



TEACHER'S NOTES
EDITION No. 23
November 2000

Climate change

 Why is it happening?

 What are the effects?

 What can we do?



THE NEXT FEW WEEKS COULD BE CRUCIAL to the future of the Earth. The world's governments are meeting in Holland in mid-November to try and agree how to reduce global warming. In Great Britain disastrous floods and a crisis over the cost of petrol have made environmental issues into headline news.

What is
Global express?

Global express helps you teach about topical global issues and events.

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Instant photocopiable classroom activities for 8 to 14 year olds.

Primary

- True or false quiz
- Energy and transport picture activity

Secondary

- Headlines activity
- Choose climate change solutions
- Discuss energy sources

Curriculum

- Literacy
- English
- Geography
- Citizenship
- 5-14 Curriculum Guidelines (Scotland)

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Our changing climate

Most experts agree that the changes we are seeing in the world's weather are caused – at least in part – by the gases our industries and transport systems pour into the atmosphere. These 'greenhouse gases' – mainly carbon dioxide, methane and nitrous oxide – have been blamed for heating up the global ambient temperature and changing the world's climate.

After years of discussions, the world's governments are almost at the point of agreeing specific targets and actions for reducing the amount of greenhouse gases we produce. However, some people say that even if the Climate Change Convention agrees targets, it will make little difference to the catastrophic course the world seems set on; others are more optimistic.

Human causes or natural?

There are sceptics, including some scientists, who argue that the extreme weather events we are witnessing probably have causes other than global warming.

These extremes, they say, are no greater than those which have occurred from time to time during the past millennium and more – for instance, the increase and severity of hurricanes in the eastern US is a regular natural cycle, just as drought also occurs in cycles. Periods of cold – 'Ice-Ages' and 'mini Ice-Ages' – occur as a matter of course. The most recent mini Ice Age was from the thirteenth to the nineteenth centuries, when the River Thames in London froze, half the populations of Sweden and Norway may have starved to death, and snow blanketed parts of Ethiopia.

Most scientists, however, agree that even if it is part of a natural cycle, there is enough evidence that human activity is also affecting the climate. They argue that we cannot afford to wait for absolute proof and that we should take action to prevent further climate change, even if we are not certain it will worsen.

Taking the blame

In 1990 the quarter of the world's population living in the North (the developed world) contributed about three quarters of the world's carbon dioxide emissions and well over half of total global greenhouse gas emissions. The US alone produces almost a quarter of the total world emissions of greenhouse gases. In 1996, one US citizen was responsible for generating as much greenhouse gas as 19 Indians, 30 Pakistanis, or 269 Nepalese. Levels of emissions per person in the European Union (EU) and Japan are about half the levels of the United States and Australia.

The poorer world argues that the biggest polluters must be the first to take action. But in countries like the US, governments are reluctant to take measures that might be unpopular with voters or with corporations.

And within the next four decades, total emissions by Southern countries (the developing countries) are expected to catch up with those of the North.

Poor will be hit hardest

The biggest producers of greenhouse gases are in the North, but it is the South that remains most at risk. Poverty makes people more vulnerable to natural changes as they don't have the resources – whether at country or individual level – to deal with changes and adapt to natural disasters.

For example, rising sea levels threaten 10 million people living in island states and in low-lying deltas in countries like Bangladesh, Egypt and China. Most of the endangered areas are in south and south-east Asia, and include 30 of the world's largest cities. Global warming may affect water supplies and reduce food production in the tropics and subtropics, putting an additional 50 million people at risk of hunger by 2100. It may also damage non-tropical forests; lead to loss of species; and perhaps spread tropical diseases further north.



Panos Pictures

Romania: factory pollution on the Black Sea coast

Global express uses "countries of the South" or "South" instead of "developing" or "Third World" countries.

Frequently asked questions

What are 'greenhouse gases' ?

'Greenhouse gases' are mainly carbon dioxide, methane and nitrous oxide. Carbon dioxide is the most important, forming 80% of the industrialised world's greenhouse gas emissions in 1990. It is principally produced by the combustion of oil, coal and gas.

Why is there global warming now?

The harmful build up of greenhouse gases was caused initially by the industrial revolution in countries in the North. After over 200 years of industrialisation powered by carbon-based fossil fuels, large quantities of gases have been released faster than natural processes can remove them from the atmosphere. As a result, concentrations of carbon dioxide have risen by almost one third – more and faster than at any time in recorded history. The cutting down of forests that absorb carbon dioxide has added to the problem. Carbon dioxide forms a tiny proportion of the atmosphere – only 0.028% at pre-industrial levels and 0.036% now – but it is critical for maintaining the temperature in which life flourishes. Released into the atmosphere, carbon dioxide remains there for around 100 years. This causes the atmosphere to retain more of the infrared heat radiated from the earth's surface, thus leading to a gradual rise in global temperature. This is global warming.

