

Shout about climate change Competition!

Take part in the Shout about climate change competition and win a digital camera.

Create an **A2 poster** on the theme What can we do about climate change?

You can use a slogan of up to **20 words** to get the message across but no words are necessary.

You can submit **one entry per class per school**, but why not encourage all students to get involved and then **choose the best entry to submit?**

Entries must reach Friends of the Earth by **18 November 2005**. The winning class will receive a digital camera as a prize and their poster will appear on the cover of *Earthmatters*, Friends of the Earth's member magazine that goes out to more than 100,000 people. We also hope to exhibit all entries for the media and the public to see. Details will be confirmed in the autumn.

To sign up to the competition **fill in the form below and send back to Friends of the Earth, 56–58 Alma Street, Luton, LU1 2PH**

Free **Friends of the Earth** DVD with visual aids to teach climate change.

This resource has a selection of visual aids to help you talk to young people about climate change. **Fill in the form below to order your free copy.**



Please fill in all of the following details

Name

Name of school/youth group

Address

Postcode

E-mail

Telephone

I want to enter my class/youth group to the Shout about climate change competition

I want a copy of the free DVD

Your details will be held on our campaigning and fundraising database.

If you would prefer us not to contact you with campaigning and fundraising information, please tick?

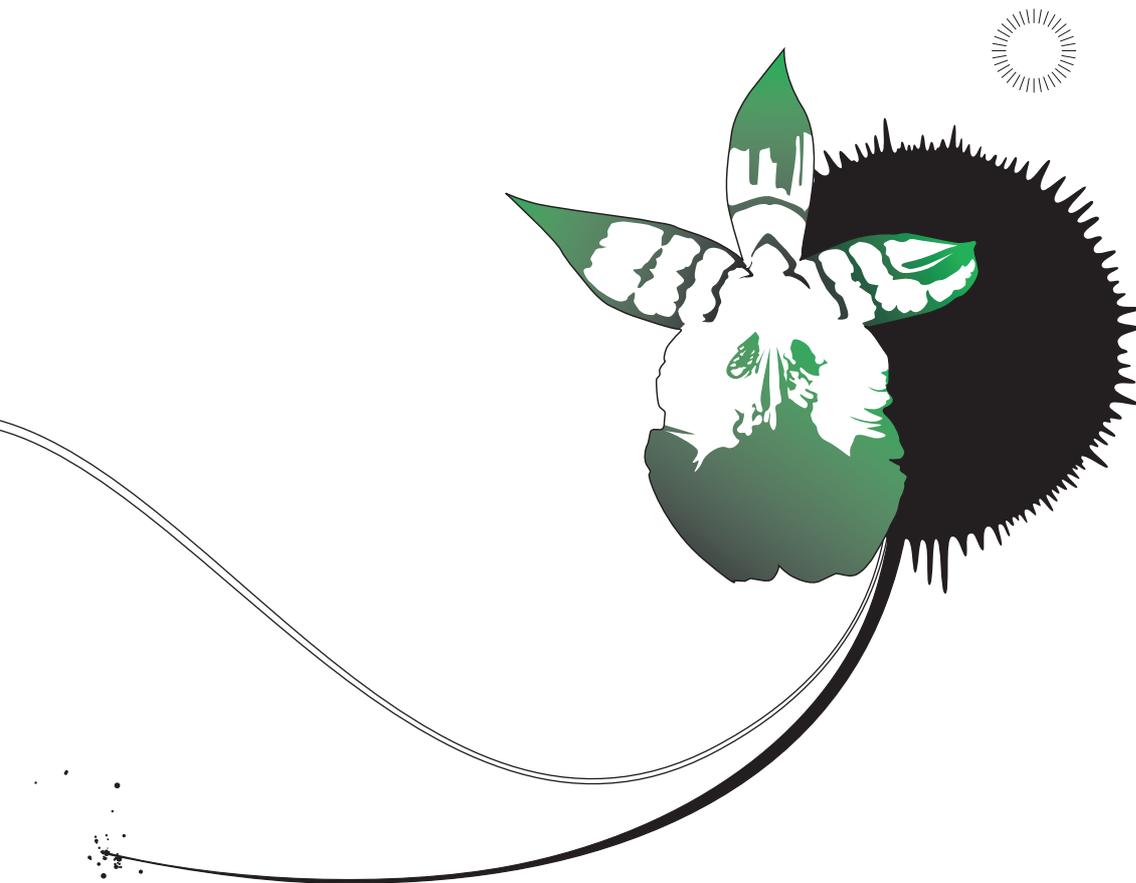
If you would prefer us not to pass your details to other organisations, please tick?



The climate is changing.
It's time to ask questions.

Shout about

climate change



Please Affix
Stamp Here



**Friends of
the Earth**

Friends of the Earth
56-58 Alma Street
Luton
LU1 2PH

Pull out and pin up!

More resources

Friends of the Earth
www.foe.co.uk
tel: 0800 800 1111
Contact us for further information on Shout about and other climate change questions

Department for Environment, Food and Rural Affairs
www.defra.gov.uk/environment/climatechange/schools/index.htm
Talks about what climate change is and gives information for projects and course work.
There are pages for 7–11, 12–16 year-olds, parents and teachers.

Atmospheric, Climate & Environment Information Programme
www.ace.mmu.ac.uk/resources.html
Includes comprehensive fact sheets for key stages 2–4 on climate change and other related topics. There is also a free CD-ROM available for key stage 3–4.

BBC Weather Centre
www.bbc.co.uk/climate/
Information on evidence, impacts, adaptation, policies, links and chat. There is also an interactive game of dilemma and consequence for the climate.

The Met Office
www.met-office.gov.uk/education/index.html
Fact sheets, case studies and quizzes for all ages and for teachers on weather and climate change. Free CD-ROM available.

Eco-Schools
www.eco-schools.org.uk/energy/index.asp
Promotes environmental awareness in a way that links to many curriculum subjects. It covers a variety of sustainable development topics, including energy. Has case studies and activities on energy and climate change.

Centre for Sustainable Energy
www.cse.org.uk/
Projects and resources cover all key stages and involve numeracy, literacy, science, geography, citizenship and PHSE.

