Anatomy and Physiology

Rev. 2010

Course Description:

The Anatomy and Physiology curriculum at Lee Academy is designed to provide students with advanced investigations and deepen student understanding of the human body. The course focuses on a hands on approach to learning the different body and organ systems. Students will be introduced to several college level lab investigations and dissections. The twenty units covered in the course provide an overview of the human body and how it works. Students will also investigate careers in the medical and healthcare fields. Anatomy and Physiology explores the systems comprising the human body by emphasizing physiological mechanisms and a thorough understanding of human anatomy. An emphasis is placed on the interrelatedness of such systems as the skeletal, muscular, nervous, and circulatory. This course has a substantial laboratory component, including a cat dissection.

Some of the topics studied include cells, integumentary system, skeletal system, muscular system, senses, endocrine system, blood, heart, blood vessels and circulation, lymphatic system and immunity, respiratory system, digestive system, nutrition, urinary system, reproductive system, aging. Students will study these topics through interactive laboratory investigations, group collaboration, research projects, and dissections. Laboratory work and projects provide a means of assessing student progress in learning over the year.

Text: *Essentials of Anatomy and Physiology Fourth Edition*
Seeley, Stephens, and Tate

McGraw Hill
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Course Outline:

The course is divided into two semesters. Each semester has a final exam.

Semester 1: Unit 1 - Unit 8

Semester 2: Unit 9 - Unit 17

Unit 1	Objectives	Essential Questions	Assessments
Chapter 1 **Introduction to the Human Body** **Duration:** 2 weeks **Materials:** ✓Text Pages 1-18 **Topics Covered:** ✓Laboratory Safety ✓Using Microscopes ✓Anatomy ✓Physiology ✓Structural and Functional Organization ✓Characteristics of Life	**Students will:** ✓ Explain the importance of understanding the relationship between structure and function ✓ Define anatomy and physiology ✓ Describe seven levels of organization of the body, and give the major characteristics of each level ✓ List 11 organ systems and give the major functions of each ✓ List six characteristics of life ✓ Define homeostasis and explain why it is important ✓ Diagram a negative-feedback mechanism and a positive-feedback mechanism, and describe their relationships to homeostasis ✓ Describe a person in the anatomical position ✓ Define the directional terms for human body, and use them to locate specific body structures ✓ Name and describe the three major planes of the body and an organ ✓ Define the regions and parts of the body ✓ Describe the major trunk cavities ✓ Describe the serous membranes, and give their functions	✓ Why is homeostasis important to the human body? ✓ Why is the human body arranged the way it is? ✓ What systems allow our body to carry our every day functions? ✓ How are negative and positive-feedback loops different?	**Formative:** ✓ Lab Safety Discussion ✓ Worksheets labeling parts of a microscope ✓ Hands on Microscope Use Examining Different Slides ✓ Worksheets practicing anatomical terminology ✓ Group activity working on anatomical terminology ✓ Construct a flowchart connecting the cardiovascular to the 10 other systems ✓ Text questions p.17 ✓ Research and Discussion on homeostasis ✓ Discussion on

✓Homeostasis ✓Terminology and the Body Plan			negavite-feedback and positive-feedback loops ✓ Practical Study Guide Summative: ✓ Laboratory Safety Test ✓ Microscope Test ✓ Lab practical on anatomical terminology, homeostasis, feedback loops

Unit 2	Objectives	Essential Questions	Assessments
<u>Chapter 2</u> The Chemistry of Life <u>Duration:</u> 1 week <u>Materials:</u> ✓Text Pages 19-40 <u>Topics Covered:</u> ✓Basic Chemistry ✓Chemical Reactions ✓Acids and Bases ✓Inorganic Chemistry ✓Organic Chemistry	Students will: ✓ Define matter, mass, and weight ✓ Define element and atom ✓ Name the subatomic particles of an atom, and describe how they are organized ✓ Define hydrogen bond, and explain its importance ✓ Distinguish between a molecule and a compound ✓ Describe the process of dissociation ✓ Using symbols, explain synthesis, decomposition, and exchange reactions ✓ Explain how reversible reactions produce chemical equilibrium ✓ Distinguish between chemical reactions that release or take in energy ✓ List the factors that affect the rate of chemical reactions ✓ Describe the pH scale and its relationship to acidity and alkalinity ✓ Explain why buffers are important ✓ List the properties of water that make	✓ How can reaction rates be increased or decreased? ✓ How does pH affect the human body? ✓ What is the role of enzymes in the human body? ✓ Why are buffers important?	Formative: ✓ Worksheets reviewing chemistry concepts ✓ Text questions p. 39 ✓ pH Lab ✓ Discussion of the affect of pH on the human body ✓ Study Guide for quiz Summative: ✓ pH Lab Report ✓ pH paper ✓ Quiz on material in chapter 2

	it important for living organisms ✓ Describe four important types of organic molecules and their functions ✓ Explain how enzymes work		

