



Scope and Sequence

Cluster:	Health Science
Course Name:	Anatomy and Physiology (One Science Credit)
Course Description:	<p>(1) Anatomy and Physiology. In Anatomy and Physiology, students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students in Anatomy and Physiology study a variety of topics, including the structure and function of the human body and the interaction of body systems for maintaining homeostasis.</p> <p>(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.</p> <p>(3) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.</p> <p>(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).</p> <p>(5) Science, systems, and models. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.</p>
Course Requirements:	This course is recommended for students in Grades 10-12. Recommended prerequisites: three credits of science. To receive credit in science, students must meet the 40% laboratory and fieldwork requirement identified in §74.3(b)(2)(C) of this title (relating to Description of a Required Secondary Curriculum).
Equipment & Supplies	<p>Required: Teaching stethoscope, Sphygmomanometers, thermometers (digital IV AC/thermoscope) clock (with second hand), metric rulers, anatomical charts, anatomical models - various parts of the body, human torso, skeleton, gloves, masks, hand scrub/germicidal soap, microscopes, reagent strips, refractometer, slides, cover strips, test tubes, stains for blood and bacteria, distilled water, computers, monitors, tv/dvdplayer, internet access</p> <p>Recommended: Water bath 37 degrees centigrade, glucometer, centrifuge, urinometer, clinitest, acetest, EKG machine, snellen eye chart, scales with height measure, autoclave, autoclave tape, assorted instruments, wraps (paper-sterile, cloth-nylon), multimedia projector</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
I. ORIENTATION TO THE HUMAN BODY			
<p>A. Common Terms B. Organization of a Multi-cellular organism C. Survival needs to maintain homeostasis D. Regional Terms E. Directional Terms Ventral/dorsal; medial/lateral; proximal/distal; anterior/posterior F. Serous membrane G. Homeostatic Imbalances H. Planes of the body & Anatomical positions</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and (B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p>	<p>www.texashste.com www.cdc.gov/mwmr Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition</p>
	<p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section; (B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories; (C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed; (D) distinguish between scientific hypotheses and scientific theories; (E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology; (F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures; (G) analyze, evaluate, make inferences, and predict trends from data; and (H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	<p>6) The student examines the body processes that maintain homeostasis. The student is expected to:</p>	<p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive.	
II. CHEMICAL PROCESSES			
<p>This unit will acquaint the student with the basic chemical processes essential for life.</p> <ul style="list-style-type: none"> A. Potential vs. Kinetic Energy B. Atom structure C. Ionic Bonds: <ul style="list-style-type: none"> 1. Ions (electrolytes) 2. Bonding D. Covalent Bonding <ul style="list-style-type: none"> 1. Polar 2. Non-polar E. Water <ul style="list-style-type: none"> 1. Characteristics 2. Acid vs. Bases 3. pH F. Organic Compounds: <ul style="list-style-type: none"> 1. Carbohydrates 2. Lipids 3. Fats 4. Proteins 5. Nucleic Acids 6. ATP 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	<p>www.texashste.com www.cdc.gov/mwmr Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D.</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	(A) analyze the chemical reactions that provide energy for the body.	
	6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	

III. CELLULAR BIOLOGY

<p>This unit will acquaint the student with the cellular basis of life.</p> <ul style="list-style-type: none"> A. Basic Cell Structure B. Cell Membrane Structure C. Membrane Transport D. Cell Cycle E. Protein Synthesis F. Define Metabolism and how the hormones T3 & T4 (Thyroid hormones) regulate metabolism. G. Glycoproteins & Cell Junctions H. Emerging Technologies 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p>	
	<p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p>	

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		(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.	
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student; (B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials; (C) draw inferences based on data related to promotional materials for products and services; (D) evaluate the impact of scientific research on society and the environment; (E) evaluate models according to their limitations in representing biological objects or events; and (F) research and describe the history of science and contributions of scientists.	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	
	(12) The student recognizes emerging technological advances in science. The student is expected to:	(A) recognize advances in stem cell research such as cord blood utilization; and (B) recognize advances in bioengineering and transplant technology.	

