

YEAR 10 GEOGRAPHY – CYCLE 2 – CLIMATE CHANGE

BOX 1: KEYWORDS	
climate change	long-term change in climate patterns e.g. temperature and precipitation
Quaternary period	period of geological time from 2.6 million years ago to the present day
mitigation	reducing the causes of climate change (which also reduces the effects)
adaptation	reducing the effects of climate change (without reducing the causes)
glacial	a period of time with cooler global temperatures e.g. an ice age
interglacial	a period of time with warmer global temperatures
ice core	ice tube drilled out of ground → gases from ancient atmosphere frozen into ice → can measure carbon dioxide and methane levels from past
fossil fuels	coal, oil and gas → formed in the past from the fossils of living organisms
greenhouse gases	<ul style="list-style-type: none"> methane → released from cattle (from digestive system of cow) carbon dioxide → from burning fossil fuels e.g. to create electricity

BOX 2: THE GREENHOUSE EFFECT	
greenhouse effect	incoming solar radiation → some outgoing radiation reflected back to space → some outgoing radiation absorbed by greenhouse gases → warms planet → maintains temperature for life to survive ☺
enhanced greenhouse effect	incoming solar radiation → less outgoing radiation reflected back to space → as more is absorbed by more greenhouse gases → warms planet more → temperature rises → negative effects ☹

BOX 3: EVIDENCE FOR CLIMATE CHANGE	
past	<ol style="list-style-type: none"> ice cores → show there have been glacial and interglacial periods in the past (show temperatures have increased and decreased) ocean fossils → give evidence about ancient ocean temperatures (show temperatures have increased and decreased over time) art → from 1684 shows ice skating on River Thames (artwork and diaries show temperatures have changed throughout history)
present	<ul style="list-style-type: none"> Earth's average temperature has increased 1° C over last 100 years sea levels have risen by 19 cm since 1900 ocean temperatures are the warmest they have been since 1850 glaciers and ice sheets are melting since 2002 → 134 billion tonnes of ice lost from Antarctica per year

BOX 4: NATURAL FACTORS THAT CAUSE CLIMATE CHANGE	
1. volcanic activity	volcanic ash and sulphur dioxide can reflect sunlight → reduces temperatures → Mount Tambora eruption (1815) caused average global temperatures to fall by 0.4° C to 0.7° C → 'The year without a summer'
2. orbital changes	orbit of the Earth changes → called Milankovitch cycles → 3 orbital cycles change the Earth's climate and seasons over thousands of years : <ol style="list-style-type: none"> eccentricity → orbit becomes more elliptical in 100,000 year cycles axial tilt → Earth's axis angle changes in 41,000 year cycles precession → the Earth wobbles on its axis in 26,000 year cycles

3. solar output (sunspots)	<ul style="list-style-type: none"> more dark spots on sun → emitting more energy → Earth warmer fewer dark spots on sun → emitting less energy → Earth cooler sunspot cycle → sunspots increase and decrease every 11 years
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BOX 5: HUMAN FACTORS THAT CAUSE CLIMATE CHANGE	
fossil fuels	<ul style="list-style-type: none"> burning fossil fuels releases carbon dioxide → temperatures rise over 50% of greenhouse gas emissions are from burning fossil fuels
agriculture	<ul style="list-style-type: none"> rice farming releases methane → temperatures rise cattle farming releases methane → temperatures rise 20% of greenhouse gas emissions are from agriculture
deforestation	<ul style="list-style-type: none"> trees cut down → fewer trees to absorb carbon dioxide during photosynthesis → more carbon dioxide stays in atmosphere → enhanced greenhouse effect → temperatures rise trees burnt → to clear area of land → the carbon dioxide stored inside tree is released into atmosphere → temperatures rise

BOX 6: EFFECTS OF CLIMATE CHANGE	
predicted effects	<ul style="list-style-type: none"> ocean acidification → coral reef bleaching → biodiversity loss warmer → more wildfires → deaths and destruction more intense tropical storms → infrastructure damage increased ice melt → sea level rise → coastal erosion → homes lost droughts → lower crop yields → less food → famine unreliable rainfall → desertification → mass migration warmer → wider distribution of tropical diseases e.g. malaria

BOX 7: CLIMATE CHANGE MITIGATION	
alternative energy	use renewable energy e.g. solar → less greenhouse gases in atmosphere
carbon capture	stores carbon dioxide in rocks → less greenhouse gases in atmosphere
planting trees	trees to absorb carbon dioxide → less greenhouse gases in atmosphere
international agreements	Paris Agreement 2015 → international agreement to stop global temperature increase rising above 2° C

BOX 8: CLIMATE CHANGE ADAPTATION	
changing/adapting agricultural systems	as the climate changes → difficult to grow crops → may need to grow crops differently (new locations, different seasons, more irrigation) → e.g. in Peru project to grow potatoes at higher altitudes where it is cooler
managing water supply	<ol style="list-style-type: none"> reduce demand → e.g. shorter showers, rainwater to flush toilets increase supply → new reservoirs, desalination, water transfers
reducing risk from rising sea levels	may need to build more coastal defenses to protect from flooding e.g. Thames Barrier protects London from coastal flooding