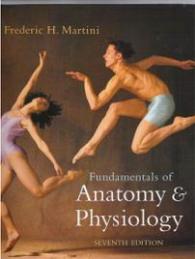


# *Anatomy and Physiology*

## *(NVCC: Principles of the Human Body—Biology H110)*

<i>Content Standard</i>	<i>Learning Objectives</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p><b>NVCC Biology H110:</b> Course objective is to develop scientific thinking skills in Biology and to gain a better understanding and appreciation for human biological systems and how they work to maintain homeostasis.</p> <p><b>WHS Anatomy and Physiology Course Questions:</b></p> <ol style="list-style-type: none"> <li>I. What are the various levels of organization within the human body?</li> <li>II. What is the biochemical relationship to the human body?</li> <li>III. How does metabolism and genetics fit into the basic cellular organization of the human body?</li> </ol>	<p><b>Levels of Organization</b></p> <ol style="list-style-type: none"> <li>1. explore the structural and functional characteristics of living things</li> <li>2. consider the structure of atoms the basic chemical building blocks</li> <li>3. relate how combinations of chemicals form cells, the smallest living units in the human body</li> <li>4. discuss how a variety of cell types arranged in various combinations form tissues, structures with discrete structural and functional properties.</li> </ol>	<p><b>Basic Plan Experiment</b></p> <ul style="list-style-type: none"> <li>-<u>Anatomy</u>-identify and label planes of orientation &amp; body cavities</li> <li>-<u>Physiology</u>-show how the activities of various systems function together</li> </ul> <p><b>Chemistry Experiment</b></p> <ul style="list-style-type: none"> <li>-build organic molecules and demonstrate a biological synthesis reaction</li> <li>-demonstrate a chemical change showing the release or absorption of energy</li> </ul> <p><b>Cellular Structure and Function Experiment</b></p> <ul style="list-style-type: none"> <li>-<u>Anatomy</u>-draw and label structures of the cheek cells &amp; phases of mitosis</li> <li>-<u>Physiology</u>-demonstrate diffusion, osmosis, dialysis and filtration</li> </ul> <p><b>Intercellular Organization Experiment</b></p> <ul style="list-style-type: none"> <li>-identify tissues of various histology slides and examine the structures of the various tissues</li> </ul>	<p><b>Any combination of the following, based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b></p> <ul style="list-style-type: none"> <li>-KWL charts</li> <li>-pretests</li> <li>-checklists</li> <li>-observations</li> <li>-self evaluation &amp; questions</li> </ul> <p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>-questioning student</li> <li>-conferencing</li> <li>-peer evaluation</li> <li>-observation</li> <li>-performance tasks</li> <li>-exit cards</li> <li>-portfolio check</li> <li>-quizzes</li> <li>-journal entries</li> <li>-self evaluation</li> </ul> <p><b>Summative Assessments</b></p> <ul style="list-style-type: none"> <li>-lab/science journal entries</li> <li>-performance tasks</li> <li>-portfolio review</li> <li>-unit tests</li> <li>-semester exams</li> <li>-product/exhibits/displays</li> <li>-demonstrations</li> </ul>	<p>“<i>Fundamentals of Anatomy and Physiology</i>” 7<sup>th</sup> edition by Frederic H Martini</p>  <p>Supplements with Textbook:</p> <p>“<i>InterActive Physiology</i>” CD-ROM</p> 

