

**Worksheet 1: Taking notes**

What is climate change?

To understand climate change, it's important to recognise the difference between weather and climate. Weather is the temperature, precipitation (rain, hail, sleet and snow) and wind, which change hour by hour and day by day. Climate is the average weather and the nature of its variations that we experience over time.

The greenhouse effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun (ultraviolet and visible light) and stopping it being transmitted back out into space (infrared radiation or heat). This makes the Earth warm enough for life.

For several thousands of years the atmosphere has been delicately balanced, with levels of greenhouse gases relatively stable. Human influence has now upset that balance and, as a result, we are seeing climate change.

***Look at the notes two people took about the article. Which do you think are better and why? Example 1 or example 2? Discuss with your partner.***

**Example 1**

To understand climate change, it's important to recognise the difference between weather and climate

The greenhouse effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun

For several thousands of years the atmosphere has been delicately balanced, with levels of greenhouse gases relatively stable.

**Example 2**

- weather/climate different – short term vs. long term
- Greenhouse effect – natural process, keeps earth warm enough!
- people upsetting balance – climate change

**Worksheet 2:** Cut out the following boxes and distribute one for each student.

How are we causing climate change?

Human activities, like travelling by car, eating hamburgers or heating water in the home have led to an increase in greenhouse gases in the atmosphere, causing an enhanced greenhouse effect and extra warming.

As a result, over the past century there has been an underlying increase in average temperatures which is continuing. Globally, the ten hottest years on record have all been since 1997.

What will happen if we don't reduce emissions?

If emissions continue to grow at present rates, CO<sub>2</sub> concentration in the atmosphere is likely to reach twice pre-industrial levels by around 2050. Unless we limit emissions, global temperature could rise as much as 7 °C above pre-industrial temperature by the end of the century and push many of the world's great ecosystems (such as coral reefs and rainforests) to irreversible decline.

Even if global temperatures rise by only 2 °C, 20–30% of species could face extinction. We can expect to see serious effects on our environment, food and water supplies, and health.

But isn't the climate always changing?

Yes. There is natural variability in Earth's climate but the current climate change is very unusual as it is not exclusively part of a natural cycle.

Natural factors include volcanic eruptions, aerosols and phenomena such as El Niño and La Niña (which cause warming and cooling of the Pacific Ocean surface). Natural climate variations can lead to periods with little or no warming, both globally and regionally, and other periods with very rapid warming. However, there is an underlying trend of warming that is almost certainly caused by man's activities.

Do climate scientists really agree about climate change?

Yes. The overwhelming majority of climate scientists agree on the fundamentals of climate change — that climate change is happening and has recently been caused by increased greenhouse gases from human activities.

The core climate science from the Intergovernmental Panel on Climate Change (IPCC) was written by 152 scientists from more than 30 countries and reviewed by more than 600 experts. It concluded that most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in man-made greenhouse gas concentrations.

Are you sure there's a link between temperature rise and CO<sub>2</sub>?

Yes. Temperature and CO<sub>2</sub> are linked. Studies of polar-ice layers show that in the past, rises in temperature have been followed by an increase in CO<sub>2</sub>. Now, it is a rise in CO<sub>2</sub> that is causing the temperature to rise.

Concentrations of CO<sub>2</sub> have increased by more than 35% since industrialisation began, and they are now at their highest for at least 800,000 years.

When natural factors alone are considered, computer models do not reproduce the climate warming we have observed. Only when man-made greenhouse gases are included do they accurately recreate what has happened in the real world.

Has global warming stopped?

No. The rise in global surface temperature has averaged more than 0.15 °C per decade since the mid-1970s. The 10 warmest years on record have occurred since 1997. Global warming does not mean that each year will necessarily be warmer than the last because of natural variability, but the long-term trend is for rising temperatures. The warmth of the last half century is unprecedented in, at least, the previous 1,300 years.

How can I help?

Over 40% of current CO<sub>2</sub> emissions are caused by the choices we make as individuals. Simple actions can save money and energy; and there are many things you can do to reduce your CO<sub>2</sub> emissions, from switching off electrical appliances when they are not being used to insulating your home properly and walking instead of driving one short trip a week, taking the train instead of flying or putting in energy-saving light bulbs in your home.

Find out how you can make a difference on [Act on CO<sub>2</sub> website](#).

**Worksheet 3:** Mingle

Speak to other members of class. They will help you to answer the following questions.

What is climate change?	
How are we causing climate change?	
What will happen if we don't reduce emissions?	
But isn't the climate always changing?	
Do climate scientists really agree about climate change?	
Are you sure there's a link between temperature rise and CO <sub>2</sub> ?	
Has global warming stopped?	
How can I help?	

**Worksheet 4: Climate change vocabulary**

1. *Match the words from the texts to the definitions below.*

climate change	greenhouse gases	electrical appliances
carbon dioxide	atmosphere	emissions
extinction	ecosystems	global warming
rise	greenhouse effect	

1. The process in which gases in the atmosphere trap the sun's heat.
2. The types of gases that trap the sun's warmth in the atmosphere.
3. A greenhouse gas with the chemical name CO<sub>2</sub>.
4. A change in the earth's climate over a period of time.
5. When the average temperature on Earth is getting hotter.
6. A verb or noun which is a synonym of increase.
7. The scientific word for 'air'.
8. Greenhouse gases caused by human activity.
9. A system of plants and animals living together.
10. When a type of plant or animal disappears completely.
11. Televisions, fridges and other electrical goods.

2. *Test your partner on these words. Say the definition and your partner has to say the word.*