

**ROBBINSVILLE PUBLIC SCHOOLS**

**OFFICE OF CURRICULUM AND INSTRUCTION**

**DEPARTMENT**

Science

**COURSE TITLE**

**Anatomy and Physiology**

**Board of Education**

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**BOARD OF EDUCATION INITIAL ADOPTION DATE:**

## Course Philosophy

Anatomy and physiology will challenge students to apply their knowledge of the human body and how it functions to human diseases and medical treatments. Students will be able to understand the structures and workings of their own bodies to maintain a healthy lifestyle and make educated medical decisions.

## Course Description

Anatomy & physiology is designed for self-motivated students interested in pursuing a career in which detailed knowledge of the human body would be expected. Topics will include advanced studies of cytology, histology, integumentary, skeletal, muscular, digestive, cardiovascular, respiratory, reproductive, urinary, nervous, endocrine systems and sense organs with an emphasis on interdependence, complementarity and homeostasis. Students will be required to identify anatomical structures by performing dissections of representative organisms. Students will learn about human diseases by case study investigations. Additionally, students are expected to read a non-fiction book about medical practice and ethics and partake in bioethical discussions.

## Core and Supplemental Instructional Materials

Core Materials	Supplemental Materials
<ul style="list-style-type: none"><li>● <i>The Essentials of Human Anatomy &amp; Physiology</i> (4<sup>th</sup> edition) by Martini and Bartholomew</li><li>● <i>Anatomy and Physiology</i>, (9th edition) by Marieb and Hoehn</li></ul>	<ul style="list-style-type: none"><li>● Instructor Notes</li><li>● Marieb Anatomy and Physiology Coloring Workbook: A Complete Study Guide</li><li>● Various Anatomy and Physiology Websites including: -<ul style="list-style-type: none"><li>- <i>Instant Anatomy</i></li><li>- <i>Human BioDigital</i></li><li>- <i>Anatomy Corner</i></li></ul></li></ul>

## Integration of 21st Century Themes and Skills

### Educational Technology

Standards: 8.1.12.A.3. 8.1.12.B.2

- Technology Operations and Concepts: Students can collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.  
Example: Students can research and create collaborative informational project presentations on several Anatomy and Physiology topics and submit them electronically.
- Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products using technology.  
Example: Students create a digital learning game or tutorial on various assigned Anatomy and Physiology topics that they electronically post and instruct their peers on usage.

### Career Ready Practices

**Standards: (CRP1, CRP2, CRP3, CRP4, CRP7, CRP9, CRP10, CRP11, CRP12)**

**CRP1.** Act as a responsible and contributing citizen and employee Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

**Example**: Students will demonstrate the responsibilities associated with being a member of a community when engaging collaboratively during sharing in pairs/trios, and participating in whole group discussions. Examples may include pair sharing activities and research projects on specific Anatomy and Physiology topics.

**CRP2.** Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply

the use of an academic skill in a workplace situation.

**Example:** Students will demonstrate the connections between abstract concepts with real-world applications through anatomical dissections of various animal dissections and clinical collaboration of symptoms, diagnosis, and treatment of real-world case studies.

**CRP3.** Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial wellbeing, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.

**Example:** Students will identify anatomical systems and physiological functions of healthy individuals as well as unhealthy, injured, and diseased individuals. Students will conduct research on a specific health related career, identifying life style, educational costs, and salary with the goal of making informed decisions on their own career choices.

**CRP4.** Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

**Example:** Students will utilize effective communication of thoughts and ideas during collaborative laboratory exploration with small groups of their peers and will create informative laboratory reports. Students will research on specific Anatomy and Physiology topics and create an informative digital presentation and review for their peers.

**CRP7.** Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

**Example:** Students will consider patient data and employ research to discern clinical dysfunctions, diagnosis, and treatment options that are currently employed in clinical settings.

**CRP9.** Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' actions, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

**Example:** Students will examine clinical patient situations and effectively communicate the ethical treatment of patients and the effects of unethical treatment to patients.

**CRP10.** Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

**Example:** Students will research educational pathways to health careers and the pathways to licensing.

**CRP11.** Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

**Example:** Students will utilize various types of clinical instruments during laboratory explorations and will investigate various types of technology currently utilized in clinical setting for patient analysis, diagnosis, treatment, and communication.