Unit 3	Objectives	Essential Questions	Assessments
<u>Chapter 3</u> Cell Structures and Their Functions <u>Duration:</u> 1.5 weeks <u>Materials:</u> ✓Text Pages 41-70 <u>Topics Covered:</u> ✓Functions of the Cell ✓Cell Structure ✓Nucleus ✓Cytoskeleton ✓Whole Cell Activity ✓Movement Through the Cell	Students will: ✓ Describe the structure of the cell membrane ✓ Describe the structure and function of the nucleus and nucleoli ✓ Compare the structure and function of rough and smooth endoplasmic reticulum ✓ Describe the roles of the Golgi apparatuses and secretory vesicles in secretion ✓ Explain the roles of lysosomes in digesting material taken into cells by phagocytosis ✓ Describe the structure and function of mitochondria ✓ Compare the structure and function of cilia, flagella, and microvilli ✓ List four ways by which substances cross the cell membrane ✓ Explain the role of osmosis that of osmotic pressure in controlling the movement of water across the cell membrane. Compare hypotonic, isotonic, and hypertonic solutions ✓ Define "mediated transport," and	✓ How is cell structure related to its function? ✓ What affects cell function? ✓ How do cells protect the body? ✓ How do cells reproduce?	Formative: ✓ Egg Osmosis Lab ✓ Cell Diagram ✓ Cell Packet ✓ Cell WebQuest ✓ Text Questions p.69 ✓ Discussion of Cells Article ✓ Study Guide for Chapter 3 Summative: ✓ Osmosis Lab Report ✓ Chapter 3 Test

Membrane ✓Cell Metabolism ✓Protein Synthesis ✓Cell Division ✓Differentiation	compare the processes of facilitated diffusion, active transport, and secondary active transport ✓ Describe endocytosis and exocytosis ✓ Describe the process of protein synthesis ✓ Explain what is accomplished during mitosis and meiosis ✓ Define "differentiation" and explain how it occurs		

Unit 4	Objectives	Essential Questions	Assessments
<u>Chapter 4</u> Tissues, Glands, and Membranes <u>Duration:</u> 1.5 weeks <u>Materials:</u> ✓Text Pages 71-94 <u>Topics Covered:</u> ✓Epithelial Tissue ✓Functions of Epithelia ✓Connective Tissue ✓Muscle Tissue ✓Nervous Tissue ✓Membranes	Students will: ✓ List the characteristics of epithelial tissue ✓ Classify and give an example of the major types of epithelium ✓ Explain the function in epithelium of the following: cell layers, cell shapes, free cell surfaces, and connections between cells ✓ Define and categorize glands ✓ Describe the basis for classifying connective tissue, and give examples of each major type ✓ Name the three types of muscle, and list their functions ✓ State the functions of nervous tissue and describe a neuron ✓ List the structural and functional characteristics of mucous and serous membranes ✓ Describe the process of inflammation, and explain why inflammation protects the body ✓ Describe the major events involved in tissue repair	✓ How do tissues protect the body? ✓ What is the role of inflammation in the body? ✓ How does tissue structure relate to its function?	Formative: ✓ Tissue Packet ✓ Text Questions p.93 ✓ Lab Identifying tissue structures and one major type Summative: ✓ Tissue Lab Practical ✓ Tissue Disease Project/Presentations