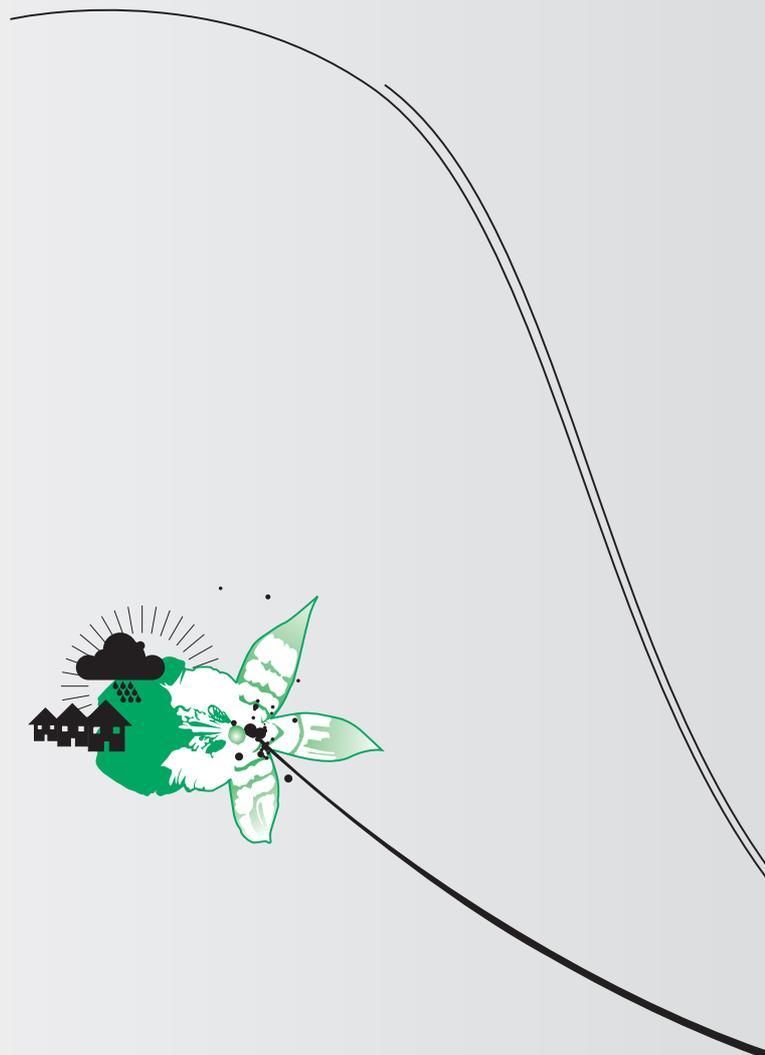
Planet.com
www.http://web.channel4.com/learning/microsites/P/planet/maieng.html
Basic information on energy and climate change and what you can do about it. Video clips from Bangladesh on impacts of climate change, Denmark on renewable energy in action, and Plymouth on a school that has saved thousands by saving energy.

Think Energy
www.think-energy.co.uk/
Online activities, quizzes, surveys, information and links exploring climate change, energy and solutions. The site has pages for 7–11, 11–14, 14–16, 16–18 year-olds, parents and teachers.

Centre for Alternative Technology (CAT) Machynlleth Wales
www.cat.org.uk/education/
At the Centre power comes from wind and water generation, and organically grown vegetables are nurtured by the recycled waste produced by residents and visitors. Includes an interactive demonstration of a wind farm. Resources are available for all key stages.

Climateprediction.net
www.climateprediction.net/schools/resources.php
Learn about climate and how to predict it by running experiments and watching the weather patterns develop in your unique simulation of the Earth. Resources on a range of subjects and key stages. Comprehensive teachers' notes, worksheets, presentations and spreadsheets.

The GLOBE Programme
www.globe.org.uk/intro/intro.htm
An international environmental education project that encourages children to explore and measure their local areas, and report their findings over the internet.



Shout about

climate change



**Friends of
the Earth**

Education pack for
key stage 3:

11–13 year-olds

Citizenship
Geography
Science
English
Art
Maths
Design & Technology
Information Technology

Shout about climate change

Climate change week

7–11 November 2005 is Shout about climate change week.

Shout about activity week is an annual event to get young people active on an environmental issue through their schools and youth clubs.

This year the topic is climate change.

This pack is a free resource from Friends of the Earth containing all you need to run the week.

Be creative, design an eco-friendly car of the future or hold a walk-to-school day.

You can do as much or as little as you want, but get involved and together let's shout loud about climate change.

The Prime Minister Tony Blair has said that climate change is "the most important environmental issue facing the world today".

Friends of the Earth's Big Ask campaign is encouraging everyone to ask questions about climate change. We want to create a debate about climate change, what it is, why it's happening and most importantly, what is being done about it. We want young people to take part in the Big Ask and get active on climate change.

Visit www.thebigask.com for more information.



The climate is changing.
It's time to ask questions.

People who took part in Shout about waste said:

"By doing this, the school is seen to be doing something positive—it's a real visible gesture"

Andy Chambers,
Teacher, Shorefields Technology College

"Students throughout the school have been very enthusiastic about the project"

Ms Ravenscroft,
Attleborough High School

Shouts to...

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Friends of the Earth inspires solutions to environmental problems, which make life better for people.

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This pack contains:

- Educators' notes explaining how the pack fits with the national curriculum, suggestions for larger activities and useful contacts and websites
- Four booklets with information and activities on the following topics:
 - What is climate change?
 - The effects of climate change
 - Solutions to climate change
 - What can we do?

Competition entry form and order form to send off for a free DVD containing extra visual aids on climate change.

Whatever form your Shout about week takes we want to know about it. Send us your pictures, photos and stories. The most creative ones may find themselves on our website or in the *Shout about* review magazine. The winner of our poster competition will see their poster on the front of our members' magazine *Earthmatters*, which goes out to more than 100,000 people.

Don't forget to tell others at your school or youth club about the pack so they can use it too. Free copies can be downloaded from www.foe.co.uk/learning or contact Friends of the Earth on the number below.

We want to make sure Shout about gives you everything you need. We'll be sending you a questionnaire in November; please let us know how you got on and how we can improve the pack for next year.

Friends of the Earth's Youth and Education Programme provides a range of publications exploring sustainable development, citizenship and environmental issues, designed to be used in a class or youth group or by individual young people.

Why not read our other education publications?

For details phone Friends of the Earth or write to:

Publications Despatch,
Friends of the Earth,
56–58 Alma Street,
Luton LU1 2PH.

