

Lesson Title: Human Body Systems
Grade 11 / 12
Anatomy and Physiology
Methuen High School

Goal and Rationale

It is important for students to understand that there is a relationship between the organization of cells into tissues and the organization of tissues into organs. Also, the idea that the structures and functions of organs determine their relationships within body systems of an organism is key to their understanding of human anatomy and physiology. The basic concept of homeostasis allows the body to perform its normal functions in their own bodies.

Lesson Outline Process:

This lesson will take place over the course of four, one-hour class periods. One day for presentation of body systems and teacher instruction. Working in small groups of 2 – 3 students, the next three days will focus on class time for project development of a PowerPoint on human body systems. Projects will focus on how similar or different human body systems are to other organisms and their body systems (cat, pig, frog, snake, wolf, etc.)

- 1.) Present PowerPoint presentation on human body systems
- 2.) Present: levels of organization within the human body
- 3.) Situationally: speak about the systems and how they work together
- 4.) Define important terms
- 5.) Talk about how humans differ from other animals
- 6.) Explain project guidelines
- 7.) Work in computer labs organizing PowerPoint Presentations
- 8.) Present Presentations to class (at later date)

Essential Questions

- 1.) What are the key components of human body systems?
- 2.) What are the levels of organization within a human being?
- 3.) What is homeostasis and what does each body system contribute to this idea?

Defining Terms

Anatomy, Physiology, Structure, Function, Compare/Contrast
Chapter specific vocabulary regarding body systems (*view objectives of lesson plan*)
PowerPoint Program software specific vocabulary (*see IT support if need arises*)

Objectives

Anatomy and physiology is means structure and function. In the class of anatomy and physiology, students will study the structure and function of important body systems.

Mass Framework Strand and Learning Standard (<http://www.doe.mass.edu/omste/ca.html>):

- 4.1 Explain generally how the digestive system (mouth, pharynx, esophagus, stomach, small and large intestines, rectum) converts macromolecules from food into smaller molecules that can be used by cells for energy and for repair and growth.
- 4.2 Explain how the circulatory system (heart, arteries, veins, capillaries, red blood cells) transports nutrients and oxygen to cells and removes cell wastes. Describe how the kidneys and the liver are closely associated with the circulatory system as they perform the excretory function of removing waste from the blood. Recognize that kidneys remove nitrogenous wastes, and the liver removes many toxic compounds from blood.
- 4.3 Explain how the respiratory system (nose, pharynx, larynx, trachea, lungs, alveoli) provides exchange of oxygen and carbon dioxide.
- 4.4 Explain how the nervous system (brain, spinal cord, sensory neurons, motor neurons) mediates communication among different parts of the body and mediates the body's interactions with the environment. Identify the basic unit of the nervous system, the neuron, and explain generally how it works.
- 4.5 Explain how the muscular/skeletal system (skeletal, smooth and cardiac muscles, bones, cartilage, ligaments, tendons) works with other systems to support the body and allow for movement. Recognize that bones produce blood cells.
- 4.6 Recognize that the sexual reproductive system allows organisms to produce offspring that receive half of their genetic information from their mother and half from their father, and that sexually produced offspring resemble, but are not identical to, either of their parents.
- 4.7 Recognize that communication among cells is required for coordination of body functions. The nerves communicate with electrochemical signals, hormones circulate through the blood, and some cells produce signals to communicate only with nearby cells.
- 4.8 Recognize that the body's systems interact to maintain homeostasis. Describe the basic function of a physiological feedback loop.

Technology/Materials

The necessary materials are:

- 1.) Whiteboards (2) with use of different colored markers
- 2.) Student notebook with writing utensil
- 3.) Television
- 4.) DVD player
- 5.) DVD lesson Video (The Human Body)
- 6.) Virtual Frog Software
- 7.) Wall posters to reinforce concepts
- 8.) Computer Lab: Computers / Monitors / Printers / Teacher's Overhead Projector
- 9.) Textbooks and reference materials from media center (if needed)
- 10.) The physical and natural world inside and outside of the classroom
- 11.) Formative and Summative Assessments

Classroom Set-up

Traditional setting

Setting: Traditional Classroom Setting

- 1.) Desks with chairs facing forward in rows
- 2.) 2 Whiteboards—one on side wall, one on front wall, left side listing: notes, diagrams and definitions
- 3.) 1 Chalkboard—on front wall, right side listing: daily agenda and additional writing space
- 4.) Posters on wall for reference to topics presented
Topics: Ecology, Environment, Biomes and Organisms
- 5.) Television/DVD combo in front left corner of room

Computer Lab Setting

Setting: Lab Area

- 1.) Horseshoe style set up in lab area with 21 computers
- 2.) Central table with supplies and printer
- 3.) Teacher table with computer / monitor, with projector cart
- 4.) Whiteboard at front of room

Strategies for Assessing Student's Backgrounds

- 1.) Discuss implications of IEP with liason
- 2.) Discuss student's abilities with team members (if team or co-teaching)

Accomodations for Learner Diversity

- 1.) Typewritten Notes (for those with IEP modifications)
- 2.) Use of Diagrams for Clarity
- 3.) Concept Mapping
- 4.) Clear and precise Written and Oral Directions
- 5.) Clear listing of expectations
- 6.) Preferential Seating (for those with IEP modifications)
- 7.) Cooperative Learning Groups
- 8.) Multilevel Teaching Strategies
- 9.) Peer Tutoring and Peer Correcting

Closure

A.) Formative Assessments

- 1.) Critical thinking, open ended questions with daily Journal entries (rubric grading)
- 2.) Small group development of ideas onto a brainstorming picture (rubric grading)
- 3.) Homework: Vocabulary reinforcement worksheet (answer key)

B.) Summative Assessment

- 1.) MS PowerPoint Project comparing human and one other animal (rubric grading)