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## WORLD OF WONDER

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# WHAT'S UNDERFOOT

## THE SUBTERRANEAN WORLD OF ANIMALS AND INSECTS

Underground animals and insects thrive in complex, dark environments that offer protection and stable temperatures. While many of these creatures are considered to be pests, most are quite beneficial.

### Soil basics

The skin of the Earth, soil forms from bedrock in a process that takes thousands of years. It is a complex mixture of minerals, water, air, organic matter and countless decaying organisms, and it is home to some interesting living creatures.

### Microbes in actions

Soil biologists study the living creatures in the soil. Some are so tiny, they can be seen only with a powerful microscope.

These tiny creatures, called **microbes**, are the most abundant soil organisms. Bacteria, protists and some fungi are microbes.

Soil bacteria play a vital role in the Earth's health. As decomposers, they recycle dead plants and animals into nitrogen and carbon, the building blocks of life.

Protists are simple organisms such as amoebas, diatoms or ciliates.

Slime molds are a funguslike group of protists. They reproduce by forming spores.

### The benefits

**Aeration:** The underground tunnels of subterranean creatures allow air and water to reach plant roots.

**Nutrient Cycling:** Many underground insects break down organic materials, feeding the soil ecosystem.

**Predation Control:** Many underground creatures help regulate pest populations.

### Did you know?

Animals that live primarily underground are called **fossorial animals**.

Scientists who study soil are called **pedologists**.

Earthworms soften the soil by moving through it. They pull plant debris into their burrows to eat.

Particles in the soil are brought together by soil organisms. This process is called **aggregation**.

Each gram of soil can contain about a billion microbes.

There are 10,000 known species of soil microbes, exhibiting more biodiversity than the entire Mammalia class.

### Some interesting underground animals

Many underground animals have long, slender, cylindrical bodies that help them move quickly through tight spaces. Some, such as the naked mole-rat, have tiny eyes or no eyes, relying instead on touch, sound and smell. Almost all have powerful digging limbs and specialized claws or teeth for turning soil.

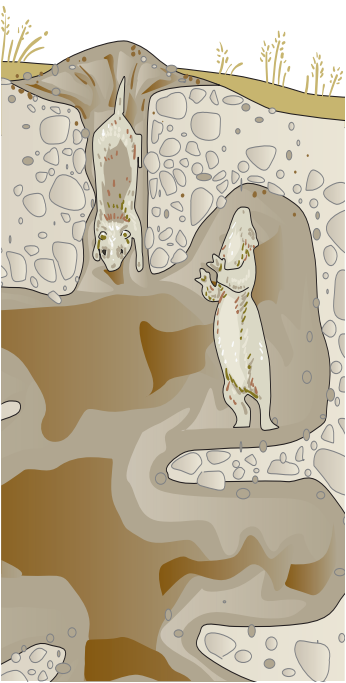
#### Naked mole-rats

These small rodents are native to the dry regions of East Africa, they spend their entire lives in vast underground tunnel systems that can stretch up to 2.5 miles (4 km) long.



#### Meerkats

These desert inhabitants construct intricate, shallow underground burrows.



#### Groundhogs

Groundhogs dig vast underground, multichambered homes, known as **warrens** or **setts**.



#### Burrowing owls

These small birds use the abandoned tunnels of other creatures. They often store extra food in underground larders. One cache observed in Saskatchewan in 1997 contained more than 200 rodents.



### Just a few examples of invertebrates that live underground

Underground invertebrates form a vast, hidden ecosystem crucial for soil health, nutrient recycling and aeration. Many, such as cicada nymphs and termites, spend years underground feeding on roots or decomposing organic matter. These creatures, including beetles and ants, are important decomposers and predators.

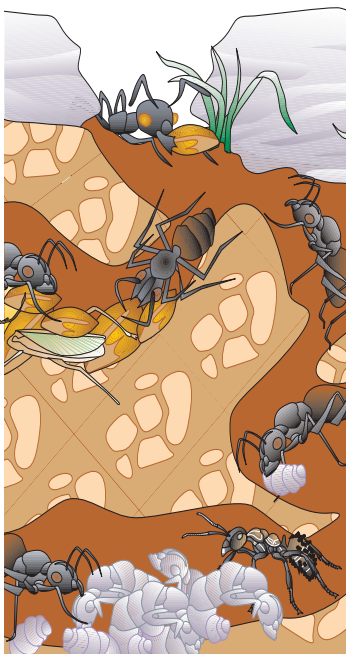
#### Earthworms

Earthworms are constantly burrowing through the uppermost layers of soil. Fertile droppings, called **casts**, are the by-product of worm activity.



#### Ants and termites

These insects build large, complex, organized colony structures.



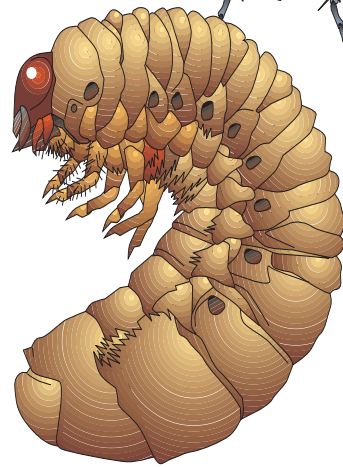
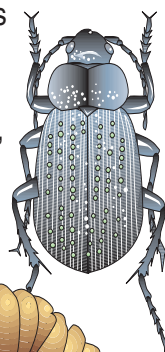
#### Cicadas

Cicadas spend the vast majority of their lives — anywhere from 2 to 17 years — underground as nymphs, feeding on the sap of tree roots. Cicadas are eaten by humans in many parts of the world.



#### Beetles and larvae

Grubs are the white larval stage of beetles that feed on grass roots, causing patchy, yellowing turf.



SOURCES: World Book Encyclopedia, World Book Inc.; <https://en.wikipedia.org>; <https://www.britannica.com>; <https://www.discoverwildlife.com>; <https://www.wildlifeteam.com>; Natural History Museum; <https://www.discoverwildlife.com>

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