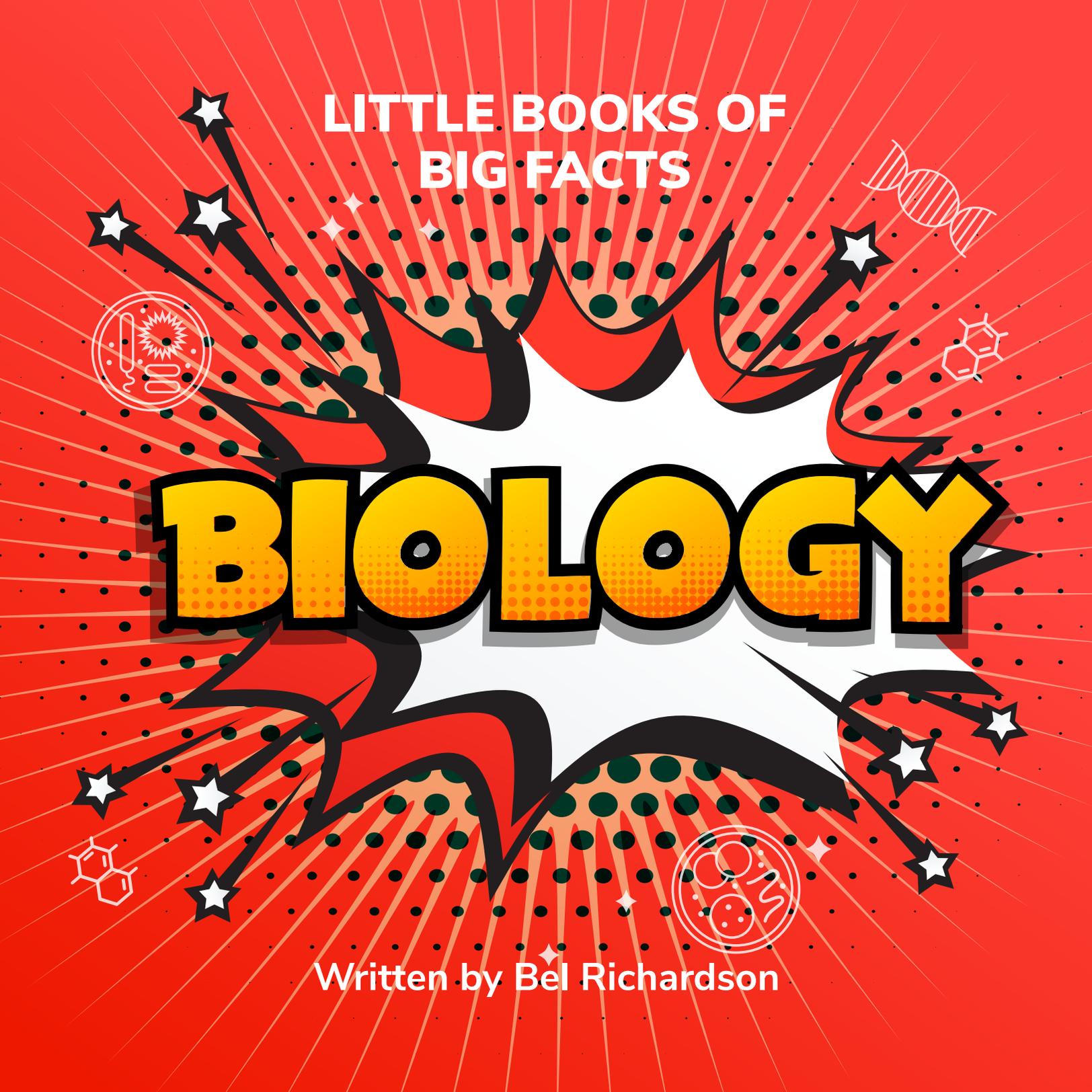


LITTLE BOOKS OF  
BIG FACTS

# BIOLOGY

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# What is biology?



The field of biology is the study of all living organisms, from the very large to the very small. Biologists study plant and animal species, ecosystems, cells, the history of life on our Earth, the possibility of life on other planets, and the ways that we can protect our biodiversity. We live in a time where a lot of plants and animals are struggling to survive due to climate change and other human induced environmental issues. Let's learn about some key ideas in the field of biology.



Do biologists get to name plants and animals?

**YES!**

Yes! When they discover a new species, biologists get to name the new addition.

# What is the biosphere?



Understanding the world as one large biosphere is one of the most important parts of biology. If we think of built and natural spaces as separate, this does not let us fully comprehend the many connections between them. Pollution, climate change, and many other factors affect the built and the natural alike, so understanding the full impact of effects on our planet means that we need to see it as one large system where everything affects and is affected by each other.

# Can pollution cause problems for plants and animals?

Yes. Some biologists study how we can reduce pollution and deal with the pollution that we already have in our world.

## Why do biologists research plants?

We are tightly linked in our life cycle with plants, as we each breathe each other's waste. Plants also feed off the nutrients in the soil and give life to all of the animals in an ecosystem. Plants are producers, which are eaten by the first level of consumers. These animals are then eaten by their predators, who are eaten by their predators in turn. When animals die, bacteria decomposes their bodies and returns them to the soil for plants to begin the process again.



## Do plants evolve?



Yes! Just like animals, plants change over time to suit their surroundings.

## How are landscapes different?



Part of biology is understanding the landscape that plants and animals live in. This can help to give clues about their history and behavior. It also explains the presence of different plants and animals. For example, think about the differences between animals that live on coasts, on mountains, in the deep sea, and in the desert. The plants and animals in these regions have been there for a long time. They have adapted to be able to take advantage of the food and shelter that these landscapes have to offer.