Or, go to:
www.foe.co.uk/pubsinfo/pubscat/educators.html

Shout about climate change

Educators' notes

The educators' notes outline how this pack can be used to meet the requirements of the National Curriculum. It includes suggestions for larger activities and a list of useful contacts.

The Shout about climate change pack is designed for Key Stage 3 with elements of whole school involvement.

It covers four topics that can be used as an introduction to climate change and its potential impact on the world.

The topics can be studied as a series of lessons/youth club meetings, or as part of an organised themed day or week on climate change.

We hope educators will use this pack to enthuse young people to become more aware of the issues surrounding climate change and that young people will be inspired to do things to help the environment at a local level. Through some of the information and activities suggested in this pack young people could start to see links between environmental issues and their own lives and what it means to be global citizens.

National Curriculum

“Education for sustainable development enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future.”

The National Curriculum, 1999.

Government Panel for Sustainable Development Education, 1999.

The theme of climate change relates closely to National Curriculum requirements for the subjects of Citizenship, PSHE, Geography and Science.

Through the activities suggested students will develop:

- Communication skills including discussion, reporting and debate
- Skills of collecting, recording and presenting data
- Knowledge about energy use and resources
- Ability to relate use of energy resources to effects on the environment
- Understanding of the needs and values of diverse groups
- Understanding of the social, economic and natural issues that have to be addressed in designing solutions
- Critical awareness of alternatives for the future

The table below indicates how the pack can link to a number of core and non-core subjects.

	Citizenship	Geography	Science	English	Maths	Art	ICT	DT
What is climate change	●	●	●	●	●			
Effects of climate change	●	●	●	●		●		
Solutions to climate change	●	●	●	●	●	●	●	●
What can we do?	●	●	●	●	●	●		

Suggestions for larger activities

If you want to do something bigger than a lesson you could try one of the suggestions below.

- Organise a walk to school/alternative transport day
- Hold a whole school climate change day/week
- Try an energy saving day
- Find out what your local council is doing about climate change – interview or write to your local MP asking what they are doing about climate change. Invite them to give a talk.
- Invite a speaker in – don't forget your network of Friends of the Earth local group members who may be able to visit.
- Visit an alternative energy site
- Combine several activities in the pack and organise your own awareness campaign. For example you could write a play to get the messages across, design a poster or leaflet and hold an open evening for parents/members of the community to let them know about climate change.
- Make your own five minute video showing how climate change affects you and what you are doing



What is climate change?

Around 35 per cent of our electricity is produced by burning coal in power stations. Burning coal produces two to three times more carbon dioxide (CO₂) emissions – the main gas leading to global warming – than gas does.

In 2003 some 560 million tonnes of CO₂ were emitted in the UK – that's about 9 tonnes of CO₂ per person. This is about twice the global average and three times the amount emitted per person in developing countries.

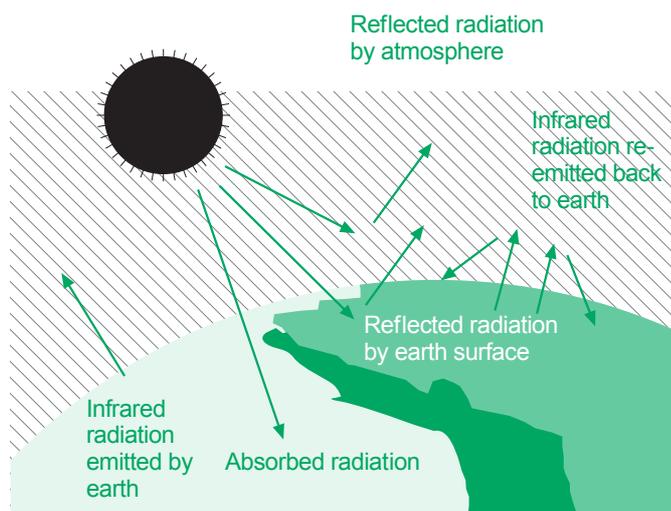
“What is now plain is that the emission of greenhouse gases... is causing global warming at a rate that began as significant, has become alarming and is simply unsustainable in the long-term. And by long-term I do not mean centuries ahead. I mean within the lifetime of my children certainly; and possibly within my own. And by unsustainable, I do not mean a phenomenon causing problems of adjustment. I mean a challenge so far-reaching in its impact and irreversible in its destructive power, that it alters radically human existence.”

Tony Blair,
14 September 2004

The greenhouse effect

The global climate can change for all sorts of reasons. The Earth's path around the sun can change, volcanoes can blanket the world in ash. The sun's energy also slightly changes and for the past century it has been unusually active and affected our climate. But for the past 50 years, global temperature rises have been largely due to our own carbon dioxide (CO₂) pollution.

When we burn fossil fuels (oil, coal, natural gas, petrol and diesel) for energy, CO₂ and other gases are released. These are known as greenhouse gases because they form a blanket around the Earth trapping in heat like in a greenhouse. Greenhouse gases have been building up in the atmosphere at an alarming rate since the industrial revolution. Levels of CO₂ are higher now than at any point in the last 440,000 years.



The greenhouse effect

Booklet 01

What is climate change?

Fossil fuels

Oil, coal, natural gas, petrol and diesel are all fossil fuels. Fossil fuels come from deep underground. They were created millions of years ago and took millions of years to form from the remains of plants and animals buried gradually under layers and layers of rock and soil. We are now releasing the energy trapped by this process in an extremely short period.

We use energy from fossil fuels for almost everything we do: for heating our homes, cooking our meals and powering our cars. Industrial processes use vast amounts of energy to make the products we buy for our homes. Fossil fuels are also used to power aeroplanes and to transport goods and food. The burning of fossil fuel to meet our energy needs is largely to blame for the climate changes we are now experiencing worldwide.