Won't climate change mean better weather for us?

Despite the term global warming, climate change does not mean pleasant warmer weather everywhere. What it does mean is more unstable, unpredictable and extreme weather patterns. Through disruption to prevailing winds and ocean currents,

some countries could end up much colder and others may face more severe droughts, floods or storms. The recent bad weather in the United Kingdom is thought to be the result of global warming.

Isn't it up to governments to stop climate change?

World leaders met every year after the 1992 Earth Summit in Rio up to the conference in Kyoto in December 1997 where they agreed to reduce the emissions of greenhouse gases on a worldwide basis. Each country now has a target figure which they should meet by 2012. But so far the US, Japan and Australia have increased production of greenhouse gases, as have China and other newly industrialised countries. Europe has stood still. Leaders are meeting again in The Hague in Holland from 13-24 November to discuss climate issues and the failure to make progress on meeting the targets. Governments of rich Northern countries are under pressure to maintain growth in economies and preserve lifestyles and Southern governments are often keen to develop industrially, so governments tend to be slow to act.

What can we do?

People, industries and governments all need to take action. China, as the world's largest producer of coal, has taken dramatic steps to curb growth in coal use. Subsidies for coal use fell from 37% to 29% between 1984 and 1995, and petrol subsidies were slashed from 55% to 2% between 1990 and 1995. In India, a high-level advisory committee on climate change has been set up and the country's wind energy programme is one of the largest in the world. There are many things which individuals can do, wherever we may live. We can use cars less, save energy and recycle waste. We can support campaigns which lobby politicians.

Quotes

"Climate change is not some trendy intellectual scenario for the distant future. It is with us now. It is remarkable that, during the recent fuel crisis, hardly anyone mentioned the environment."

Michael Meacher, UK Environment Minister

"The rainfalls are much heavier; they often result in floods. On the other hand, there are droughts and extremely high temperatures... I don't remember such changing weather in my childhood."

Tadeusz Kostus, Polish farmer

"In the old days, the climate was more predictable. When the wind blew towards the east we knew winter was on the way and when it turned again towards the west it was a sign that winter was over. Now, when the winds blow strongly, they lift up the topsoil and expose the ground to the sun's rays. We don't really understand why or how these changes have come about."

Se'e Dembele, 70 year old man from Mali

"We are all adrift in the same boat. And there is no way that only half the boat is going to sink."

Raul Estrada Oyuela,
Argentine climate negotiator

"The international community has a moral obligation to assist Bangladesh in adapting to climate change, as the problem... is not of our own making but is clearly caused by others. The Bangladesh government should take a more active role in the international climate change negotiations to persuade other countries to reduce their emissions."

Dr Saleemul Huq, Bangladesh

"In the developed world only two people ride in a car and you want us to give up riding the bus!"

Zhong Shukong, Chinese Delegation Leader,
Kyoto Conference

Talking about climate change

What do we know about global warming?

- The world is heating up – fast. Temperatures are rising more quickly than they have done for 10,000 years.
- The 1990s were the warmest decade on record, and 1998 was the hottest year.
- The earth's average surface temperature has warmed between 0.3 and 0.6 degrees Celsius in the last 100 years. It may rise by two degrees in the next 100 years, if we go on producing greenhouse gases at the present rate.
- Sea levels have risen by between 10-25 centimetres in 100 years, as polar ice caps have melted. They are projected to rise another 50 centimetres by 2100.
- There have been unpredictable and extreme weather patterns – freak weather disasters such as Hurricane Mitch that hit Central America in 1998; the devastating storm “Lothar” that swept through Europe in December 1999; and the floods in Mozambique in early 2000.

Source: *Just a Lot of Hot Air*,
The Panos Institute, 2000

Just a Lot of Hot Air?

In mid-November 2000 the world's governments are meeting in Holland to discuss climate change. Some see this Conference of Parties (COP6) as make-or-break for the world's efforts to deal with climate change. After years of discussion the industrialised countries - the rich countries in the North - are nearly at the point of agreeing specific targets and actions for reducing greenhouse gas emissions. But there are still major disagreements to be resolved.

