

**MEDFORD HIGH SCHOOL
COURSE SYLLABUS**

Department:	Science
Course Title:	Anatomy & Physiology
Level and/or Grade:	Honors; Grades 11-12
Prerequisite:	A grade of “B” or better in Honors Biology and Honors Chemistry or “A-” or better in Standard Biology and Standard Chemistry or teacher recommendation and department approval

Course Description:

This course has been designed to meet the needs of those students who must acquire a firm grounding in human anatomy and physiology in order to prepare for medical, nursing or paramedical careers. Standards are similar to those in the standard level of the course, but are addressed in greater depth and with high levels of sophistication. Students will investigate the structure and function of the human body with and emphasis on laboratory work. This course studies the structure and function of the human body and the mechanisms for maintaining homeostasis within it. It includes the study of cells, tissues and the integumentary, skeletal, muscular and nervous systems. It also includes the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems, and the concepts of development, metabolism, fluid and electrolyte balance, and acid-base balance. This course uses dissection as an instructional activity. Students will be presented with alternatives as described in the district’s Dissection Policy.

Learning Standards: *Through inquiry, experimentation, labs, dissections, use of tools, discussion, presentation, and composition, students will be able to.....*

Energy:

- ◆ Understand that energy is needed to support all metabolic processes of the body, and that carbohydrates and lipids are primary sources of energy, while ATP provides a reservoir of energy for cellular metabolism.
- ◆ Explain the processes of respiration (intracellular, extracellular) by which energy is released.

Scale & Structure:

- ◆ Describe the hierarchy of molecular organization from biomolecules to complex organisms and how these levels result in progressively more complex function.
- ◆ Understand that organic and inorganic compounds are the basic materials that compose more complex units of the body.
- ◆ Describe the structure and function of DNA (as a genetic code that determines organisms’ structural and functional characteristics); understand that nucleic acid, DNA and RNA, along with amino acids and enzymes synthesize proteins that are important structural components at any level of organization.
- ◆ Understand that, as tissues combine to form organs and organs combine to form systems, certain functional properties emerge that are not observed in simpler components.
- ◆ Understand that growth in an organism is accomplished through division of cells.

Stability:

- ◆ Explain how the major organ systems in humans have functional units with specific anatomy that perform a function of that organ system.
- ◆ Be familiar with parts of several systems: generalize their functions; describe how the functions of individual systems within humans are integrated to maintain homeostatic balance in the body.
- ◆ Recognize that communication between cells is required for coordination of body functions.

Systems & Interaction:

- ◆ Describe how the processes necessary to sustain life involve the interaction of multiple systems such as:
 - ◆ Basic metabolism can be seen in all body systems.
 - ◆ Distribution of nutrients throughout the body involves digestive and circulatory system.
 - ◆ Nervous and endocrine systems control the interaction of other body systems as well as allow the organism to respond to environmental stimuli.
 - ◆ Support and movement involve interaction of skeletal, muscular, and nervous systems.
 - ◆ Respiratory gases are exchanged between the organism and the external environment by moving across membranes of the respiratory and circulatory systems.
 - ◆ Excretion of wastes may involve the digestive, urinary, respiratory, and integumentary systems.
 - ◆ Creation of new life involves the reproductive and endocrine systems.

Structure & Function:

- ◆ Understand that cells are the structural and functional units of the body.
- ◆ Identify, locate, define, dissect, and label parts of various systems of the body, and describe the functions of each system such as:
 - ◆ Membranes function as boundaries between diverse structure and function; membranes as well as various forms of integument define and protect the body from the external environment.
 - ◆ Skeletal structure provides an internal framework for the body, encloses vital organs, and provides attachment for skeletal muscle to cause movement.
 - ◆ Various muscles structures create a variety of movement.
 - ◆ Nervous system is structured to provide electrical signals to activate a variety of organ functions.
 - ◆ Endocrine system exerts chemical control over a variety of organ functions.
 - ◆ Circulatory system is related to the movement of molecules through the body.
 - ◆ Respiratory system is structured to exchange gas between the organism and its environment.
 - ◆ Digestive system breaks down ingested nutrients to a level that can be absorbed by the circulatory system.
 - ◆ Urinary system is structured to filter nitrogenous wastes and other substances from blood, thus contributing to homeostatic balance.
 - ◆ Male and female reproductive anatomy and physiology, as well as embryonic life involve the reproductive and endocrine systems.

Course Alignment with High School Expectations for Student Learning:

Students will...

1. Analyze, interpret, evaluate and use logical reasoning to solve problems using a variety of resources and strategies.

- Make observations, raise questions, and formulate hypotheses.
- Read, interpret, and examine the credibility and validity of scientific claims in different sources of

information.

- Design and conduct scientific investigations - identify purpose, select appropriate tools and conditions; identify variables; write clear procedures; measure accurately and collect data in organized ways; follow safety guidelines.
 - Analyze and interpret results of scientific investigations.
2. Communicate effectively to a variety of audiences.
 - Communicate orally and in writing, and apply the results of scientific investigations.
 - Explain diagrams and charts and prepare lab reports,
 - Use language and vocabulary appropriately, speak clearly, and use appropriate technology.
 3. Create works using a variety of communication forms.
 - Present arguments through writing; solve problems through projects, homework, tests, and lab experiences; use technology; make oral presentations.
 4. Develop skills and knowledge to reach personal and career goals.
 - Develop ‘habits of mind’: work beyond center of competence; gain attitude of persistence; seek feedback; develop confidence.
 - Become familiar with careers related to science.
 5. Work cooperatively to achieve objectives.
 - Work in pairs, small groups, and part of the whole class to solve problems.
 - Analyze and evaluate the mathematical thinking and strategies of others.

Assessment:

- ◆ See attached grading policy and dissection policy.