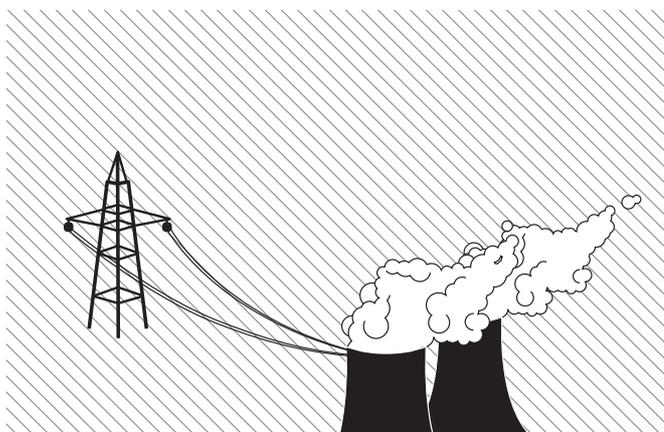


Heat loss from homes

Power stations

In the UK, the biggest source of CO₂ is from burning fossil fuels in power stations. But not all fossil-fuelled power stations are the same. Old coal-fired power stations produce more CO₂ than gas ones.

Our coal-fired power stations are some of the oldest and most inefficient in Europe. In electricity generating terms they're prehistoric carbon dinosaurs and are making a big contribution to climate change. The Government says it wants to take the lead on tackling climate change but our emissions of greenhouse gases have been rising not falling in recent years. This is mainly down to burning more coal for electricity and heat.



Coal-fired power station

Glossary

CO₂ —
chemical symbol for the gas carbon dioxide.

Fossil fuels —
oil, coal and natural gas, petrol and diesel are all types of fossil fuel, formed over millions of years from plant and animal matter.

Greenhouse gases —
carbon dioxide, HFCs and methane are all known as greenhouse gases. They wrap around the Earth like a blanket trapping heat in.

Industrial revolution —
the transformation of Britain during the 18th and 19th centuries into an industrial nation.

Booklet 01

What is climate change?

Activities

Assembly

Time: 30 minutes

What you need: information

Curriculum links: Science, English, Citizenship

Learning aim: to introduce the topic of climate change and develop presentation skills.

Use the information provided to create an assembly or talk to introduce the theme of climate change to the rest of the school.

Where do CO₂ emissions come from?

Time: 45 minutes

What you need: 'who emits the most CO₂' figures, stationery

Curriculum links: Maths, Science, Citizenship, Geography, English

Learning aim: to explore where CO₂ emissions come from, the impact they have on the environment and what could be done to reduce the amount of CO₂ emitted.

Use the information below to create pie charts and graphs.

Discuss the impact of CO₂ emissions on the environment, and how they contribute to climate change.

Use the prompt questions below to help.

Prompt questions

What types of transport do we use that release CO₂?

How could road traffic emissions be cut?

How could aeroplane emissions be cut?

How can we cut down on the energy wasted in our homes?

How could factories and offices reduce their emissions?

Who emits the most CO₂? (figures from 2002)

Who	Example of where emissions are from	Percentage of CO ₂ emissions
Business	heating and electricity in offices	32.5
Road transport	car exhausts	24.8
Residential	central heating and electricity in homes	27.1
Public	electricity and heating in government buildings	4.1
Industrial process	gases released from factories	4.0
Domestic air transport	plane engines	0.6
Other		6.8

Climate change quiz

Time: 15 minutes

What you need: quiz sheet, stationery

Curriculum links: Geography, Science

Learning aim: test your knowledge of climate change.

Use the questions overleaf to quiz young people on what they know. The answers are below.

1. All
2. Greenhouse gases
3. Because they trap heat next to the Earth like in a greenhouse
4. Carbon dioxide
5. Wind, solar power (from the sun), water power (waves and tides and watermills), power from plants (biomass), using the natural difference in temperature between the Earth and the air (geothermal)
6. Coal, oil, gas
7. Watch TV, listen to music, have lights on, watch a video/DVD, use the computer, cook, use a fridge/freezer, wash clothes, use heating
8. Cars, power stations, factories, aeroplanes
9. Climate change
10. Everyone, but particularly Government leaders
11. Save energy
Cut down on car journeys
Reduce air journeys
Reduce waste and recycle more

Extension activity:

Use the climate change quiz at home to test other family members. Pull all the results together and display the information in the form of a graph or chart.

Booklet 01

What is climate change?

Quiz

1. Which of the following can be caused by global warming and climate change?

Floods
Droughts
Hurricanes
Spread of tropical diseases
Animals becoming extinct
2. What are the gases carbon dioxide, methane and *HFCs known as?

(*HFCs are the gas in aerosols, refrigerator coolants and air conditioners.)
3. Why are they called this?
4. When fossil fuels are burnt to make electricity, what is the main gas that is released?
5. Can you name three ways of making electricity without burning fossil fuels?
6. Which of the following are fossil fuels?

Coal
Air
Oil
Gas
Water
7. Can you list four things that you do that need electricity?
8. Which of the following uses fossil fuels?

Cars
Walking
Power stations
Reading
Factories
Aeroplanes
9. What is causing the ice caps in the Arctic to melt?
10. Who is responsible for helping to stop climate change?
11. Can you name four things that you can do to help stop climate change?

Flooding will be more common across the UK as the climate changes and many low lying homes will be in danger.

Weather changes

More heat energy in the atmosphere leads to more extreme and unpredictable weather events such as storms, floods, hurricanes, droughts and hot summers.

There has been a threefold increase in the number of major natural disasters since the 1960s and the number of people affected by floods worldwide has risen from 7 million in the 1960s to 150 million today. Everyone will be affected.

A recent research report by Oxford University suggested that the heat wave of 2003 will become the average summer by the middle of the century. The heat wave resulted in 26,000 premature deaths across the EU, cost an estimated \$13.5 billion, and led to the hottest day ever recorded in Britain (38.5 degrees centigrade).

The poorest and most vulnerable countries are worst affected.

A warmer world threatens people, especially those living in developing countries where subsistence farming that depends on regular rainfall patterns is the norm and where they have little financial means to adapt to rising sea levels and more floods.

Rising sea levels, due to melting glaciers, as well as the expansion of ocean water as it heats up, could result in sea levels rising by half a metre by 2080, according to the UN. This spells disaster for countries with large river deltas such as Bangladesh, Southern China and Egypt, as well as for many islands in the Pacific and Indian Oceans. If the whole of the Greenland ice sheet were to melt this would raise sea levels by up to seven metres.

It has been estimated that by 2050 there could be 150 million environmental refugees because of climate change. An extra 300 million people may be at increased risk of malaria. The World Health Organisation (WHO) estimates that 160,000 people are dying annually through the effects of global warming.

