

Haddon Township High School
Course Overview Template

Subject Area: Science
Course Name: Physiology

Summary: This course is designed for the student interested in a career in the medical field or with a genuine interest in the structure and function of the human body. Biochemistry and cellular and tissue levels are discussed. Body systems are investigated, with an emphasis on independent weekly labs including dissections of a cow's eye, sheep brain, sheep heart, and cat. The coursework culminates with the 2-week cat dissection and lab practical, tying all the body systems together. Research topics on diseases will also be examined.

Unit Title	Student Learning Target	Standards	Resources	Assessment
Anatomical Terminology	<p><i>Students will</i></p> <ul style="list-style-type: none"> • Use anatomical terminology correctly and understand why it is necessary. • Describe the importance of maintaining homeostasis by keeping the body healthy. • Communicate with others both verbally and in written form how anatomy and physiology are related. 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the</p>	<p>textbook, online diagrams from anatomy website, teacher website for anatomical lab sources; pickle, scalpel, probe, dissecting pan, toothpicks, razor blades, microscope, slides, lab handout, textbook, smartboard, powerpoint,</p>	<p>Anatomy of a pickle lab (pickle/human autopsy simulation using anatomical terms, cause of death, and organs excised & analyzed</p>

		<p>use of mathematics.</p> <p>9.1 21st Century Life & Career Skills</p> <p>All students will demonstrate the creative, critical-thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>		
Chemistry	<ul style="list-style-type: none"> • Be able to explain hydrolysis and condensation synthesis reactions involving lipids, carbohydrates & proteins. <ul style="list-style-type: none"> • Explain how ions are involved in chemical reactions. 	<p>5.1 Science Practices:</p> <p>All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.2 Physical Science: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.</p> <p>5.3 Life Science: All</p>	Internet access and news articles	<p>Compare/Contrast Current Articles on Body Chemistry and Homeostasis.</p> <p>(Pertinent articles: <u>pH and Cancer</u> and <u>Why Drinking Too Much Water is Dangerous</u>.)</p> <p>Critical Reading and Writing Skills are included in this assessment.</p>

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<p>Cellular Organelle Functions/ Transport</p>	<ul style="list-style-type: none"> • Differentiate between types of cellular transport • Investigate and report on a specific type of molecular movement 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural</p>	<p>Internet access, HHMI unit on cancer, video clips and animations of cellular transport</p>	<p>Student presentations of cellular transport mechanisms HHMI (Howard Hughes Medical Institute) video clip analysis of cancer cells and an altered cell cycle.</p>

		systems can be modeled and predicted through the use of mathematics.		
Tissues	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Be able to recognize the 4 basic types of tissues and examples of each at the microscopic level • Describe how membranes function to protect, lubricate, cover, and divide body organs. 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p>	microscope, slides	<p>Microscope Lab Practical – tissue identification</p> <p>Response paper (1-2 pages) on the role of tissue biopsy as a diagnostic tool (Students will be given a specific tissue disorder to investigate).</p> <p>Computer lab practice test – visual recognition of tissues</p>
Integumentary system	<p><i>Students will</i></p> <ul style="list-style-type: none"> • .Be able to identify the layers of the skin (epidermis & dermis) • Describe how the severity of a burn is 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise</p>	microscope, slides, fingerprinting pads and patterns	<p>Lab Activity on Skin and its accessory organs- Identification, comparison and use in forensic science.</p>

	<p>calculated using the rule of nines.</p> <ul style="list-style-type: none"> • Recognize precancerous tumors of the skin and how to protect the body from malignant melanomas • Describe how the integument 	<p>that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p>9.1 21st Century Life & Career Skills All students will demonstrate the creative, critical-thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>		
Skeletal System	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Differentiate between axial and appendicular skeleton and identify 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge</p>	Commercially prepared skeletal system posters, interactive websites on bone formation and	Completion of 6-station lab rotation on skeletal system involving identification, bone development, and

	<p>specific bones</p> <ul style="list-style-type: none"> • Describe 2 types of ossification (bone formation) • Identify symptoms of common skeletal disorders • Develop a diet and exercise plan for a teenager 	<p>and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p>	<p>development</p> <p>Bones, microscopes, components for model joint construction</p>	<p>joint construction</p>
<p>Nervous System</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Summarize the mechanisms involved in the transmission of nerve impulses • Relate brain structure to actions, emotions, memories, and malfunctions • Describe a day in the life of a neurologically impaired individual • Analyze specific case 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p>	<p>Biology Corner website, Anatomy & Physiology Coloring (Marieb) & Physiology Coloring Workbook (The Princeton Review)</p> <p>sheep brain (for dissection) & dissecting tools</p>	<p>Investigate a specific neurological disorder, prepare a report on "A day in the life of" and present it to the class. (outside research required).</p>

