The basics of climate change

1. UNDERLYING PRINCIPLES

The underlying science behind the greenhouse effect is not hard to understand or explain. It is based on three principles:

1. In the mid 19th century scientists found in the laboratory that each gas has a different capacity to retain and hold heat. Oxygen and Nitrogen loose heat rapidly- Carbon Dioxide, however, is very good at holding heat.

2. The ability of some gases to retain heat is very important for the functioning of the atmosphere. They allow the suns rays pass through the atmosphere and warm the earth and then they prevent that heat from being radiated back into space. They function like the glass in a greenhouse- letting through the suns rays and then holding in the heat. That's why this is called the greenhouse effect.

3. The gases that have the quality of retaining heat in the atmosphere are called the greenhouse gases. The most important one is Carbon Dioxide. There are other gases in the atmosphere which are far more powerful but are present in far smaller concentrations . Methane retains 25 times as much heat as Carbon Dioxide; Nitrous Oxide 320 times.

Climate change can be summed up in two sentences:

o Different gases have different capacities to retain heat.
o When we change the gases in the atmosphere, we will change the way that it holds in the heat from the sun.

It is important to remember that the greenhouse effect is not a bad thing in itself- if we didn't have the greenhouse gases in our atmosphere the earth would be as cold as the moon. They are like a blanket that keeps us warm and make life possible.

2. THE PROBLEM

Our whole economy is based on burning oil, gas or coal, called fossil fuels. We can't see most of these fires, but just imagine every car on the motorway as a roaring fire, every electricity powerstation as a huge inferno. We all contribute to this through our carbon intensive lifestyle, our cars, home heating, and air travel.

** Talk of the wasteful things we do. Exotic green beans in supermarkets flown by air from Africa. We spend hours every day sitting in traffic jams. We build heated conservatories that double a houses energy consumption. We fly huge distances for a week in the sun.*

Every time we burn these fuels we produce more waste carbon dioxide. A lot more; 8 billion tons a year in fact. Within 50 years we will have twice as much Carbon Dioxide in the atmosphere as we had before industrialisation.

Burning also produces Nitrous Oxides another powerful greenhouse gas. We are also dumping new gases in the atmosphere. CFC's (Chloroflourocarbons) are used in refridgerators and, although they are present in tiny quantities relative to carbon dioxide they are 9,000 times more powerful at retaining heat (which is what made them so good for refridgeration in the first place!)

The change in the atmosphere will mean that far more of the sun's energy is held within the climate systems, throwing all existing climate systems into chaos. Computer predictions estimate global temperature increases over the next 100 years of across the world by up to 6°C. Scientists know of

no time when temperatures have risen faster and beyond 2°C increase find it hard to make reliable predictions of the actual effects in the weather. In the next fifty years we will see ever increasing extremes of weather. More storms, floods, droughts.

The natural world will not be able to adjust fast enough. By 2050 climate change will have directly led to the extinction of 30% of species, the death of 90% of coral reefs and the loss of half the Amazon rainforest.

3. MAIN POINTS TO STRESS

DANGEROUS EXPERIMENT

It is absolute scientific fact that the changes we are making to the concentrations of different gases will effect the way the atmosphere behaves. The only areas of debate is how serious the impacts are likely to be. This is a huge a very dangerous experiment with something we don't understand.

WEIGHT OF SCIENTIFIC OPINION

Over 2,000 scientists are directly working on the United Nations to study this problem and its impacts. This is one of the largest mobilisations of scientific research ever undertaken. All the scientists agree that we have a huge problem. In 1997 3,000 scientists signed a Statement on Climatic Disruption. Also in 1977 1,500 scientists including 110 Nobel Prize winners, signed a letter to US President Clinton calling for immediate action. In 1999 the 35,000 scientists in the US Geophysical Union adopted a position calling for action. In May 2001, the national scientific academies of 17 nations including the UK Royal Society signed a statement calling for action.

IF WE DON'T TAKE ACTION IT WILL BECOME FAR WORSE

Beyond 2050 we face the acceleration of the process of climate change. Carbon and methane stored in soils and oceans will start to leak into the air and the natural processes in forests and oceans that remove carbon dioxide from the air will break down.

THE LANGUAGE IS MISLEADING AND SHOULD BE CHALLENGED

The jargon does not reflect the seriousness of the situation.

* Climate change suggests a slow and steady predictable change. In reality we face a rapid and chaotic flip-flop between extreme weather events.
* Global warming suggests a slow steady increase in temperatures, like warming a bath. In reality it will not be steady, and local weather choas may include extremes of cold as well as heat.
* Talking of Climate suggests something scientific and outside people's concern. But the reality in people's lives will concern violent changes in weather.
* Scientists talk of the uncertainties of climate change. There are no uncertainties about the reality of change, only the exact nature those changes will take.

CLIMATE CHANGE HAS ALREADY STARTED

This is not some vague future threat. All around the world rapid changes in the weather are already happening.

Every one of the hottest 15 years on record has occurred since 1980 – the hottest five since 1997.

The 12 months up to March 2001 were the wettest in Britain since records began in 1730. Scientists argue that it was the wettest in at least 500 years.

2005 was the second warmest year on record. Researchers linking the warming to a record US hurricane season, accelerated melting of Arctic sea ice and Siberian permafrost, and apparent disruption of the global ocean current that warms Europe.

The US winter of 1999-2000 was the mildest since records began. The winter of 2000-2001 was the coldest since records began. This is an example of the "flip-flop in extreme weather.

Mozambique in 2000 had the worst floods in 50 years displacing 100,000 people

Northwest India had the worst drought in 100 years in 2000

1998 was the warmest year recorded since 1860, the earliest year for which a precise global estimate is possible. 2002 and 2003 tie for second place. The UK's Meteorological Office predicts that 2007 will be hottest still.

** Collect cuttings from recent newspaper reports of record breaking weather*

TRAPS TO BE WARY OF

* Don't get bogged down in the atmospheric science- stress the causes and impacts.
* Don't say the Greenhouse Effect is the problem. It's the emission of greenhouse gases which is the problem.
* Don't say sea level rises are because of melting ice caps- the expansion of water as it heats up is far more important.
* Don't say Britain is all going under water- for the next 50 years sea level rises will effect only some coastal regions.
* Don't get confused with the hole in the ozone layer- there are connections between the two, but they are complex and the ozone hole does not directly lead to climate change.