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

This is the sixth episode in our series on Ecology, and today we're going to talk about biodiversity, how many different species of animals and plants exist.

We're also going to take a look at how humans have impacted the environment.

It's not good news.

But by knowing about it and caring about it, you can pass your exams and build a better future.

Tropical rainforests have millions of different species living in them, so we say they have high biodiversity.

Biodiversity is defined as the range of different species within an ecosystem, or across Earth.

So, areas like the north pole have far fewer species so we say they have low biodiversity or are less biodiverse.

But remember, it's all about variety. An area with very large populations of a small number of species is not a diverse habitat.

Remember, organisms are interdependent. They exist in complex food webs where different organisms depend on each other.

Ecosystems that have higher biodiversity will have fewer species that solely depend on just one other species for food, shelter or maintaining their environment.

This means that the more biodiverse an ecosystem is, the more stable it generally is, and so it can easily adjust to any changes.

So high diversity is important to maintain stable ecosystems.

Humans are also dependent on animals and plants too. So, the future of humanity on Earth depends on maintaining high biodiversity.

We're not somehow separate from our ecosystem, just because we have towns and cities. We rely on high biodiversity too.

Unfortunately, biodiversity is being reduced by human activities causing pollution, which destroys the habitats of organisms and can cause them to go extinct, reducing biodiversity.

We've talked about how population sizes of different species need to be in balance for stable communities, but one species has increased in size beyond all others: humans.

We currently have a record level of number of people alive on Earth.

In 2022 the human population exceeded eight billion. According to estimates from the United Nations, we'll hit 10.4 billion in around 2086.

So why are there so many of us? It's down to a few things:

Better health care enables people to live longer.

New medicines mean that people aren't dying of diseases that would have otherwise killed them.

Farmers can produce large amounts of food using new crop breeds and specialised equipment.

Some communities and religions do not allow the use of contraception, and in some parts of the world, it's really difficult to access.

Modern medicine and increased levels of food are good things for humans, but as the human population grows, the amount of pollution that humans produce, and the volume of waste also increases. This has a negative effect on ecosystems, habitats and organisms, which subsequently reduces biodiversity

Let's look at some specific ways that human activities cause pollution and waste:

Water Pollution. Sewage and chemicals can pollute streams, rivers and oceans.

If fertilisers from farms get into streams and rivers, they can cause algae to grow out of control, which stops other plants from getting the sunlight that they need for photosynthesis.

Air Pollution is caused by combustion (or burning) of fossil fuels, which releases carbon dioxide into the atmosphere. This contributes to the greenhouse effect and leads to global warming and climate change.

Land Pollution. Lots of humans means lots of rubbish. Rubbish gets put into landfills, which are holes in the ground. Some of this rubbish contains harmful chemicals, or doesn't break down, like plastics.

Land Use. The larger the human population gets, the more land that we use for building, farming, creating quarries, and dumping waste.This means that less land is available to other plants and animals, which decreases biodiversity.

Deforestation is the cutting down of trees and forests for a different use of the land.

Lots of humans with industrial machines can clear huge areas of forests to build on or for farming, for things like crops or cattle.

Deforestation destroys the habitats for organisms, and this subsequently kills many species, reducing biodiversity. Scientists estimate that several hundred species of plants, animals and insects are lost each day, partly due to deforestation. Deforestation is causing extinction and reducing biodiversity.

Deforestation also increases the amount of carbon dioxide being released into the atmosphere, as carbon dioxide is released when trees are burnt to clear the land.

Cutting down a large amount of trees also means that less carbon dioxide is taken in, or removed, from the atmosphere by photosynthesis.

Finally, we're going to look at peat bog destruction. Peat bogs are fascinating habitats and examiners love them. So even if this seems a bit random, it's important for you to learn about them.

Peat bogs are water-logged areas of land which are acidic and often have low levels of nutrients and oxygen. Because of this, the rate of decomposition is very low, and peat is formed from plants that are only partially decayed. This means that all the carbon in these plants is stored in the peat, rather than it being released into the atmosphere.

Peat bogs are very important stores of carbon, they're known as carbon sinks.

So why do you need to know this?

Peat has been removed from these peat bogs at rates that aren't sustainable, for things like fuel or for gardeners to use in their soil, because of the nutrients inside it.

When peat is removed from the bogs, it comes into contact with microorganisms that can decompose it, which releases carbon dioxide into the atmosphere as part of respiration.

I'm afraid there's no other way around this episode than facing the facts: human activity is increasing pollution levels and reducing biodiversity.

I'm Dr Alex Lathbridge and this is Bitesize Biology. Subscribe and listen now on BBC Sounds.