

ANATOMY AND PHYSIOLOGY

COURSE DESCRIPTION

Health Science Education Anatomy and Physiology is a course in which students will examine human anatomy and physical functions. They will analyze descriptive results of abnormal physiology and evaluate clinical consequences. A workable knowledge of medical terminology will be demonstrated.

It is strongly recommended that administration and guidance follow the scope and sequence and course recommendations as listed.

Recommended Credits: 1

Recommended Grade Level(s): 11-12th

Number of Competencies in Course: 43

Note: This course may be offered for one unit of science credit if the health science instructor is considered highly qualified in science or for one unit of career and technical education credit. This course may also be offered as a dual enrollment/dual credit course.

INTEGRATION/LINKAGES

Math, Anatomy and Physiology, Biology, Chemistry, National Science Standards, HOSA Standards, Industry Standards

HEALTH SCIENCE ANATOMY AND PHYSIOLOGY

STANDARDS

- 1.0 The student will explore methods of scientific inquiry as they relate to the study of the anatomy and physiology of the human body.
- 2.0 The student will explore the chemical, microscopic, and organizational structures of the body and will relate explore their role in human anatomy and physiology.
- 3.0 The student will explore systems that relate to the support and movement of the human body.
- 4.0 The student will explore systems that relate to integration, sensation, and control of the human body.
- 5.0 The student will investigate the structure and function of body systems that relate to transportation, respiration, and defense.
- 6.0 The student will investigate the human organ systems that relate to nutrition, digestion, and excretion.
- 7.0 The student will investigate human body systems as they relate to reproduction, growth, and development.

Anatomy and Physiology

Standard 1.0

The student will explore methods of scientific inquiry as they relate to the study of the anatomy and physiology of the human body.

Learning Expectations

The student will:

- 1.1 Design and conduct scientific investigations to explore new medical or pharmacological techniques, examine previous results, test how well a theory predicts, and compare opposing theories.
- 1.2 Use appropriate tools and technology to produce accurate data.
- 1.3 Communicate and defend scientific findings.
- 1.4 Explore the history and impact of medical technology as it relates to the study of the structure and function of the human body.
- 1.5 Distinguish between human anatomy and physiology.
- 1.6 Create a wellness plan related to prevention of chronic diseases and/or disorders

Performance Indicators: Evidence Standard Is Met

The student will:

- 1.1 Conduct scientific experiments that include testable questions, verifiable hypotheses, and appropriate variables to explore new techniques or verify the experimental results of others.
- 1.2 Select appropriate tools and technology to collect precise and accurate quantitative and qualitative data.
- 1.3 Determine if laboratory data supports or contradicts a hypothesis or conclusion.
- 1.4 Trace the historical development of scientific principles, theories, and/or technology and how they relate to the current study of human anatomy and physiology.
- 1.5 Investigate the interdependence of the structure and function of the human body.
- 1.6 Research a chronic disease or disorder that is preventable and present finding to class in an electronic format.

Sample Performance Tasks:

- Use HOSA Biomedical Debate guidelines to argue the accuracy of a scientific theory.
- Identify the components of a microscope and demonstrate proper use.
- Construct a timeline demonstrating the historical developments in the study of human anatomy and physiology.

ANATOMY AND PHYSIOLOGY

Standard 2.0

The student will explore the chemical, microscopic, and organizational structures of the body and will relate explore their role in human anatomy and physiology.

Learning Expectations

The student will:

- 2.1** Analyze the structure and function of the human body from the molecular to organism level.
- 2.2** Investigate human cytology structure and function including cellular respiration and metabolism
- 2.3** Explore the structure and function of human tissues/histology
- 2.4** Investigate the major body regions, directions, and cavities to include organs within each and apply the correct related terminology.
- 2.5** Describe the body mechanisms that maintain homeostasis.

Performance Indicators: Evidence Standard Is Met

The student will:

- 2.1** Construct a concept map illustrating the levels of organization of the human body from molecular level through organismic levels.
- 2.2** Observe, draw, construct, or label a model of the human cell and explain the function of organelles.
- 2.3** Observe, draw, or label various types of human tissue.
- 2.4** Construct a concept map to illustrate the directions, regions, and cavities in the body and the organs found within each area.
- 2.5** Provide examples of bodily mechanisms that serve to maintain homeostasis and regulate body temperature, blood carbon dioxide levels, and blood glucose levels.

