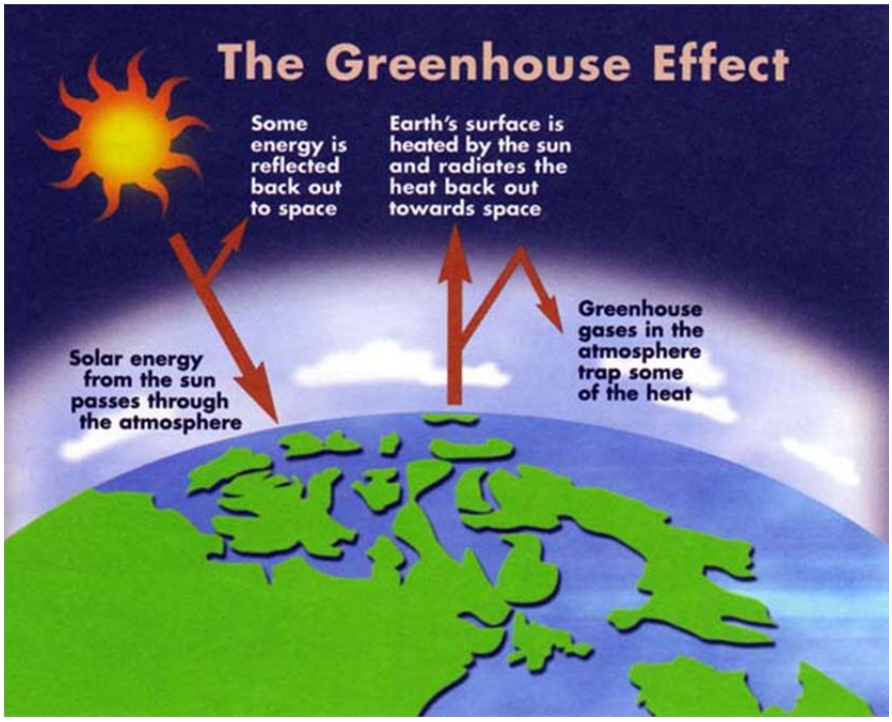
Climate change, what is it all about?

What do we mean by Climate Change?

What causes Climate Change?

The Greenhouse effect

The Earth atmosphere acts like a transparent, protective covering around the earth, letting in sunlight and retaining heat.



Source: Government of Canada Climate Change website

Did you know that…

Without our atmosphere the earth would be around **30 degrees Celsius colder**, in fact the world would be a frozen planet where all the suns heat is rebounded off the earth surface into outer space.

Why do we use the expression ‘greenhouse effect’?

What makes our atmosphere?

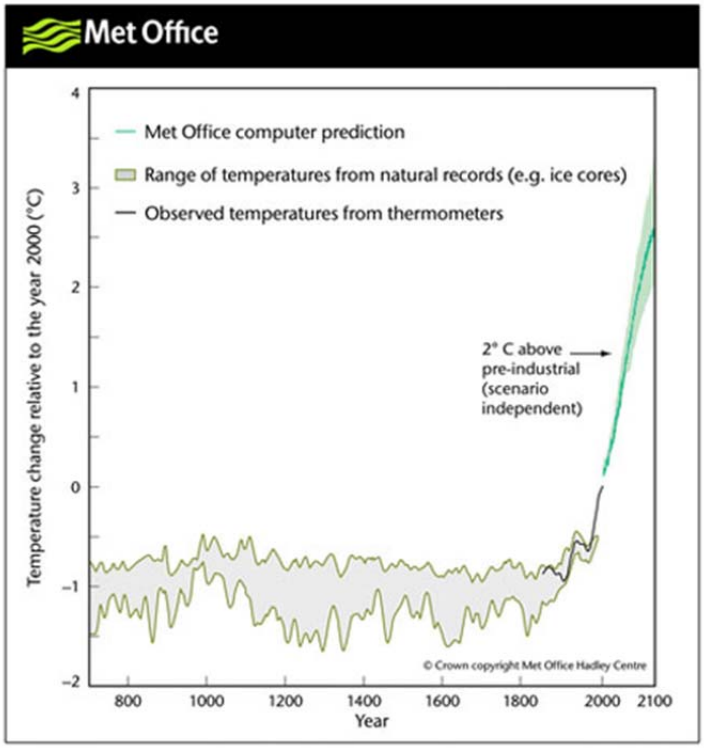
Why is there a problem?