The key questions are:

- ◆ should industrialised countries be cutting back on their emissions more, so countries of the South can develop?
- ◆ should emission targets be the same for all countries?
- ◆ are the suggested targets achievable?
- ◆ will the United States agree to the targets and what happens if they don't?
- ◆ to what extent can reforestation and other land use activities be used as ways of reducing greenhouse gas emissions?

There is now almost universal acceptance by governments of the need to take action, and commitment to doing so. There is also a system for monitoring and reporting on greenhouse gases and actions to reduce them; and a system for constantly revising targets every five years. But it is not yet clear whether the political will for change is there. Although the European Union has been pressing for stronger action on climate change, some members will be nervous of any measures which might affect the price of fuel after the recent public outcry over taxes on petrol.

Source: *Just a Lot of Hot Air*, The Panos Institute, 2000

Glossary

Atmosphere: The band of air around the earth.

Biomass: Any organic (human, animal or plant) matter that can be burnt as a fuel, for example wood and dung.

Carbon dioxide: The name of a gas produced when anything containing carbon is burnt in our atmosphere. All living things and their remains contain carbon. Carbon dioxide can be written as CO₂.

Fuel: Any substance that provides energy when it is burnt.

Fossil fuel: A fuel, such as oil, created by the fossilization of decaying organic matter millions of years old.

Greenhouse effect: Carbon dioxide and other gases in the earth's atmosphere trap heat from the sun in the same way that a greenhouse traps heat .

Greenhouse gases: Carbon dioxide, nitrous oxide, methane and CFCs that prevent heat escaping from the atmosphere. Without them the earth would be too cold for us - too much and the earth will be too hot.

Non-renewable energy source: A source of energy of which there is a limited supply, such as oil.

Renewable source of energy: An unlimited source of energy, such as wind or wave power.

Recycling: When something is repaired or reused.

Solar power: Energy from the sun.

Solar panels: Special panels which produce electricity from sunlight energy.

IDEAS FOR THE CLASSROOM

Curriculum links

PRIMARY

Literacy: non-fiction.

English: speaking and listening; writing in response to stimuli.

Personal, social and health education: debate about topical issues.

Geography: weather; environmental issues.

SECONDARY

English: speaking and listening.

Citizenship: topical issues and events; the significance of the media; the world as a global community.

Geography: environmental issues.

True or false?

Age range: 8 to 12

Purpose: to establish facts about energy use and climate change.

Ask pupils in pairs to fill in the quiz on page CLI 1. Discuss their answers. Were there any that surprised them?

Answers: 1 True. 2 True. 3 False. Oil was formed by a natural process over millions of years and cannot be replicated by scientists in a laboratory. **4 True.** Can pupils add to this list by doing some research? **5 False.** Pupils can carry out research to make comparisons between costs of litres of petrol, milk, coca cola, fresh orange juice and water. **6 False.** Weather patterns will become more unpredictable. Some places may become hotter but also wetter. Some may become cooler. There may be more storms. **7 False.** If there was no carbon dioxide in the air all warmth would disappear and the world would be too cold to live on. **8 True.** All fossil fuels contain carbon and make carbon dioxide when they are burnt in the presence of oxygen. **9 True.** This is sometimes called the 'greenhouse effect'. **10 False.** A number of different fuels for cars have been developed - ethanol based on sugar cane juice, vegetable oil derivatives,

hydrogen. **11 False.** Governments recognise that we must stop global warming if we want to avoid some huge and costly problems in the next 100 years. **12 False.** Every individual can do something - find out more, recycle, reduce their use of fossil fuels and campaign for others to do the same.

Energy use and transport

Age range: 8 to 12

Purpose: to make pupils' aware of the high fossil fuel usage of many forms of transport.

Copy page CLI 2 and ask pupils to work in pairs. Explain any unfamiliar terms or provide copies of the glossary on teachers' page 4. Discuss their answers and relate points raised to pupils' own experience of both the recent petrol crisis and the bad weather. Draw out the links between floods, global warming and the use of petrol. You could follow this with a discussion or formal debate about whether we should use less petrol.

Headline news

Age range: 12 to 14

Purpose: to look at news reporting of climate change.

Copy page CLI 3 for pupils and ask them to work in pairs or groups. Can pupils make links between the headlines and the solutions? Can they think of any solutions not mentioned? As a follow-on pupils could collect news headlines and articles on similar issues from newspapers or news sites on the internet and group them into different categories - optimistic/pessimistic; problem/solution; concerned about the environment/the economy. If pupils are able to visit the official website of the climate conference (www.climatechange2000.org) there is a Youth Corner. Pupils could write a short speech for the Youth Conference.