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IV. TISSUES			
<p>This unit will acquaint the student with the various types of tissues that are found in the human body.</p> <p>A. Epithelial Tissues</p> <ol style="list-style-type: none"> 1. 4 simple 2. 4 stratified <p>B. Connective Tissues</p> <ol style="list-style-type: none"> 1. Connective Tissue Proper <ol style="list-style-type: none"> a. 3 Loose b. 3 Dense 2. Cartilage 3. Osseous (Bone) 4. Blood <p>C. Overview of Muscle Tissues</p> <p>D. Overview of Nervous Tissue</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p> <p>(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:</p> <p>(9) The student investigates environmental factors that affect the human body. The student is expected to:</p> <p>(10) The student investigates structure and function of the human body. The student is expected to:</p> <p>(11) The student describes the process of reproduction and growth and development. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(F) research and describe the history of science and contributions of scientists.</p> <p>(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.</p> <p>(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and</p> <p>(B) explore measures to minimize harmful environmental factors on body systems.</p> <p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;</p> <p>(C) research technological advances and limitations in the treatment of system disorders; and</p> <p>(D) examine characteristics of the aging process on body systems.</p> <p>(A) explain embryological development of tissues, organs, and systems.</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com www.cdc.gov/mwmmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for basic histology</p>
V. INTEGUMENTARY SYSTEM			
<p>This unit will acquaint the student with covering of the human body.</p> <p>A. Epidermis</p> <p>B. Dermis</p> <p>C. Purpose of Skin Color</p> <p>D. Overview of Skin Appendages</p> <p>E. Functions of the Skin</p> <p>F. Homeostatic Imbalances</p> <ol style="list-style-type: none"> 1. Burns and Causes of Burns 2. Skin Cancers and Possible Causes 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com www.cdc.gov/mwmmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for basic histology</p>

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		<p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	<p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p>	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	

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	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems.	
VI. SKELETAL SYSTEM			
<p>This unit will acquaint the student with the support system of the body.</p> <ul style="list-style-type: none"> A. Primary Functions B. Classify Bone Tissue C. Classify Bone Shapes D. Bones of the Skeleton and their functions E. Articulations F. Ossification Process <ul style="list-style-type: none"> 1. Role of Growth Hormone 2. Role of Sex hormones G. Fractures & Healing <ul style="list-style-type: none"> 1. Role of Calcitonin and PTH in the remodeling process 2. Include how nutrition and smoking affect the healing process. 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com www.cdc.gov/mwmmr Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for basic histology</p>

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		<p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	<p>(B) investigate and report the uses of various diagnostic and therapeutic technologies;</p> <p>(C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage;</p>	

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		<p>(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body; and</p> <p>(E) perform an investigation to determine causes and effects of force variance and communicate findings.</p> <p>(6) The student examines the body processes that maintain homeostasis. The student is expected to:</p> <p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and</p> <p>(B) determine the consequences of the failure to maintain homeostasis.</p> <p>(7) The student examines the electrical conduction processes and interactions. The student is expected to:</p> <p>(B) investigate the therapeutic uses and effects of external sources of electricity on the body system.</p> <p>(9) The student investigates environmental factors that affect the human body. The student is expected to:</p> <p>(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and</p> <p>(B) explore measures to minimize harmful environmental factors on body systems.</p> <p>(10) The student investigates structure and function of the human body. The student is expected to:</p> <p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;</p> <p>(C) research technological advances and limitations in the treatment of system disorders; and</p> <p>(D) examine characteristics of the aging process on body systems.</p> <p>(11) The student describes the process of reproduction and growth and development. The student is expected to:</p> <p>(A) explain embryological development of tissues, organs, and systems.</p>	
VII. MUSCULAR SYSTEM			
<p>This unit will acquaint the student with system responsible for movement of the body.</p> <p>A. Primary functions of Skeletal Muscle</p> <p>B. Identification of Muscle Movement & Location (flexors vs. extensors)</p> <p>C. Identification of Muscles</p> <p>D. Muscle Contraction</p> <p>E. Nerve Connection to Muscles & Motor Units (Fine motor movements vs. gross motor movements.)</p> <p>F. Muscle Twitch and Strength of Contraction</p> <p>G. ATP & ADP Regeneration</p> <p>H. Compare and Contrast Skeletal muscle with Cardiac and Smooth muscle.</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com</p> <p>www.cdc.gov/mwmmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition</p> <p>A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella</p> <p>A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al</p> <p>Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition</p> <p>www.pathguy.com for basic histology</p>

