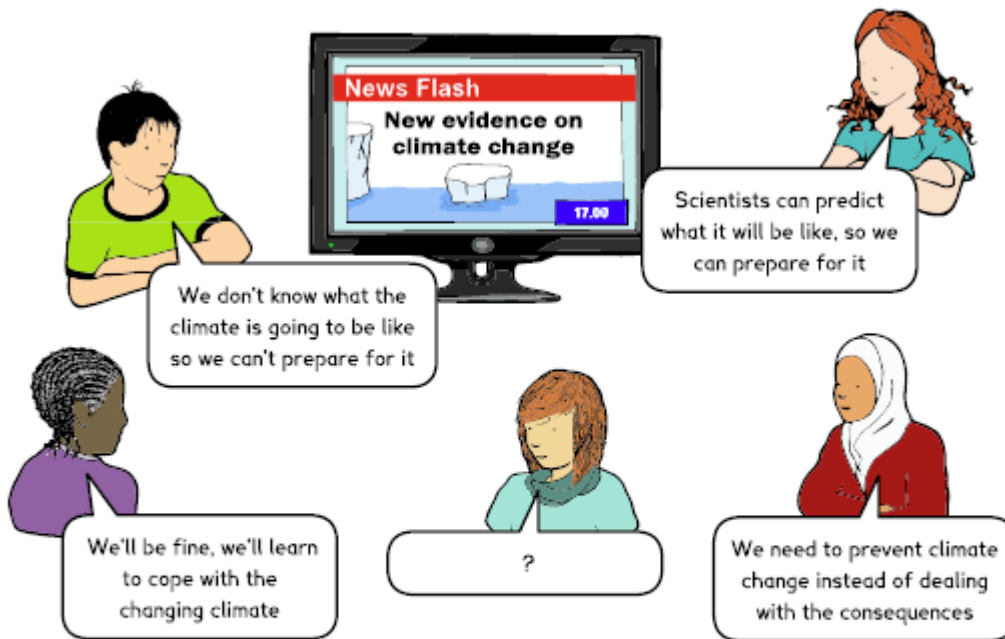


Climate debate- Help Cards

Four viewpoints are shown below:



Dealing with climate change

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These 'help cards' are based on comments of scientists who made responses to the IPCC 5th Assessment Report (published in 2014) collated by the Science Media Centre in London (<http://www.sciencemediacentre.org/expert-reaction-to-ipcc-ar5/>)

**Viewpoint 1
ADAPT**

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<p>Climate change is happening but it is not for the first time in human history. There was a Medieval warm period and a Little Ice Age and humans survived those – and they didn't have the education and technology that we have now. Society just needs to understand what is coming, such as the rising sea levels and heavier rainfall and then make adaptations so that these don't affect people badly.</p>	<p>Many large urban areas, with lots of people, infrastructure and industries, are in low-lying or delta areas which means that they must adapt to sea level rise and storm surges. An international priority is to adapt urban areas and infrastructure to be able to resist and survive a wider range of environmental conditions.</p>
<p>The climate of the Earth has always varied with massive warm and cold periods lasting a very long period of time. Modern humans just need to get used to the present short-term period of warming and change their lifestyles accordingly. We understand the present warmth and so can get ready for it.</p>	<p>We now understand the climate system quite well and therefore we are able to monitor changes as they happen. So we know when we must take practical actions and make adaptations. CO₂ concentrations are increasing, so what we need to do is improve our weather forecasting so that people know what is going to happen in the near future and be able to get ready for it.</p>
<p>There are so many natural processes at work that determine the Earth's climate, especially variations in the amount of energy received from the Sun, that there could be further changes ahead. This could include a period of cooling, which would give people time to adapt for the longer term warming.</p>	<p>There are natural cycles within climate change, so as well as the warming caused by human emissions of greenhouse gases from fossil fuels, the natural processes will help balance the heat budget. The increase in average global temperature is not unexpected. Life exists on Earth because of greenhouse gases keeping the planet warm enough to support life, humans just need to adapt to it being a little bit warmer still.</p>
<p>The slowdown in the rate of temperature increase since 1998 shows that climate models have yet to include all the variables and so are not entirely accurate. The slowdown shows that humans have time to adapt.</p>	<p>The oceans are absorbing a lot of the extra heat energy, and there may be other counteracting effects on global warming that have not yet been observed. These counteracting effects will give people time to learn how to adapt to a warmer world.</p>

<p>Viewpoint 2 MITIGATE</p>	<p>Viewpoint 2 MITIGATE</p>
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<p>Viewpoint 2 MITIGATE</p>	<p>Viewpoint 2 MITIGATE</p>

