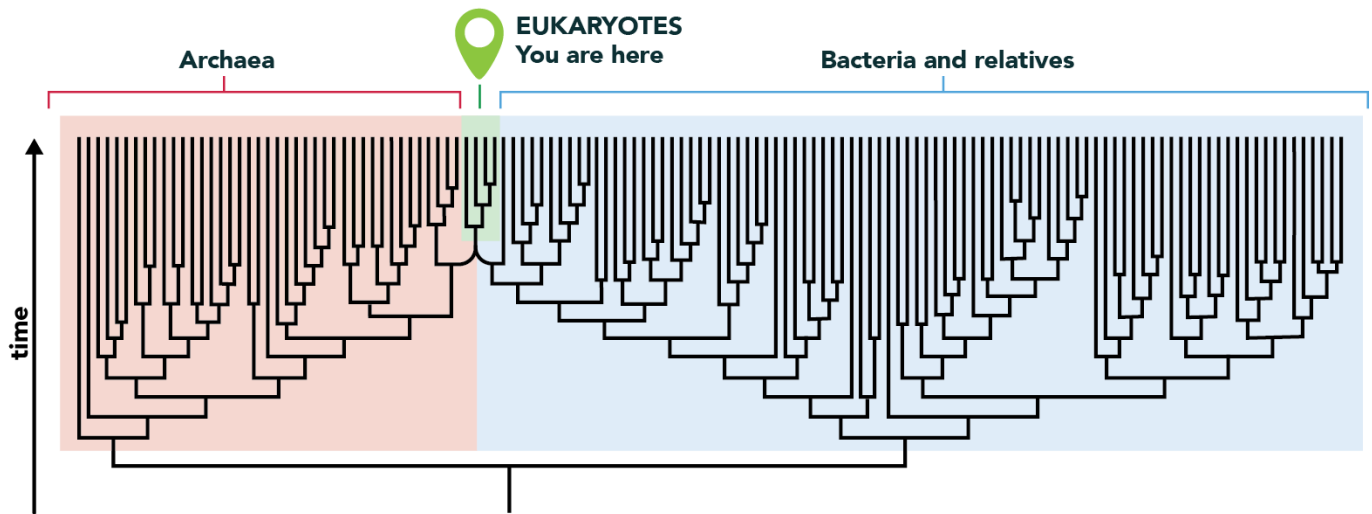




## Evolution 101

What is evolution and how does it work? Evolution 101 provides the nuts-and-bolts on the patterns and mechanisms of evolution. You can explore the following sections:



Tree of Life adapted from Hug et al. (2016)

*Large evolutionary tree showing Bacteria and relatives, Archaea, and Eukaryotes. Eukaryotes is highlighted green, is the smallest of the groups, and has a label stating "You are here."*

- [\*\*An introduction to evolution\*\*](#)  
Evolution briefly defined and explained
- [\*\*The history of life: looking at the patterns\*\*](#)  
How does evolution lead to the tree of life?
- [\*\*Mechanisms: the processes of evolution\*\*](#)  
How does evolution work?
- [\*\*Microevolution\*\*](#)  
How does evolution work on a small scale?
- [\*\*Speciation\*\*](#)  
What are species anyway, and how do new ones evolve?
- [\*\*Macroevolution\*\*](#)  
How does evolution work on a grand scale?
- [\*\*The big issues\*\*](#)  
What are some of the big questions that evolutionary biologists are trying to answer?



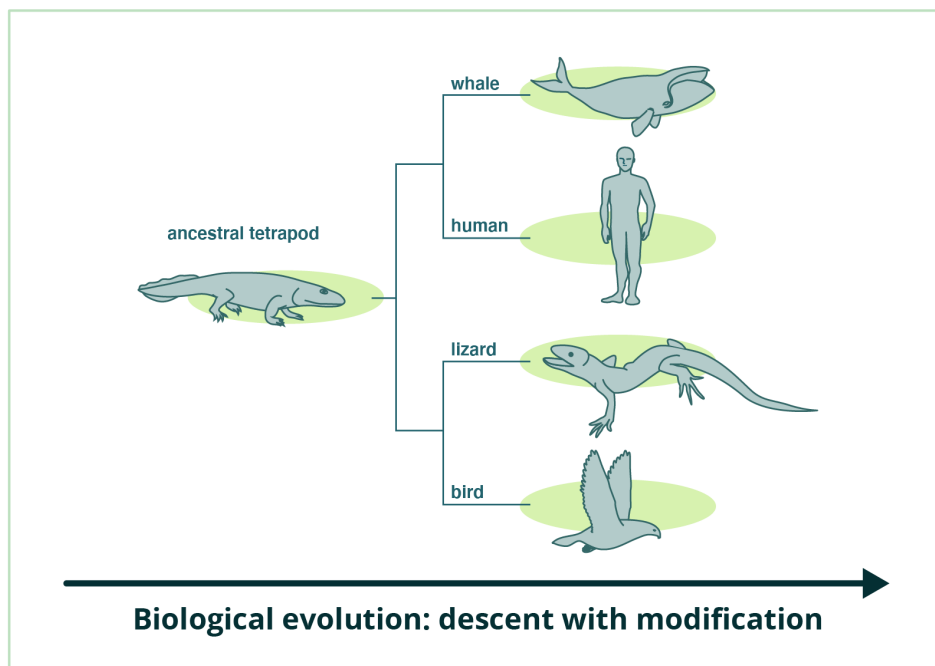
## The definition

Biological evolution, simply put, is descent with inherited modification. This definition encompasses everything from small-scale evolution (for example, changes in the frequency of different gene versions in a population from one generation to the next) to large-scale evolution (for example, the descent of different species from a shared ancestor over many generations). Evolution helps us to understand the living world around us, as well as its history.

## The explanation

Biological evolution is not simply a matter of change over time. Many things change over time: caterpillars turn into moths, trees lose and regrow their leaves, mountain ranges rise and erode, but they aren't examples of biological evolution because they don't involve descent with inherited modifications.

All life on Earth shares a common ancestor, just as you and your cousins share a common grandmother. Through the process of descent with modification, this common ancestor gave rise to the diverse species that we see documented in the fossil record and around us today. Evolution means that we're all distant cousins: humans and oak trees, hummingbirds and whales.



Four seasons photo credit Joisey Showaa, illustration UCMP.