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		<p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	<p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p>	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	(B) investigate and report the uses of various diagnostic and therapeutic technologies; (C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage; (D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body; and (E) perform an investigation to determine causes and effects of force variance and communicate findings.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	
	(7) The student examines the electrical conduction processes and interactions. The student is expected to:	(A) illustrate conduction systems such as nerve transmission or muscle stimulation; (B) investigate the therapeutic uses and effects of external sources of electricity on the body system; and (C) evaluate the application of advanced technologies such as electroencephalogram, electrocardiogram, bionics, transcutaneous electrical nerve stimulation, and cardioversion.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems.	
VIII. NERVOUS SYSTEM			
<p>This unit will acquaint the student with the control system of the body.</p> <p>A. Components of the Nervous System and the framework of how they accomplish communication</p> <p>B. Basic Neuron Structure & Function</p> <p>C. Central Nervous System</p> <ol style="list-style-type: none"> 1. Major Brain areas 2. Spinal Cord <p>D. Peripheral Nervous System</p> <ol style="list-style-type: none"> 1. Dorsal & Ventral Horns 2. Sensory Nerves: <ul style="list-style-type: none"> Unipolar neurons & Bipolar neurons 3. Motor Nerves: <ul style="list-style-type: none"> Multipolar neurons 4. Reflex Arc 5. Spinal Nerves <p>E. Cranial Nerves</p> <p>F. Special Senses:</p> <ol style="list-style-type: none"> 1. Taste & Smell 2. Eye & Vision 3. Hearing & Balance <p>G. Neuroglia: Supporting Cells</p> <p>H. Regeneration of the Nervous Tissue</p> <p>I. Overview of Brain Tumors</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com www.cdc.gov/mwmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for basic histology</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	<p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and</p> <p>(B) determine the consequences of the failure to maintain homeostasis.</p>	
	(7) The student examines the electrical conduction processes and interactions. The student is expected to:	<p>(A) illustrate conduction systems such as nerve transmission or muscle stimulation;</p> <p>(B) investigate the therapeutic uses and effects of external sources of electricity on the body system; and</p> <p>(C) evaluate the application of advanced technologies such as electroencephalogram, electrocardiogram, bionics, transcutaneous electrical nerve stimulation, and cardioversion.</p>	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	<p>(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and</p> <p>(B) explore measures to minimize harmful environmental factors on body systems.</p>	
	(10) The student investigates structure and function of the human body. The student is expected to:	<p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;</p> <p>(C) research technological advances and limitations in the treatment of system disorders; and</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(D) examine characteristics of the aging process on body systems.	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems.	
IX. ENDOCRINE SYSTEM			
<p>This unit will acquaint the student with glandular and hormone systems of the body.</p> <p>A. Compare & Contrast the Nervous System vs. Endocrine System</p> <p>B. Basic Endocrine Gland structure and the three types of hormones:</p> <ol style="list-style-type: none"> 1. Amino-Acid Based Hormones 2. Steroid Hormones 3. Prostaglandin Hormones <p>C. Endocrine Glands and their primary hormones</p> <p>D. Organs that contain Endocrine tissue:</p> <ol style="list-style-type: none"> 1. Pancreas 2. Ovaries 3. Testes 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasstate.com www.cdc.gov/mwmmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella</p> <p>A.D.A.M. Anating Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al</p> <p>Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	(C) analyze the effects of energy deficiencies in malabsorption disorders such as diabetes, hypothyroidism, and Crohn's disease.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	<p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and</p> <p>(B) determine the consequences of the failure to maintain homeostasis.</p>	
	(8) The student explores the body's transport systems. The student is expected to:	(C) contrast the interactions among the transport systems.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	<p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(D) examine characteristics of the aging process on body systems.</p>	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(B) identify the functions of the male and female reproductive systems.	