## Is it easy to introduce animals into a new ecosystem?

No. When an animal is introduced into a new place, it can cause imbalance for long stretches of time.

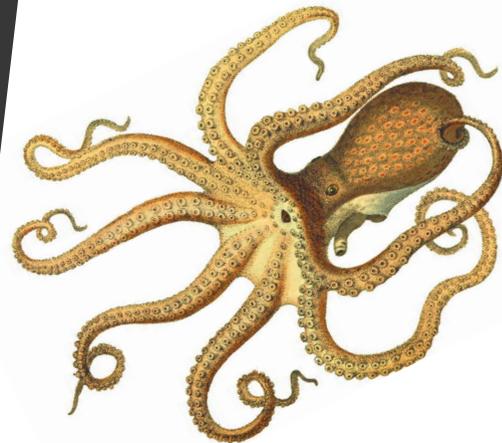
## Why are some animals similar?



Some animals are very similar even though they may come from different regions. Often, we will see that they look similar as well as play the same role in their ecosystem. Part of this is due to these creatures being more closely genetically related than they are to other creatures. Even though populations may have split off long ago, they share more of their genetic history with these creatures than others. Take the raccoon and the red panda or the octopus and the squid as examples. We can see a lot of common ground in their anatomy. They play similar roles in their ecosystem due to these physical and behavioral similarities, and these roles continue to shape them over generations through evolution.

## What do cephalopods (the family with octopuses and squid) have as a mouth?

They have a beak!



## Why are other animals so different?

As interesting as it is to notice similarities between animals, it is also fascinating to see the differences! Studying the anatomy and behavior of insects, birds, reptiles, aquatic creatures, and mammals reveals the history of how these animals have evolved. The differences between animals helps us to understand mutations that have allowed animals to survive and breed in different ecosystems. The ability for animals to adapt over generations accounts for the staggering biodiversity that we have on Earth.



## Which animals did therapod dinosaurs (like T-rex and velociraptor) evolve into?

Birds! Therapods were covered in feathers and shared features like hollow bones with birds.

## Why do biologists study animal behavior?



We can learn a lot from the anatomy of a creature, but we can understand a different spectrum of things by observing them. Watching an individual or family can give you clues to the creature's diet, habits, defenses, and aggressive strategies. What is even more interesting is observing how animals' behavior is changing. Social behavior evolves just like bodies do. As our world changes, animals change the way that they interact with their landscape, communities, and other creatures within their ecosystem. Animals can also teach and learn, which we can see by watching their behavior.



## Can animals use tools?

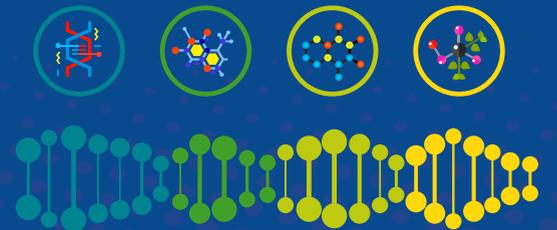
Yes, a lot of different animals use tools to get food, make homes, and have fun. The tools might just be a rock or a stick, but how they use them is important.

## How are biology and health connected?

Understanding how our bodies and the bodies of other animals function helps us to be able to look after them. Biologists can study diseases and how to treat them with medicine and procedures. They can research life choices and how we can look after our bodies to avoid getting sick. Doctors and vets need to understand biology to be able to do checkups for people and other animals. Now, we are even starting to unravel the mysteries of DNA. Understanding our genetic code will help us to know more about conditions that people are born with, and perhaps even how these might be avoided.

## Is your DNA unique?

Yes. Every person on the planet has their own DNA.



## What does farming have to do with biology?

Some biologists research agricultural science to understand how to look after crops and farm animals. There are a lot of things to factor on a farm, and it is easy for plants and animals to become ill or have parasites. Agricultural scientists research ways to change systems on farms to keep crops and animals healthy. They can also find ways for crops to be more plentiful, and to make sure that the soil on a farm is balanced. If you do not give the soil time to rest, it can affect the nutrients.



## What is monoculture?

This is when the same plants are grown in an area over and over. Monoculture can have huge effects on the soil.

## What is some important equipment for biology?

Depending on the field of biology that a scientist is in, they need different equipment. For those that study anatomy, they must have dissection tools to look inside of animals and understand their structure and function. For those that observe animals, they use a lot of different types of cameras. They sometimes need special equipment for that ecosystem, like diving gear. In the lab, biologists use different types of microscopes to examine cells and small organisms.



## Is this a view through a light microscope or an electron microscope?

This view is through an electron microscope.

## What do biologists do when they aren't in the field?

When biologists aren't collecting samples or observing animals in their ecosystems, they are researching in the lab. After a sample is taken out of an ecosystem, it is possible to do tests to see how the sample behaves under different conditions. Biologists can do simulations to see how these samples cope with changing environments. They can also do tests to help us understand more about how plants and animals function. Even though we have acquired a lot of knowledge over the years, there is still so much that is a mystery about our planet.

## Do you think that mold is a plant, animal, or fungus?

Like mushrooms, mold is a fungus.

## Why is biology important for our future?

We live in an interesting time for biology. So many creatures and plants are facing extreme challenges due to changes in their ecosystem. Weather is getting extreme, and temperatures are changing all over the world. Even small changes in an ecosystem can have big effects. Whether biologists are studying how species are evolving, how to conserve their habitats, or the ways that we can live more sustainable lives for the health of our biosphere, every project helps. We only have one planet, and we need to make sure that we care for our wonderful home.



## Is it possible to repair lost habitats?

Yes. With the proper planning and knowledge, habitats can become healthy again.



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