

12. How do alveoli work?
13. What are nutrients? How do our cells take in nutrients?
14. What are the main components of the digestive system?
15. How does the digestive system work with other systems?
16. What body system is responsible for removing waste from the body?
What are the main organs of this system?
17. Who is Andreas Vesalius?
18. What is the job of the immune system?
19. What are some examples of pathogens?
20. How do white blood cells work?
21. What system controls all other body systems?

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their "Everything We Think We Know About..." list. It might also be helpful to review the list by marking each entry with a "+" or "-" to show which facts were correct and which were incorrect.

Thought-provoking discussions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion topics.

- Explain how a cell functions as a system and how the human body functions as a system.
- Discuss the meaning of the expression, "The whole is greater than the sum of its parts."
- Explain what systems must be functioning properly in order for us to walk to the store.

Follow-up Activities

- Assign each student a specific body system to study and ask them to make a class presentation to share what they have learned.
- Have students research machines that enhance human functions and equate them with body systems.
- Ask students to research diseases of various body systems and how they affect the human body as a whole.

Suggested Internet Resources

Periodically, Internet Resources are updated on our web site at www.LibraryVideo.com

- www.innerbody.com/htm/body.html
The "Inner Body" Web site is an interactive journey through the human body.
- www.ehc.com/vbody.asp
The Virtual Body provides an animated tour of internal organs.
- kidshealth.org/kid/body/mybody.html
The "KidsHealth" web site developed by the Nemours Foundation is an interactive journey through the human body.

Suggested Print Resources

- Harris, Nicholas. *The Incredible Journey Through the Human Body*. School Specialty Publishing, Grand Rapids, MI; 2001.
- Walker, Richard. *Encyclopedia of the Human Body*. DK Publishing, New York, NY; 2002.
- Wiese, Jim. *Head to Toe Science*. Wiley Publishing, New York, NY; 2000.

TEACHER'S GUIDE CONSULTANT

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TITLES

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| • THE BRAIN & THE NERVOUS SYSTEM | • HEALTH & NUTRITION |
| • CELLS | • IMMUNE SYSTEM |
| • CIRCULATORY & RESPIRATORY SYSTEMS | • INTERRELATIONSHIP OF THE BODY SYSTEMS |
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Interrelationship of the Body Systems

Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers at these grades need all the help they can get! This guide has been designed to help the 5-8 science teacher by providing a brief synopsis of the program, previewing and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create an "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the followup questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.



Program Summary

The human body is a complex organism made up of thousands of individual systems. Each living cell in the body carries out all of the processes that allow us to live and to grow. Similar cells group together to form special tissues (e.g. muscle tissue, nerve tissue, bone tissue) that group together to form organs (e.g. heart, lungs, brain). Organs group together to create organ systems. Major body systems include the skeletal and muscular systems, the circulatory and respiratory systems, the digestive and excretory systems, and the nervous system. The highest level of organization is the whole organism — a living human being. The key is the ability of all the separate body systems to work together.

The skeletal system is responsible for providing body structure, protection for delicate organs, storage of minerals and the production of blood cells. This system is composed of 206 bones connected to each other with special tissue called ligaments. The muscular system is responsible for all body movements. Muscle tissue is attached to the skeletal system by tendons, and when muscles are stimulated by the nervous system, they contract, moving the bones to which they are attached. There are also involuntary muscles that keep our heart beating and our lungs breathing.

The circulatory system includes the blood, the tireless pumping heart, and blood vessels called arteries, veins and capillaries. This system delivers oxygen and nutrients to cells, removes waste and carries disease-fighting white blood cells of the immune system. The immune system is also composed of the skin and lymph organs like the thymus and spleen and is responsible for fighting disease, caused by invading pathogens. The circulatory system works hand in hand with the respiratory system, which brings fresh oxygen into our bodies through lung tissue called alveoli. The respiratory system also works as part of the excretory system by removing carbon dioxide and other gases when we exhale. In addition to removing gaseous waste products, the excretory system is responsible for eliminating liquid and solid wastes that the body does not need. This system involves special tissues as well as organs like the skin, lungs, kidneys, bladder, large intestines and the rectum.

