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Nicola Davies

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"I can't understand why the reaction in the UK to extreme climate change is to turn the newspaper over and start reading an article about the latest tartan-bikini trend."

CARRI SWANN

(In 2006, when she was 15, Carri was chosen by the Department of Environment, Food and Rural Affairs to be a "Climate Champion" and spread the word about climate change.)

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The low-lying Netherlands have always suffered from floods, but rising sea-levels have made people interested in buying floating houses like these.

www.ecoboot.nl

Piles of concrete blocks protect Male, the capital of the Maldives, from storms and rising sea-levels.

Eagan, Bluepeace

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UNLESS you've been hiding under a stone for years, you'll have heard about climate change: all those scary predictions about melting ice-caps, killer storms, rising sea-levels and severe droughts. But maybe you've been telling yourself, "Oh, it won't REALLY happen," or "It won't happen for a hundred years."

Well, it's happening right now, **already**, all over the world.

The sea ice in the Arctic has melted to the smallest area ever recorded, and in 2002 an ice shelf in Antarctica the size of Luxembourg broke up and disappeared. The strength of storms, cyclones and hurricanes is increasing, and since the 1960s the number of people whose homes get flooded every year has risen from 7 million to 150 million. Male, the capital city of the Maldives (a country made entirely from tiny islands in the Indian Ocean), has had to build a wall 3.5m high to keep out the rising sea, and the people of Tuvalu – another nation of islands, in the South Pacific – are trying to negotiate settlement rights in New Zealand, ready for when their whole country disappears under the waves. The people of the Netherlands are building floating houses to prepare for the flooding of their low-lying country, while in Western Australia farmers are struggling with declines in rainfall that threaten to put them out of business.

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That's just a few of the many thousands of examples of the effects climate change is already having on human lives around the world. In our lifetimes, and the lifetimes of our children and grandchildren, climate change is going to be the biggest challenge human beings have ever had to face.

Yes, it's a real drag that we should be alive at **just** the time when it's all going a bit wrong, and yes, it **is** scary, but sticking our fingers in our ears and going "La la la, it's not happening!" isn't going to help. Neither is going round being gloomy, and telling everyone you meet that "We're doomed, all doomed."

Climate change **is** happening, but we're **not** doomed. We can't stop it, but we could slow it down and we could prepare for its effects. It's going to be a big job, and it'll mean changing almost everything about the way we live now – how we light and heat our homes, what transport we use, how we design buildings, how we grow food, how we handle disasters and diseases, even how people and countries work out, together, what's fair and what isn't.

It isn't going to be easy, but it isn't going to be boring, either. In fact, we could all be about to participate in the most exciting period in human history. Never mind "Xbox" and "Wii", "orcs", "Sauron" and "Voldemort"; this is the **REAL** battle, the battle to save ourselves and our planet from climate catastrophe.

The good news about this battle is that it isn't going to involve guns, blood and killing; the weapons you'll need to help fight it are ideas, energy and determination. The even better news is that there are already lots of people out there fighting, and actually enjoying being part of such an exciting and

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challenging struggle. Who knows, if you join them, we might just save the world.

> **“Humans never change unless we have to. And finally, we have to.”**
>
> *SEVERN CULLIS SUZUKI*

(Severn is a young Canadian who has been sticking up for our planet since she spoke to the 1992 UN Earth Summit in Río de Janeiro when she was 12.)

There are about a trillion books and websites that will tell you all you could ever possibly want to know about climate change (you'll find some of the most useful ones listed at the back of this book). The aim of this section isn't to compete with all these, but to give you a guide to some of the main points. It's in the form of answers to questions that people often ask, especially people who aren't sure that they really believe "the whole global warming thing". So even if you already know all there is to know, you might find these answers useful if you're trying to convince someone that climate change isn't something made up by a worldwide conspiracy of job-seeking scientists and that the greenhouse effect is not a mental illness suffered by gardeners.

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“Global warming – the great big lie. How can they say the Earth is warming up? Just look at our summers – once again this year it is rain, rain, rain and more rain.”

Contributor to the SUN newspaper online discussion

(Someone taking a short-term and short-sighted view of climate change, and getting in a muddle).

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WHAT IS CLIMATE CHANGE?

The first thing to understand is that **climate and weather are not the same thing**. As science-fiction writer Robert A. Heinlein once said, "Climate is what you expect, but weather is what you get." But you already know this. You know that a summer picnic is a better bet than a winter one, but that the weather on the day of the picnic could make the summer picnic wet, and the winter one dry (you know this especially well if you live in the UK).

Getting climate and weather muddled up can create confusion: another famous writer, Michael Crichton (who wrote *Jurassic Park* and *Twister*), was doing just that when he wondered how scientists can claim that the climate is changing when they can't get weather forecasts right. Day-to-day weather may be very unpredictable, as we all know, but over years and decades the ups and downs in temperature, wind and rain can be seen to be part of a stable and predictable pattern; that pattern is what we call climate.

Because climate is a pattern that reveals itself only over many years, you can't look at climate in close-up; it has to be the big picture. A single bit of weather – an extra-hot summer month or an unusually fierce storm – tells you as much about climate as the trunk of a single tree tells you about the whole forest. But a STRING of hot summers or a rise in the number and ferocity of storms over several years could show that the big picture – the long-term pattern of climate – is shifting, and that climate **is** changing.

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That is what's happening to the Earth right now. The long-term records of weather all over the world (see *How Do We Know That Climate Is Changing?*, page 25) show that the pattern isn't the same as it was 100 or even 50 years ago. The Earth is undergoing climate change. Overall, the planet is getting hotter, which is why some people call what's happening "global warming" or "global heating". But the Earth's increasing temperature could affect all sorts of aspects of the climate – rainfall patterns, winds and storms – so I'm going to use the term "climate change". It seems to be the most commonly used label these days anyhow.

The other term you might come across that's used to describe what's happening to our planet is "the greenhouse effect". It's worth understanding this one, because it actually tells you something about what causes climate change/global warming/global heating.

The greenhouse effect isn't a bad thing; without it we'd be like the moon, boiling when the sun's up and colder than a freezer after sunset, with an average temperature of –18°C! But, unlike the moon, we have an atmosphere which stops us getting too hot or too cold. The atmosphere, along with its clouds and dust, reflects some of the sun's light straight back to space, so it never has a chance to heat us. The remaining sunlight makes it to ground level and is absorbed by the Earth's surface, which heats up. Without an atmosphere, all that heat would be lost straight back into space, so the moment the sun went down we'd be freezing cold again. But the atmosphere traps some of the heat, soaks it up and then radiates it out again: some of it goes up and out into space, and some goes down to the Earth's surface.

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This balance of keeping heat in and letting heat out is how the atmosphere keeps us comfortably cosy. (This isn't the way a greenhouse works, but the atmosphere and greenhouse glass both keep what's underneath them warm, so the name has stuck.)

The bad news is that the balance of heating and cooling has been upset. The atmosphere today is trapping more heat than it is losing. In other words, we now have a bigger greenhouse effect than we need, and it's making the Earth hotter and changing our climate.

As the Earth's climate gets hotter, deserts could expand.

Mark Maslin

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