

Wilson Area School District Planned Course Guide

Title of planned course: Anatomy and Physiology: Muscles, Messengers, and More

Subject Area: Science

Grade Level: 12

Course Description: This rigorous senior-level course includes a detailed study of the structures and functions of the following human body systems: the integumentary system (skin), the muscular system, the skeletal system, the nervous system, the immune/lymphatic system, and the endocrine system. Introductory anatomical terminology will also be taught. This course is recommended for students who plan to major in the medical field, but is not meant to serve as a substitute for AP level Biology, Chemistry, and Physics classes.

Time/Credit for this Course: Half Year / 0.5 Credit

Curriculum Writing Committee: Jennifer Burd

Curriculum Map

Weeks 1 & 2:

Introduction to Anatomy (Overview of body systems & the language of anatomy)

Weeks 3 & 4:

The Integumentary System

Weeks 5 & 6:

_____The Muscular System

Weeks 7 & 8:

The Skeletal System

Weeks 9 & 10:

_____The Nervous System

Weeks 11 & 12:

_____The Lymphatic System

Weeks 13 & 14:

The Immune System

Weeks 15 & 16:

The Endocrine System

Weeks 17 & 18:

Final labs and review for the final exam

Wilson Area School District Planned Course Materials

Course Title: Anatomy and Physiology: Muscles, Messengers, and More

Textbook: *Essentials of Human Anatomy and Physiology*, Elaine N. Marieb; Pearson

Supplemental Books:

Essentials of Human Anatomy and Physiology Laboratory Manual (6th Ed.)

Elaine N. Marieb; Pearson; 2015

Anatomy and Physiology Coloring Workbook: A Complete Study Guide (11th Ed.)

Elaine N. Marieb; Pearson; 2015

Biology; Miller and Levine; Pearson 2010

Teacher Resources:

- Biodigital Human App
- Ted Ed
- Crash Course Anatomy
- Biozone A&P Workbook

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: An Introduction to Anatomy

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A8, 3.1.12.A1, 3.1.12.A5, 3.1.12.A6

Essential content/objectives: At the end of the unit, students will be able to:

- Differentiate the terms “anatomy” and “physiology” in definition and examples
- Arrange the levels of anatomical organization from simple to complex (atom to organism)
- Identify body systems based on structures and functions
- Use proper anatomical terminology to describe body directions, surfaces, body planes, and relationships between structures
- Locate the major body cavities and list the chief organs in each cavity
- Describe necessary life functions and explain how they work to maintain homeostasis in the body
- Compare and contrast the major cell types in the human body
- Compare and contrast the four tissue types in the human body

Core Activities: Students will complete/participate in the following:

- Guided outline on the Introduction to Anatomy
- Diagrams packet including anatomical terminology, body cavities, and body regions
- Directional Terms practice and discussion
- Body regions practice and discussion
- Body landmarks practice and discussion
- “Do You Know Your Body?” activity

Extensions:

- “The Human Body: An Orientation” packet
- Play-Doh terminology activity

Remediation: Manipulation of Biodigital Human App for Review

Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework
- Class notes
- Labs
- Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Integumentary System

Time frame: 2 weeks

State Standards: 3.1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.12.A1, 3.1.12.A5, 3.1.12.A6, 3.1.12.A8

Essential content/objectives: At the end of the unit, students will be able to:

- Compare and contrast the structure, function, and location of the major body tissues
- Identify and describe the structures, functions, and locations of the epidermis, dermis, and hypodermis
- Explain the importance of the accessory structures of the integumentary system
- List the pigments associated with skin color and explain how each of those pigments is unique
- Differentiate between first, second, and third degree burns

Core Activities: Students will complete/participate in the following:

- Application Project on The Integumentary System
- Guided outline on the skin and body tissues
- Diagrams packet including mucous, serous, synovial, and cutaneous membranes, a cross-section of the skin, and the microanatomy of the 3 layers
- Scalpel scenario pertaining to the serous membranes
- Effectiveness of Sunscreen at Blocking UV light lab
- Developmental Concerns of the Integumentary System (impetigo, eczema, skin cancer etc.)
- Systems in Sync Discussion
- Microscopic observation and identification of epithelial, connective, muscle, and nervous tissues