Sample Performance Task

- Students analyze anatomical position by using directional terms
- Illustrate body regions, planes, directions, and cavities; label anatomical references and diagrams using correct terminology for each.
- Construct or label a model of the human cell
- Examine human histological slides and identify distinguishing features

- Students can practice checking oral temperature, utilizing pulse oximeter measurement and discussing glucose levels with variables of each.

ANATOMY AND PHYSIOLOGY

Standard 3.0

The student will explore systems that relate to the support and movement of the human body.

Learning Expectations

The student will:

- 3.1** Explain the structure and functions of the integumentary system and its role in homeostasis of the human body
- 3.2** Identify the skeletal system (the bones and their parts) and relate the physiological mechanisms that assist the skeletal system in fulfilling its function.
- 3.3** Illustrate the various types of muscles, including major skeletal muscles of the body, and explain the physiology of muscle contraction.
- 3.4** Investigate and explain diseases and disorders common to integumentary system
- 3.5** Investigate and explain diseases and disorders common to skeletal system
- 3.6** Investigate and explain diseases and disorders common to muscular system.

Performance Indicators: Evidence Standard Is Met

The student will:

- 3.1** Construct, draw, or label a model of skin layers, identifying the unique features and functions of each layer as they relate to integumentary function as a whole.
- 3.2** Distinguish between the four classifications of bones and examine the microscopic development and structure of bone tissue.
- 3.3** Label a skeletal model or diagram of the bones comprising the axial and appendicular skeletons and discuss their various functions.

- 3.4 Observe, draw, or label the different types of muscle tissues, noting the function and anatomical differences of each type.
- 3.5 Research and construct written and verbal presentation on disease or disorders of integumentary, skeletal and muscular system.

Sample Performance Tasks

- Research a disorder of the integumentary, muscular or skeletal system, write a research paper on the disorder, and present the disorder via an electronic method.
- Research various types of injuries and burns affecting the skin and perform mathematical calculations utilizing the Rule of Nines.
- Compare and contrast gender differences within the skeletal system using anatomical models or diagrams.
- Perform range of motion exercises and evaluate joint angles using a goniometer.

ANATOMY AND PHYSIOLOGY

Standard 4.0

The student will explore systems that relate to integration, sensation, and control of the human body.

Learning Expectations

The student will:

- 4.1** Investigate the anatomy and physiology of the central and peripheral nervous systems from the microscopic to systemic levels.
- 4.2** Analyze the anatomy and physiology of the special senses and their role in sensory perception.
- 4.3** Investigate the anatomy and physiology of the endocrine organs and connect the relation of each structure to the hormonal regulation of homeostasis.
- 4.4** Investigate and explain diseases and disorders common to the nervous system and senses.
- 4.5** Investigate and explain diseases and disorders common to the endocrine system.

Performance Indicators: Evidence Standard Is Met

The student will:

- 4.1** Observe or construct microscopic slides of nervous tissue and differentiate the function of nervous tissue structures.
- 4.2** Identify the components of the central and peripheral nervous system and compare and contrast their functions.

- 4.3 Investigate the physiology of electrochemical impulses and neural integration.
- 4.4 Identify the structure and functions of the body's sensory organs.
- 4.5 Differentiate among the major organs and tissues that comprise the endocrine system and explain how the hormones secreted by these tissues assist in the maintenance of homeostasis.
- 4.6 Research and construct written and/or verbal presentation on disease or disorders of the nervous and endocrine system.

Sample Performance Tasks

- Demonstrate a neurological assessment.
- Analyze a case study of a neurological disorder to make a speculative diagnosis or prognosis.
- Compare X-rays, MRI, and CT Scans to identify the structure of the body systems.
- Invite health professionals from different fields to speak.

ANATOMY AND PHYSIOLOGY

Standard 5.0

The student will investigate the structure and function of body systems that relate to transportation, respiration, and defense.

Learning Expectations

The student will:

- 5.1** Describe the molecular and cellular components of the blood and their role in the maintenance of the normal homeostasis of the human body.
- 5.2** Demonstrate an understanding of the anatomy and physiology of the heart and the flow of blood through the heart.
- 5.3** Describe the structure of blood vessels and label the major arteries and veins.
- 5.4** Describe the physiological basis of circulation and blood pressure.
- 5.5** Describe the structure and function of the respiratory system and demonstrate the role of the respiratory and cardiovascular systems in maintaining homeostasis.
- 5.6** Describe the major organs of the lymphatic system and explain how they relate to the immune response.
- 5.7** Investigate and explain diseases and disorders common to cardiac system
- 5.8** Investigate and explain diseases and disorders common to respiratory system