Units of Study	Knowledge and Skills	Student Expectations	Resources
X. Cardiovascular System: BLOOD & BLOOD VESSELS			
<p>This unit will acquaint the student with the components of blood and blood vessels and the role they play in homeostasis.</p> <p>A. Characteristics of Blood</p> <p>B. Blood Components of Nutrient Delivery</p> <ol style="list-style-type: none"> 1. Plasma 2. Red Blood Cells (Erythrocytes) <p>C. Blood Vessels & Tissue Feeding</p> <ol style="list-style-type: none"> 1. Arteries 2. Capillary Beds 3. Veins <p>D. White Blood Cells (Leukocytes): Protecting the Body</p> <p>E. Platelets (Thrombocytes):</p> <ol style="list-style-type: none"> 1. Blood Loss Prevention 2. Blood Transfusions 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p> <p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p> <p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasstate.com www.cdc.gov/mwmm</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;	
		(E) evaluate models according to their limitations in representing biological objects or events; and	
		(F) research and describe the history of science and contributions of scientists.	
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	(A) explain the coordination of muscles, bones, and joints that allows movement of the body;	
		(B) investigate and report the uses of various diagnostic and therapeutic technologies;	
		(C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage; and	
		(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and	
		(B) determine the consequences of the failure to maintain homeostasis.	
	(8) The student explores the body's transport systems. The student is expected to:	(A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;	
		(B) determine the factors that alter the normal functions of transport systems; and	
		(C) contrast the interactions among the transport systems.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and	
		(B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;	
		(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems. (11) The student describes the process of reproduction and growth and development. The student is expected to:	
XI. Cardiovascular System: THE HEART			
This unit will acquaint the student with the anatomy and physiology of the heart and blood vessels and their role in the transport system of the body and their role in homeostasis. A. Basic Structure of the Heart. B. Blood Flow of the Pulmonary & Systemic Loop C. Blood Pressure D. Valves of the Heart & Heart Sounds E. Coronary Circulation F. Electrical System of the Heart G. ECG (also known as an EKG) H. Cardiac Cycle I. Sympathetic and Parasympathetic influence on the Heart.	(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to: (2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:	(A) demonstrate safe practices during laboratory and field investigations; and (B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. (A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section; (B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories; (C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed; (D) distinguish between scientific hypotheses and scientific theories; (E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology; (F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures; (G) analyze, evaluate, make inferences, and predict trends from data; and	Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasstate.com www.cdc.gov/mwmm Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for basic histology

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.	
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;	
		(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;	
		(E) evaluate models according to their limitations in representing biological objects or events; and	
		(F) research and describe the history of science and contributions of scientists.	
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	(A) explain the coordination of muscles, bones, and joints that allows movement of the body;	
		(B) investigate and report the uses of various diagnostic and therapeutic technologies;	
		(C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage; and	
		(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and	
		(B) determine the consequences of the failure to maintain homeostasis.	
	(8) The student explores the body's transport systems. The student is expected to:	(A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;	
		(B) determine the factors that alter the normal functions of transport systems; and	
		(C) contrast the interactions among the transport systems.	

