

2.5

The Role of Decomposers in Recycling Matter

▶ LEARNING TIP

Make connections to your prior knowledge. What do you already know about decomposers?

Earth is often compared to a spaceship (**Figure 1**). It has been launched, and nothing more can be added to it. Because a spaceship is closed, air and water must be recycled or the astronauts will die. The same is true on Earth. Life depends on the recycling of matter. How does this recycling occur? How much do we depend on the recycling of matter? What is the role of living things in the recycling of matter?

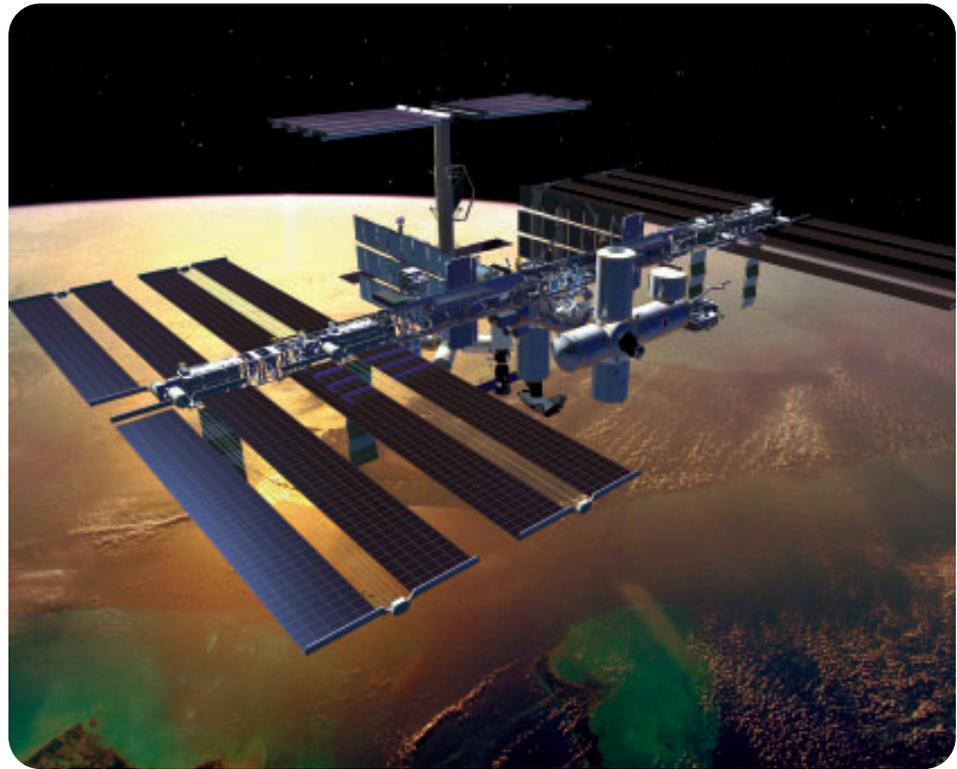


Figure 1

Life on this spaceship depends on careful recycling of matter, as does life on Earth.

Food chains and food webs show how matter and energy are moved from one organism to another. We often forget, however, about a very important part of this cycle: the decomposers (**Figure 2**). As decomposers break down their food, they use the last of the energy in the food chain. They also release nutrients. Nutrients are chemical substances that organisms need to grow and survive. Nutrients are released into the soil, water, or air. They can be taken up by plants and used again to help the plants grow. Decomposers keep matter moving between the living and non-living parts of an ecosystem.



Figure 2

These bracket fungi are decomposers.

The importance of decomposers in an ecosystem should not be underestimated based on their small size. Imagine what your schoolyard would look like with years of accumulated leaves and grass clippings still in their original forms. Without decomposers, nutrients would remain locked in the tissues of dead plants and animals. Decomposers break down matter and turn it into the nutrients that living things need every day (**Figure 3**).



