From Cells to Systems

Vocabulary

cell the smallest living part of an organism
organ a group of tissues that work together to carry out a certain function
organ system a group of organs that work together to carry out a certain function
tissue a group of cells that work together to carry out a certain function

Concepts and Skills

• Students observe that multicellular organisms have specialized structures to transport materials.
• Students classify parts of the human body.
• Students know how blood circulates throughout the body.
• Students know how carbon dioxide and oxygen are exchanged in the lungs and tissues.
• Students identify the functions of digestive and excretory organs.

Materials

• cover slips
• dropper
• human body slides, prepared
• iodine solution
• microscope slides
• *microscopes
• *onion
• paper towels
• toothpicks, flat
• *video/microscope projection system (optional)
*Not provided in kit

Planning

Student Resources

• 1.1 Vocabulary
• 1.2 Parts of a Cell
• 1.3 What Do Cells Look Like?
• 1.4 Digestive System
• 1.5 Circulatory System
• 1.6 Respiratory and Excretory Systems
• 1.7 Nervous System
• 1.8 Muscular and Skeletal Systems
• 1.9 Section 1 Assessment

In Advance

• For Investigate 1 (p. 4) and Section 1 Assessment (p. 8), prepare slides of onion cells and human cheek. Put a drop of iodine on a microscope slide. Remove the outer papery layer of an onion. Peel off a layer of onion flesh, and cut it into pieces about one-half inch square. Take one piece and snap it in two without breaking the thin tissue on the inside. Then carefully peel off the thin layer of tissue. Place the onion tissue on the slide over the iodine. Dab off any excess iodine with a paper towel. Put the onion slide on a microscope and focus at low power. Prepare the cheek cells slide similarly. Using the flat side of a toothpick, very gently scrape the inside of your cheek. Gently rub the toothpick on a clean microscope slide. Add one drop of iodine, and cover with a cover slip.

Inquiry Focus

Observe When students observe, they use their senses to determine and describe the properties of objects and events.

Learn by Reading

For additional content area reading, see the Houghton Mifflin Science eBook: Grade 5, Unit A, pages A6–A10 and A32–A33.

Also see: Inside a Cell, a Houghton Mifflin Science Leveled Reader. Reading Skill: Main Idea and Details.
Levels of Organization  The bodies of most multicellular organisms have multiple levels of organization. The cell is the most basic level of organization, followed by tissues, organs, organ systems, and finally the entire organism. The various levels carry out specific functions and work together to allow the body to function efficiently. Nerve cells make up nerve tissue, which in turn makes up the brain and spinal cord. These organs make up the nervous system, which works with other body systems to carry out the functions necessary for the life of the organism.

Structure and Function  Cell structure is frequently related to function. Nerve cells are long and thin and transmit nerve signals throughout the body. Striated (skeletal) muscle cells are also long and thin and contract to pull on bones. Bone cells are hardened by calcium, which strengthens them to support the body.