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<p>IV. How does the skin effect body temperature?</p> <p>V. What are the processes involved in the development and maintenance of bones?</p> <p>VI. What is the mechanism of muscle fiber contraction and how is energy supplied for it?</p>	<p><b>Support and Movement</b></p> <ol style="list-style-type: none"> <li>1. consider the many and varied functions of the skin</li> <li>2. examine the mechanisms involved with the growth, remodeling, and repair of the skeleton</li> <li>3. differentiate the functional anatomy of the axial skeleton to that of the appendicular skeleton</li> <li>4. consider the ways bones interact wherever they interconnect at joints, or articulations</li> <li>5. examine the histological and physiological characteristics of skeletal muscle cells, and relate those features to the functional properties of the tissue</li> </ol>	<p><b>Skin; Regulation of Body Temperature Experiment</b>            -test the body's ability to regulate temperature under various environmental conditions</p> <p><b>Skeleton-the Framework Experiment</b>            -<u>Anatomy</u>-examine a fresh long bone's external covering and interior parts            -<u>Physiology</u>-determine the water content of a fresh bone specimen</p> <p><b>Muscle Tissue Experiment</b>            -<u>Anatomy</u>-observe histology slides of 3 muscle tissue types            -<u>Physiology</u>-compare isotonic to isometric muscle contraction; time the onset of muscle fatigue</p>		<p>"Anatomy 360°"            CD-ROM</p> <div style="text-align: center;">  </div> <p>Student Access Kit for <u>MyA&amp;P</u> online resource center and <u>The Anatomy &amp; Physiology Place</u> companion website            AccessCode:            USMFA-CHILI-CLUNG-FUMED-GIGOT-BIDES</p>

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VII. What are the two major divisions of the nervous system and how does each function?	<p>6. describe the gross anatomy of the muscular system and consider functional relationships between muscles and bones</p> <p><b>Control and Regulation</b></p> <p>1. consider the structure of neural tissue and the basic principles of neurophysiology</p> <p>2. discuss the functional anatomy and organization of the spinal cord and spinal nerves</p> <p>3. diagram simple spinal reflexes</p> <p>4. discuss the functional organization of the brain and cranial nerves</p> <p>5. describe simple cranial reflexes</p> <p>6. examine the nervous system working as an integrated unit</p> <p>7. consider aspects of higher function such as consciousness, learning,</p>	<p><b>Skeletal Muscle Experiment</b>            -<u>Anatomy</u>-show antagonistic activity of wing muscles            -dissection of feline specimen to observe and identify superficial and deep muscles            -<u>Physiology</u>-compare handwriting of name before and after placing hand in ice water; explain the effect of temperature on muscle contraction</p> <p><b>Nervous Tissue Experiment</b>            -<u>Anatomy</u>-examine a histology slide of neurons from cerebrum and spinal cord; identify and label the structure of a motor neuron            -<u>Physiology</u>-show the patellar reflex and papillary-light reflex</p> <p><b>Nervous System Experiment</b>            -<u>Anatomy</u>- examine a preserved sheep brain and spinal cord; examine under a stereomicroscope            -<u>Physiology</u>-show the effect of discrimination on reaction time.</p> <p><b>Determine your right or left sided dominance and the effect on learning</b></p> <p><b>Eyes and Ears Experiment</b>            -use the Snellen eye chart to determine visual acuity            -determine astigmatism</p>		

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VIII. How do hormones affect the homeostasis of the body?	<p>and intelligence</p> <p>8. explore smell, taste balance, hearing, and vision</p> <p>9. compare the structural and functional organization of the endocrine and nervous systems</p> <p>10. describe the mechanisms involved in the hormonal modification of metabolic operations</p>	<p>-show effect of distance and direction on auditory acuity</p> <p><b>Diabetes Activity</b></p>		
IX. What organs comprise the cardiovascular system and how do they work together?	<p><b>Fluids and Transport</b></p> <p>1. discuss the nature of the circulating blood</p> <p>2. consider the structure and function of the heart</p> <p>3. examine the organization of blood vessels</p> <p>4. consider the integrated functions of the system as a whole</p>	<p><b>The Blood and the Heart Experiment</b></p> <p>-<u>Anatomy</u>-observe a prepared blood smear specimen under the microscope and draw and label the blood components observed</p> <p>-examine and dissect a preserved sheep heart</p> <p>-<u>Physiology</u>-listen for your partner's heart sound and note its strength and rate</p> <p>-determine systolic and diastolic blood pressure</p> <p><b>Mini research &amp; report on a cardiovascular disorder</b></p>		