Extensions:

- “The Integumentary System” packet
- Integumentary foldable
- Medical Mondays: Viruses and Bacteria / Sun vs. Sunless Tanning

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Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework
- Class notes
- Labs
- Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Muscular System

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A, 3.2.12B

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.12.A1, 3.1.12.A5, 3.1.12.A6, 3.1.12.A7, 3.1.12.A8, 3.2.12.B1

Essential content/objectives: At the end of the unit, students will be able to:

- Describe similarities and differences in the structure and function of the three types of muscle tissue and indicate where they are found in the body
- Differentiate between tendons and ligaments
- Describe the microscopic structure of skeletal muscle and explain the sliding filament model of muscle contraction
- Name and locate the major muscles of the human body
- Name and locate the major muscles of the head and neck
- Draw the ADP and ATP molecules and use the drawing as a guide to elaborate on how ADP/ATP functions in the body
- Explain the three processes that muscles use to generate ATP for contractions

Core Activities: Students will complete/participate in the following:

- Application Project on The Muscular System
- Guided outline on the muscular system
- Diagrams packet including skeletal, smooth, and cardiac muscles
- Identification and coloring of the anterior and posterior body muscles
- Identification and coloring of the muscles of the head and neck
- Creation of a muscular “foldable” to examine the microanatomy and physiology of a muscle and how it contracts at the molecular level
- Building of a skeletal muscle model
- Types of movements at the synovial joints demonstrations and descriptions (flexion, extension, adduction, abduction, etc.)
- Linguistics of the Skeletal Muscles
- Effect of Fatigue on Muscle Grip Action Lab
- Developmental Concerns of the Muscular System (muscular dystrophy, fibromyalgia, etc.)
- Systems in Sync Discussion

Extensions: Medical Mondays: Exercise / Anabolic Steroid Doping

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Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests / Homework / Class notes
- Labs / Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Skeletal System

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.12.A5, 3.1.12.A6, 3.1.12.A8

Essential content/objectives: At the end of the unit, students will be able to:

- Differentiate between the axial and appendicular skeletons
- To locate the 206 bones of the adult body including bones of the body and bones of the skull
- To classify the 4 types of bones based on shape and location
- Describe the microscopic structure of bone and compare and contrast between red and yellow marrow
- Explain the processes of bone remodeling and hematopoiesis

Core Activities: Students will complete/participate in the following:

- Application Project of The Skeletal System
- Guided outline on the skeletal system
- Diagrams packet including axial and appendicular skeleton, 8 cranial bones, and 14 facial bones
- Skeletal foldable of the anatomy of a long bone and the microanatomy of an osteon
- Flow chart creation of the process of hematopoiesis
- “What’s the Difference” skeletal activity (osteoblast vs. osteoclast, WBC vs. RBC, etc.)
- Types of bone fractures X-Ray activity
- 6 Types of Joints artistic review and demonstration
- Developmental Concerns of the Skeletal System (scoliosis, osteoporosis, etc.)
- Systems in Sync Discussion

Extensions:

- Skeletal Model ID lab
- Medical Mondays: Exercise / Anabolic Steroid Doping

Remediation: Manipulation of Biodigital Human App for Review

Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework
- Class notes
- Labs
- Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Nervous System

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.10.A8, 3.1.12.A5, 3.1.12.A6, 3.1.12.A8

Essential content/objectives: At the end of the unit, students will be able to:

- Explain the processes of sensory input, integration, and motor processing
- Differentiate between the CNS and PNS
- Identify the regions, lobes, and other structures of the brain
- Explain how the regions, lobes, and structures of the brain function
- Trace the pathway of a nerve impulse
- Describe the blood brain barrier and predict how treatments for brain cancer would work with regard to this barrier
- Label diagrams of a nerve cell and other structures associated with the nervous system
- Compare and contrast the 6 neuroglial cells
- Differentiate between the sympathetic and parasympathetic nervous systems.
- Discuss spinal nerve innervation

