



SPRING GROVE AREA SCHOOL DISTRICT



PLANNED COURSE OVERVIEW

Course Title: Human Anatomy and Physiology 2 A – Body Systems Grade Level(s): 12 Units of Credit: .5 Classification: Elective	Length of Course: 15 cycles Periods Per Cycle: 6 Length of Period: 43 minutes Total Instructional Time: 64.5 hours
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Course Description

Human Anatomy and Physiology II A – Body Systems will offer students who are pursuing a medical career the opportunity to gain concepts that are designed to help them in a nursing or pre-medical major in college. Concepts to be covered include: cardiovascular (circulatory) system with blood types, lymphatic (immune) system, and the endocrine system with aspects of the reproductive system. Dissection of specimens will include various organs that correlate with body systems.

Instructional Strategies, Learning Practices, Activities, and Experiences

Teacher Demonstration Detailed Laboratory Experiments Inquiry Laboratory Experiments Textbook Reading Homework	Posted Objectives and Agenda Formal Assessments Guided Practice Online Tutorials/Resources Critical Thinking	Bell Ringers Class Discussion Flexible Groups Best Practice Strategies Hybrid Learning
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Assessments

Chapter Examinations Laboratory Write-ups/Reports	Final Exam Unit Projects	Directed Reading Packets Study Guides
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Materials/Resources

Anatomy and Physiology Textbook Current Book: <u>Essentials of Human Anatomy and Physiology</u> 8 th Ed.	PowerPoint Lectures Note Packets Online Resources	Laboratory Resources and Equipment Laboratory Experiments iPads and Apps
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Adopted: 5/15/2017

Revised:

Cardiovascular System with Blood Types	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> 1. Composition and Functions of Blood 2. Hemostasis 3. Blood Groups 4. Transfusion 5. The Heart 6. Physiology of the Heart 7. Microscopic Anatomy of Blood Vessels 8. Gross Anatomy of Blood Vessels 9. Physiology of Circulation 10. Homeostatic Imbalances of Blood 11. Homeostatic Imbalances of the Heart 12. Homeostatic Imbalances of the Cardiovascular System 	<p>3.1.12.A1: Relate changes in the environment to various organisms' ability to compensate using homeostatic mechanisms.</p> <p>3.1.12.A5: Analyze how structure is related to function at all levels of biological organization from molecules to organisms.</p> <p>3.1.12.A6: Analyze how cells in different tissues/organs are specialized to perform specific functions.</p> <p>CC.3.5.11-12.G. 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.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.5.11-12.B. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. 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.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.3.6.11-12.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> <p>CC.3.6.11-12.F. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>

Cardiovascular System with Blood Types (continued)	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
	<p>Objectives:</p> <p>Composition and Functions of Blood Describe the composition and volume of whole blood. Describe the composition of plasma, and discuss its importance in the body. List the cell types making up the formed elements, and describe the major functions of each type. Define <i>anemia</i>, <i>polycythemia</i>, <i>leukopenia</i>, and <i>leukocytosis</i>, and list possible causes for each condition. Explain the role of the hemocytoblast.</p> <p>Hemostasis Describe the blood-clotting process. Name some factors that may inhibit or enhance the blood-clotting process.</p> <p>Blood Groups and Transfusions Describe the ABO and Rh blood groups. Explain the basis for a transfusion reaction.</p> <p>The Heart Describe the location of the heart in the body, and identify its major anatomical areas on an appropriate model or diagram. Trace the pathway of blood through the heart. Compare the pulmonary and systemic circuits. Explain the operation of the heart valves. Name the functional blood supply of the heart. Name the elements of the intrinsic conduction system of the heart, and describe the pathway of impulses through this system. Explain what information can be gained from an electrocardiogram.</p> <p>Blood Vessels Compare and contrast the structure and function of arteries, veins, and capillaries. Identify the body's major arteries and veins, and name the body region supplied by each. Define <i>blood pressure</i> and <i>pulse</i>, and name several pulse points. List factors affecting and/or determining blood pressure. Define <i>hypertension</i> and <i>atherosclerosis</i>, and describe possible health consequences of these conditions. Describe the exchanges that occur across capillary walls.</p>

Lymphatic (Immune) System	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> 1. Lymphatic Vessels 2. Lymph Nodes 3. Other Lymphoid Organs 4. Nonspecific Body Defenses 5. Specific Body Defenses 6. Autoimmune Diseases 7. Homeostatic Imbalances 	<p>3.1.12.A1: Relate changes in the environment to various organisms' ability to compensate using homeostatic mechanisms.</p> <p>3.1.12.A5: Analyze how structure is related to function at all levels of biological organization from molecules to organisms.</p> <p>3.1.12.A6: Analyze how cells in different tissues/organs are specialized to perform specific functions.</p> <p>CC.3.5.11-12.G. 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.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.5.11-12.B. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. 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.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.3.6.11-12.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> <p>CC.3.6.11-12.F. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>

