



SECTION
17.4 | DOMAINS AND KINGDOMS
Reinforcement

KEY CONCEPT The current tree of life has three domains.

The tree of life is a model that shows the most current understanding of how living things are related. This model has changed from a two-kingdom system devised by Linnaeus in 1753, to the six-kingdom and three-domain system used today. It will continue to change as scientific research leads to new discoveries about evolutionary relationships.

The most recent change in the kingdom system involved prokaryotes, which at one time were grouped together in a kingdom called Monera. Research by biologist Carl Woese revealed that there are two genetically distinct groups of prokaryotes, which have very different cell wall chemistry. This discovery led to the splitting of kingdom Monera into two kingdoms: Bacteria and Archaea. Therefore, the most current tree of life includes six kingdoms: Bacteria, Archaea, Protista, Fungi, Plantae, and Animalia.

Woese’s research showed that in terms of genes, bacteria and archaea are actually more different from each other than animals, plants, fungi, and protists are from each other. Based on these differences, Woese proposed that all life be divided above the kingdom level into three domains. These domains are called Bacteria, Archaea, and Eukarya.

- The domain **Bacteria** is made up of single-celled prokaryotes in the kingdom Bacteria. Bacteria are classified by many traits, such as their shape, their need for oxygen, and whether they cause disease.
- The domain **Archaea** is made up of single-celled prokaryotes in the kingdom Archaea. Archaea are known for their ability to live in extreme environments.
- The domain **Eukarya** is made up of all organisms with eukaryotic cells. It includes the kingdoms Protista, Plantae, Fungi, and Animalia.

1. Why is the tree of life considered a work in progress?

2. What kind of research prompted living things to be classified into domains, a grouping above the kingdom level?

3. Name the three domains in the current tree of life, including what kingdoms they contain.
