Your notes

GCSE Geography: revision notes

Climate change

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Evidence

- The **Quaternary period** is the last 2.6 million years. It has had cold glacial periods and warmer interglacial periods, and we are in an interglacial now.
- Evidence of past climate: **ice cores** (air bubbles trapped in ice show past temperatures and carbon dioxide levels, going back about 800,000 years), tree rings (thicker rings grow in warm, wet years), and historical records such as paintings, diaries and harvest dates.
- Evidence of recent warming: temperature records since the 1850s show the world has warmed by more than 1 °C since the late 1800s. Sea levels are rising, and glaciers and Arctic sea ice are shrinking.

Natural causes

- Orbital changes (**Milankovitch cycles**): the shape of the Earth's orbit, its tilt and its wobble change slowly, changing how much energy reaches the Earth. They match the glacial and interglacial cycles.
- Solar output: the Sun's energy varies slightly. The Maunder Minimum (1645–1715), when there were very few sunspots, matches the coldest part of the Little Ice Age.
- Volcanic eruptions: ash and sulphur dioxide block sunlight, cooling the Earth for a year or two, as after Mount Pinatubo erupted in 1991.

Human causes: the enhanced greenhouse effect

- Greenhouse gases, such as carbon dioxide and methane, trap heat in the atmosphere. Humans have added more, strengthening the natural **greenhouse effect**.

- Burning **fossil fuels** (coal, oil and gas) for electricity, transport and industry releases carbon dioxide. Farming releases methane from cattle and rice paddies. Deforestation removes trees that absorb carbon dioxide, and burning them releases more.

Effects

- On the environment: rising sea levels (warming water expands and land ice melts), shrinking glaciers and ice sheets, coral bleaching, changing habitats and more extreme weather.
- On people: coastal flooding in low-lying places such as Bangladesh and the Maldives, water shortages and droughts, lower crop yields in some places, deaths from heatwaves, and people forced to move. There are some benefits, such as longer growing seasons in cooler places.

Managing climate change

- **Mitigation** reduces the causes: renewable energy, **carbon capture** and storage, planting trees, and international agreements. The Paris Agreement (2015) aims to keep warming well below 2 °C, and to try to limit it to 1.5 °C.
- **Adaptation** copes with the effects: drought-resistant crops, storing and saving water, flood defences, raising buildings and managing coastal retreat.

The carbon cycle and Quaternary evidence (Eduqas)

- Eduqas Component 2, Theme 5. In the **Quaternary period** (the last 2.6 million years) the climate has swung between cold glacial and warmer inter-glacial periods.
- Evidence includes tree rings, historical records, temperature records and, above all, **ice cores**, whose trapped air shows past CO_2 levels.
- Carbon is stored in the atmosphere, oceans, plants, soils, and **fossil fuels** and rocks. It flows between them by photosynthesis, respiration, decomposition, combustion and the oceans absorbing CO_2.
- Humans add carbon to the atmosphere by burning **fossil fuels** and cutting down forests, strengthening the **greenhouse effect**.
- Natural causes include big volcanic eruptions, whose ash and gases block sunlight and cool the planet for a year or two.

Key terms

Quaternary period	The last 2.6 million years of the Earth's history.
Ice core	A cylinder of ice drilled from an ice sheet, containing evidence of past climates.
Greenhouse effect	The natural trapping of heat by gases in the atmosphere, which keeps the Earth warm.

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Enhanced greenhouse effect	Extra warming caused by the greenhouse gases added by humans.
Fossil fuel	A fuel formed from ancient plants and animals, such as coal, oil or gas.
Milankovitch cycles	Slow changes in the Earth's orbit, tilt and wobble that affect the climate.
Mitigation	Reducing the causes of climate change.
Adaptation	Changing the way people live to cope with the effects of climate change.
Carbon capture	Collecting carbon dioxide from power stations and storing it underground.
Carbon store	A place where carbon is held, such as the atmosphere, oceans, forests or fossil fuels. (Eduqas)

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is the Quaternary period?
2. What do ice cores show about the past?
3. What do thicker tree rings suggest?
4. Which of these is a natural cause of climate change?
5. How can a large volcanic eruption affect the climate?
6. Which gas is released when fossil fuels are burnt?
7. How does farming contribute to climate change?
8. What is the enhanced greenhouse effect?

Answers

1. The last 2.6 million years of the Earth's history
2. Past temperatures and carbon dioxide levels
3. Warm, wet years with more growth
4. Changes in the Earth's orbit
5. Ash and gases block sunlight, cooling the Earth for a year or two
6. Carbon dioxide
7. Cattle and rice paddies release methane
8. Extra heat trapped because humans have added greenhouse gases

What to do next

Practise 13 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.