Units of Study	Knowledge and Skills	Student Expectations	Resources
	<p>(9) The student investigates environmental factors that affect the human body. The student is expected to:</p> <p>(10) The student investigates structure and function of the human body. The student is expected to:</p> <p>(11) The student describes the process of reproduction and growth and development. The student is expected to:</p>	<p>(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and</p> <p>(B) explore measures to minimize harmful environmental factors on body systems.</p> <p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;</p> <p>(C) research technological advances and limitations in the treatment of system disorders; and</p> <p>(D) examine characteristics of the aging process on body systems.</p> <p>(A) explain embryological development of tissues, organs, and systems.</p>	
XII. LYMPHATIC SYSTEM AND IMMUNITY			
<p>This unit will acquaint the student with the components of the lymphatic system and the immune system.</p> <p>A. Lymph Vessel Structure and Location</p> <ol style="list-style-type: none"> 1. Role of helping return unabsorbed fluid from the capillary bed. 2. Cleaning the lymph before it re-enters the blood stream. <p>B. Other Lymph Organs</p> <ol style="list-style-type: none"> 1. Spleen 2. Thymus 3. Tonsils 4. Peyer's Patches <p>C. Non-Specific Defenses:</p> <ol style="list-style-type: none"> 1. Barriers 2. Cell & Chemical Weapons: <ol style="list-style-type: none"> a. Phagocytes b. Natural Killer Cells c. Inflammation d. Complement e. Interferon f. Fever <p>D. Specific Body Defenses: Immunity with a Memory</p> <ol style="list-style-type: none"> 1. Primary Immune Response 2. Secondary Immune Response 3. Active Immunity: vaccinations 4. Passive Immunity: antivenoms <p>E. Allergies</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasstate.com www.cdc.gov/mwmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian Barron's Anatomy & Physiology, The easy way, 2nd edition</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:	<p>(A) explain the coordination of muscles, bones, and joints that allows movement of the body; and</p> <p>(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.</p>	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	<p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and</p> <p>(B) determine the consequences of the failure to maintain homeostasis.</p>	
	(8) The student explores the body's transport systems. The student is expected to:	<p>(A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;</p> <p>(B) determine the factors that alter the normal functions of transport systems; and</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(C) contrast the interactions among the transport systems.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems.	