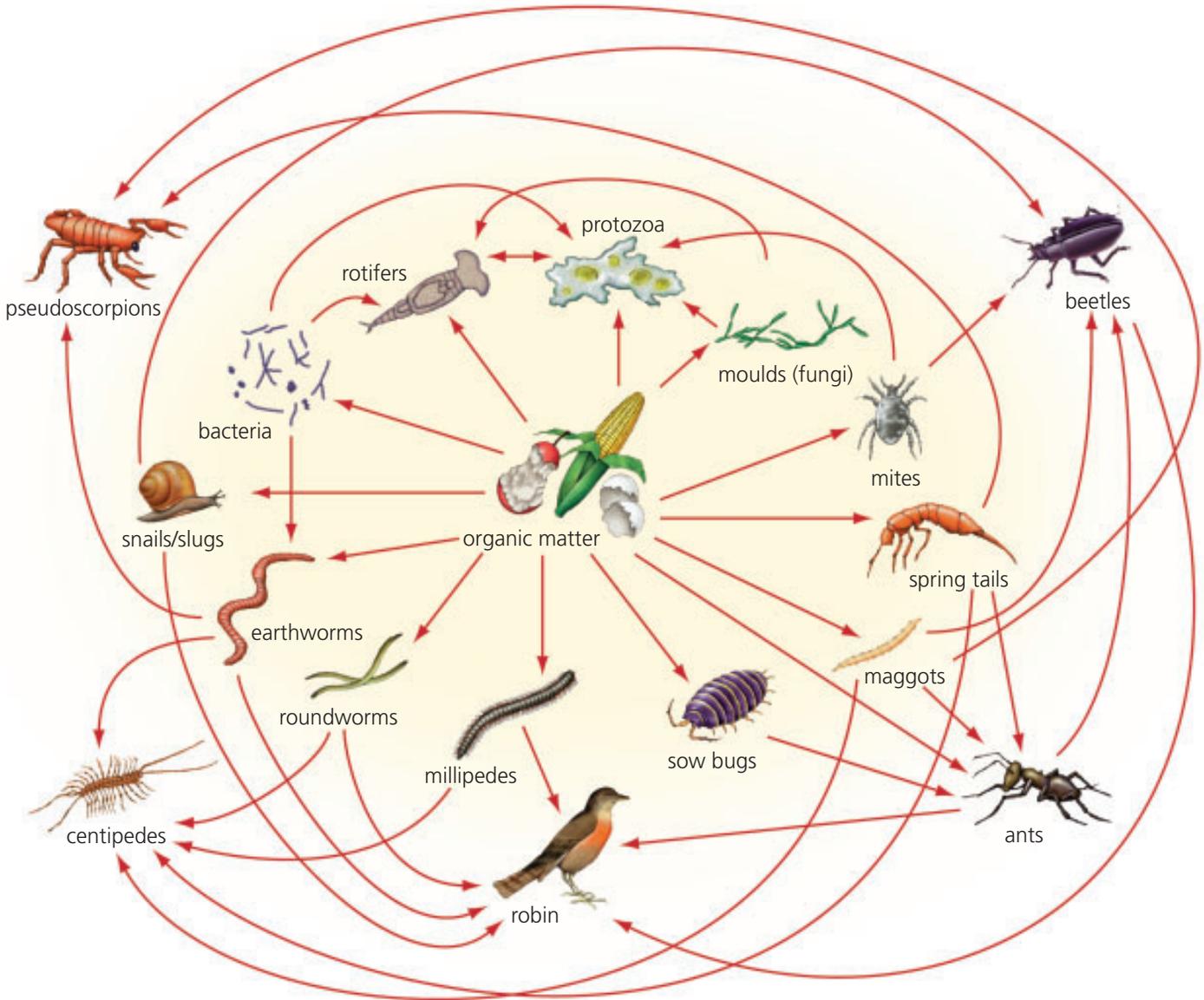
Figure 3

Moulds and bacteria spoil food, but by doing so they recycle nutrients within the ecosystem.

Composting

If you compost your kitchen scraps or plant waste, you are relying on the work of decomposers to break down the waste and release the nutrients it contains. In a compost ecosystem (Figure 4), small detritivores, such as earthworms, mites, grubs, insects, and nematodes (microscopic worms), chew, digest, and mix the waste. As detritivores mix the waste, air is added to the compost mixture. Decomposers, such as bacteria and fungi (moulds), then help to break down the waste further. This makes the nutrients available to plants when you put the compost on a garden. Putting compost on a garden is like giving the soil a giant vitamin pill.

Figure 4
A food web of a compost heap



Dying Salmon

Salmon return from the ocean to their home stream to reproduce and die (**Figure 5**). Some onlookers are sad to see the masses of dying fish. The death of the salmon, however, helps to ensure the survival of the species. First detritivores (such as gulls, eagles, and bears) take their share of the dying and dead salmon. Then bacteria and fungi finish decomposing the salmon and turn the tissue into a liquid. This allows the nutrients from the salmon to be dissolved in the stream. In the spring, the nutrients in the stream help to nourish plankton, an important part of the salmon fry's food chain. If you visit a salmon stream in the spring, you will no longer find piles of rotting salmon, thanks, in part, to these decomposers.



Figure 5
Spawning sockeye salmon
in the Adams River

The nutrients from the decomposing salmon are not only used by the next generation of salmon. The nutrients also fertilize the forest. Scientists believe that some forests have high levels of nutrients in the soil because of dead salmon, deposited there by feeding bears and wolves. Bears and wolves don't eat the whole salmon. The rest is left to be consumed by crows and other detritivores, and by decomposers. The nutrients that are released by the decomposers fertilize trees and other plants in the forest. Many of these nutrients entered the bodies of the salmon while they lived in the open ocean. The migration of the salmon moves these nutrients from ocean to forest, linking ecosystems that are thousands of kilometres apart.

LEARNING TIP

Close your eyes and try to "see" the process of the nutrients from the salmon being returned to the ecosystem.

CHECK YOUR UNDERSTANDING

1. Explain how decomposers link the living and non-living parts of an ecosystem.
2. What would happen if there were no decomposers in an ecosystem?