Pequannock Township School District
Curriculum Syllabus

Anatomy and Physiology I / Grade 11

Course Description:

Anatomy and Physiology is the study of the structure and function of the human body. This course follows a sequential development of the major body systems in an organized and structured curriculum. The course is designed to give the students a selective overview of human anatomical structure and an analysis of human physiological principles. Labs will include slide work, dissection of various animals and studies of the human skeleton. The course will also use computer simulated dissection.

Course Standards:

The following is a list of NJSLS that describe what students are expected to know and be able to do as a result of successfully completing this course. The following NJSLS are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

NJSLS	New Jersey Student Learning Standards
HS.LS.1.A	Structure and Function:Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.) Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)

HS.LS1.B	In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material.
HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Scope and Sequence

Unit 1 Marking period 1 This unit is an introduction to anatomy and physiology which familiarizes students with fundamental terminology including anatomy, physiology.
Unit 2 Marking period 1 Characteristics of life unit focuses on 10 major characteristics of humans that define them as living. This includes survival needs of humans and the maintenance of homeostasis. Homeostatic mechanisms which include hormonal and nervous system responses through feedback loops will be learned.
Unit 3 Marking period 1 The levels of organization for a human are studied starting with the subatomic level to the organism level. Subdivision of the body systems into cavities and planes and the eleven major organ systems along with their basic function. This unit also looks at directional terms for the human body.
Unit 4 Marking period 2 The basic functions of chemistry as they relate to anatomy and physiology of the human body are studied in this unit. Students will learn what the three energy forms are and the four major elements found in the body. Atomic structure, bonding and ionic functions in the body will be studied. Students will also learn about clinical applications of isotopes.

Unit 5 Marking period 2

Biochemistry will study the electrolytes, acids and bases in the body along with the four major macromolecules of lipids, proteins, nucleic acids and carbohydrates. Structure and function of the macromolecules will be studied along with the role of ATP as the energy molecule. pH of the blood and urine will be explained along with how pH influences other chemical reactions and homeostasis.

Unit 6 Marking period 2

This unit studies the general characteristics of human cells along with the specific functions of different organelles and cellular structures. Students will learn how the three types of RNA relate to protein synthesis and which organelles are involved in protein production and what the central dogma is. Students will also study different tissue types in the body including epithelial, connective, muscle and nervous tissues along with their unique characteristics at the cellular level and their functions. Students will learn about mitosis and irregular cellular division and its clinical applications.

Unit 7 Marking period 3

The integumentary system unit studies the major function of the skin as a protective membrane around the body. The different tissue types within the integumentary system and how the integumentary system is correlated to the other body systems will be studied. Aging, disease and skin damage and recovery will be studied.

Unit 8 Marking period 3

In this unit students will study the skeletal system, how it is subdivided and its five major functions. Students will learn all 206 bones of the body along with the process of bone formation and growth and diseases and disorders related to the skeletal system. Students will

learn different abnormal spinal curvatures and development of the human skull from infancy. Students will also study major joint classifications.
Unit 9 Marking period 3 Students will study the three muscle types and their location and functions in the human body. Students will learn muscle groups along with antagonists and synergist muscles. The major parts of the muscle fiber, how a muscle contracts and uses ATP will be explained along with the difference between slow and fast twitch muscle fibers. Muscle system clinical diseases and applications will be studied along with muscle terminology.
Unit 10 Marking period 4 In the nervous system unit students will learn the function and subdivision of the nervous system. Students will study neuron cell types and their functions and how a nerve impulse is received and the chemical electrical processes that carry that impulse. Types of sensory receptors and parts and functions of the brain and plexuses will be learned. The autonomic versus limbic system and sympathetic and parasympathetic systems will be studied. Diseases and terminology of the nervous system will be studied.
Unit 11 Marking period 4 The special senses unit focuses on the different sensory receptor types especially related to the eyes and ears. The structure and function of the eyes and ears along with transmission of sound and visual pathways will be studied in this unit.

Assessments

Evaluation of student achievement in this course will be based on the following:

a. Projects
b. Case Studies
c. Quizzes
d. Tests
e. Laboratory Experiments
f. Activities

Curriculum Resources

Anchor Programs/Teacher Materials

Hole's Human Anatomy and Physiology, 14th edition
David Shier
Jackie Butler
Ricki Lewis
Wm. C. Brown/McGraw Hill Publishers

Home and School Connection

The following are suggestions and/or resources that will help parents support their children:

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New Jersey Student Learning Standards (NJSLS) are referenced and available at these links:
Specific Standards used in this curriculum are listed in Appendix B.

Career Readiness: http://www.state.nj.us/education/cccs/2014/career/CareerReadyPractices.pdf
Career Awareness, Exploration, and Preparation: http://www.state.nj.us/education/cccs/2014/career/91.pdf
Career and Technical Education: http://www.state.nj.us/education/cccs/2014/career/93.pdf
English Language Arts Standards/ Science and Technical Subjects 11- 12th Grade: http://www.corestandards.org/ELA-Literacy/RST/11-12/
English Language Arts Standards/ Writing in History, Social Studies, Science & Technology Grades 6-12:
http://www.corestandards.org/ELA-Literacy/WHST/11-12/
High School Life Science Standards : http://www.nextgenscience.org/next-generation-science-standards
Appendix M. Connections to CCSS-Literacy in Science and Technical Subjects