

# Importance of Biodiversity

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# CHAPTER 1 Importance of Biodiversity

- Define biodiversity.
- Discuss the ecological and economic importance of biodiversity.
- Define and discuss biomimicry (bionics).



## Why is preserving the rainforest important?

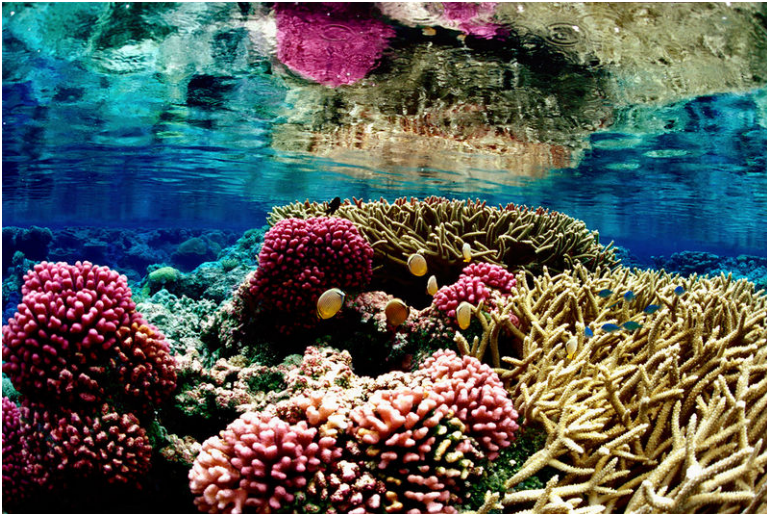
Preserving the rainforest is important for many reasons. But one reason conservation efforts have focused here is that the rainforest is home to more species of insects, amphibians, and birds than anywhere else on the planet. This wide diversity of life is called biodiversity.

## Importance of Biodiversity

**Biodiversity** is a measurement of the amount of variation of the species in a given area. More specifically, biodiversity can be defined as the variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

A place such as a coral reef has many different species of plants and animals. That means the coral reef is an ecosystem with high biodiversity ( **Figure 1.1**). Because of its biodiversity, the rainforest shown above is an ecosystem with extreme importance. Why is biodiversity so important? In addition to maintaining the health and stability of the ecosystem, the diversity of life provides us with many benefits.

**Extinction** is a threat to biodiversity. Does it matter if we are losing thousands of species each year? The answer is yes. It matters even if we consider not only the direct benefits to humans, but also the benefits to the ecosystems. The health and survival of ecosystems is related to that ecosystem's biodiversity.



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**FIGURE 1.1**

Coral reefs are one of the biomes with the highest biodiversity on Earth.

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## Economic Importance

Economically, there are many direct benefits of biodiversity. As many as 40,000 species of fungi, plants, and animals provide us with many varied types of clothing, shelter, medicines and other products. These include poisons, timber, fibers, fragrances, papers, silks, dyes, adhesives, rubber, resins, skins, furs, and more. According to one survey, 57% of the most important prescription drugs come from nature. Specifically, they come from bacteria, fungi, plants, and animals ( **Figure 1.2**). But only a small amount of species with the ability to give us medicines have been explored. The loss of any species may mean the loss of new medicines, which will have a direct effect on human health.



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**FIGURE 1.2**

Aspirin originally came from the bark of the white willow tree, pictured here.

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## Biodiversity and Technology

Nature has inspired many technologies in use today. **Bionics**, also known as biomimetics or biomimicry, uses organisms to inspire technology or engineering projects. By studying animals and their traits, we are able to gain valuable information that we can put to use to help us. For example, rattlesnake heat-sensing pits helped inspire the development of infrared sensors. Zimbabwe's Eastgate Centre ( **Figure 1.3**) was inspired by the air-conditioning efficiency of a termite mound ( **Figure 1.4**).



**FIGURE 1.3**

Design of the Eastgate Centre (brown building), in Zimbabwe, which requires just 10% of the energy needed for a conventional building of the same size, was inspired by a biological design.

## Ecological Importance

Biodiversity also has many benefits to ecosystems. High biodiversity makes ecosystems more stable. What can happen to an ecosystem if just one species goes extinct? What if that one species was a **producer** or **decomposer**? Would the loss of a producer have an effect on all the organisms that relied on that producer? If a decomposer vanishes, are there other decomposers to fill the void? Maybe the resulting species will adapt. Other species may fill in the **niche** left by the extinct species. But the extinction of one species could have a "domino" effect, resulting in the extinction of other species. This could greatly effect the stability of the whole ecosystem.



**FIGURE 1.4**

The air-conditioning efficiency of this termite mound was the inspiration for the Eastgate Centre.

One important role of biodiversity is that it helps keep the nutrients, such as nitrogen, in the soil. For example, a diversity of organisms in the soil allows **nitrogen fixation** and nutrient recycling to happen. Biodiversity also allows plants to be pollinated by different types of insects. And of course, different species of fungi are necessary to recycle wastes from dead plants and animals. These are just a few of the many examples of how biodiversity is important for ecosystems.

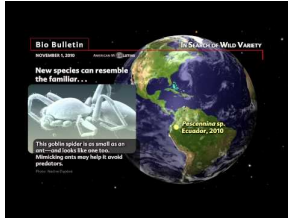
## Summary

- Biodiversity is a measurement of the amount of variation of the species in a given area.
- Biodiversity is important because it directly benefits humans and ecosystems.

## Explore More

Use the resource below to answer the questions that follow.

- **In Search of Wild Variety** from American Museum of Natural History [http://www.youtube.com/watch?v=Pbg\\_pGZv3CQ](http://www.youtube.com/watch?v=Pbg_pGZv3CQ) (1:52)



### MEDIA

Click image to the left or use the URL below.

URL: <http://www.ck12.org/flx/render/embeddedobject/57320>

1. As of November 2010, about how many species have been identified on the Earth? How close do scientist feel this number is to the total number of species which exist?
2. In what kinds of locations are new species being found?
3. Can different species be identified by just looking at them? What techniques are scientists using to identify new species?

## Review

1. What is biodiversity?
2. What does it mean if a place has high biodiversity?
3. What is an economic impact of biodiversity?
4. How does high biodiversity help the stability of an ecosystem?

## References

1. USFWS Pacific. [Coral reefs are one of the biomes with the highest biodiversity on Earth](#) . CC BY 2.0
2. User:Willow/Wikimedia Commons. [Aspirin is a medicine derived originally from nature](#) . CC BY 2.5
3. Flickr:damien\_farrell. [Nature has also helped to inspire designs such as the Eastgate Centre](#) . CC BY 2.0
4. Bengt Olof ÅRADSSON. [The air-conditioning efficiency of this termite mound was the inspiration for the Eastgate Centre](#) . CC BY 2.5