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

This is the fifth episode in our series on ecology and in this episode, we're going to talk about decomposition: dead things being broken down.

I've got some good news for you; you're going to die one day.

And when that happens, that bacteria that you have inside of us, like in your gut, will start breaking down your moist and warm corpses, essentially, digesting us from the inside out.

And the bacteria on our skin starts breaking us down from the outside in.

And with so many different processes going on, it can take anything from five to ten years to be left

It's the same way that rotting leaves shrivel up and die in the winter months. Or why oranges go bad when you leave them out for too long.

It's just decomposition. And it's a fact of life or death.

Decomposition is the breakdown of dead animals and plants, also known as dead matter and detritus.

If nobody ever died, we wouldn't have the resources to support us all.

In the same way, if no decomposition ever happened when things die, it would cause havoc to the world.

How come?

Well, decomposition is vital to allow energy to flow through an ecosystem.

When dead organisms decompose, they are broken down into simpler materials, making nutrients available for primary producers, like plants.

Without it, vital nutrients would be locked up inside dead matter, which is no good for an ecosystem.

Decomposition is just a chemical process that happens at the end of life. Like any chemical process, there are ways to accelerate it, and other ways to slow it down.

This process is normally done by decomposers, things like bacteria and fungi, as well as things that live in soil like worms and woodlice.

They use enzymes to break down dead animals and plants, fallen leaves and animal droppings. (We did a whole podcast episode on enzymes in our series on the cell, go back and listen on BBC Sounds.)

There are several factors that determine the speed of decomposition, which is just the rate at which something decays:

Temperature. In colder environments, decomposers are less active and so the rate of decomposition is low. This is why food is kept in a fridge where temperatures are cold, to stop decay and keep food

fresh. As temperatures get higher, decomposers become more active and the rate of decomposition increases. But, at really high temperatures decomposers will not survive and decomposition stops.

Water. In environments where there is little or no water, the rate of decomposition is low because decomposers can't survive without water. As the volume of water increases, the rate of decomposition does too. Water is important for decomposers as they use enzymes to break down decaying matter into simpler molecules which they absorb. These enzyme reactions cannot happen without water.

Oxygen also affects the rate of decomposition. Decomposers will not survive in environments where there is little or no oxygen. It is important for respiration, growth and allows them to multiply. As the amount of oxygen increases in an environment, the rate of decomposition does too. This is why we often seal food away in things like bags or containers before putting it into the fridge. The containers trap the oxygen, so no more is added, and the rate of decomposition is kept low.

Understanding these factors means that you can prevent decomposition.

This is why Ancient Egyptians wrapped dead humans (and sometimes their pets) in paper to preserve them, this is known as mummification.

The process removed all moisture and water from the dead bodies and so stopped decomposers from breaking down the dead body. Basically, they felt it was important to keep the body looking as close to life-like as possible.

On the subject of death and decay, let's have a chat about compost and manure.

Compost is a mixture of decayed organic matter, basically, dead plants and food.

Manure is the waste product from animals. If you've gone past a farm, you know what this smells like.

How do these two things relate to decomposition? Well, gardeners and farmers use compost or manure to improve the quality of their soil, which helps new plants to grow.

Once added to soil, compost and manure are broken down by decomposers in the soil like bacteria and worms, which release useful minerals. These minerals released from the decomposition process are then absorbed by any new plants, helping them to grow.

Now, there are some instances where decomposition occurs without oxygen.

Anaerobic decay happens when decomposers, such as bacteria and fungi, break down dead matter without oxygen (Remember anaerobic respiration? Anaerobic means without oxygen.)

This occurs naturally in places like water-logged soils, lakes and marshes. This also happens in peat bogs.

When people give their houseplants too much water (like me because I'm incompetent), it can flood the roots, and anaerobic decay can occur which unfortunately kills the plant.

The products of anaerobic decay are methane and carbon dioxide. Both are greenhouse gases which contribute towards global warming (but more on that later in this series.)

These two products are important because we can use them as biogas.

Biogas is a type of fuel that is made from the action of bacteria decomposing animal manure or other organic waste.

This process is a source of a renewable energy using natural resources (like manure) that doesn't run out.

Biogas generators are large, industrial vessels where animal waste, or crops grown specifically for biogas production (such as maize), are allowed to anaerobically decompose.

This release of methane gas is used by humans for cooking or heating.

Advances in renewable energy are always good, but biofuels do have some negatives, which I'll mention in the next episode.

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