In the UK, the Environment Agency has estimated that annual damage from flooding could rise from the present level of £1 billion to as much as £25 billion; claims for storm and flood damages have doubled to over £6 billion in the last five years. The number of people at a high risk from flooding could rise from 1.5 million to 3.5 million.

Fact: The ten warmest years on record have all occurred since the beginning of the 1990s

Warmer winters have already caused wildlife to suffer. Many seabirds, like the guillemot, failed to breed in 2004 because of food shortages.

A warmer world also threatens wildlife.

The implications of climate change for the natural world, the economy and societies are unprecedented in human history. Global average temperatures are predicted to rise by almost six degrees centigrade by the end of the present century leading to large-scale losses of biodiversity. A recent study in *Nature* suggested that a quarter of land animals and plants, altogether 1 million species, could be made extinct by the middle of this century.

Temperature increases on this scale would mean that some of the UK's resident species will not be able to adapt quickly enough, whilst other species will not be able to migrate to reach new hospitable surroundings. Low-lying coastal areas across the globe and some islands will be inundated with seawater. Plant flowering, arrival of migrating birds, the breeding season for birds, and the emergence of insects have all been observed to occur earlier across the northern hemisphere. Already some impacts are being felt. In 2004, breeding among the seabirds which nest on the northern coasts of Britain failed. This was because of food shortages due to warmer winters.

Glossary

Biodiversity —
existence of a wide variety of plant and animal species in their natural environments.

Refugee —
A person who has been forced to leave their country in order to escape war, persecution or natural disaster.

Subsistence farming —
type of farming in which most of the produce is consumed by the farmer and his family.

Booklet 02

Effects of climate change

Activities

Newspaper headlines

Time: 45 minutes

What you need: newspapers/other media, stationery

Curriculum links: Citizenship, Geography, Science, English, ICT

Learning aim: investigating the news/media; finding out what is being said about climate change; thinking about the future and what can be done about climate change.

Collect headlines from newspapers, magazines or the internet which feature a story on climate change, extreme weather conditions or flooding. Then create headlines for 20 years time. Discuss the difference between today's headlines and those of the future.

Prompt questions:

Has climate change been halted or are the effects even worse?

If the effect of climate change has been slowed down how did this happen?

If the effects have worsened what should we and Government be doing now?

Extension activities:

Develop the headline into a newspaper article.

Write a press release about the story.

Write a report for the 9 o'clock news.

You could use a local example or think about how climate change is affecting people in other countries.

Role plays

Time: 30 minutes

What you need: scenarios, information sheet

Curriculum links: Citizenship, Geography, English

Learning aim: explore a topical issue/news item; discussion practice; considering other people's experiences; drama.

Use the scenarios below to create a short role play, use the information provided for background information.

1. Interview a person from another country who has been affected by climate change. Decide on what roles you will have, for example:

- Reporter/interviewer
- Person from an affected village

- Person whose business/livelihood has been affected
- Someone the same age as the young people doing the role play
- The local MP
- The Head of the country affected, eg Prime Minister, Head of State, King/Queen
- What was the disaster, what questions will you ask them, what will they say?

2. Imagine a radio interview with a climate change expert and an oil company chairman – what questions would you put to them?

3. Imagine you are delivering a TV report on a local climate change incident. What is the incident? Who will be the reporter? Who are you interviewing? Any other characters?

Case studies

Time: 30–45 minutes

What you need: case studies, Himalaya video (available from Friends of the Earth's website, see link below)

Curriculum links: Citizenship, Geography, Science, English, ICT

Learning aim: to encourage young people to think about how climate change affects people and animals in other countries; how what we do in the UK affects the climate and people on the other side of the world; and how as global citizens young people have a responsibility to help stop the effects of climate change.

There are three case studies overleaf highlighting different consequences of climate change. Read out the statements or the case study and discuss the environmental, social and economic problems caused by climate change.

Case study 1 – Statements

Statements about local and global effects of climate change.

Case study 2 – Effects on people

A local and global example of effects of climate change on people.

Four-minute video of how climate change will hit the Himalaya available on Friends of the Earth website. (4.5MB - MPEG format) http://www.foe.co.uk/campaigns/climate/news/everest_climbers.html

Case study 3 – Effects on wildlife/biodiversity

A local and global example of effects of climate change on wildlife and biodiversity.

Prompt questions:

Do they think this is the result of climate change?

How does climate change affect people's lives?

How would they react if this happened to their home, family, etc?

What are the similarities and differences between what happens in the UK and what happens abroad?

How could climate change be prevented?

What could we do to help stop climate change?

Case study 1: Statements

Local

- The UK looks set to have warmer, wetter winters and hotter, drier summers, with an increasing number of both droughts and floods.
- Low-lying coastal areas such as Norfolk and Suffolk coasts could be submerged, including many important breeding habitats for birds.
- More flooding may make homes in some areas uninsurable.
- Species that are unable to migrate including trees vulnerable to drought, like the beech, may disappear.

Case study 2: Effects on people

Local—Carlisle

(Filed: 11/01/2005 from www.telegraph.co.uk)

Two elderly women died within feet of each other in neighbouring houses, overcome by the floodwater that engulfed Carlisle at the weekend, it emerged yesterday.

Margaret Threlkeld, 79, and Margaret Porter, 85, are thought to have died at about the same time, neither able to summon help from those milling about in the street outside.

Digital Vision

Reynolds Geo-Sciences Ltd

Drought is already a serious problem in many parts of the world and climate change is making it worse.

Global

- The level of the sea could rise by 10cm–90cm (almost 1 metre). This would mean that as many as 90 million people around the world could have their homes flooded every year. This is a lot if you think that about 60 million people live in the UK.
- In many countries the amount of rainfall may change so about 3 billion people could have more problems getting the water they need for drinking, cooking, washing and for watering their crops.
- Many people in places like Asia and Africa may not be able to grow the crops they need to survive so there could be more famines.
- Diseases, like malaria, that prefer hot temperatures may spread to more places in the world as the temperature goes up.
- Most of the countries where the effects will be worse are very poor and already have problems with drought and famine.

The Imja Tsho lake in Nepal has been put on the danger list by experts. Rising temperatures are causing the nearby Imja Glacier to melt, which is threatening the lake to burst.

The fate of the two pensioners put into perspective the trauma of hundreds of their neighbours made homeless after the River Eden and its tributaries burst their banks. The floods, the worst in Carlisle since 1822, took hold after a massive cloudburst unleashed two months' rainfall in 24 hours.