Looking into the future

Age range: 8 to 14

Purpose: to imagine or construct the future, either freely or within certain parameters and acknowledge uncertainty and precaution about the future.

An important aspect of citizenship, of participating in society and working for change is being able to project into the future and imagine the consequences of action or the lack of it. Pupils should be encouraged to develop these skills through activities such as the following: **Real or ideal** Using the futures activity in *Tune into the News* (Edition 1 of *Global Express*) ask pupils to draw two future timelines of action to avert climate change - one to show what they would like to happen and one to show what they think will happen.

If I ruled the world... Ask pupils to imagine that they can decide what happens in the world. What would they do about climate change? They can make three world laws. What would the results be? Would they be fair to all the world's citizens? Would everyone be happy?

Weather forecast Ask pupils to write (and present to the class) a weather forecast for January 2020 imagining either that climate change has speeded up or that it has slowed down.

Transport 2050 Ask pupils to draw a picture of the transport they will be using in the year 2050 and write notes to explain it. Or they could draw the same street in the photo on page CLI 2 as it might appear in 2050.

"In the West, you spend millions of dollars a year protecting endangered species. Soon, we will be endangered too."
Nakibae Teuatobo, Pacific Island of Kiribati

Pictures on pupils' page CLI 4

- 1 Woman in India drying dung cakes for fuel.
- 2 Wind turbines in the USA.

Recommended resources

AVAILABLE MAIL ORDER FROM DEP
Postage and packing will be charged extra.

Fuels for the Future. WAY 302, £10.99

Most of the energy we use comes from burning fossil fuels, which cause pollution and are running out fast. But if we act now, there is time to develop clean, renewable fuels for the future. Other titles in the same series: Keeping the Air Clean; Waste; Recycling and Re-use.

How Green are You? BS 81, £4.99

Help save the world if you're 6 years old or more. Explanations and exciting projects on saving energy, protecting wildlife, cleaning up the water and air, with David Bellamy and the Friendly Whale.

Learning to Live for the Future. BREC 1, £15

A comprehensive activity file for KS 2 & 3 teachers to introduce sustainable development and equip children with the knowledge, skills, values and confidence to participate in environmentally responsible decision-making.

Live Well, Live Wisely. IT 3, £10

This KS 3&4 resource from Intermediate Technology provides accessible and lively ways of bringing the issues of sustainable and appropriate technology to life. The activities are well described with clear links to the curriculum. There are design and make activities, and focused tasks which relate to students' own lives.

Pachamama: Our Earth, our future. PCI 4, £7.99

A perfect introduction for young people (KS 3/4+) to the environmental challenges of the 21st century. Includes personal accounts, poems, illustrations and a fold-out game to test readers' knowledge in a fun and informative way.

Sustainability. NI, £2.50

November 2000 issue of *New Internationalist*, focusing on sustainability and the search for solutions. Useful graphics and statistics.

Just a Lot of Hot Air. Panos, £5

A Panos briefing explaining the issues and concerns of the Climate Change Convention. Readable background information.

Websites

cop6.unfccc.int The official web site of the Climate Change Conference in Holland - in English.

www.climatechange2000.org The outreach site of the Climate Change Conference with a Youth Corner.

www.climatevoice.org Information on climate change and the conference with ideas for action from the Worldwide Fund for Nature.

panda.org/climate/solutions.cfm WWF Global Network site with useful information about solutions to climate change.

www.oneworld.net/campaigns/climatechange/index.html Latest news about climate change campaigns.

www.foe.co.uk Friends of the Earth site. **www.ipcc.ch** UN intergovernmental panel on climate change - detailed info and statistics.

www.guardianunlimited.co.uk/petrol/special reports Very useful news reports and links to many sites including other special reports on weather and the environment. **www.bbc.co.uk** Latest information on flooding and storms with pictures.



Global express aims to enable young people to gain a greater understanding of the context in which news stories from the developing world happen, and to build links between their experience of life in the UK and their understanding of development issues. Editions reach teachers within 10 days of a high-profile news story, and provide materials that help answer young people's questions and increase their critical awareness of how the media can influence their image of the developing world.

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- 22 Olympics 2000
- 21 Zimbabwe
- 20 Mozambique floods
- 19 Asylum seekers
- 18 Millennium
- 17 The Commonwealth Summit
- 16 East Timor

Edition 1, *Tune into the News*, is a 16-page edition which has activities on the media and exploring controversial issues. It is available free when you take out a subscription to **Global express**.

Global express is your pupils' key to understanding news from around the world.

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