<p>Human influences have dominated warming of the planet since the mid-20th century with 2013 being the year when CO₂ concentrations in the atmosphere passed 400 ppm (parts per million), the highest for 800,000 years. We must reduce emissions over the next 20 years to stop temperatures increasing well beyond the 2°C increase by the end of the 21st century.</p>	<p>The atmosphere and oceans are warming, snow and ice cover is shrinking, sea levels rising, oceans becoming more acidic and extreme weather events more common. We must decrease CO₂ emissions from burning fossil fuels now if we are to limit climate change. So the message to governments is clear: we need to accelerate efforts to reduce emissions whatever climate research shows.</p>
<p>Without immediate reductions in global emissions of greenhouse gases the world will not reach its political target of limiting temperature increase to 2°C, it will be between 3°C and 5°C instead. Time to act is running out if we are to respond to enhanced global warming seriously.</p>	<p>Many large urban areas with lots of people, infrastructure and industries are in low-lying or delta areas which makes them vulnerable to sea level rise and storm surges. An international priority is to reduce warming through more efficient use of resources and reductions in greenhouse gas emissions is needed.</p>
<p>2014 was a key year with the publication of the IPCC's 5th assessment report. It provided information for EU policy makers to reform the carbon emissions trading system and develop policies on biofuels so that all countries reduce CO₂ emissions. Governments need to take tough decisions on their climate change policy now.</p>	<p>Big improvements in the way that we use energy are needed in order to bring flexibility to energy supply systems so that carbon emissions can be removed. Mitigation needs faster development of low carbon technologies, more efficient energy use by appliances and machinery and the spread of these innovations around the world.</p>
<p>Increasing levels of greenhouse gases are disrupting our climate and the cumulative impact is likely to be severe. So any delay in reducing emissions will lead to greater risks and increasing difficulties and higher adaptation costs as the scale of the changes gets larger.</p>	<p>Climate change is a dangerous threat because it is like a large container ship – you can turn off the engines but it continues to move forward for a long distance. If we wait before acting the impacts of climate change will become unmanageable, it will be too late because we have created centuries of change. We need to be committed to reducing pollution now.</p>

**Viewpoint 3
VULNERABLE**

**Viewpoint 3
VULNERABLE**

**Viewpoint 3
VULNERABLE**

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<p>There is growing evidence that the frozen parts of the world are very sensitive to global warming. The retreat of Arctic sea ice is faster than ever and the melting rate of the ice sheets in Greenland and Antarctica is five times greater than it was 20 years ago.</p>	<p>More greenhouse emissions will cause more global warming. The Arctic will warm the most and will be ice free by the middle of this century, and continents will warm more than the oceans. There will be an increase in hotter days and fewer cold days, and areas with high rainfall will get more. Avoiding 2°C or more of warming by the end of the century is impossible, even if we cut CO₂ emissions to zero now.</p>
<p>Annual CO₂ emissions are much higher today than they were back in 1990, and the highest the Earth has experienced in 2 million years. Despite this, countries such as China, the USA and the UK continue to invest in extracting and producing fossil fuels. We do not know how much warming will result from doubling CO₂ concentrations in the atmosphere, but given the trends our grandchildren will find out what Earth's climate sensitivity is.</p>	<p>Reducing CO₂ emissions has massive implications for businesses and industries because of the costs involved with changing to other energy sources. Waiting before action is taken is very dangerous as temperatures will increase to the top of the predictions. Even if mitigation measures reduce CO₂ emissions to nearly zero now the planet would still take centuries to reset itself to normal.</p>
<p>Important questions remain unanswered, for example the Southern Ocean around Antarctica currently soaks up about 10% of CO₂ emissions, stopping them getting into the atmosphere. But this carbon sink (or store) may get full or fail as the seawater warms up. Observations show that heat has continued to build up in the oceans since 2000, and to a greater depth, even as the rate of temperature increase in the air has slowed a little.</p>	<p>The climate change models cannot accurately consider all of the influences on global warming, for example melting permafrost (frozen ground) in polar areas will release methane (a greenhouse gas) from storage and create further warming.</p>
<p>Making decisions and putting policies into action in order to reduce climate change are very difficult. This is because there are many different interests, values and attitudes involved around the world. Reaching global agreements has been difficult and even the agreements that have been made such as at Kyoto and Paris have many weaknesses.</p>	<p>Scientists say that the Earth will warm more due to the quantity of greenhouse gases in the atmosphere – it is simple physics. Greenhouse gases are changing the world with temperatures rising over the last 60 years, oceans becoming more acidic, rainfall patterns changing, sea levels rising, Arctic sea ice melting and extreme weather events becoming stronger. In as little as 10 to 20 years great harm will be done.</p>