Around 10,000 people had to be evacuated from their homes.

Global—Himalaya

In November 2004, the youngest and fastest men to climb Everest called on UNESCO to place Everest National Park on the Danger List because of the rapid impacts of climate change on the region. Temba Tsheri Sherpa and Pemba Dorje Sherpa warned that unless urgent action is taken, many Himalayan lakes could burst, threatening the lives of thousands and destroying an irreplaceable environment.

The melting of Himalayan glaciers as a result of climate change has swollen the Himalayan lakes, increasing the risk of catastrophic flooding.

There is wide agreement that many lakes are at risk, but a lack of monitoring limits realistic assessments of how close they are to bursting.

Putting Everest National Park on the Danger List would mean UNESCO would have to assess Nepal's glacial lakes and stabilise those most at risk.

Case study 3: Effects on wildlife/biodiversity

Local

Cod and chips, spring daffodils, village greens and Christmas trees are some of the things that people associate with Britain. But they could all disappear by 2050 because of the effects of climate change.

The picture is especially bleak for daffodils, as warmer winter temperatures may threaten these flowers along with bluebells and crocuses. Cod may have to be replaced with tuna, as dwindling cod stocks are further affected by warmer seas. Spruce plantations could die as they no longer have sufficient cold spells in the winter to allow them to grow in the spring. This would hit the Christmas tree trade. Summer drought, soaring temperatures and water restrictions could spell the end for traditional village greens and golf courses.

Global – polar bears

In the Arctic, climate change impacts will be seen earlier and more dramatically than elsewhere in the world. Arctic indigenous communities are already noticing some of these changes: warmer winters, earlier break-up of ice in the spring, and thinner ice year round.

In the southern range of polar bears, for example the Hudson and James Bays of Canada, sea ice is now melting earlier in the spring and forming later in the autumn. The time bears have on the ice, storing up energy for the summer and autumn when there is little available food, is becoming shorter. As the periods without food become longer, the overall body condition of these polar bears declines. This is particularly serious for bears that are pregnant or have cubs, and for the cubs themselves. In Hudson Bay, scientists have found the main cause of death for cubs to be either lack of food or lack of fat on nursing mothers.

Hugh Threlfall / Arany

Ingram Publishing

Cod stocks are dwindling as rising temperatures are warming up the seas.

Climate change and thinning of sea ice have already shortened the time mother polar bears have to feed and build the fat that enables them to sustain themselves and feed their young.

Solutions to climate change

Fact 1: There are more than enough natural sources of energy to meet our energy needs many times over but large amounts of money will need to be invested in new technologies.

Fact 2: Lots and lots of solar energy hits the earth every day – if we could harness it we could generate 10,000 times more energy than the world currently uses.

Fact 3: The UK is the windiest country in Europe – it has the largest potential off-shore wind resource in the world, enough to power the country's electricity needs nearly three times over.

We need to act now to reduce the effects of climate change. It's all about reducing CO₂ emissions, reducing the demand for energy, using renewable sources of energy and cleaning up our use of fossil fuels.

The Kyoto Protocol

The Kyoto Protocol is an agreement between countries to reduce the amount of greenhouse gases they produce. The wording of this agreement was written and voted on in Kyoto, Japan, on 11 December 1997. Developed countries agreed to contribute to reducing greenhouse gases emissions by 5 per cent of their levels in 1990, by 2012. The UK's contribution is to reduce its baseline emissions of six major greenhouse gases by 12.5 per cent. However, the UK Government has also set a target to reduce carbon dioxide emissions to 20 per cent beneath that baseline by 2010.

The Protocol came into effect and became a Treaty when countries accounting for 55 per cent of greenhouse gas emissions in the world signed up to the Protocol. Russia has just ratified the agreement meaning it is now legally binding. The US (the biggest emitter of greenhouse gases) and Australia have not signed the agreement.

Developed countries are largely to blame for climate change. Western nations' CO₂ emissions are up to 25 times higher per head of population than in developing countries and it is believed that 20 per cent of the world's population use 80 per cent of the world's resources.

Renewable energy

We are surrounded by clean, natural and inexhaustible energy sources such as solar and wind power. They are known as 'clean' energy sources as they do not emit greenhouse gases including CO₂ into the atmosphere. As well as the urgent environmental need for clean energy, it also has many social and economic benefits such as creating new jobs.

- Solar power uses solar panels to capture the energy in sunlight to make electricity and heat water. The Sun is the greatest source of most of the world's energy.
- Wind power uses wind turbines to harness the energy from the wind to make electricity.
- Hydroelectric power uses moving water to make electricity. It involves controlling running water to capture its energy.
- Biomass power involves burning wood and other plants. This is a renewable source of energy provided we replant the trees we use.
- Geothermal energy uses the steam from underground water heated up from the hot magma in the centre of the earth to create electricity.
- Heat pumps use the natural difference between underground and above ground temperatures to heat and cool homes.

Installing solar panels on the roof of your home will cut electricity bills and help cut carbon emissions.

Once we have enough renewable electricity it can be used to generate heat and to power vehicles. By moving away from polluting technologies to cleaner, renewable energy and more energy efficient solutions, we can reduce emissions and tackle climate change.

Glossary

Atmosphere —
the mass of gases surrounding the Earth.

Baseline emissions —
starting point from which emissions are compared.

CO₂ emissions —
the amount of carbon dioxide released into the atmosphere.

Renewable energy —
energy sources that are immediately replaced as we use them. This means they will not run out.

Energy efficiency

Being energy efficient means being able to meet our energy needs today without compromising the resources of tomorrow. It means using the energy we have wisely. Specifically, in order to maintain long-term energy supplies, we must not use energy wastefully, we must develop alternative sources of energy and we must protect the environment. By improving how we use energy today, we can reduce greenhouse gas emissions and help slow climate change – that's good for our health, the environment and our children's future.

We can all:

- Save energy in the buildings we use
- Cut down on car journeys
- Reduce air journeys
- Reduce waste and recycle more

It is also our responsibility to spread the word, talk to others and ask questions about climate change and what can be done.

The big ask

Find out what the Government, your local council, your community, your school, your youth club, your faith group, your family and your friends are doing to help stop climate change.

What are some schools doing?

Below are examples of what some schools are doing to tackle climate change.