What is Global warming?

Carbon dioxide and other gases warm the surface of the planet naturally by trapping solar heat in the atmosphere. This is a good thing because it keeps our planet habitable. However, **by burning fossil fuels** such as coal, gas and oil **and clearing forests we have dramatically increased the amount of carbon dioxide and other greenhouse gasses in the Earth's atmosphere and temperatures are rising.**

Did you know that…

Since the industrial revolution began in 1750, **CO_2 levels have risen by more than 30% and methane levels have risen more than 140%.** The concentration of CO_2 in the atmosphere is now higher than at any time in at least 800,000 years.



The principle greenhouse gas generated by human activities is carbon dioxide (CO_2). **Across the European Union 82% of greenhouse gas emissions is carbon dioxide**.

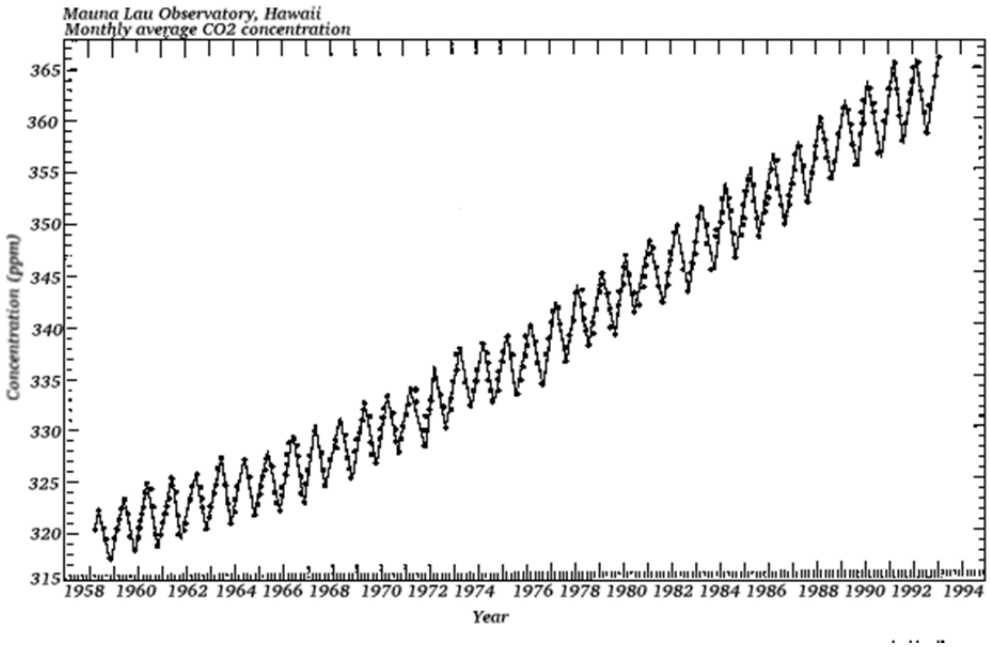
What percentage of greenhouse gases are the following sectors in the EU creating?

Sector	Percentage (total should equal 100)
Power sector	%
Transport	%
Industry	%
Households and small businesses	%
Agriculture	%
Other	%
Total Percentage	100 %

Why are forests so important?

When we breath, we take in oxygen and breathe out carbon dioxide (CO_2). In reverse, trees and plants absorb carbon dioxide and produce oxygen. This is why the world forests are so important, as **they help to soak up some of the excess CO_2** that we produce.

This graph shows the rapid increase in CO_2 in the atmosphere.



Why do you think the CO_2 goes up and down each year?

