Hello. I'm Dr Alex Lathbridge and this is Bitesize Biology.

This is the seventh and final episode in our series on ecology.

In this episode we're going to talk about something very important: climate change and global warming.

Before listening to this episode, you should have some idea about human impacts on the environment, things like deforestation. If you need a refresher, go back and listen to the last episode.

We need to get one thing very clear: no matter what some people might claim, climate change is not a myth, a hoax, nor is it a conspiracy. It's a real issue.

For you to understand why this topic is such a big deal, we need to start with something known as the greenhouse effect, so grab a pen and make a note.

The temperature on earth is maintained by energy being absorbed from the sun. Some of this energy, about 30 percent, is radiated back out to space.

In our atmosphere, there are gases such as methane and carbon dioxide. They absorb a lot of this energy that would otherwise radiate back all the way out into space, and they re-radiate it in a lot of directions, including back down to Earth.

We call this the greenhouse effect because, in the same way that glass keeps a greenhouse insulated so it's warm, these gases help retain some of the energy that would radiate back to space, keeping our planet warm.

To define it: the greenhouse effect is the retention of heat in the atmosphere, caused by a build-up of greenhouse gases such as carbon dioxide, water vapour and methane.

So, what does this tell us?

It says that the greenhouse effect (without recent human activities) is a good and necessary thing.

Because without it, the average temperature on Earth would be minus 18 degrees Celsius, and so it basically keeps Earth at a suitable temperature for most organisms to live.

"Alright Alex, why does it sound like you're gearing up to tell me something bad?"

Because, like glass on a greenhouse has to be a certain thickness to keep the perfect temperature inside, more greenhouse gases mean a much stronger greenhouse effect.

A stronger greenhouse effect means more energy is retained and the average temperature of the earth's surface increases.

This is known as global warming, one of the types of climate change (no, global warming and climate change aren't the same thing.)

Human activity from burning fossil fuels in power stations and in vehicles, and from farming livestock, is increasing the greenhouse effect and causing global warming by increasing the amount of carbon dioxide and methane in the atmosphere.

Listen to the last episode if you need a reminder.

This is something that the scientific community have agreed on and is based on peer-reviewed evidence. Peer review is the process of scientists evaluating each other's work to check that it's valid

The two main worries are carbon dioxide and methane, because their levels are sharply rising.

Even though carbon dioxide is a small part of the atmosphere, an increase in its level has big effects on the climate. Think about just how much energy the sun releases.

In the UK we have temperature measurements going back to the 1850s.

Experts from our National Weather Service report that each decade from the 1980s has been successively warmer than the decade before.

The average increase in temperature over the last 100 years is less than one degree Celsius.

This might not seem a huge change but think about just how big this planet is.

It's significantly difficult to heat up a planet on average by about one degree. And that has effects on other types of climate change, like heavier rainfall and stronger storms.

Alright so you might think, "global warming, it gets a bit warmer, so what?" Well, let's go through a few of the consequences in detail, make sure that you have a pen.

Firstly, biodiversity. If the Earth's temperature continues to increase, some species may not be able to adapt to temperature changes and so they won't survive. These organisms will become extinct, leading to a decrease in biodiversity. For example, a small rodent that lived only on a single island off of Australia was the first mammal to go extinct due to climate change.

In particular, because of the second effect: sea levels rising. When seas get warmer, they expand, which leads to a rise in sea levels. Ice also melts as temperatures increase, which runs into the sea, releasing more water and causing sea levels to rise.

If sea levels continue to rise in this way, humans and animals living in coastal and low-lying places could experience flooding, which will damage habitats.

That brings us to the third effect: changing migration patterns. It's common for birds to migrate to different areas of the world in different seasons. An increase in the Earth's temperature could change migration patterns, where they travel to different areas at differing times to before.

And finally, the distribution of organisms. Plants and animals live in areas where they can access the resources that they require to best survive. This distribution of organisms in different habitats may change if the temperature of the Earth continues to increase. Species which need cooler temperatures to survive, will have smaller areas in which they can live optimally, so they will be distributed differently.

Alright, so by now you should know that bad things are happening.

So what can be done? To start with, we need to cut our global emissions of greenhouse gases, for example, by burning less fossil fuels. There are positive things being done to help. For example, conservation.

Conservation is the preservation of ecosystems and the organisms that live within them. It helps to slow down the decrease in biodiversity caused by global warming. Remember, it's important that a high level of biodiversity is maintained so that ecosystems are stable.

Conservation scientists do lots of things to help maintain biodiversity. You need to know the names of these:

1. Breeding programmes. These help to preserve endangered species and stop them becoming extinct. Animals, such as pandas are bred in captivity (so not in the wild.)
2. Protection of habitats. Habitats can be endangered and rare. Examples of these are coral reefs, mangrove areas and heathland. Protected areas can be made into National Parks to protect the species that live in them.
3. Replanting hedgerows. There are higher levels of biodiversity in hedgerows than the fields that surround hedges. The fields might only be growing a single crop due to farming, but hedgerows provide a habitat for more organisms. So replanting hedges helps to increase the levels of biodiversity.
4. Reducing deforestation and the release of greenhouse gases. Some governments have made rules and laws to reduce the rate of deforestation and the release of carbon dioxide into the atmosphere.
5. Recycling. If more people and companies recycle, fewer raw materials will be needed to make products and less waste will be dumped in landfill sites.

It’s important to consider though, that us humans do need things like food and houses to survive, so we're stuck with these conflicting pressures when it comes to conservation.

The regeneration of habitats can be very expensive, and humans use land for important things that are necessary for our survival.

Let me try to end this on a positive note.

It’s vital for the planet that we understand the science.

Because, if you understand this stuff, then you can help to find solutions and, not just that, pass your exams. I want you to do both.

I’m Dr Alex Lathbridge and this is Bitesize Biology. To hear more, search Bitesize Biology on BBC Sounds.