**CRP12.** Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

**Example:** Students will work in collaborative groups with peers of various cultural backgrounds during laboratory explorative and engage in effective communication and teamwork.

## Robbinsville Ready 21st Century Skill Integration

The following skills will be embedded throughout the curriculum and instruction of this course.

**Collaborative Team Member:** Robbinsville students will learn more by working together than in isolation. As educational theorist Lev Vygotsky advocated, learning is a social process. Many workplaces today encourage employees to work in teams to solicit diverse perspectives, brainstorm new ideas and/or products, and solve problems. Further, collaboration fosters interpersonal relationships, self-management skills, cooperation, and a sense of collective responsibility. Collaborative team members are able to work with diverse groups of people who hold a variety of perspectives.

**Effective Communicator:** Robbinsville students must be able to clearly articulate their ideas orally, in writing, and across various media in order to successfully connect to the world around them. As the world becomes increasingly globalized, communication is more than just sharing one's ideas. Effective communicators are able to communicate their convictions, actively listen and analyze others' work to identify perspective and/or potential bias.

**Emotionally Intelligent Learner:** Robbinsville students who are emotionally intelligent learn to be empathetic, demonstrate integrity and ethical behavior, are kind, are self-aware, willing to change, and practice self-care. They are better able to cope with the demands of the 21st century digital society and workplace because they are reliable, responsible, form stable and healthy relationships, and seek to grow personally and professionally. Emotionally intelligent people are able to manage their emotions, work effectively on teams and are leaders who can grow and help to develop others.

**Informed and Involved Citizen:** Robbinsville students need to be digital citizens who are civically and globally aware. The concept of what it means to be "literate" has evolved along with 21st century technological and cultural shifts. Our progressive vision of literacy entails having our students explore real world problems in the classroom. Informed and involved citizens are able to safely and accurately communicate with people all around the world and are financially, environmentally and informationally literate.

**Innovative Thinker:** Robbinsville students must encompass innovative thinking skills in order to be successful lifelong learners in the 21st century world. As stated by Karl Fisch and Scott McLeod in the short film Shift Happens, "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't been invented . . . in order to solve problems we don't even know are problems yet." Innovative thinkers are able to think analytically, solve problems critically, creatively engage in curiosity and tinkering, and demonstrate originality.

**Resilient and Self-Directed Learner:** Robbinsville students need to take risks and ultimately make independent and informed decisions in an ever-changing world. Author of Life, the Truth, and Being Free, Steve Maraboli stated, "Life doesn't get easier or more forgiving, we get stronger and more resilient." Self-directed scholars of the 21st century are able to set goals, initiate resolutions by seeking creative approaches, and adjust their thinking in light of difficult situations. Resilient students are able to take risks without fear of failure and overcome setbacks by utilizing experiences

to confront new challenges. Resilient and self directed scholars will consistently embrace opportunities to initiate solutions and overcome obstacles.

**Robbinsville Public Schools**  
**Scope, Sequence, Pacing and Assessment**  
*Anatomy & Physiology*

Unit Title	Unit Understandings and Goals	Recommended Duration/ Pacing	Assessments			
			Formative	Summative	Common Benchmark Assessments (mid-course and end of course <u>only</u> )	Alternative Assessments (projects, etc. <b>when appropriate</b> )
Introduction to Anatomy & Physiology	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Utilize anatomical terminology and anatomical planes</li> <li>● Compare positive and negative feedback mechanisms that maintain homeostasis in the body</li> <li>● Identify major structures and functions of each of the 11 organ systems</li> <li>● Compare structures and functions of biologically significant macromolecules</li> <li>● Explain the significance of water to life</li> </ul>	2 blocks	<p>Socratic Quiz</p> <p>Creation of paper dolls identifying the 11 organ systems</p> <p>Labeling the anatomical planes and terminology of stuffed animals</p>	Ch 1 Exam	Final exam	Pickle Autopsy
Histology	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● List structural and functional characteristics of epithelial tissue</li> <li>● Name, classify and describe various types of epithelia</li> <li>● Differentiate between exocrine and endocrine glands</li> <li>● List structural and functional characteristics of connective tissue</li> <li>● Compare and contrast structures and locations of the 3 types of muscle tissue</li> </ul>	4 blocks	<p>Socratic Quiz</p> <p>Cell Mix &amp; Match Cards</p> <p>Tissue Microscope Lab</p> <p>Clinical Tissue research and report</p>	Tissue Exam	Final exam	Tissue Box Project