Lymphatic (Immune) System (continued)	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
	<p>Objectives:</p> <p>The Lymphatic System Name the two major types of structures composing the lymphatic system. Describe the source of lymph, and explain its formation and transport. Describe the function(s) of lymphatic vessels, lymph nodes, tonsils, the thymus, Peyer’s patches, and the spleen. Explain how the lymphatic system is functionally related to the cardiovascular and immune systems.</p> <p>Body Defenses Describe the protective functions of skin and mucous membranes. Explain the importance of phagocytes and natural killer cells. Describe the inflammatory process. Name several antimicrobial substances produced by the body that act in innate body defense. Describe how fever helps protect the body. Define <i>antigen</i> and <i>haptan</i>, and name substances that act as complete antigens. Name the two arms of the adaptive defense system, and relate each to a specific lymphocyte type (B or T cell). Compare and contrast the development of B and T cells. State the roles of B cells, T cells, and plasma cells. Explain the importance of macrophages in immunity. List the five antibody classes and describe their specific roles in immunity. Describe several ways in which antibodies act against antigens. Distinguish between active and passive immunity. Describe immunodeficiencies, allergies, and autoimmune diseases.</p>

Endocrine System	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> 1. Chemistry of Hormones 2. Functions of Hormones 3. Major Endocrine Organs 4. Physiology of the Organs 5. Homeostatic Imbalances 	<p>3.1.12.A1: Relate changes in the environment to various organisms' ability to compensate using homeostatic mechanisms.</p> <p>3.1.12.A5: Analyze how structure is related to function at all levels of biological organization from molecules to organisms.</p> <p>3.1.12.A6: Analyze how cells in different tissues/organs are specialized to perform specific functions.</p> <p>CC.3.5.11-12.G. 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.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.5.11-12.B. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. 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.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.3.6.11-12.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> <p>CC.3.6.11-12.F. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>

Endocrine System (continued)	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
	<p>Objectives: The Endocrine System and Hormone Function—An Overview Define <i>hormone</i> and <i>target</i> organ. Describe how hormones bring about their effects in the body. Explain how various endocrine glands are stimulated to release their hormonal products. Define <i>negative feedback</i>, and describe its role in regulating blood levels of the various hormones.</p> <p>The Major Endocrine Organs Describe the difference between endocrine and exocrine glands. On an appropriate diagram, identify the major endocrine glands and tissues. List hormones produced by the endocrine glands and discuss their general functions. Discuss ways in which hormones promote body homeostasis by giving examples of hormonal actions. Describe the functional relationship between the hypothalamus and the pituitary gland. Describe major pathological consequences of hypersecretion and hyposecretion of hormones.</p>

Aspects of the Reproductive System	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> 1. Male vs. Female Anatomy 2. Spermatogenesis 3. Oogenesis 4. Mammary Glands 5. Survey of Pregnancy 6. Homeostatic Imbalances 	<p>3.1.12.A1: Relate changes in the environment to various organisms' ability to compensate using homeostatic mechanisms.</p> <p>3.1.12.A5: Analyze how structure is related to function at all levels of biological organization from molecules to organisms.</p> <p>3.1.12.A6: Analyze how cells in different tissues/organs are specialized to perform specific functions.</p> <p>CC.3.5.11-12.G. 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.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.5.11-12.B. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. 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.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.3.6.11-12.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> <p>CC.3.6.11-12.F. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>

Aspects of the Reproductive System (continued)	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
	<p>Objectives:</p> <p>Anatomy of the Male Reproductive System Discuss the common purpose of the reproductive system organs. When provided with a model or diagram, identify the organs of the male reproductive system, and discuss the general function of each. Name the endocrine and exocrine products of the testes. Discuss the composition of semen, and name the glands that produce it. Trace the pathway followed by a sperm from the testis to the body exterior. Define <i>erection</i>, <i>ejaculation</i>, and <i>circumcision</i>.</p> <p>Male Reproductive Functions Define <i>meiosis</i> and <i>spermatogenesis</i>. Describe the structure of a sperm, and relate its structure to its function. Describe the effect of follicle-stimulating hormones (FSH) and luteinizing hormone (LH) on testis functioning.</p> <p>Anatomy of the Female Reproductive System When provided with an appropriate model or diagram, identify the organs of the female reproductive system, and discuss the general function of each. Describe the functions of the vesicular follicle and corpus luteum of the ovary. Define <i>endometrium</i>, <i>myometrium</i>, and <i>ovulation</i>. Indicate the location of the following regions of the female uterus: cervix, fundus, body.</p> <p>Female Reproductive Functions and Cycles Define <i>oogenesis</i>. Describe the influence of FSH and LH on ovarian function. Describe the phases and controls of the menstrual cycle.</p> <p>Mammary Glands Describe the structure and function of the mammary glands.</p>

Aspects of the Reproductive System (continued)	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
	<p>Survey of Pregnancy and Embryonic Development Define <i>fertilization</i> and <i>zygote</i>. Describe implantation. Distinguish between an embryo and a fetus. List the major functions of the placenta. Indicate several ways that pregnancy alters or modifies the functioning of the mother's body. Describe how labor is initiated, and briefly discuss the three stages of labor. List several agents that can interfere with normal fetal development.</p>