Medina High School at Newport, on the Isle of Wight, has installed solar panels to reduce electricity bills.

The first wind turbine to be installed at a school site in mainland Britain has been established at Cassop Primary School in County Durham. The wind turbine produces approximately twice the school's electricity requirements; the surplus power is sold back to the National Grid.

Cassop Primary also has a wood pellet boiler which generates heat – the wood used for the pellets is waste which would otherwise have gone to landfill. It also has solar PV panels – with a 50 per cent grant from DTIs Energy Saving Trust and top up grant from Scottish Power. The children at the school have designed an interactive display panel with information from the turbine, and it is hoped that weather data will be added to it. The school's green initiatives were funded by Durham County Council, Northern Electric plc, the Energy Saving Trust and Scottish Power.

South Somerset District Council, is launching a 'windy schools' initiative, which will involve eight local schools. The Government's Clear Skies grants will provide 50 per cent of the costs.

Maidstone Borough Council's Primrose Promise will be launched at All Saints School Primary School when every child will be given a primrose as a symbol of the council's commitment to become carbon neutral by 2010. Primroses were chosen as they are an indicator of how the seasons are changing. Scientists estimate that primroses are now flowering up to six weeks earlier than they did just 30 years ago.



Booklet 03

Solutions to climate change

Activities



Eco-designs
Time: 40–60 minutes

What you need: stationery, art materials, ICT
Curriculum links: Science, DT, Art, ICT
Learning aim: to encourage young people to think about the role of the motor car in climate change and what alternatives to fossil fuels could be used.

Extension activity:
Re-design everyday objects to make them more environmentally friendly.
Ask young people to bring in any renewable energy powered items such as solar powered calculators or wind up toys. Use these to look at energy transfer and transformations

Travel survey
Time: 20 minutes

What you need: stationery, survey
Curriculum links: Citizenship, English, Maths
Learning aim: young people will be encouraged to think about how they travel to school, how this impacts on climate change and if there are alternative ways.
Find out how your classmates/friends travel to school/youth club. Perhaps a few people from different classes are travelling from the same area at the same time but in separate cars. They might want to share lifts. Perhaps some of your classmates want to walk to school but don't want to walk on their own – maybe they could walk with someone else.
This can also be used in an assembly setting. Ask young people to either put their hands up or stand up when asked how they travel to school.

Extension activities:
Make a chart showing how your class travel to school.
Do a traffic count of the number of cars, bicycles and pedestrians going past your building at a certain time.
Make a note of how many cars only have one person in them.

Example survey:

Method of travel	Number
Walk	
Cycle	
Use a train	
Use a bus	
Driven in a car (only child)	
Efficient small car	
Inefficient large car	
Share a lift to school with friends	
If you are driven in a car, would you like to get to school in another way?	

World conference role play
Time: 30 minutes

What you need: World conference roles (photocopy and hand out)
Curriculum links: Citizenship, Geography, English
Learning aim: encourage young people to see different points of view and to think about how different groups' views can be accommodated whilst taking action on climate change.

Extension Activity:
Drop the roles and ask young people to vote on who they think had the strongest argument.

Using the roles provided, set up a world conference to debate how different groups view climate change. Each group can prepare a one minute speech to convince the others.
Can an agreement be achieved?

Booklet 03

Solutions to climate change

World conference roles

Photocopy and cut into strips

- 1. Chair of the World Conference**
Your job is to remain neutral and to try and find an agreement on how to tackle climate change. Make sure everyone gets heard and that people don't start talking over each other.
- 2. Petrol company Chairman**
"Fossil fuels don't cause climate change. The world's temperatures have always gone up and down. We need to drill for oil and gas more than ever because people are using more and more energy. My business is making money for my company and that's not illegal."
- 3. Airline company worker**
"If people want to fly half way across the world for the weekend why shouldn't they? I'm pleased that air journeys are so cheap – why should we pay tax on airline fuel? This is about consumer choice and freedom to do what you want when you want."
- 4. Wildlife expert with special interest in arctic species like polar bears**
"Scientists are predicting that as global warming gets worse the arctic will start to melt and polar bears will lose their habitat. Sea levels will rise and many coastal habitats for birds will disappear under water too."
- 5. Citizen of poor, low-lying country like Bangladesh**
"We use a tiny amount of the energy rich people use in the West, but if climate change gets worse flooding will ruin my country leaving millions of people homeless. Please stop burning fossil fuels now. You have the know-how and the money to invest in clean energy – why don't you just do it?"
- 6. Politician with a small majority from an area in the UK where most people work in the local power station**
"I'm not concerned with what's happening on the other side of the world. I'm just worried about jobs in my town. If the power station closes down people here will lose out."
- 7. Wind power company Chairman**
"Wind energy has enormous potential which we haven't explored. The UK is the windiest country in Europe. My company can create jobs in areas where they are scarce, and wind energy is clean energy which doesn't produce CO₂."

We all play a part in causing climate change and we must all be part of the solution

This isn't a problem we can wait to tackle and as global citizens we need to do something about it. The actions that we take every day impact not only upon our local area and community, but also on communities and environments globally.

Government action is essential

Climate change requires international co-operation which only our global leaders can negotiate. Industrialised countries must make large emissions reductions in their own countries.

Governments can:

- Introduce new laws and taxes to encourage cleaner technologies
- Clean up inefficient, polluting industries including dirty power stations
- Force car manufacturers to make more efficient cars
- Make fossil fuel companies switch to renewable fuels
- Invest in alternative transport options
- Plan for more energy efficient homes

They must also help vulnerable countries cope with the effects of climate change. All countries must be able to choose climate-friendly technologies and provide clean and affordable energy sources for their citizens.

Use less energy

Asking our leaders to tackle climate change is one of the most important things we can do, but there are everyday actions that can also help. Each of us can take responsibility for how much energy we use. Using less energy means the amount of energy we need to produce is reduced. Turning off light bulbs when we leave a room, making sure our TVs and videos aren't left on standby all make a real difference. Walking or cycling instead of using a car, cutting down on waste and recycling more also help.

Did you know?

- If every standby button on TV sets and videos in the UK were switched off we would save the power equivalent to about half the annual output of a typical power station
- If everyone boiled only the water they needed, instead of filling the kettle, it would save enough electricity in a year to run more than three-quarters of the street lighting in the entire country.
- If every household changed just two ordinary light bulbs for energy efficient ones, enough electricity would be saved each year to power all the street lighting in the UK.
- The average household could save around £200 a year by taking energy efficient measures. This is equivalent to a saving of around two tonnes of CO₂ per year.