Yet deforestation –logging, clearing and burning of forests- **is taking place at an increasing rate.**

How quickly are our tropical forests disappearing each year?		
1 million hectares	5 million hectares	10 million hectares

When forests are cut or burned they release CO_2 into the atmosphere, it's estimated that that **deforestation causes around 20% of global emissions of greenhouse gases**, so stopping this process is very important.

Other 'greenhouse' gases released by human activities are **methane and nitrous oxide**.

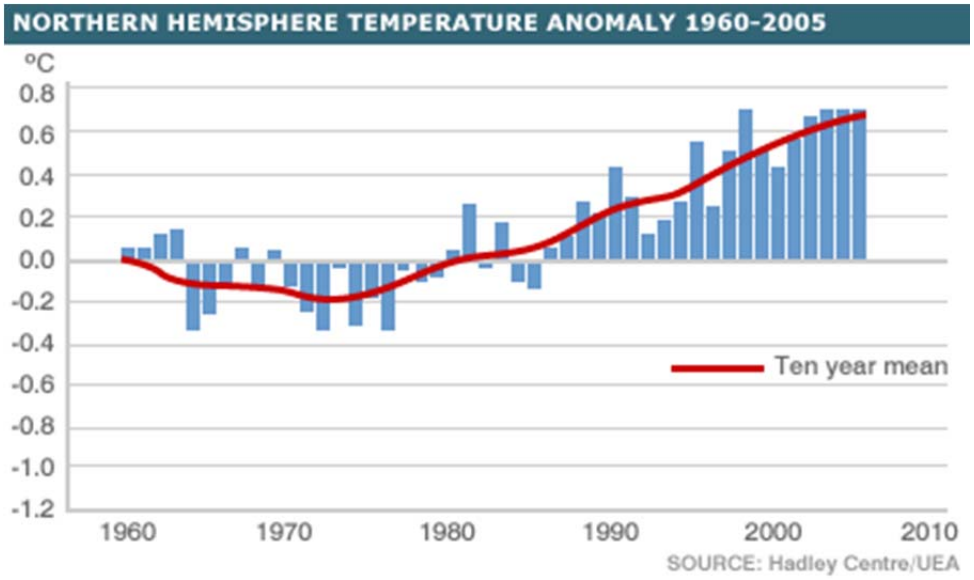
These gases are created by?		
Landfill sites	Cattle breeding	Rice cultivation

We also artificially manufacture some greenhouse gases (**fluorinate gases**).

These fluorinate gases are created by?		
Refrigeration	Air conditioning	Raining shoes

Is the climate changing?

Since 1850 average global temperatures have increased by 0.76 degrees Celsius. The average temperature **in Europe has gone up by almost 1 degree with the fastest rises being recorded in the last 30 years.**



Did you know that…

- **14 of the 15 hottest years on record have occurred since 2000.**
- **The first half of 2015 has already been recorded as the hottest ever,** and the elevated temperatures will continue in the last six months of the year.
- Earth has broken **monthly heat records 25 times since the year 2000** but hasn't broken a **monthly cold record since 1916**.
- Climate change is **raising the odds of summer heatwaves in Europe by a factor of 10**. Over the past 10 to 15 years, the likelihood of a 'very hot' summer **has risen -from once every 50 years to once every five years.**

- As the frequency of heatwaves increases, so do **risks to human health**. Improving resilience to high temperatures is critical to avoiding deaths caused by extended periods of hot weather, the authors say.

- During this century scientist predict that global temperature could rise by **between 1.8 degrees to 4 degrees** and in the worst case scenario to 6.4 degrees.

Small Change – Big Effect

Increases of 2 or 3 degrees does not sound a lot until we remember the last ice age which finished 11,500 years ago and the polar ice covered most of Europe.

During the last ice age, how much lower was the global temperature than today?		
5 degrees Celsius	10 degrees Celsius	15 degrees Celsius

Climate Change and its effects

Did you know that…

- The area of Arctic ice on the North Pole has shrunk **by 10%** in recent decades and the thickness of ice above the water **decreased by 40%.**

- Since 1850 the glaciers in the Alps have lost **two thirds** of their volume.

