Science & Math

Recycling the dead: how things decompose

Mushrooms are one type of fungus. It is a decomposer, which break is down dead organisms. One example is when leaves die in the fall. The leaves on the ground rot and decay. Decomposers, like mushrooms, help that process. Photo: Skitterphoto/Pexels

By Science News for Students, adapted by Newsela staff

All living things die. After, these things rot. This is how nature recycles things. Rot, also known as decay or decomposition, provides material for new life.

After something dead rots, then living things, plants and creatures alike, take the broken-apart pieces of those dead things to help them grow.

Carbon's Significance

How does this happen? Most dead things end up on or in the ground. Soil contains thousands of types of decomposers. Some are microbes like bacteria, which are organisms that have only one cell. Others, like fungi, can be clusters of cells. Even insects or worms can be decomposers. The decomposers break dead things down into chemical compounds.

Carbon is the most important chemical element. It is a big part of molecules like DNA or proteins that are used by life on Earth. As dead things rot, carbon-based molecules get released into the air, soil and water. Living things take these molecules to build new life. It's part of what scientists call the carbon cycle.

The carbon cycle starts with plants. In the presence of sunlight, green plants combine carbon dioxide from the air with water. This process, called photosynthesis, creates the simple sugar glucose. It's made of nothing more than the carbon, oxygen and hydrogen in those starting materials.

Plants use glucose and other sugars to grow. When plants die, carbon and other nutrients stay in their fibers. Stems, roots, wood, bark and leaves all contain these fibers. What do decomposers do to these fibers?

Rot Has Its Purpose

Leaves are made up of cells, and each cell is surrounded by tough walls. These walls contain molecules called cellulose. When a plant dies, microbes and even larger fungi break down these walls. The decomposer releases molecules called enzymes that speed up chemical reactions. Here, different enzymes help break apart chemical bonds that hold together cellulose. Breaking those bonds releases nutrients, including the sugar glucose.

The decomposer uses that sugar for growth and other activities. Along the way, it releases carbon dioxide back into the air as waste. That sends carbon back for reuse as part of that never-ending carbon cycle.

But carbon is far from the only thing that gets recycled this way. Rot also releases nitrogen, phosphorus and about two dozen other nutrients. Living things need these to grow and thrive.

It Happens All Around Us

Decay helps make soil that farmers need to grow food. It also keeps forests healthy and even helps make biofuels. That is why so many scientists are interested in decay. They're also interested in how climate change and pollution may affect decay.
But decomposition doesn't only happen in forests, farms and factories. It happens all around us and inside us. Did you know that microbes live inside our stomach and

intestines, and help digest the food we eat? There is still a lot we don't know about decomposition and microbes.

You can see for yourself how decay works by performing your own rotten science experiment: start a compost pile. Add kitchen and yard waste together in your backyard.

In just a few months, decomposition will change that dead plant material to fertile compost. You can then spread it on your lawn or in your garden to help new plants grow. Hooray for decay!