✓Inflammation ✓Tissue Repair			

Unit 5	Objectives	Essential Questions	Assessments
<u>Chapter 6</u> The Skeletal System: Bones and Joints <u>Duration:</u> 2.5 weeks <u>Materials:</u> ✓Text Pages 112-147 <u>Topics Covered:</u> ✓Functions of the Skeletal System ✓Connective Tissues	Students will: ✓ List and describe the components of the skeletal system ✓ Describe the components of the connective tissue matrix and state the function of each ✓ Describe the structure of compact and cancellous bone ✓ Outline the process of bone ossification, growth, remodeling, and repair ✓ Describe the main features of the skull as seen from the lateral, frontal, internal, and inferior views ✓ Describe the shape of the vertebral column and list its divisions. Describe the general features of each vertebra and the differences among vertebrae from each region of the vertebral column ✓ List the bones of the thoracic cage, including the three types of ribs ✓ Name and describe the bones of the	✓ How do bones grow and repair? ✓ How are the structure of different bones related to their function? ✓ What is the function of the different types of ribs? ✓ What are the different types of joint movement? ✓ How are the axial	Formative: ✓ Text Questions p.150-151 ✓ Skeletal System Packet ✓ Fracture Discussion ✓ Coloring Pages of Skeletal Structures ✓ Bones Hokey Pokey ✓ Skeletal/Joint Disorders Research Paper/Project ✓ Lab Examining Bones ✓ Lab Examining Bones Microscopically ✓ Study Guide for Chapter 6

✓General Features of Bone ✓General Considerations of Bone Anatomy ✓Axial Skeleton ✓Appendicular Skeleton ✓Articulations	pectoral girdle and upper limb ✓ Name and describe the bones of the pelvic girdle and lower limb ✓ List and describe the various types of joints ✓ Describe the major types of joint movement	skeleton and appendicular skeleton related?	Summative: ✓ Terminology Quiz (Dividing Each Skeletal Section) ✓ Lab Practical Labeling Bones ✓ Creating own skeletons/Skeletal Models ✓ Chapter 6 Test

Unit 6	Objectives	Essential Questions	Assessments
<u>Chapter 5</u> The Integumentary System <u>Duration:</u> 1 week <u>Materials:</u> ✓Text Pages 95-111 <u>Topics Covered:</u>	Students will: ✓ Describe the structure and function of the hypodermis, dermis, and epidermis ✓ Define epidermal strata and relate them to the process of keratinization ✓ Explain how melanin, carotene, blood, and collagen affect skin color ✓ Describe the structure of a hair and discuss the phases of hair growth ✓ Name the glands of the skin and describe the secretions they produce ✓ Describe the parts of a nail and explain how nails grow ✓ Discuss the functions of skin, hair, glands, and nails	✓ How does skin change color? ✓ Why do glands secrete fluids? ✓ What are the functions of accessory skin structures? ✓ What are the different types of burns and the affect on the body?	Formative: ✓ WebQuest ✓ Text Questions p.110 ✓ Integumentary System Packet ✓ Cancer Discussion ✓ Research on Burn Centers and Skin Cancer (Can we help raise awareness in any way?)

✓Functions of the Integumentary System ✓Hypodermis ✓Skin ✓Accessory Skin Structures ✓Physiology of the Integumentary System ✓Effects of Aging on the Integumentary System ✓The Integumentary System as a Diagnostic Aid ✓Burns ✓Skin Cancer	✓ List the changes the integumentary system undergoes with age ✓ Explain how the integumentary system can be used as a diagnostic aid ✓ Classify burns on the basis of the amount of skin damage they produce ✓ Name and define the types of skin cancer	✓ What are the different types of skin cancer?	Summative: ✓ Class Project on Skin Cancer ✓ Project on a Disease of the Skin ✓ Open Book Quiz/Reaction Paper

Unit 7	Objectives	Essential Questions	Assessments
<u>Chapter 8</u> The Nervous System <u>Duration:</u> 3 weeks <u>Materials:</u> ✓Text Pages 193-235	Students will: ✓ List the divisions of the nervous system and describe the characteristics of each ✓ Describe the structure of neurons and the function of their components. Describe the location, structure, and general function of neuroglial cells ✓ Define and describe the structure of a nerve, nerve tract, nucleus, and ganglion ✓ Explain what a resting membrane potential is and how an action potential is generated and propagated ✓ Describe the structure and function of a synapse ✓ List the parts of a reflex arc and describe its function	✓ How are reflexes important? ✓ How do nerves work to bring messages to the brain? ✓ What is the difference between sensory, short-	Formative: ✓ Text Questions p.234 ✓ Nervous System Packet ✓ Lab Testing Reflexes ✓ Case Study: Man with the Weak Arm ✓ Brain Labeling Worksheets ✓ Disease of Nervous System Article /Discussion ✓ Botulism Article

