

2010-2011 WHRO VideoClassroom Preview

Series Title:	The Human Body: How It Works
Curriculum Area:	Science
Grades:	6-12
# of Programs/Length:	9/22:00 minute programs

This nine-part series uses physiologic animations and illustrations, microscopic imaging, expert commentary, and footage of the body in motion to provide a thorough overview of the amazing human machine. Marvelously detailed, yet readily understandable. Viewable/printable instructor's guides are available online.

1.) **Cells, Tissues, & Skin**

After an introductory segment on cell characteristics, this program discusses the way human body cells function and combine into the structures that sustain life. Topics include membrane permeability and the processes of passive and active transport; cytoplasm, with its cytosol, organelles, and inclusions; the constituent parts of the nucleus and the stages and processes of the cell cycle; the four basic tissue types; and the skin, the body's largest organ.

2.) **The Immune System**

This program examines how the human immune system defends the body against disease-causing invaders—and how in some cases its antigen-fighting capabilities can be turned against the bodily cells it protects. Topics include the elements of the immune system, passive barrier defenses and nonspecific reactive responses, the humoral immune response and its associated antibodies, and the process of cell-mediated immunity. The program also addresses the importance of vaccines, the mechanics of allergies and autoimmune diseases, and advances in the field of immunology.

3.) **Human Development & The Reproductive System**

This program traces the development of a human being from conception to full-term fetus, with a focus on the functions of the male and female reproductive systems. The three stages of development in the womb—pre-embryonic, embryonic, and fetal, generated by the mechanisms of division, differentiation, morphogenesis, patterning, and growth—are illustrated, after which there is a close examination of male and female puberty—the maturation of the reproductive system and the beginning of human sexual response.

4.) **The Respiratory System**

Following an opening segment on the importance of oxygen to the human body, this program studies the structure and function of the respiratory system. Topics include the anatomy of the upper respiratory tract, the lower respiratory tract, and the alveoli; the diffusion of gas molecules through the walls of the alveoli and capillaries, and the effect of high altitude on the diffusion process; and the mechanics of breathing via the bulk flow transport process. In addition, the program describes three factors that help prevent lung collapse and the role of the medulla oblongata in regulating breathing.

5.) **The Circulatory System (Preview Title)**

This program takes a close look at the organs of the human circulatory system and how they work to sustain life. After an introductory overview, the composition of blood—its plasma, erythrocytes, leukocytes, and platelets—is analyzed, blood types and Rh factor are considered, the role of hemoglobin in transporting oxygen is explained, and the anatomy and function of the heart is examined. Factors that affect blood pressure and circulation are also discussed, along with the circulatory demands of exercise.

6.) **The Skeletal & Muscular Systems**

This program deconstructs the human skeletal and muscular systems, two interdependent assemblies that endow the body with structure and movement. Beginning with an introductory overview, the video identifies the body's bones by dividing the skeleton into its axial and appendicular components, analyzes bone composition, describes the process of bone repair, and categorizes bone and joint types. The program then shifts focus to the skeletal muscular system—a detailed study of muscle cells, fibers, bundles, and connective tissue. The ATP-fueled process of muscle contraction is addressed as well.

7.) Digestion & Nutrition

This program examines the chemical structure of food and the human body's ability to convert food into fuel and raw materials. Major and minor nutrients are defined, catabolism and anabolism are contrasted, and the function of the digestive tract at the cellular level is scrutinized. The sequence of physical and chemical processes that facilitate digestion is also illustrated, spotlighting each constituent anatomical system: mouth/esophagus, stomach, small intestine, and large intestine. A segment on healthier eating concludes the program.

8.) The Endocrine System

After an introductory segment contrasting the human endocrine and nervous systems, this program addresses the complex physiology of the endocrine system. Topics include the endocrine organs and glands; the characteristics of hormones and the process of signal transduction; hormonal regulation of blood glucose and blood calcium levels; the roles of growth hormone, thyroid hormone, testosterone, and estrogen in bodily development; hormones and reproduction; and hormonal involvement in the fight-or-flight response.

9.) The Nervous System & The Senses

This program discusses the development, organization, and functions of the nervous system and the input organs that stimulate it. Beginning with an introductory overview of neural anatomy, the video outlines the organization of the central and peripheral nervous systems and the processes of sensation, transduction, and perception. In addition, the senses of vision, hearing, taste, smell, and equilibrium are analyzed, as well as sensitivities to temperature, pressure, and pain; bodily movement via the somatic neurons is illustrated; and the neural mechanics of sleep and wakefulness are considered.