- 5.9** Investigate and explain diseases and disorders common to circulatory and lymphatic system

Performance Indicators: Evidence Standard Is Met

The student will:

- 5.1** Examine the cellular components and physical characteristics of blood and explore blood types in the ABO system.
- 5.2** Observe, construct, or label the anatomy of the human heart and outline the flow of blood through cardiovascular and respiratory systems.
- 5.3** Label the major arteries and veins and identify the structural components of a blood vessel.
- 5.4** Describe the biochemical and physiological events associated with heart contraction, blood pressure, and blood clotting.
- 5.5** Label the structures of the respiratory system and verbalize understanding of the exchange of gases at the cellular level.
- 5.6** Draw or label the structures that comprise the lymphatic system and verbalize understanding of their role in the immune response.
- 5.7** Relate nonspecific cellular and chemical defenses of the body to environmental factors.
- 5.8** Analyze diseases and disorders of lymphatic, cardiac, respiratory and circulatory systems.

Sample Performance Tasks:

- Dissect and identify the parts of a mammalian heart.
- Write a research paper or construct a electronic slide presentation on a cardiovascular, respiratory or immunological system dysfunction and present it to the class. Include an interview with a health professional as a resource for this assignment.
- Illustrate risk factors affecting cardiovascular function using HOSA Extemporaneous Health Poster guidelines.
- Investigate current health risks or outbreaks utilizing the Center for Disease Control as one of the resources. Then, utilizing HOSA Chapter Newsletter guidelines create a newsletter informing the public of risk, causes and preventive methods.
- Measure pulse and blood pressure and synthesize causes of deviation from normal.

ANATOMY AND PHYSIOLOGY

Standard 6.0

The student will investigate the human organ systems that relate to nutrition, digestion, and excretion.

Learning Expectations

The student will:

- 6.1** Analyze the structure and function of major organs of the digestive system.
- 6.2** Analyze the structure and function of major organs of the excretory system.
- 6.3** Describe mechanisms of digestion and absorption within the body.
- 6.4** Relate how nutrition, metabolism, and body temperature are interrelated.
- 6.5** Examine the homeostatic mechanisms involved in the maintenance of normal fluid/electrolyte and acid/base balance.
- 6.6** Investigate and explain diseases and disorders common to digestive system.

- 6.7 Investigate and explain diseases and disorders common to excretory system.

Performance Indicators: Evidence Standard is Met

The student will:

- 6.1 Observe, label, or draw models of each organ within the digestive system, listing the functions of each organ.
- 6.2 Observe, label, or draw models of each organ within the excretory system, listing functions of each organ comparing male and female systems.
- 6.3 Investigate mechanisms of digestion and food absorption.
- 6.4 Explore the role of the digestive and excretory systems in maintaining body temperature.
- 6.5 Discuss the importance of water and electrolyte balance in the maintenance of homeostasis.
- 6.6 Identify the enzymes and biochemical reactions that facilitate digestion.
- 6.7 Summarize research of disease and disorders related to digestive and excretory systems and share with other students.

Sample Performance Tasks:

- Trace a selected food through the alimentary canal
- Perform a ChemStrip test on a simulated urine sample
- Prepare questions that relate to the HOSA Nutrition Test.
- Construct model of kidney to include all parts.

ANATOMY AND PHYSIOLOGY

Standard 7.0

The student will investigate human body systems as they relate to reproduction, growth, and development.

Learning Expectations

The student will:

- 7.1** Identify the structures and related functions of the male reproductive system.
- 7.2** Identify the structures and related functions of the female reproductive system.
- 7.3** Indicate the duration and relate the major events at each stage of gestation.
- 7.4** Investigate and explain diseases and disorders common to female reproductive system and/or pregnancy.

- 7.5** Investigate and explain diseases and disorders common to male reproductive system.

Performance Indicators: Evidence Standard is Met

The student will:

- 7.1** Observe, draw, and label diagrams of the male reproductive systems and list their functions.
- 7.2** Observe, draw, and label diagrams of the female reproductive systems and list their functions.
- 7.3** Outline the major events in each stage of gestation.

Sample Performance Task

- View a video relating to human reproduction and/or fetal development.
- Construct a timeline of events sequencing the stages of human development from fertilization to birth.
- Invite a guest speaker from the health department to discuss reproductive health.
- Compare and contrast the anatomy and physiology of a mammalian dissection specimen to the structure and functions of the human body.