<u>Topics Covered:</u> ✓Functions of the Nervous System ✓Division of the Nervous System ✓Cells of the Nervous System ✓Propagation of Action Potentials ✓Central Nervous System ✓Peripheral Nervous System ✓Autonomic Nervous System	✓ List the parts of the brainstem and diencephalon and give their functions ✓ Describe the major functional areas of the cerebral cortex and explain their interactions ✓ Describe sensory, short-term, and long-term memory ✓ Describe the major functions of the basal nuclei, limbic system, and cerebellum ✓ List the major ascending and descending pathways of the spinal cord ✓ Describe the three meningeal layers surrounding the central nervous system, the four ventricles of the brain, and the origin and circulation of the cerebrospinal fluid ✓ List the various types of cranial nerves and give a brief description of their functions ✓ Define the term plexus and describe the three primary plexuses, including their branches ✓ Contrast the structure of the autonomic nervous system and the somatic motor nervous system. Name the two divisions of the autonomic nervous system and describe the differences between them.	term, and long-term memory? ✓ What is the role of the autonomic nervous system and the somatic motor nervous system? ✓ Why is the brain important?	✓ Huntington's Disease Article ✓ Chapter 8 Study Guide Summative: ✓ Brain Model Project ✓ Lab Brain Dissection ✓ Chapter 8 Test

Unit 8	Objectives	Essential Questions	Assessments
<u>Chapter 9</u> The Senses <u>Duration:</u> 2 weeks *Term Ends at the End of this Unit (Final Project) <u>Materials:</u> ✓Text Pages 236-259	Students will: ✓ Define sensation ✓ List the sensory modalities and briefly describe each ✓ Describe olfactory neurons and explain what is known about how airborne molecules can stimulate action potentials in the olfactory nerves ✓ Outline the structure and function of a taste bud ✓ List the accessory structures of the eye and explain their functions ✓ Name the tunics of the eye, list the parts of each tunic, and give the functions of each part ✓ Explain the differences in function	✓ How does the human body "sense"? ✓ How does olfaction help the human body? ✓ How do humans taste? ✓ What are the structures and functions of the eye? ✓ How do human eyes	Formative: ✓ Text Questions p.258 ✓ Senses Packet ✓ Case Study:Otitis Media ✓ Vision Videos Online ✓ Chapter 9 Study Guide ✓ Summative: ✓ Smell/Taste Lab ◦ PTC Taste Paper ✓ Comparative Anatomy

Topics Covered: ✓General Senses ✓Special Senses ✓Olfaction ✓Taste ✓Vision ✓Hearing and Balance	between the rods and cones ✓ Describe the chambers of the eye and the fluids they contain ✓ Explain how images are focused on the retina ✓ Describe the structures of the outer ear and middle ear, and state the function of each ✓ Describe the anatomy of the cochlea and explain how sounds are detected ✓ Explain how the structures of the vestibule and semicircular canals function in static and kinetic equilibrium	differ from other mammals? ✓ How are images seen? ✓ What are the structures and functions of the ear?	Eye Dissection Lab ✓ Vision Lab ✓ Hearing Lab ✓ Senses Lab Practical/Examination Semester Final: ✓ Cumulative Assessment from first semester ◦ Research Paper ◦ Group Project ◦ Lab Practical Overview

Unit 9	Objectives	Essential Questions	Assessments
Chapter 11 Blood Duration: 1 week *Term Usually Ends During Materials:	Students will: ✓ List the functions of blood ✓ Name the components of plasma and give their functions ✓ Describe the origin and production of the formed elements ✓ Describe the structure, function, and life history of red blood cells ✓ Compare the structures and functions of the five different types of white blood cells ✓ Describe the origin and structure of platelets ✓ Explain the formation and function of	✓ How do white blood cells help the human body? ✓ What is the function of clots? ✓ How are blood types determined? ✓ How do you figure out	Formative: ✓ Text Questions p.309 ✓ Blood Packet ✓ WebQuest ✓ Researching a Blood Disorder/Discussion ✓ Blood Type Problems (Genetics) ✓ Jaundice Case Study ✓ Chapter 11 Study Guide

