

## Cells: The Basic Units of Life

### BIG Ideas

- ✓ Cells are the basis of life.
- Cells organize into tissues, tissues into organs, organs into organ systems, and organ systems into organisms.
- ✓ Healthy cells contribute to healthy organisms.
- Systems are interdependent.

### Looking Back

Living things have several characteristics that distinguish them from non-living things.

- All living things grow, reproduce, repair themselves, and have a lifespan.
- Living things require energy, respond to their environment, and produce wastes.
- While some objects may appear to be living, only those that exhibit all the characteristics of life are considered to be alive.



All living things are made up of one or more cells.

- The cell theory states that all living things are made of one or more cells, that the cell is the basic unit of life, and that all cells come from pre-existing cells.

The compound microscope is an instrument used to see cells and can help us learn more about the structure and function of cells.

- The compound microscope has many delicate parts and must be used safely. It is commonly called the “compound light microscope.”
- Compound light microscopes use light and glass lenses to magnify the images of specimens.
- The total magnification of a compound microscope is calculated by multiplying the magnification of the ocular lens by the magnification of the objective lens being used.
- Compound microscopes have limited magnification.

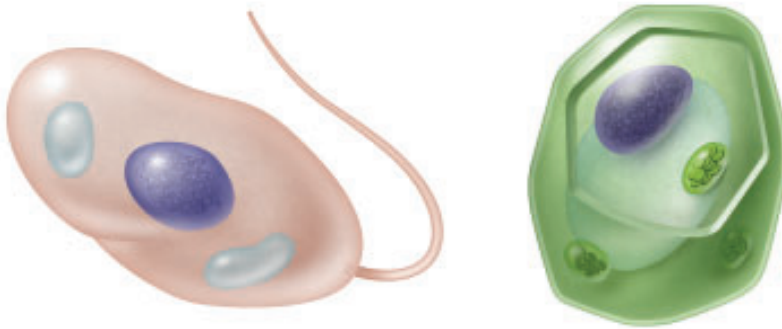


**Microscopes and the skills of scientific inquiry can be used to learn more about the structure of cells.**

- Wet mounts and dry mounts can be used with a microscope.
- Compound microscopes can be used to observe and identify different organelles in plant and animal cells.

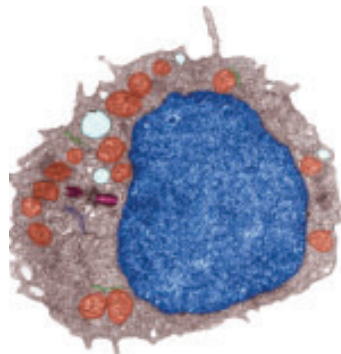
**Plant and animal cells have many similarities, but they also have distinctive differences.**

- Plant and animal cells have many organelles in common (such as the nucleus, cell membrane, and vacuoles).
- Plant cells contain chloroplasts, which they use in photosynthesis to produce their own food from sunlight.
- Plant cells have a cell wall that provides structural support.



**Advances in microscope technology have allowed us to look more closely at cells.**

- Electron microscopes are microscopes that use electrons instead of light to see small objects. They have greater magnification than the compound light microscope.
- The transmission electron microscope transmits a beam of electrons through a specimen. The magnified image is projected onto a screen.
- The scanning electron microscope scans a specimen using reflected electrons, and uses a computer to layer the scans to build a three-dimensional picture of the specimen.
- Electron microscopes allow scientists to see cell organelles that are too small to be seen with compound microscopes.



#### VOCABULARY

cell, p. 96  
cell theory, p. 97  
magnification, p. 98  
field of view, p. 100  
organelle, p. 104  
cytoplasm, p. 104  
cell membrane, p. 104  
nucleus, p. 105  
chromosomes, p. 105  
vacuole, p. 105  
cell wall, p. 106  
chloroplast, p. 106  
flagella, p. 107  
cilia, p. 107  
electron microscope, p. 111