XIII. RESPIRATORY SYSTEM

<p>This unit will acquaint the student with the anatomy and physiology of the respiratory system and its role in transport and homeostasis.</p> <p>A. Overview of the Respiratory Organs</p> <p>B. Respiratory Zone:</p> <ol style="list-style-type: none"> 1. Respiratory Bronchioles 2. Alveolar Ducts 3. Alveoli <p>C. Pulmonary Ventilation: Inspiration & Expiration</p> <ol style="list-style-type: none"> 1. Muscle movement 2. Pressure changes <p>D. The Pick up of Respiratory Gases:</p> <ol style="list-style-type: none"> 1. O₂ 2. CO₂ <p>E. Obstacles that lower O₂ pick up:</p> <ol style="list-style-type: none"> 1. Anemia (low RBC) 2. Congestive Heart Failure 3. Emboli 4. Cyanide Poisoning 5. Carbon Monoxide Poisoning <p>F. Brain Stem Control of Breathing</p> <p>G. Life Styles that Help or Hinder Respiratory Functions:</p> <ol style="list-style-type: none"> 1. Aerobic Exercise 2. Smoking 3. Inhaling chemical substances (Illegal drugs) 	(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:	(A) demonstrate safe practices during laboratory and field investigations; and (B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasshste.com www.cdc.gov/mwmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella</p> <p>A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al</p> <p>Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for lung damage due to smoking, drug use, CO poisoning</p>
	(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:	(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section; (B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;	
		(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;	
		(D) distinguish between scientific hypotheses and scientific theories;	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	<p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p>	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	<p>(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:</p>	<p>(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.</p>	
	<p>(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:</p>	<p>(B) investigate and report the uses of various diagnostic and therapeutic technologies;</p> <p>(C) interpret normal and abnormal contractility conditions such as in edema, glaucoma, aneurysms, and hemorrhage; and</p> <p>(D) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.</p>	
	<p>(6) The student examines the body processes that maintain homeostasis. The student is expected to:</p>	<p>(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(B) determine the consequences of the failure to maintain homeostasis.</p> <p>(8) The student explores the body's transport systems. The student is expected to:</p> <p>(A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;</p> <p>(B) determine the factors that alter the normal functions of transport systems; and</p> <p>(C) contrast the interactions among the transport systems.</p> <p>(9) The student investigates environmental factors that affect the human body. The student is expected to:</p> <p>(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and</p> <p>(B) explore measures to minimize harmful environmental factors on body systems.</p> <p>(10) The student investigates structure and function of the human body. The student is expected to:</p> <p>(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive;</p> <p>(B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;</p> <p>(C) research technological advances and limitations in the treatment of system disorders; and</p> <p>(D) examine characteristics of the aging process on body systems.</p> <p>(11) The student describes the process of reproduction and growth and development. The student is expected to:</p> <p>(A) explain embryological development of tissues, organs, and systems.</p>	
XIV. DIGESTIVE SYSTEM			
<p>This unit will acquaint the student with the anatomy and physiology of the digestive system and the role it plays in maintenance of life.</p> <p>A. Digestive Organs: Location and Primary Functions:</p> <ol style="list-style-type: none"> Mechanical Digestion Chemical Digestion Ability to Absorb Molecules (nutrients) <p>B. Accessory Organs:</p> <ol style="list-style-type: none"> Liver: Production of Bile Gall Bladder: Storage of Bile Pancreas 	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p> <p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texasstate.com www.cdc.gov/mwmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition www.pathguy.com for GI cancers and malabsorption disorders</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	
	(4) The student evaluates the energy needs of the human body and the processes through which these needs are fulfilled. The student is expected to:	<p>(A) analyze the chemical reactions that provide energy for the body;</p> <p>(B) evaluate the means, including the structure and function of the digestive system, by which energy is processed and stored within the body;</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(C) analyze the effects of energy deficiencies in malabsorption disorders such as diabetes, hypothyroidism, and Crohn's disease; and</p> <p>(D) analyze the effects of energy excess in disorders such as obesity as it relates to cardiovascular and musculoskeletal systems.</p> <p>(5) The student differentiates the responses of the human body to internal and external forces. The student is expected to:</p> <p>(6) The student examines the body processes that maintain homeostasis. The student is expected to:</p> <p>(9) The student investigates environmental factors that affect the human body. The student is expected to:</p> <p>(10) The student investigates structure and function of the human body. The student is expected to:</p> <p>(11) The student describes the process of reproduction and growth and development. The student is expected to:</p>	
XV. URINARY SYSTEM			
<p>This unit will acquaint the student with the filtration system of the body and the role it plays in homeostasis.</p> <p>A. Location and Function of the Urinary Organs</p> <p>B. Basic Structure of the Kidneys</p> <p>C. Basic structure of the nephron</p> <p>D. Mechanism of nephron filtration</p> <p>E. Renin-angiotensin Mechanism</p> <p>F. Urination Process</p> <p>G. High Altitude and the Kidneys</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashste.com www.cdc.gov/mwmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition</p> <p>A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella</p> <p>A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al</p> <p>Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
		<p>(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;</p> <p>(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;</p> <p>(D) distinguish between scientific hypotheses and scientific theories;</p> <p>(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;</p> <p>(G) analyze, evaluate, make inferences, and predict trends from data; and</p> <p>(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.</p>	
	<p>(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:</p>	<p>(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;</p> <p>(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;</p> <p>(C) draw inferences based on data related to promotional materials for products and services;</p> <p>(D) evaluate the impact of scientific research on society and the environment;</p> <p>(E) evaluate models according to their limitations in representing biological objects or events; and</p> <p>(F) research and describe the history of science and contributions of scientists.</p>	

