NEW MILFORD PUBLIC SCHOOLS

New Milford, Connecticut

Anatomy and Physiology I

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New Milford Public Schools
Honors Anatomy & Physiology I Curriculum

Committee Member(s): **Karen Terhaar** **Robin Barboza-Josephson** **Unit Title: Unit 1 - Levels of Organization**	**Course/Subject:** **Honors Anatomy & Physiology I** **Grade Level: 11 - 12** **# of Weeks: 8**

Identify Desired Results

Common Core Standards

- HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]
- 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. [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.] [Assessment Boundary: Assessment does not include the details of the specific chemical reactions or identification of macromolecules.]
- CCSS.ELA-LITERACY.RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- CCSS.ELA-LITERACY.RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.
- CCSS.ELA-LITERACY.WHST.11-12.1.C Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations
● Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) ● Multicellular organisms have a	● How do the structures of organisms enable life's function? ● How do organisms obtain and use the matter and energy they need to live and grow?

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) ● 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 (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)	

Expected Performances
What students should know and be able to do

Students will know the following:

- How anatomical structures relate to their physiological functions
- Correct terminology when explaining the orientation of body parts and regions
- The interdependence of the various body systems to each other and to the body as a whole
- The role of homeostasis and its mechanisms as these relate to the body as a whole
- How cellular metabolism and transport relate to homeostasis and cellular respiration
- How structure and function are related in terms of the cell and different tissue types

Students will be able to do the following:

- Analyze how the human body is organized to accomplish those tasks that are essential to maintain life.
- Connect how chemistry is related to the structure and function of living things and their parts.
- Critique how the structures of cellular organelles contribute to and support the functions of each organelle and, in turn, the cell.
- Predict the consequences of the failure to maintain homeostasis
- Connect how tissues are related to the organization of the body.

Character Attributes

- Citizenship
- Respect
- Responsibility
- Compassion

Technology Competencies

- Students use technology to research, communicate, collaborate and solve an authentic problem.

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Activities:
● Use of gradual release model ● PowerPoint presentations and notes ● Laboratory investigations ● Case Study Investigations ● Cooperative grouping ● Audio Visual presentations ● Research ● Nonlinguistic representations	● Observing cells under the microscope ● Histology Project ● Case Study Analysis ● POGIL activities (using models)

Assessments

Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: To produce a Histology Reference Manual Role: Researcher/Illustrator Audience: Medical Students Situation: Medical students will need a reference manual to identify the different tissue types in a variety of organs. Product or Performance: Every student will produce a Histology Manual	● Formative quizzes ● Summative unit assessments ● Lab Reports ● Case Study notes ● Poster and Presentation of case study results

containing 35 labeled drawings of Epithelial, Connective, Muscle, and Nerve tissues and 12 drawings of various organs with a number of tissue types. These will be presented with a computer image of the tissue and a listing of their characteristics, location, and function. Standards for Success: Student work will be assessed on correct labeling, drawing accuracy, and tissue characteristics.	

Suggested Resources

- Hole, John W, David Shier, Jackie Butler, and Ricki Lewis. *Hole's Essentials of Human Anatomy & Physiology*. Boston. Mass: WCB/McGraw-Hill, 2003. Print.

Committee Member(s): **Karen Terhaar** **Robin Barboza-Josephson** **Unit Title: Unit 2 - Support & Movement**	**Course/Subject:** **Honors Anatomy & Physiology I** **Grade Level: 11 - 12** **# of Weeks: 8**

Identify Desired Results

Common Core Standards

- HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.]

[Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

- HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]
- CCSS.ELA-LITERACY.RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.
- CCSS.ELA-LITERACY.WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.
- CCSS.ELA-LITERACY.WHST.11-12.1.E Provide a concluding statement or section that follows from or supports the argument presented.

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that …)	**Essential Questions** Inquiry used to explore generalizations
● 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) ● As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. (HS-LS1-7)	● How do the structures of organisms enable life's function? ● What are the physiological mechanisms that allow organ systems to function?

Expected Performances
What students should know and be able to do

Students will know the following:

- The structure of the integumentary system to its functional role in protection the body and maintaining homeostasis
- How the skeletal structures provide support and protection for tissues and function together with the muscular system to make movements possible

Students will be able to do the following:

- Apply concepts of how the skin helps you adjust to the changes in temperature and prevent a systemic infection.
- Analyze how the skeletal system contributes to your ability to move and to protect you from injury.
- Connect how the skeletal system maintains a calcium balance in the body.
- Connect and analyze how joints enable you to move.
- Apply the concept of how muscle cells utilize energy and interact with bones to accomplish diverse movements.

Character Attributes

- Citizenship
- Respect
- Responsibility
- Compassion

Technology Competencies

- Students use technology to communicate, collaborate and solve an authentic problem.

Develop Teaching and Learning Plan

Teaching Strategies:	Learning Activities:
● Use gradual release model ● PowerPoint presentations and notes ● Laboratory investigations ● Case Study Investigations ● Cooperative grouping ● Audio Visual presentations ● Research ● Nonlinguistic representations	● Skeletal System T-shirt ● Examining Skeletal Structure (using models) ● Examining Joint Structure (using models) ● Identifying Muscles (labeling diagrams) ● Case Study Analysis ● Cat Dissection ● Diagramming

Assessments

Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	**Other Evidence** Application that is functional in a classroom context to evaluate student achievement of desired results
Goal: To produce a Skeleton Tee Shirt that depicts and labels the bones that are found directly beneath the drawing (Students can also produce an entire bodysuit with all the bones) Role: To be an illustrated skeleton Audience: classmates Situation: the tee shirt can be worn on the day for the Skeleton Test as a walking cheat sheet Product or Performance: the shirt Standards for Success: A well-drawn tee shirt showing an accurate skeleton (formative assessment)	● Formative quizzes ● Summative unit assessments ● Lab Reports ● Case Study notes ● Poster and Presentation of case study results

Suggested Resources

- Hole, John W, David Shier, Jackie Butler, and Ricki Lewis. *Hole's Essentials of Human Anatomy & Physiology*. Boston. Mass: WCB/McGraw-Hill, 2003. Print.