✓Text Pages 291-310 <u>Topics Covered:</u> ✓Functions of Blood ✓Composition of Blood ✓Plasma ✓Formed Elements ✓Preventing Blood Loss ✓Blood Grouping ✓Diagnostic Blood Tests	platelet plugs and clots ✓ Describe the regulation of clot formation and how clots are removed ✓ Explain the basis of ABO and Rh incompatibilities ✓ Describe diagnostic blood tests and the normal values for the tests, and give examples of disorders that produce abnormal test values	your own blood type? ✓ What are ABO and Rh incompatibilities? ✓ What blood type is the universal donor and universal acceptor?	Summative: ✓ Blood Lab (Beakers) ✓ Blood Type Lab ✓ Lab Report on Blood Types ✓ Chapter 11 Test

Unit 10	Objectives	Essential Questions	Assessments
<u>Chapter 12 and 13</u> The Heart and Blood Vessels and Circulation	Students will: ✓ Describe the size, shape, and location of the heart ✓ Give the location and function of the coronary arteries ✓ Describe the chambers of the heart ✓ Name the valves of the heart and state their location and function ✓ List the components of the heart wall and describe the structure and	✓ What mechanisms allow blood to flow through the heart? ✓ What is the flow of blood through the heart?	Formative: ✓ Text Questions p.338-339 ✓ Heart Packet ✓ Text Questions p.371 ✓ Circulation Packet ✓ Current Event: Research the

Duration: 3 weeks **Materials:** ✓Text Pages 311-340 ✓Text Pages 341-372 **Topics Covered:** ✓Functions of the Heart ✓Size, Form, and Location of the Heart ✓Anatomy of the Heart ✓Histology of the Heart ✓Electrical Activity of the Heart ✓Cardiac Cycle ✓Heart Sounds ✓Regulation of Heart Function ✓Functions of the Peripheral Circulation ✓General Features of Blood Vessel Structure ✓Blood Vessels of Pulmonary Circulation, Systemic Circulation: Arteries and Veins ✓Physiology of Circulation	function of each ✓ Describe the flow of blood through the heart and name each of the chambers and structures through which the blood passes ✓ Explain the structure and function of the conduction system of the heart ✓ Define each wave of the electrocardiogram and relate each of them to contractions of the heart ✓ Describe the cardiac cycle and the relationship between contraction of each of the chambers, the pressure in each of the chambers, the phases of the electrocardiogram, and the heart sounds ✓ Describe intrinsic and extrinsic regulation of the heart ✓ Give the conditions for which the major heart medications and treatments are administered ✓ Describe the structure and function of arteries, capillaries, and veins ✓ List the major arteries and veins and their functions ✓ Describe how blood pressure can be measured	✓ How does an electrocardiogram represent heart function? ✓ What is the difference between the chambers of the heart? ✓ What is the structure and function of veins, arteries, and capillaries? ✓ How is blood pressure measured?	heart/circulation write a reaction paper ✓ Online Tutorial about Circulation/Blood Pressure with Worksheet ✓ Videos of Heart and path of Red Blood Cells ✓ Diagram of route of blood flow through heart ✓ Study Guide for Heart and Circulation **Summative:** ✓ Heart Dissection Lab ✓ Blood Pressure Lab ◦ Heart Rate ◦ AED ✓ Test on Heart and Circulation

Unit 11	Objectives	Essential Questions	Assessments
Chapter 14 The Lymphatic System	Students will: ✓ Describe the functions of the lymphatic system ✓ Explain how lymph is formed and transported ✓ Describe the structure and function of	✓ How does the lymphatic system function? ✓ What are the parts of	Formative: ✓ Text Questions p.397 ✓ Lymphatic Packet ✓ Allergy Research ✓ AIDS/HIV

and Immunity Duration: 1 week Materials: ✓Text Pages 373-398 Topics Covered: ✓The Lymphatic System ✓Immunity ✓Innate Immunity ✓Adaptive Immunity ✓Immune Interactions ✓Immunotherapy ✓Acquired	tonsils, lymph nodes, the spleen, and the thymus ✓ Define innate immunity and describe the cells and chemical mediators involved ✓ List the events that occur during an inflammatory response and explain their significance ✓ Define the term antigen ✓ Describe the origin, development, activation, and proliferation of lymphocytes ✓ Define antibody-mediated immunity and cell-mediated immunity and name the cells responsible for each ✓ Diagram the structure of an antibody and describe the effects produced by antibodies ✓ Discuss the primary and secondary responses to an antigen. Explain the basis for long-lasting immunity ✓ Describe the functions of T cells ✓ Explain how innate, antibody-mediated, and cell-mediated immunity can function together to eliminate an antigen ✓ Define and give examples of immunotherapy ✓ Explain the four ways that adaptive immunity can be acquired	the lymphatic system? ✓ What is an inflammatory response? ✓ How do T cells function? ✓ What is immunotherapy? ✓ How are vaccines created?	Research/Discussion Summative: ✓ Vaccine Research Paper