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<p>X. How are the upper and lower respiratory tract structures related to the function?</p>	<p>5. discuss the components of the lymphatic system and the ways those components interact</p> <p><b>Environmental Exchange</b></p> <p>1. describe how air enters and leaves the lungs as a result of the actions of respiratory muscles</p> <p>2. describe how oxygen and carbon dioxide are exchanged across delicate epithelial surfaces within the lung</p>	<p><b>Vascular and Lymph Systems Experiment</b></p> <p>-<u>Anatomy</u>-examine and compare microscopic slides of arteries, veins, and capillaries</p> <p>-examine a microscopic slide of a lymph node</p> <p>-sketch and label artery, capillary, vein, and lymph node</p> <p><b>Respiratory Organs and the Mechanics of Breathing Experiment</b></p> <p>-<u>Anatomy</u>-trace the passage of air through the segments of the respiratory tree from nostrils to alveoli on a torso model</p> <p>-<u>Physiology</u>-determine the changes that occur in the size of the thorax by contraction of the diaphragm and chest elevating muscles</p> <p>-using a spirometer measure your tidal volume, vital capacity and calculate your ERV, IEV, and IC</p> <p><b>Respiratory Gases and Barometric Physiology Experiment</b></p> <p>-<u>Anatomy</u>-analyze data on the concentration of respiratory gases in inspired, alveolar, and expired air</p> <p>-<u>Physiology</u>- compare the respiratory patterns at rest and following exercise and hyperventilation</p>		

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<p>XI. How does the structure of the digestive organs contribute to the metabolic activity of the body?</p> <p>XII. What structures of the kidney help maintain homeostatic through natural dialysis?</p>	<p>3. discuss the structure and function of the digestive and the digestive glands (liver and pancreas)</p> <p>4. describe the process of digestion breaking down large and complex organic molecules to smaller fragments that can be absorbed into the blood</p> <p>5. identify how organic wastes are removed from the body via the digestive tract</p> <p>6. examine how the body obtains energy released by the breakdown of organic molecules, stores it as ATP, and used it to support intracellular operations</p> <p>7. relate how the kidneys remove metabolic waste products from the circulation to produce urine</p> <p>8. discuss the homeostatic mechanisms that regulate ion concentrations, volume, and pH in the fluid surrounding cells</p>	<p><b>Food and Nutrition, Metabolism Experiment</b>  <u>-Anatomy-</u>analyze an individual diet as to macronutrient, micronutrient and caloric content  <u>-Physiology-</u>determine the basal metabolic rate by means of specific calculation-calculate the expenditures of Calories while performing certain activities</p> <p><b>Kidney Experiment</b>  <u>-Anatomy-</u> examine a torso model, locate and label major structures of the urinary system  <u>-dissection of the kidneys of a feline specimen</u>  <u>Physiology-</u>list several normal urine constituents and determine results of self urine testing</p>		

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<p>XIII. How do the structures of the male and female reproductive organs contribute to the processes involved in the development of the fetus?</p>	<p><b>Continuity of Life</b></p> <ol style="list-style-type: none"> <li>1. describe the male and female reproductive organs produce and store specialized reproductive cells that combine to form new individuals</li> <li>2. discuss the major role in the maintenance of normal sexual function the gonads secretion of hormones plays</li> <li>3. describe how genetic programming, environmental factors, and physiological processes affect the events from prenatal development through senescence</li> </ol>	<p><b>Reproduction and Development Experiment</b></p> <p>-<u>Anatomy</u>-examine models of male and female reproductive organs; identify and label</p> <p>-dissection of the reproductive organs of a feline specimen; compare and contrast to a human</p> <p>-<u>Physiology</u>-virtual dissection of a fertilized, unincubated chick egg and a incubated chick egg</p> <p>-relate the developing chicken embryo to the human embryo</p> <p><b>Human Genetics Experiment</b></p> <p>-<u>Anatomy</u>-draw the phases of mitosis and meiosis comparing and contrasting the two</p> <p>-<u>Physiology</u>- observe, test and consider probable genotypes and phenotypes of yourself and your partner</p> <p><b>Field Trip “Bodies” Exhibit</b></p>		