Units of Study	Knowledge and Skills	Student Expectations	Resources
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	
	(8) The student explores the body's transport systems. The student is expected to:	(A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory; (B) determine the factors that alter the normal functions of transport systems; and (C) contrast the interactions among the transport systems.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems.	
XVI. REPRODUCTIVE SYSTEM			
<p>This unit will acquaint the student with the importance of the reproductive systems in the continuity of life.</p> <p>A. Basic Structure and Function of:</p> <ol style="list-style-type: none"> 1. Male Reproductive Organs with Spermatogenesis 2. Female Reproductive Organs with Oogenesis <p>B. Pituitary Control of Reproduction:</p> <ol style="list-style-type: none"> 1. Sperm and Testosterone Production 2. Menstrual Cycle and Egg maturation <p>C. Fertilization Process and Embryo Development</p> <p>D. Fetus Development</p> <p>E. Birthing Process:</p>	<p>(1) The student conducts investigations, for at least 40% of instructional time, using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment, but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom. The student is expected to:</p> <p>(2) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:</p>	<p>(A) demonstrate safe practices during laboratory and field investigations; and</p> <p>(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.</p> <p>(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;</p>	<p>Human Anatomy & Physiology, Elaine Marieb, R.N., Ph.D. www.texashte.com www.cdc.gov/mwmmr</p> <p>Anthony's Textbook of Anatomy & Physiology, 17th edition</p> <p>A.D.A.M. Interactive Anatomy Student Lab. Guide, Third Edition, by Mark Lafferty & S. Panella</p> <p>A.D.A.M. Anatomy Practice, Human Cadaver Dissection Videos, R. Leigh Vines, et al</p> <p>Anatomy Flash Cards, G. Bastian</p> <p>Barron's Anatomy & Physiology, The easy way, 2nd edition</p>

Units of Study	Knowledge and Skills	Student Expectations	Resources
1. Natural 2. C-section 3. Water births		(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;	
	(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;		
	(D) distinguish between scientific hypotheses and scientific theories;		
	(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;		
	(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;		
	(G) analyze, evaluate, make inferences, and predict trends from data; and		
	(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.		
	(3) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;	
		(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;	
		(C) draw inferences based on data related to promotional materials for products and services;	
(D) evaluate the impact of scientific research on society and the environment;			
(E) evaluate models according to their limitations in representing biological objects or events; and			

Units of Study	Knowledge and Skills	Student Expectations	Resources
		(F) research and describe the history of science and contributions of scientists.	
	(6) The student examines the body processes that maintain homeostasis. The student is expected to:	(A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and (B) determine the consequences of the failure to maintain homeostasis.	
	(9) The student investigates environmental factors that affect the human body. The student is expected to:	(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and (B) explore measures to minimize harmful environmental factors on body systems.	
	(10) The student investigates structure and function of the human body. The student is expected to:	(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems; (C) research technological advances and limitations in the treatment of system disorders; and (D) examine characteristics of the aging process on body systems.	
	(11) The student describes the process of reproduction and growth and development. The student is expected to:	(A) explain embryological development of tissues, organs, and systems; (B) identify the functions of the male and female reproductive systems; and (C) summarize the human growth and development cycle.	

Resources: Books

Anthony's Textbook of Anatomy & Physiology. 17E, Elsevier/Mosby & Saunders.	323016308
Body Structures and Functions with CD. 10E, Delmar Learning.	1401809960
Essentials of Human Anatomy & Physiology. 7E, Pearson/Prentice Hall.	131836633
The Human Body in Health & Disease. 3E, Elsevier/Mosby & Saunders.	323013392

Resources: Web Sites

Texas Health Science Curriculum Resources	www.texashste.com
Morbidity and Mortality Weekly Report	www.cdc.gov/mwmr
Pathology Guy	www.pathguy.com