Unit 12	Objectives	Essential Questions	Assessments
Chapter 18 Urinary System and Fluid Balance	Students will: ✓ List the structures that make up the urinary system and describe the overall functions it performs ✓ Describe the location and anatomy of the kidneys ✓ Describe the structure of the nephron		Formative: ✓ Text Questions p.517 ✓ Urinary Packet ✓ Diagram of the Control of ADH Secretion and Effect on Nephron

Duration: 2 weeks Materials: ✓Text Pages 487-518 Topics Covered: ✓Functions of the Urinary System ✓Urinary System ✓Urine Production ✓Regulation of Urine Concentrations and Volume ✓Urine Movement ✓Body Fluid Compartments ✓Regulation of Extracellular Fluid Composition ✓Regulation of Acid-Base Balance	and the location of the parts of the nephron in the kidney ✓ List the components of the filtration barrier and describe the composition of the filtrate ✓ Describe the ureters, urinary bladder, and urethra ✓ Identify the principal factors that influence filtration pressure and explain how they affect the rate of filtrate formation ✓ Give the function of the proximal tubule, descending and ascending limbs of Henle's loop, distal tubule, and collecting duct. Discuss how the movement of substances across the walls of these structures influences the composition of the filtrate ✓ Explain how antidiuretic hormone, aldosterone, and atrial natriuretic hormone influence the volume and concentration of urine ✓ Describe micturition reflex ✓ Describe the mechanisms by which sodium ions, potassium ions, and calcium ions are regulated in the extracellular fluid ✓ Illustrate how the mechanisms that regulate the body fluid pH function by explaining how they respond to decreasing and increasing pH in the body fluids		✓ Current Event Dialysis Research ✓ Research on Effects of Alcohol on Urinary System/Discussion ✓ Chapter 18 Study Guide Summative: ✓ Urinary System Lab ✓ Kidney Dissection Lab ✓ Chapter 18 Test

Unit 13 Chapter 10	Objectives	Essential Questions	Assessments
	Students will: ✓ Compare the means by which the nervous and endocrine systems regulate body functions ✓ Describe the relationship among	✓ How do chemical signals produce responses in tissues?	Formative: ✓ Text Questions p.289 ✓ Endocrine Packet ✓ Current Event: Stress

The Endocrine System Duration: 1 week Materials: ✓Text Pages 260-290 Topics Covered: ✓Functions of the Endocrine System ✓Chemical Signals ✓Receptors ✓Hormones ✓The Endocrine Glands and Their Hormones ✓Other Hormones	chemical signals, receptor molecules, and receptor sites ✓ Describe how membrane-bound and intracellular receptor molecules mediate responses to intercellular chemical signals ✓ List the mechanisms by which intercellular chemical signals produce responses in their target tissues ✓ Describe categories of intercellular chemical signals that are based on the cells from which they are released and their target cells ✓ List the major categories of hormones on the basis of their chemical structure and describe how they interact with tissues to produce a response ✓ Describe three methods of regulating the release of hormones ✓ State the location of each of the endocrine glands in the body ✓ List the hormones produced by each of the endocrine glands and describe their effect on the body ✓ Describe how the hypothalamus regulated hormone secretion from the pituitary ✓ Describe how the pituitary gland regulates the secretion of hormones from other endocrine glands ✓ Choose a hormone and use it to explain how negative feedback results in homeostasis	✓ How do hormones produce a response in tissues? ✓ How are hormones regulated? ✓ Where are the endocrine glands located in the body? ✓ What hormones are produced by each endocrine gland what is their effect on the body? ✓ What is the role of the pituitary gland?	Research ✓Choose a hormone and use it to explain how negative feedback results in homeostasis ✓ Endocrine Glands/Hormone Study Guide Summative: ✓ Endocrine Gland/ Hormone Test ◦ Name ◦ Function ◦ Produce by

