The de Ferrers Trust

GEOGRAPHY – GCSE – THE CHALLENGE OF NATURAL HAZARDS (CLIMATE CHANGE)

A EVIDENCE FOR CLIMATE CHANGE

1	**Keywords**	
	Quaternary period	The last 2.6 million years
	Thermal expansion	Water particles expand when ocean temperatures increase
	Ice cores	Samples of ice gained by drilling through the ice cover.
	Glacial period	Cooler period lasting 100 000 years
	Interglacial period	Warmer periods lasting 10 000 years
2	**Evidence**	
	Ocean sediments	Remains of organisms found in ocean sediments can be traced back 5 million years
	Tree rings	A tree grows one new ring each year. Rings are thicker in warm, wet conditions. This gives us reliable evidence for the last 10 000 years
	Rising sea levels	Sea levels have risen by 19cm on average since 1900
	Ice cores	Show changes in CO_2, methane and oxygen over the past 400 000 years
	Shrinking glaciers and melting ice	Glaciers across the world are shrinking. Expected that some areas may disappear completely by 2035.

B HUMAN CAUSES OF CLIMATE CHANGE

1	**Keywords**	
	Insolation	The amount of solar radiation (sunlight) an area receives
	Greenhouse effect	The gases in the atmosphere which trap outgoing radiation and keep the Earth at a temperature at which humans can live.
	Enhanced greenhouse effect	The increase in the effects of global warning due to human activities
2	**Human Causes**	
	Fossil fuels	Release CO_2 into the air and make up 60% of greenhouse gases
	Agriculture	Methane makes up 20% of greenhouse gases due to cows etc.
	Deforestation	Increases CO_2 in the ability as photosynthesis is reduced

C NATURAL CAUSES OF CLIMATE CHANGE

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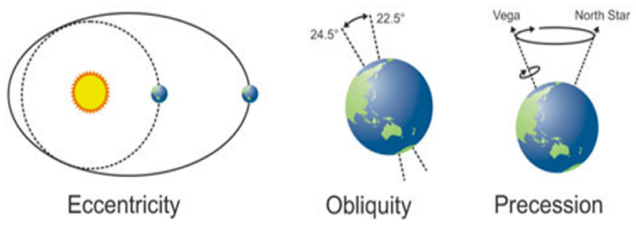

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	Orbital changes	
	Eccentricity	• Changes in the pathway of the Earth around the sun • It changes from circular to elliptical • Each cycle from circular to elliptical and back to circular takes 100 000 years • This pathway links to the alternating glacial and interglacial periods.
	Tilt	• The Earth is tilted at 23.5° • It can tilt between 21.5° and 24.5° over a period of 40 0000 years • When the earth is more upright it receives more energy from the sun and it is warmer
	Precession	The natural 'wobble' of the Earth A complete wobble takes 26 000 years
3	Solar output	• Sunspots (dark patches on the sun) increase from a minimum to a maximum and then back to a minimum over 11 years • When sunspots are at a maximum, the sun gives off more heat
4	Volcanic activity	• Volcanic ash can block out the sum which reduces temperatures (short-term) • The gases and ash mix with the air and turn it into sulphuric acid. These particles act like mirrors to reflect the heat from the sun. (Long term)
5	According to the cycles the Earth should be in a period of cooling. This is why some models say humans are having a 120% effect on climatic temperatures.	

D MANAGING CLIMATE CHANGE - ADAPTATION

1	Adaptation	Strategies responding or adjusting to climate change
2	Strategy	
	Alternative energy production	Renewable sources will last longer but they can be expensive and are less reliable than fossil fuels
	Planting trees	• Removes carbon dioxide • Has the potential to increase carbon storage by 28%. • However land may be limited and biodiversity is still threatened unless a wide range of trees are planted
	Carbon capture	• Takes CO_2 from the emission sources, turns it into a liquid and stores it underground. • It can reduce capture of up to 90% of carbon dioxide. • However, it is very expensive and unclear if the captured carbon would escape in the long term. • It discourages development of renewable energy resources
	International agreements	• Targets will only be met if they are legally binding (Paris 2015). • Financial support is needed for LICs. • However, poorer countries argue that they need to industrialise and getting richer countries to accept their responsibility is difficult

E MANAGING CLIMATE CHANGE - ADAPTATION

1	Mitigation	Reduces or prevents the greenhouse gases which cause climate change and protect carbon sinks, such as forests and oceans.
	Carbon sink	A forest, ocean, or other natural environment viewed in terms of its ability to absorb carbon dioxide from the atmosphere.
2	Strategy	
	Agriculture (Lower latitudes)	• South Africa's maize crop could fall by 30% by 2030 • Educate farmers on how to save water • Use drought resistant crops • Plant 'shade' trees to protect seeds
	Agriculture (Middle latitudes)	• Warmer climates could see an increase in wheat. • UK could grow olives • New patterns for sowing seeds • Change crop and sowing dates
	Managing water supply	• 16 000 glaciers retreating in the Himalayas • Artificial glaciers are being built
	Rising sea levels	• Maldives submerged by 2070 • Restore mangroves • 3m sea wall built around the capital Male • Buildings built on stilts • Population relocated to India or Sri Lanka