel & Polar cells, equator, latitude, temperature, precipitation, climate, high pressure, low pressure, atmosphere, storm, tropical storm, El Nino and La Nina.</p>	<p>1- The Global Circulation System (GCS) is the movement of air across the planet. High pressure atmospheric conditions are largely responsible for milder temperatures, less precipitation and calmer winds whilst low pressure conditions are responsible for colder, wetter and windier weather.</p> <p>2 Air circulates the Earth in three cells. Hadley - At the equator, the ground is intensely heated by the sun. This causes the air to rise which creates a low-pressure zone on the Earth's surface. The air continues to rise up to the upper atmosphere, and the following then happens: The air separates and starts to move both north and south towards the poles. When it reaches about 30° north and south, the air cools and sinks towards the ground.</p> <p>The Ferrel cell occurs at higher latitudes (between 30 degrees and 60 degrees N and 30 degrees and 60 degrees S): Air on the surface is pulled towards the poles, forming the warm south-westerly winds in the northern hemisphere and north-westerly winds in the southern hemisphere. At around 60 degrees N and 60 degrees S, they meet cold air, which has drifted from the poles. The warmer air from the tropics is lighter than the dense, cold polar air and so it rises as the two air masses meet. Much of our wet and windy weather in the UK is determined by this. At the poles, air is cooled and sinks towards the ground forming high pressure, this known as the Polar high. It then flows towards the lower latitudes. At about 60 degrees N and S, the cold polar air mixes with warmer tropical air and rises upwards, creating a zone of low pressure called the subpolar low.</p> <p>3 - Extreme weather is when a weather event is significantly different from the average or usual weather pattern.</p> <p>4 - Tropical storms form between approximately 5° and 15° latitude. The air above the warm oceans that are at least 60m deep is heated. Once the ocean water reaches at least 27°C, the warm air rises quickly, causing an area of very low pressure.</p> <p>5 - El Niño and La Niña are complex weather patterns resulting from variations in ocean temperatures in the east-central equatorial Pacific Ocean, between 120° west and 180° (the International Date Line). El Niño and La Niña episodes usually occur approximately every two to seven years.</p>	<p>*Global Circulation System (GCS) refers to the way that air moves around the planet as a result of the heat at the equator.</p> <p>*There are three main cells (air movement patterns)</p> <p>Hadley – warm around the equator due to intensity of the sun and then around 30 degrees north/south it gets wetter. The Ferrel is between 30 and 60 degrees north and south can cause some warmer winds and some unstable weather conditions. Polar – at around 60 degrees north and south are colder conditions and very unstable.</p> <p>*UK is around 10 degrees C colder than Australia on average.</p> <p>*Extreme heat in UK is around 30 degrees C whilst around 40 degrees C in Australia.</p> <p>*Key ingredients for a tropical storm to form are ocean depths 60metres deep, 27 degrees warm and low pressure. They occur between 5 degrees and 15 degrees north and south of the equator.</p> <p>*Tropical storms have different names in different parts of the world -hurricanes in the Atlantic Ocean, typhoons in the Pacific and cyclones in the Indian Ocean. Droughts can occur anywhere but the most severe are in central Africa, the Middle East, Australia, South America (east) and parts of North America.</p> <p>*El Nino and La Nina are complex weather patterns.</p>	<p>Unit 6: DD LIDC responses limited by development; LIDCs health care system less advanced; more PPD; aid - bi and multi-lateral</p> <p>Unit 2: Climate Change - will affect distribution, frequency and magnitude of future climatic hazards and extreme weather</p> <p>Unit 3: Distinctive Landscapes - steep sided valleys</p> <p>Unit 7: UK in 21st century weather</p>

Topic: GCSE 1.1 – How can the Weather be Hazardous? (B)

Case Studies

Duration: 7 weeks

Key vocabulary:

Core knowledge Components

Powerful knowledge

Links to previous and future topics

weather conditions, causes, affects, impacts, consequences, responses, aid, Coriolis effect, social, environmental, economic, income, drought, evaporation, hosepipe ban

1 – **Case Study 1: Typhoon Haiyan (Non-UK Based Case Study)** was a tropical cyclone that affected the Philippines in South East Asia in November 2013. **Causes** – warm oceans above 27 degrees C, deep ocean water – 60 metres deep, the Coriolis effect - It was one of the strongest tropical cyclones ever recorded with winds of 313 km/h. In some areas, 281.9 mm of rainfall was recorded, much of which fell in under 12 hours. Waves of up to 7 m in height battered the coast. The Philippines is a fairly poor part of the world with minimal investment in prediction, planning and protection schemes. Some of the impacts are:
Consequences - The overall economic impact of Typhoon Haiyan is estimated at \$5.8 billion (£3.83 billion). Six million workers lost their sources of income. Major rice, corn and sugar-producing areas for the Philippines were destroyed affecting the country's international trade and farmers' incomes. Tacloban's city airport was severely damaged, affecting business and tourism. More than 7,000 people were killed. 1.9 million people were left homeless and more than 6,000,000 displaced. There were outbreaks of disease due to the lack of sanitation, food, water, shelter, and medication Widespread floods damaged and, in many cases, destroyed homes and businesses in coastal areas. The Philippine government estimated that about 71,000 hectares of farmland was affected The **responses** were as follows: - It broadcast warnings two days before Typhoon Haiyan hit, leading to the evacuation of approximately 750,000 residents. The UK government provided food, shelter, clean water, medicine and other supplies for up to 800,000 victims. The United Nations launched an international aid appeal in December 2013 for £480 million to finance the humanitarian relief effort for 2014. Rescue effort made more challenging as a result of the Philippines being a collection of islands.

2 – **Case study 2: The UK suffered from a drought in 2012. (Non-UK Based Case Study)**
The causes: -Less rain – the area affected by the drought only received between 55% and 95% of normal rainfall between 2010 and 2012. Warmer temperatures – the weather was warmer than usual and as a result more water evaporated. Dry soils- this meant that it was challenging for the rain to soak into the ground. High water usage – Around 1.7 billion litres of water are used each day by the UK. Water is also wasted through leaking pipes. The **consequences** -Problems with farming – harvesting became an issue. Fire – areas of moorland caught fire in parts of Surrey, South Wales and Scottish Borders. Restrictions in homes – hosepipe bans affected 20 million people. The **responses:** - Permits offered to allow water companies to extract water from rivers. Hosepipe bans Education – attempts to reduce water consumption.

*Non UK Case study: Typhoon Haiyan, Phillipines, Asia Nov 2013- extreme high winds and storms. Causes – warmer water 27 degrees C and above deep water (60 metres deep). Consequences – large waves, loss of money, loss of jobs, businesses including tourism affected. 7,000 people lost their lives Responses – some warnings, evacuation, different countries provided aid and NGOS emergency supplies.
 *UK Case Study: Drought UK causes – reduced rainfall, warmer temperatures, dry soil, high water usage, leaking pipes. Consequences – fire, problems with crops, hosepipe bans. Responses – permits, education to reduce water consumption.

Unit 6: DD LIDC responses limited by development; LIDCs health care system less advanced; more PPD; aid - bi and multi-lateral
 Unit 2: Climate Change - will affect distribution, frequency and magnitude of future climatic hazards and extreme weather
 Unit 3: Distinctive Landscapes - steep sided valleys
 Unit 7: UK in 21st century weather