Core Activities: Students will complete/participate in the following:

- Application Project on The Nervous System
- Guided outline on the nervous system
- Diagrams packet including categories of the CNS and PNS, parts of the brain and spinal cord, and anatomy of the neuron
- Foldable on the parts of a neuron
- Foldable on the process of an action potential (resting and graded potentials, depolarization, etc.)
- "What's the Difference" nervous activity (gyrus vs. sulcus, gray vs. white matter)
- Developmental Concerns of the Nervous System (cerebral palsy, spina bifida, etc.)
- Systems in Sync Discussion

Extensions:

- Identification of the Cranial Nerves
- Medical Mondays: PA Immunizations / Brain Tricks

Remediation: Manipulation of Biodigital Human App for Review

Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework / Class notes
- Labs / Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Lymphatic and Immune Systems

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.10.A8, 3.1.12.A5, 3.1.12.A6, 3.1.12.A8

Essential content/objectives: At the end of the unit, students will be able to:

- Describe components of the lymphatic system including lymphatic vessels and nodes
- Trace the pathway of how lymph flows through the body in a one-way direction to the heart
- Categorize lymphatic structures as cervical, axillary, or inguinal
- Identify additional lymphatic structures and how they function in the body (spleen, tonsils, etc.)
- Describe the structures and functions of the immune system and their relationship to the lymphatic system
- To differentiate between specific and nonspecific immunity
- To identify the cells associated with immunity and how they work to protect against pathogens
- To identify general strategies the body uses to protect itself from pathogens including internal and external structures

Core Activities: Students will complete/participate in the following:

- Application Projects on the lymphatic and immune Systems
- Guided outlines on the lymphatic and immune systems
- Diagrams packet including structures of the lymphatic system, the process of phagocytosis, and the antigen-antibody interactions
- Foldable detailing the 1st and 2nd lines of innate immune response and the 3rd line of adaptive immune response (humoral vs. cell-mediated immunity)
- Assessing Potential Allergens lab
- Developmental Concerns of the Immune System (leukemia, AIDS)
- Systems in Sync Discussion

Extensions: Medical Mondays: PA Immunizations / Brain Tricks

Remediation: Manipulation of Biodigital Human App for Review

Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework
- Class notes
- Labs
- Student participation

Curriculum Scope & Sequence

Planned Course: Anatomy and Physiology: Muscles, Messengers, and More

Unit: The Endocrine System

Time frame: 2 weeks

State Standards: 3:1.10.A, 3.1.12.A

Anchor(s) or adopted anchor: 3.1.10.A5, 3.1.10.A8, 3.1.12.A5, 3.1.12.A6, 3.1.12.A8

Essential content/objectives: At the end of the unit, students will be able to:

- To explain how the endocrine system is critical to maintaining homeostasis
- To describe the purpose of a hormone and how it conveys messages throughout the body
- To distinguish between an endocrine gland and exocrine gland
- To describe the functions of some of the main hormones found in the human body

Core Activities: Students will complete/participate in the following:

- Application Project of The Endocrine System
- Guided outlines on the endocrine system
- Diagrams packet including processes involved in specific endocrine functions
- Developmental Concerns of the Endocrine System (thyroid disease, cushing's syndrome)
- Systems in Sync Discussion

Extensions:

- "The Endocrine System" packet
- Endocrine foldable
- Medical Mondays: Allergies / Holistic Medicine

Remediation: Manipulation of Biodigital Human App for Review

Instructional Methods:

- Direct instruction
- Cooperative learning labs / Activities
- Teacher and student led class discussions

Materials & Resources:

- Textbooks
- Slideshows
- Labs / Lab supplies

Assessments:

- Tests
- Homework
- Class notes
- Labs
- Student participation