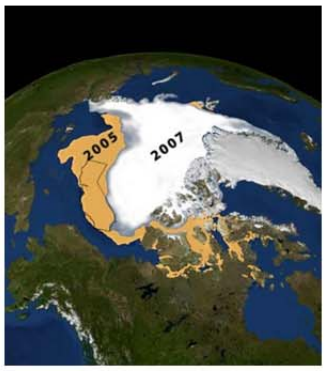
- As ice caps melt, then sea levels are rising **twice as fast** as they were 50 years ago. In 2003 the sea was rising by 31 cm per century and this could double over the next 100 years.

- Greenlands ice sheets are melting losing **100 billion** tonnes of ice a year.

- The Arctic Ocean could be **ice free** in summer by 2050.

Images of Change

On the left is a photograph of Muir Glacier taken on August 13, 1941, by glaciologist William O. Field; on the right, a photograph taken from the same vantage on August 31, 2004, by geologist Bruce F. Molnia of the United States Geological Survey (USGS).



Arctic Ice retreating in the North Pole and Greenland

Glacier in Patagonia, Argentina 1928. Glacier in Patagonia, Argentina 2004.

76 years of climate change. Then, and now.

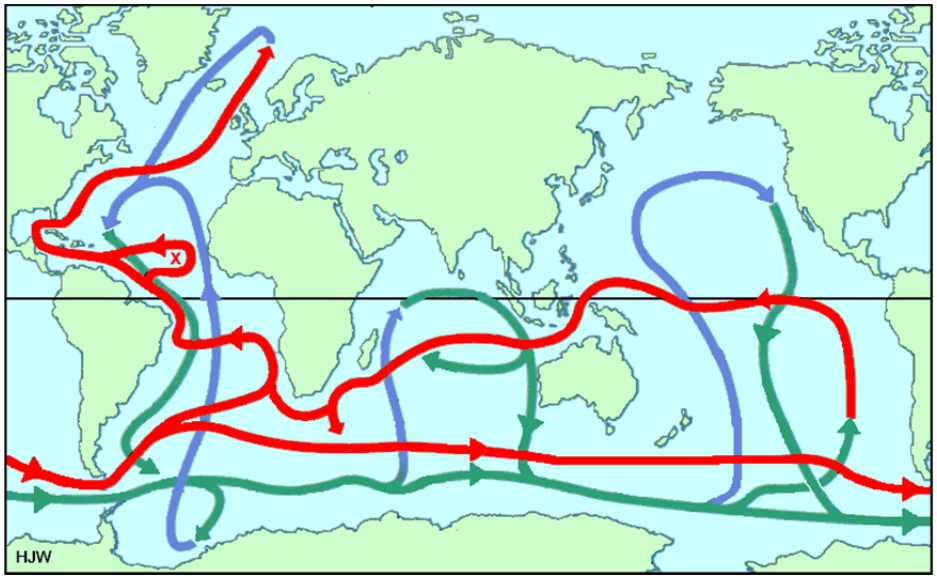
Climate Change Quiz

Question	Ring the appropriate answer
Managers of the Andermat ski resort cover the Gurschen glacier in summer with an insulating plastic sheet to stop the ice from melting	True / False
What increase in global sea level would be need to flood the Maldives, Nile Delta (Egypt) and Bangladesh?	31cm / 65 cm / 88 cm / 120 cm / 180 cm
By 2080 how many more Europeans could be at risk of than at risk today?	250,000 / 500,000 / 1 million / 1.6 m
If Greenlands ice sheet melted completely, how much could our sea level rise?	1 metre / 3 metres / 5 metres / 7 metres
14 of the 15 hottest years on record have occurred since 2000. How many people died in Europe as a result of the 2003 heat wave?	100 people 1,000 people 10,000 people 35,000 people 50,000 people
Which year in history has been the worst for climate related natural disasters?	1855, 1935, 1995, 2005, 2009
Compared with the 1980's 'climate related', disasters in Europe have increased between 1998 and 2007 by?	15%, 25%, 35%, 45%, 55%, 65%
Water is already scarce in the world. Currently, around one fifth (1.2 billion people) of the world population does not have access to clean drinking water. A 1.7 degree Celsius rise in temperature will add how many additional people suffering from water scarcity.	500,000 / 1m / 1.7m / 2.4m / 3.1m

North Atlantic Conveyor

What keeps us warm?

