

ice ages



Did England used to look like this?

Ice Ages are periods of Earth's past when conditions were much colder than today. Areas like Scotland were covered with deep ice and sea-levels everywhere were lower. This was because less water flowed into the sea from rivers once snow and ice began to build up on the land.

Major past changes have taken place in the average temperature of the Earth's atmosphere. 100 million years ago at the time of the dinosaurs, conditions were much hotter than today.

There have also been many cold phases called ice ages. Some scientists believe that the coldest chapter of Planet Earth's took place 700 million years ago. They describe it as the "Snowball earth" era.

Our last major cold period, the **Pleistocene**, started 1.8 million years ago and ended just 10,000 years before the present day. Since then, conditions have been warmer. This most recent 10,000 years is called the **Holocene**. The Pleistocene and the Holocene are part of the Quaternary Period of Earth history.

Natural causes of climate change

The earth's atmosphere is sometimes affected by naturally occurring changes that can result in climate becoming colder or warmer. Some changes take place over a short time-scale and can explain decades or particular years of warming or cooling. Other changes are far more significant and can last for thousands, or even millions of years.

Below is a table that shows four suggestions about why natural changes occur and temperatures get colder. Before you read any further, take a guess as to which four are probably / possibly true and try to spot the one which is definitely false.

Suggested explanation	Possibly true or definitely false?
The Earth's orbit around the sun changes shape so that the sun is further away from us	
Too much carbon dioxide is added to the air which causes temperatures to get colder	
Some of the Earth's mountains grow too high, because of plate tectonic movement!	
The sun gets too spotty, with dark spots appearing on its surface	
Too many major volcanoes explode, producing massive amounts of smoke and ash	

Did you work out the one that is definitely false? If not, read on and then go back and try again.

Different scientists have offered various explanations as to why the Earth has sometimes got colder.

Orbit changes

Changes in how the Earth moves around the sun are believed to cause Ice Ages. According to Milankovitch (a Serbian physicist), every 100,000 years or so the Earth's orbit changes from a circular to egg-shaped pattern. This changes how much sunlight we receive.

Solar output

The sun's output is not constant. Cycles have been detected that reduce or increase the amount of solar energy. The most well-known phenomenon is sun spot activity, when uneven temperatures develop on the sun's surface. These can be seen as tiny black spots on photographs of the sun taken by experts (never try this yourself). Sunspots seem to come and go following an irregular cycle that lasts about 11 years.

Volcanic activity

Major volcanic eruptions lead to a brief period of global cooling, due to ash and dust particles being ejected high into the atmosphere, blanketing the earth. The most recent explosion to have a similar effect was Pinatubo (1991). Sunlight reaching earth was reduced by 10%. World temperatures fell by nearly half a degree in the following year.

The uplift of the Tibetan Plateau (home of the Himalayan glaciers)

The earth's continents move and occasionally collide with one another (this is called plate tectonics). When India collided with Asia, land was forced up to form the Himalayas. A complex series of events followed that changed the earth's climate and may have caused cooling.

Activity

How much of Britain was covered with ice during the last Ice Age? For homework, research this on the internet and then draw your own line on the map below showing the **maximum extent** of the ice.



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