The digestive system is responsible for physically and chemically breaking down the food that we eat into tiny pieces that all the cells of the body can absorb and use for energy. This system involves the mouth, teeth, salivary glands, esophagus, stomach, the small intestines, the liver, the pancreas and the large intestine.

The nervous system is the body's command center. All other systems rely on messages sent from the brain through special nerve cells called neurons. The organs and tissues of the nervous system are responsible for receiving and interpreting information from all around us. It directs all bodily functions through electrochemical signals and maintains the capacity for memory, thinking and decision-making.

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Another communication network of the human body is the endocrine system, which uses chemicals called hormones as messengers that travel through the bloodstream. These hormones travel to specific organs and tell them to start performing a function. For example, adrenaline is a hormone that releases stored energy to enable a quick response in the case of danger. Growth and reproductive hormones are very active during puberty, when bodies grow to sexual maturity.

The reproductive system is responsible for humans producing children. Interestingly, it is the only body system that is not necessary for the survival of the individual, but is most important for the future survival of the species.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

cells — The microscopic, living building blocks from which every living thing is comprised. The human body is composed of over 75 trillion cells.

tissue — A group of cells with the same structure and function. Different types of tissue join together to form organs; organs work together to form organ systems that make up the human body.

organs — Body parts that perform a given function, like the heart, lungs and brain.

skeletal system — The 206 bones of the human body and the tissues that connect them. The skeletal system gives your body its structure and provides protection for the inner organs.

muscular system — The muscles that give your body the ability to move and bend. Some muscles are attached to bones and can be moved voluntarily while others, like the heart, contract and relax on their own.

digestive system — The mouth, stomach and intestines; this system is responsible for breaking down the food we eat into particles that are small enough for the cells to take in.

respiratory system — The nose, mouth, trachea and the lungs; this system is responsible for taking in oxygen from the air and getting rid of carbon dioxide and water vapor.

alveoli — Tiny sacs in the lungs where the oxygen from the air enters your blood and the carbon dioxide from your body goes into the air.

circulatory system — The blood, blood vessels and the heart; this system is responsible for transporting nutrients, eliminating waste and maintaining the health of every cell.

excretory system — The organs responsible for eliminating waste products from the human body, including the kidneys, bladder and even the skin.

immune system — All the cells and organs in your body that protect you from disease-causing germs.

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nervous system — The organs that are responsible for controlling the entire body: the brain, nerves, spinal cord and the sense organs that help us learn what is going on around us: ears, eyes, nose, tongue and skin.

endocrine system — The organs that make and send special chemical messengers called hormones throughout the body to help the body grow, to burn sugar for energy, to digest foods, to recover from injury and to help the body perform well under pressure.

hormones — Special chemicals made by the endocrine system, to help the body grow and develop.

reproductive system — The organs, glands, and other structures that allow an organism to have babies.

Andreas Vesalius — (1514-1564 CE) The European surgeon, called the “Father of Anatomy,” who wrote and illustrated the first anatomy textbook

Pre-viewing Discussion

Before students generate their list of “Everything We Think We Know About...” for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- What is a system? Give an example of a living system and an example of a nonliving system.
- How do human cells work together to form a person?
- How do our body parts communicate?

After the class has completed their “Everything We Think We Know About...” list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

1. What are the smallest living parts of the human body?
2. How is tissue formed?
3. What are some examples of organs? What are organs made of?
4. What is our skeletal system made of? What jobs does it perform?
5. What body system allows us to move?
6. How many muscles make up the human body? How do they work?
7. What is the difference between voluntary and involuntary muscles?
8. What is the most important muscle in the body?
9. What components make up the circulatory system? How does each part work?
10. What are the differences between capillaries, veins and arteries?
11. What are the main organs of the respiratory system? What is the main job of the respiratory system?

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