	<p>studies related to nervous system disorders</p> <ul style="list-style-type: none"> • Discuss how the nervous system interacts with the other body systems 	<p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p>		
<p>Muscular System</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Distinguish skeletal, cardiac, and smooth muscles (structure vs. function). • Develop an exercise plan that matches individual life style. • Identify major muscles in the human body. 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that</p>	<p>Equipment needed: Exercise stations (instructions), dumbbells, weights, broomsticks, mats, stopwatch (fast twitch/slow twitch muscles fiber activity) Biology Corner website, Anatomy & Physiology Coloring (Marieb) & Physiology Coloring Workbook (The Princeton Review)</p>	<p>Identification, palpation, and illustration of physical examples of skeletal muscles through lab activity stations</p>

		<p>govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p>9.1 21st Century Life & Career Skills</p> <p>All students will demonstrate the creative, critical-thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.</p>		
The Sensory System	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Compare/contrast the physiological pathways for taste and smell • Distinguish between balance and hearing functions of the ear • Be able to identify anatomical structures of the ear and eye and their related functions • Describe how the senses can malfunction and how we compensate for deficiencies 	<p>5.1 Science Practices:</p> <p>All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in</p>	<p>Teacher Resources:</p> <p>Biology Corner website, Anatomy & Physiology Coloring (Marieb) & Physiology Coloring Workbook (The Princeton Review)</p>	<p>Students will perform sensory tests using taste, smell, and sight and evaluate their usefulness to understanding sensory function.</p>

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<p>The Endocrine System</p>	<ul style="list-style-type: none"> • Identify specific locations and functions of the endocrine system organs. • Write and present a report on a chosen endocrine system disorder. • Create a flow chart describing negative feedback mechanisms in this system. 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of</p>	<p>Physiology Coloring Workbook (Princeton Review) Anatomy Coloring Workbooks & Essential of Human Anatomy (Marieb), Mayo Clinic, NIH, and HHMI websites</p> <p>textbook, Body Atlas video on Hormones, clinical analysis scenarios, computer</p>	<p>Students will choose an endocrine disorder and prepare a written and oral presentation</p>

		<p>life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p>		
<p>The Circulatory System</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Compare/Contrast different circulatory patterns in the body • Identify anatomical structures in the sheep's heart • Describe how the circulatory system works with the other body systems 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p>9.1 21st Century Life & Career Skills</p>	<p>Physiology Coloring Workbook (Princeton Review) Anatomy Coloring Workbooks & Essential of Human Anatomy (Marieb), Mayo Clinic, NIH, and HHMI websites</p> <p>sheep heart, dissecting tools, lab procedure, video on Vivien Thomas (Something the Lord Made)</p>	<p>Dissect, identify, and describe functions of the human heart using the sheep heart as a model. Analyze the impact of technology that lead to new heart surgeries (ie: open heart surgery, including bypasses, construction of missing vessels as in the blue babies in the JHU operations, pacemakers, and non-invasive diagnostic procedures).</p>

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<p>Digestive System and Urinary Systems</p>	<p>Students will:</p> <ul style="list-style-type: none"> • Compare the functions of the main v accessory organs of the digestive system • Explain how water balance and fiber aid in healthy colon • Relate kidney function to small and large intestine function • Describe causes/symptoms of digestive and urinary tract disorders • Prepare a timeline on advancements made with transplants (kidney, liver, pancreas) 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p>	<p>Physiology Coloring Workbook (Princeton Review) Anatomy Coloring Workbooks & Essential of Human Anatomy (Marieb), Mayo Clinic, NIH, and HHMI websites</p> <p>textbook, video on kidney transplant, reference diagrams (online)</p>	<p>Clinical scenario analysis: group activity involving diagnoses of specific case studies</p> <p>Organ transplants: Preparing a priority list; donors & recipients.</p>

<p>The Cat</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Demonstrate the ability to follow dissection directions and properly handle tools and specimens. • Share tasks, and work as a team • Prepare , dissect, and ultimately identify 90 structures in the cat with their chosen lab group • Describe any defects in their specimens, and explain the physiological implications of any defects 	<p>5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.</p> <p>5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.</p> <p>9.1 21st Century Life & Career Skills All students will demonstrate the creative, critical-thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in</p>	<p>Gilbert, Stephen G. <u>Pictorial Anatomy of The Cat</u> , two websites with diagrams: Virtual Cat Dissection, and Anatomically Correct: The Online Cat Dissection</p> <p>Article on why we dissect, specimens, dissecting tools, lab handouts, additional resource materials for dissection</p>	<p>The Lab activity runs for 2 -3weeks, with limited teacher interaction. Students work in teams, dissecting the cat, identifying structures for a specific body system each day. Directed questions are to be answered by the group based on the goal of the day. The dissection culminates with lab practical, pinning and correctly identifying 100 structures. (Guidelines: secure pins to insure they remain in place, spell anatomical structures correctly, and share the pinning and labeling task with lab partners).</p>
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