



The Living
BODY

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Design for Living

Summary

This concluding program of the Living Body series uses segments from earlier units to show the complexities and design marvels of the various body systems.



Efficient use of space is a prime characteristic of the human body. The heart consists of two pumps within one organ; the deeply wrinkled surface of the brain increases the space available for brain cells within the limited confines of the skull; the intricate network of tubes in the lungs would cover an area of 50 square yards if opened out flat; the surface area of the intestines is increased many times by the millions of villi that carpet its interior walls and absorb food molecules. There are many other design adaptations that enable the human body to function efficiently: the human eye can respond almost instantaneously to changes in the outside world; the body can pour sweat onto the skin to cool it down.

The coordination between systems and organs is a necessary part of survival as well. The perception of danger by means of the senses leads to a chain of responses involving nerve circuits and hormone-producing glands; this kind of reaction is typical of many reflex actions that enable humans to respond most efficiently to signals in the environment. The senses select those elements in the environment that change, since these are most likely to be the significant ones. Sense messages are useful only if they are acted on, and the sensitivity of the senses is matched by accuracy of movement. All of the information that flows into and out of the body is carried along nerve fibers in a simple code that enables them to travel the length of the body without distortion.

The least-known areas of the living body are those that are uniquely human. Many of the body's deepest mysteries lie in that complex organ, the brain.

Objectives

1. To illustrate the complex and efficient designs of the various organs and systems of the human body.
2. To describe the efficient use of space in the brain, lungs, and intestines.
3. To explain how the body has developed to adapt to changes in the environment.

Recall Questions

1. What does it mean when we describe the body as a “soft machine”?
2. Choose two organs and describe the economies of space in their design.
3. Name the hardest substance in the human body and give the likeliest explanation for its development.
4. Describe the coordinated response to a perceived threat in the environment.
5. Describe how the body distinguishes between different odors.

Interpretive Questions

1. The program examines some of the designs of the human body which are the result of a long evolutionary process. If this is an ongoing process, what changes can you foresee or imagine in the human species hundreds of thousands of years from now?

Vocabulary Required for Effective Viewing

- aperture
- cell
- chromosomes
- DNA
- evolution
- molecule
- nucleus
- reflex action
- retina



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