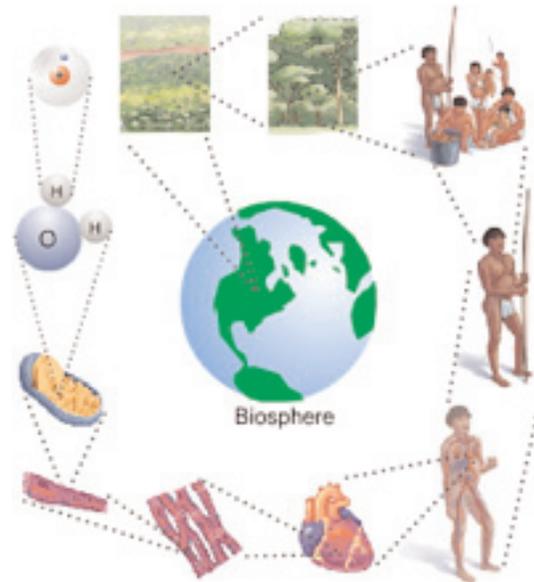


## WEB TUTORIAL 1.2

# The Hierarchical Organization of Life



### Text Sections

Section 1.3 The Nature of Biology, p. 7

### Introduction

Life is organized in a hierarchical manner, increasing in complexity from its basis in atoms to molecules and then in sequence to organelles, cells, tissues, organs, organ systems, organisms, populations, communities, ecosystems, and the biosphere.

### Learning Objectives

- Understand what is meant by the phrase “hierarchical organization of life”.
- Know the levels of organization of a multicellular organism.
- Discuss the components that make up the biosphere.

# Narration

## The Hierarchical Organization of Life

Living things are highly organized in a "hierarchical" manner: lower levels of organization are progressively integrated to make up higher levels. The building blocks of matter, called atoms, lie at the base of life's organizational structure.

Atoms come together to form molecules that consist of a defined number of atoms organized in a particular spatial arrangement. For example, a molecule of water is one atom of oxygen bonded to two atoms of hydrogen, with each atom arranged in a very precise way.

Molecules in turn form what are called organelles, which are highly organized structures within a cell that carry out specific cellular functions. For example, mitochondria transform the energy from food into an energy form your body can use.

The next step up is a cell-the functional unit of life. All living things are either single cells, or are composed of collections of cells.

Tissues are collections of similar cells that serve a common function. Several kinds of tissues can come together to form a functioning unit known as an organ. Several organs and related tissues then can be integrated into an organ system. Contractions of your heart push blood into a system of blood vessels. The heart, blood, and blood vessels form the cardiovascular system.

An assemblage of cells, tissues, and organs can form a multicellular organism. Members of a single type of organism that live in a defined area make up a population. All living things in a given area make up a community (usually many different populations). When you consider a community and the non-living elements with which they interact, such as climate and water, the result is an ecosystem. All of the communities on Earth, and the environments with which they interact, make up the biosphere.

## You should now be able to...

- List the levels of organization of a multicellular organism, starting from the building blocks of matter.
- Specify the functional unit of life.
- Define the term "ecosystem."