

#8671

CELLS AND TISSUES

Grade Levels: 9-13+

15 minutes

BENCHMARK MEDIA 2000

DESCRIPTION

Uses microphotography and graphics to examine different kinds of plant and animal cells, discussing their structures and tissues. Defines mitosis and meiosis as forms of cell division and illustrates each. Video has three 5-minute segments for convenience.

ACADEMIC STANDARDS

Subject Area: Life Sciences

- ◆ Standard: Understands the structure and function of cells and organisms
 - Benchmark: Knows that multicellular organisms have a variety of specialized cells, tissues, organs, and organ systems that perform specialized functions (e.g., digestion, respiration, reproduction, circulation, excretion, movement, control and coordination, protection from disease)

Subject Area: Life Sciences

- ◆ Standard: Understands the principles of heredity and related concepts
 - Benchmark: Knows features of human genetics (e.g., most of the cells in a human contain two copies of each of 22 chromosomes; in addition, one pair of chromosomes determines sex [XX or XY]; transmission of genetic information to offspring occurs through egg and sperm cells that contain only one representative from each chromosome pair; dominant and recessive traits explain how variations that are hidden in one generation can be expressed in the next)

INSTRUCTIONAL GOALS

1. To understand the different functions of cells and tissues.
2. To explain the different structures of cells and tissues.
3. To know the differences and similarities between plant and animal cells.
4. To know the differences in cell division between mitosis and meiosis.
5. To know why there are differences in cell division between mitosis and meiosis.



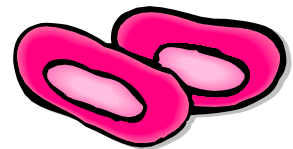
Connective tissue cell

BACKGROUND INFORMATION

Among the myriad evolutionary pathways that have led to the rich biodiversity of life, certain key cellular characteristics fully separate all plants from animals. Some of the common characteristics of plant and animal cells are presented here and the differentiating features clearly exhibited. Keep in perspective that the capacity to form tissues requires cellular adhesion into multicellular masses and regulation of genetic expression.

Modern cell biological research has clarified how surface molecules on cell membranes permit cells of the same tissue type to recognize one another and cohere. Some simple but elegant experiments illustrate this.

Similarly, modern molecular genetics helps to explain how certain genes are activated in a tissue, thus ensuring its specialized function and giving it a particular role in an organism. Tissue organization, combined with hormonal and nervous system signaling, account for much of the remarkable elegance of coordinated activity in multicellular organisms including humans.



Red Blood Cell

BEFORE SHOWING

1. Display a diagram of a ciliate such as paramecium. Elicit from the students some of the functions of life exhibited by the single-celled organism.
2. Discuss the combination of functions of life activities within a single cell. Note, however, that when an organism has more than one cell, there can be specialization, each group of cells dedicated to a particular function.
3. Make a chart on the board to provide a perspective on the levels of organization in living things. List the following categories: molecular, cellular, tissue, organ. Leave a space after each one for descriptions to be added. Ask to give examples of each level based on their prior knowledge of living things. Help them understand that each of the levels builds into the other.
4. Introduce the idea that the reproductive organs are made of cells and tissues.

AFTER SHOWING

Applications and Activities

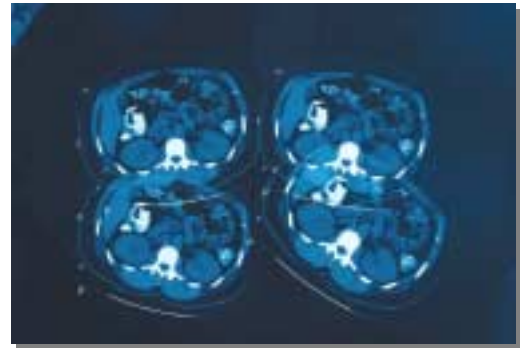
1. Prepare an outline of the human head and torso and reproduce it for distribution. Give one minute to illustrate all of the following: esophagus, stomach, small intestine, large intestine, heart, lungs, by drawing it on the outline.
2. Create small groups and assign each group a particular organ to draw.
3. Ask to describe what they think the cells would look like in each of the tissues composing the heart muscle, lining of the esophagus, inner surface of the lung, and lining of the small intestine. Display actual photographs or scientific illustrations of cells from these tissues and compare them to their descriptions. How are they similar and how are they different?

RELATED RESOURCES



Captioned Media Program

- Cells and Life #2597
- Discovering the Cell #2554
- Mitosis and Genetics #2500



World Wide Web



The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and “kid-safe” sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **WEBCYTOLOGY**

<http://www.library.thinkquest.org/27819/>

Click on “Simulation” to create your own unicellular species which is then placed into one of several virtual “worlds” so you can watch your organism reproduce over time and also interact with other people’s organisms.

- **CELLS ALIVE!**

<http://www.cellsalive.com/>

A homework page to help understand more about plant cells, animal cells, and mitosis. Link to diagrams of animal and plant cells with organelles, search an alphabetical keyword list, and other ideas.