Melting Arctic ice could profoundly change the planets entire climate pattern, as well as our own climate in Britain.



RED

is warm water

Green

is moderate water

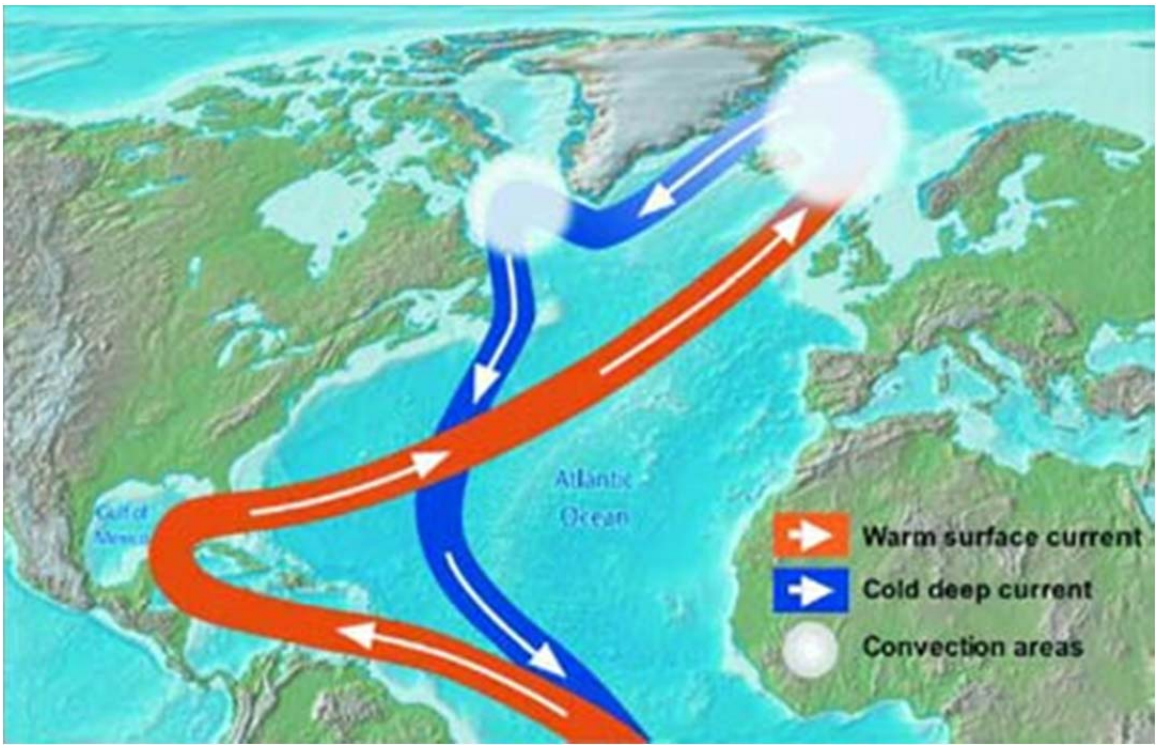
Blue

Is cold water

Heat is distributed from the Equator to the poles by climate, like a massive engine. The redistribution of heat drives the wind and the ocean currents in a pattern that has remained unchanged for the last 10,000 years (since the last ice age).

An increase in temperature at the Equator of one or two degrees centigrade means an increase of 12 percent at the poles.

The currents of the ocean area like a giant conveyer belt. Key to our climate in the UK is the **Gulf Stream or North Atlantic drift**, which brings warm water from the Caribbean to our shores.



If large quantities of ice melt the salt in, the sea will increase and this could disrupt the North Atlantic Conveyor. **If the conveyor switches off then Europe could descend into a new ice age.**

Also remember that the Polar ice reflects the sun rays, but melt water in open sea absorbs most of the heat. So **as the water warms so more ice melts.**