Unit 14	Objectives	Essential Questions	Assessments
Chapters 19 and 20 The Reproductive System and Development, Heredity,	Students will: ✓ Describe the scrotum and explain the role of the dartos and cremaster muscles in temperature regulation of the testes ✓ Describe the structure and function of the testes and penis ✓ Describe the process of	✓ How does the male reproductive system function? ✓ How does the female reproductive system	Formative: ✓ Text Questions p.548-549 ✓ Reproduction Packet ✓ Text Questions p.578 ✓ Developmental Packet

and Aging Duration: 3 weeks Materials: ✓Text Pages 519-549 ✓Text Pages 550-579 Topics Covered: ✓Functions of the Reproductive System ✓Formation of Sex Cells ✓Male Reproductive System ✓Physiology of Male Reproduction ✓Female Reproductive System ✓Physiology of Female Reproduction ✓Prenatal Developmental ✓Parturition ✓The Newborn ✓Lactation ✓The First Year Following Birth ✓Genetics	spermatogenesis and the route of sperm flow ✓ Name the male reproductive glands, state where they empty into the duct system , and describe their secretions ✓ List the hormones that influence the male reproductive system and functions ✓ Explain the events of the male sexual act ✓ Name the organs of the female reproductive system and their structure ✓ Discuss the development of the follicle and oocyte, and process of ovulation and fertilization ✓ Describe changes of the ovary and uterus during menstrual cycle ✓ List the hormones of the female reproductive system ✓ Explain the events of the female sexual act ✓ Describe menopause and changes that occur ✓ ✓ Describe the process of fertilization ✓ List the prenatal periods ✓ List the germ layers and formation process ✓ Define genetics and explain how chromosomes are related to genetics ✓ Describe the major types of inheritance	function? ✓ What occurs during the menstrual cycle? ✓ What occurs during menopause? ✓ What occurs during fertilization? ✓ How does an embryo develop? ✓ How are chromosomes related to genetics? ✓ What is inheritance?	✓ Discussion of Male vs Female Reproductive Systems ✓ Research on Sexually Transmitted Diseases ✓ Discussion on Control of Pregnancy ✓ Punnett's Squares ✓ Pedigrees ✓ Research/Discussion of Human Genome Project ✓ Study Guide for Reproduction and Development Summative: ✓ Test over Reproduction and Development

Unit 15	Objectives	Essential Questions	Assessments
Chapter 15 The Respiratory	Students will: ✓ Describe the anatomy of the respiratory passages ✓ Describe the lungs, the membranes that cover the lungs, and the cavities in which they lie	✓ How does breathing occur? ✓ What are the effects of changes in pressure in	Formative: ✓ Text Questions p.428 ✓ Respiratory Packet ✓ Research on Respiratory

System	Objectives	Essential Questions	Assessments
<u>Duration:</u> 2 weeks <u>Materials:</u> ✓Text Pages 399-429 <u>Topics Covered:</u> ✓Functions of the Respiratory System ✓Anatomy of the Respiratory System ✓Ventilation and Lung Volumes ✓Gas Exchange ✓Gas Transport in the Blood ✓Rhythmic Ventilation ✓Modification of Ventilation ✓Respiratory Adaptations to Exercise	✓ Explain how contraction of the muscles of respiration causes changes in thoracic volume during quiet breathing and during labored breathing ✓ Describe the changes in alveolar pressure that are responsible for the movement of air into and out of the lungs ✓ Explain how surfactant and pleural pressure prevent the collapse of the lungs and how changes in pleural pressure cause changes in alveolar volume ✓ List the pulmonary volumes and capacities and define each of them ✓ Name the components of the respiratory membrane and explain the factors that affect gas movement through it ✓ Describe the partial pressure gradients for oxygen and carbon dioxide ✓ Explain how oxygen and carbon dioxide are transported in the blood ✓ Describe the respiratory areas of the brainstem and how they produce a rhythmic pattern of ventilation ✓ Explain how alterations in blood pH, carbon dioxide, and oxygen levels affect ventilation ✓ Describe the regulation of ventilation during exercise and exercise training	the lungs? ✓ What are the different pulmonary volumes? ✓ How is ventilation affected by changes in pH, carbon dioxide, and oxygen? ✓ How is ventilation affected by exercise?	Disorders/Diseases ✓ Lung Model ✓ Research on Smoking and the effects on the Respiratory System ✓ Study Guide for Chapter 15 Summative: ✓ Respiratory Lab ✓ Chapter 15 Test