Glossary

Industrialised countries —
countries whose economies are based on industrial production, generally located in the northern and western hemispheres.

Alternative transport options —
this could be travelling by train, cycle lanes and walking school buses.

Booklet 04

What can we do?

Activities

The big ask - what would you ask?

Time: 20–30 minutes

What you need: board/flipchart

Curriculum links: Citizenship, English

Learning aim: to get young people thinking about who is responsible for climate change and for finding solutions to stop it.

For young people to discuss in groups or individually:

'If you could ask anyone in the world a question about climate change, who would it be and what would you ask?'

Write a letter to the person asking them your question.

Home energy survey

Time: 20 minutes

What you need: survey sheet

Curriculum links: Geography, English

Learning aim: to encourage young people to think about simple solutions to climate change around the home and how the whole family can get involved.

Ask young people to carry out this survey at home. Discuss the results.

How did their families react?

Are they going to implement any changes?

Extension activity:

We'd love to know what you want to ask here at Friends of the Earth. Send us a photo of you holding your question.

Extension activities:

Present the data collected in graphs, tables and pie charts.

Discussion: How to reduce energy use in your school/youth club.

Present the results with recommendations to your head teacher/youth centre manager.

Do an energy trial: Get a copy of the school energy bill from this time last year to see how much money is being spent on gas and electricity. Compare the bills in a few months time after you have implemented some energy saving ideas.

Have the bills gone down?

School energy survey

Time: 20–40 minutes over 2/3 sessions

What you need: survey, stationery

Curriculum links: Citizenship, Geography, Science, English, Maths, ICT

Learning aim: to help young people to make the connection between what decisions are taken at their school/youth club and how this impacts on climate change.

Use the school energy survey to find out how environmentally friendly your school/youth club is and what it's doing to help stop climate change.

Booklet 04

What can we do?

Survey

Home energy survey

How environmentally friendly is your home? Is it helping to fight climate change or is it costing the earth and costing you money?

Question	Yes	No	Tips – to save your family money and reduce your CO ₂ emissions
Are there any drafts around your home's windows and doors?			By draft excluding you could save money on your heating bill
Are there any curtains or furniture in front of your radiators?			Anything in front of your radiators will block the heat
When you are cold, do you turn up the heating or put a jumper on?			Save money by putting a jumper on
Does your home have a programmable thermostat?			Turn the room temperature down by one degree centigrade. This can save up to £30 a year
Are your home's walls insulated?			Insulation in your walls helps to keep your heat in, the cold out and will save you money on your heating bill
Are your home's hot-water pipes insulated?			Reduce heat loss by insulating pipes and save money on your hot-water heating bill
Does your loft have insulation?			Insulating your loft helps to keep your heat in, the cold out and will save you money on your heating bill
Do you leave lights and electrical appliances on when they're not in use?			Leaving lights on in rooms that are not being used is a waste of energy and costs you money on your bill
Do you have any low energy light bulbs in your home?			Low energy or energy efficient light bulbs produce less waste heat and last up to ten times longer than ordinary bulbs
Do you leave electrical appliances on standby?			Switch appliances off properly as they use energy even on standby. 85 per cent of the energy used by a DVD is wasted when it is not in use. Saves up to £11 a year
Do any of your electrical appliances have an energy efficiency logo?			A rating is the best – look at the Energy Savings Trust website for more details
Are your clothes washed on a hot or cool cycle?			Wash laundry loads on the low-temperature programme to save energy that would heat the water
Is a tumble dryer used to dry your clothes?			In summer dry your clothes outside or if you have to use a tumble dryer, don't put really wet clothes inside
Is a microwave oven used to cook small amounts of food?			Microwaves save money because you don't waste energy heating containers or air – as is the case in half-empty ovens
Do you use lids on your saucepans when cooking your food?			Put a lid on saucepans, so the contents heat quicker and you use less energy
Do you recycle in your home?			Recycling not only cuts down on the amount of waste going to landfill, it helps to reduce the amount of energy that would be used to make new products from raw materials
Do you have a bath rather than a shower?			An ordinary shower uses only two-fifths of the water needed for a bath. Power showers use as much as a bath, and sometimes even more
Do you have an adjustable thermostat on your hot water tank?			Turn the thermostat on your hot-water tank down to 60 degrees centigrade rather than adding lots of cold water to your bath. Saving: £10 a year
Do you have more than one car?			Cars produce more emissions than taking the bus, tram, train or walking or cycling
If you have a car, does it do more than 50 miles to the gallon?			Smaller cars and new 'hybrids' that use electricity as well as petrol produce much less emissions than big cars.

Get your neighbours and friends to carry out this survey and see how energy efficient they are. For more tips visit:

www.foe.co.uk/living/cpoundsavers/save_energy.html

Booklet 04

What can we do?

Survey

School energy survey

Walk round your school or youth club and make a note of the following:

Question	Yes	No
Have a look at all the rooms in the building where you are. Are all the lights turned off in empty rooms?		
Are all unused computers or other electrical appliances turned off? (This includes the monitor.) Put a tick in the 'No' column for each item left on.		
Are there any energy efficient light bulbs/compact fluorescent light bulbs in your building?		
How is the building heated?		
Are all windows and doors closed so there are no drafts?		
Does the building have double glazing?		
Does your school or club have coaches or a bus to bring people there?		
Does your school/youth group encourage car-sharing?		
Is there anywhere to recycle paper, cans and plastic bottles in your building?		
Is recycled paper used in your building?		
Are there any renewable energy sources in your school? Eg solar panels, a wind turbine (If yes have three ticks!)		

Scoring system

You get one point for each tick in the yes column but lose a point for each tick in the no column.

Add up your final score and check how you did below.

7 points or more

Well done! Your school/youth club is making a good start towards helping stop climate change and caring for the environment.

1 - 6 points

OK, your school/youth club knows a few things that can be done to help stop climate change but don't forget to keep trying and encourage them to do more.

0 points or less

Oh dear! You need to speak to your friends, teacher or youth worker about what else you could do in your building to help stop climate change. Have a look at the Friends of the Earth website for some more ideas.