Unit 16	Objectives	Essential Questions	Assessments

Chapter 7 **The Muscular System** **Duration:** 3 weeks *Seniors Usually Finish School During this Unit (Cat Dissection Final) **Materials:** ✓Text Pages 152-192 **Topics Covered:** ✓Functions of the Muscular System ✓Characteristics of Skeletal Muscle ✓Smooth Muscle and Cardiac Muscle ✓Skeletal Muscle Anatomy	**Students will:** ✓ Describe the microscopic structure of a muscle and produce diagrams that illustrate the arrangement of myofilaments, myofibrils, and sarcomeres ✓ Describe the events that result in muscle contraction and relaxation in response to an action potential in a motor neuron ✓ Distinguish between aerobic and anaerobic muscle contraction ✓ Distinguish between fast-twitch and slow-twitch muscles and explain the function for which each type is best adapted ✓ Distinguish among skeletal, smooth, and cardiac muscle ✓ Define the following terms and give an example of each: origin, insertion, synergist, antagonist, and prime mover ✓ Describe various facial expressions and list the major muscles causing each ✓ Describe mastication, tongue movement, and swallowing and list the muscles or groups of muscles involved in each ✓ Describe the muscles of the trunk and the actions they accomplish ✓ Describe the movements of the arm, forearm, and hand and list the muscle groups involved in each movement ✓ Describe the movements of the thigh, leg, and foot and list the muscle groups involved in each movement	✓ How do muscles relax and contract? ✓ What are the microscopic structures of muscles? ✓ What are the different types of muscle contraction? ✓ How is muscle movement related to function? ✓ What are the major muscles of every day body activities?	**Formative:** ✓ Text Questions p.191 ✓ Muscle Packet ✓ Muscle Coloring Book Pages ✓ Research on Muscular Disorders ✓ Study Guide for Chapter 7 **Summative:** ✓ Muscle Project: Diagramming Muscles ✓ Lab Practical on Muscles ✓ Chapter 7 Test ✓ Cat Dissection Examining Relationships Between Different Body Systems

Unit 17	Objectives	Essential Questions	Assessments

Chapter 16 and 17

The Digestive System and Nutrition, Metabolism, and Body Temperature Regulation

Duration: 2 weeks
*Final Project

Materials:
- ✓Text Pages 430-463
- ✓Text Pages 464-486

Topics Covered:
- ✓Functions of the Digestive System
- ✓Anatomy and Histology of the Digestive System
- ✓Movements and Secretions in the Digestive System
- ✓Digestion, Absorption, and Transport
- ✓Nutrition
- ✓Metabolism
- ✓Body Temperature Regulation

Students will:
- ✓ Define nutrition, essential nutrient, and kilocalorie
- ✓ For carbohydrates, lipids, and proteins describe their dietary sources, their uses in the body, and the daily recommended amounts of each in the diet
- ✓ List the common vitamins and minerals and give a function for each
- ✓ Define metabolism, anabolism, and catabolism
- ✓ List three ways in which enzyme activity is controlled
- ✓ Describe glycolysis and name its products
- ✓ Explain how the breakdown of glucose yields two ATP molecules in anaerobic respiration and 38 ATP molecules in aerobic respiration
- ✓ Describe the basic steps involved in using lipids and amino acids as an energy source
- ✓ Define metabolic rate
- ✓ Describe heat production and regulation in the body
- ✓ List the organs that make up the digestive tract and describe the structure of each.
- ✓ Name the teeth and describe the structure of an individual tooth
- ✓ Describe the major salivary glands. Compare their structure and functions
- ✓ Outline the anatomical and physiological characteristics of the stomach, small intestine, liver, pancreas, large intestine, and oral cavity

- ✓ What nutrients and vitamins are essential for a healthy diet?
- ✓ How are carbohydrates, proteins, and lipids used in the body?
- ✓ How does our body control enzyme activity?
- ✓ What occurs during the breakdown of glucose?
- ✓ How are the structures of the stomach, small intestine, liver, pancreas, and large intestine related to their function?
- ✓ Why are teeth important?

Formative:
- ✓ Text Questions p.485
- ✓ Text Questions p.462
- ✓ Nutrition Packet
- ✓ Digestive Packet
- ✓ Current Event: Nutrition in our World
- ✓ Food Diary Project
- ✓ Creating a Menu for Success
- ✓ Nutrition/Digestive Study Guide

Summative:
- ✓ Nutrition Quiz
- ✓ Digestive System Quiz
- ✓ Final Project Creating a way to Educate Middle or Elementary School Students about Nutrition and Metabolism