	<ul style="list-style-type: none"> <li>● Indicate general characteristics of nervous tissue</li> <li>● Describe structure and function of cutaneous, mucous, and serous membranes</li> <li>● Outline the process of tissue repair of a superficial wound</li> </ul>					
Integumentary System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Name the tissue types composing the epidermis and dermis, list the major layers of each and their functions</li> <li>● Describe factors that contribute to skin color</li> <li>● Name the regions of hair and explain the basis of hair color. Describe the distribution, growth, and changing nature of hair during the life span</li> <li>● Describe the structure of nails</li> <li>● Compare the structure and location of sweat and oil glands in addition to the composition and function of their secretions</li> <li>● Describe how skin accomplishes at least 5 different functions</li> <li>● Summarize characteristics of 3 major types of skin cancer</li> <li>● Differentiate between 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> degree burns</li> <li>● Describe the changes that occur in skin as a result of aging</li> </ul>	7-8 Blocks	<p>Socratic Quiz</p> <p>Skin Disease and Disorder Clinicals and report</p> <p>Skin Model</p> <p>Various Labs</p> <p>Frog Dissection</p>	Integumentary Exam	Final exam	Skin Cancer Project

Skeletal System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Compare and contrast the 4 bone classes and provide examples for each</li> <li>● List and describe 7 important functions of bone</li> <li>● Describe the gross anatomy of a typical flat bone and a long bone, indicate locations and functions of red and yellow marrow</li> <li>● Describe the histology of compact and spongy bone</li> <li>● Discuss the advantages of having both organic and inorganic components in bone tissue</li> <li>● Compare and contrast intramembranous ossification and endochondral ossification</li> <li>● Explain how hormones, stress, and various cells regulate bone remodeling</li> <li>● Describe the steps of fracture repair</li> <li>● Name the parts and functions of the axial and appendicular skeleton and identify significant bone markings</li> <li>● Compare and contrast the male and female pelvis</li> <li>● Compare an adult and infant skull</li> <li>● Classify joints by structure and function</li> </ul>	10-12 Blocks	<p>Socratic Quiz</p> <p>Skeleton Model</p> <p>Case Studies</p> <p>Skull Quiz</p> <p>Axial Quiz</p> <p>Appendicular Quiz</p> <p>Various Labs</p>	Skeletal System Exam	Final exam	Bones Project
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Muscular System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● List 4 important functions of muscle tissue</li> <li>● Describe the gross and microscopic structure of skeletal muscle</li> <li>● Describe the sliding filament model of muscle contraction</li> <li>● Describe events that occur at the neuromuscular junction to stimulate muscle contraction</li> <li>● Describe the events that lead up to cross bridge formation</li> <li>● Describe 3 ways in which ATP is regenerated during skeletal muscle contraction</li> <li>● Name and identify major muscles of the human body</li> </ul>	8-9 Blocks	Muscle Model Socratic Quiz Case Studies Muscle Quiz Various Labs Dissection Lab Reflective Writings	Muscular System Exam	Final exam	Health Procedures Project
Nervous System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Explain structural and functional divisions of the nervous system</li> <li>● List and describe the functions of neuroglia</li> <li>● Describe important structural components of the neuron and relate to their functions</li> <li>● Explain the significance of a myelin sheath</li> <li>● Classify neurons by structure and function</li> <li>● Compare resting, graded, and action potentials</li> <li>● Explain how action potentials are generated and propagated along neurons</li> <li>● Distinguish between electrical and chemical synapses</li> </ul>	8-10 Blocks	Socratic Quiz Neuron Model Various Labs Case Studies Brain Dissection Brain Quiz	Nervous System Exam	Final exam	Neurological Disorders Project

	<ul style="list-style-type: none"> <li>● Distinguish between excitatory and inhibitory postsynaptic potentials</li> <li>● Describe and give examples of neurotransmitters</li> <li>● List the major lobes, fissures, and functional areas of the cerebral cortex</li> <li>● Name and locate the ventricles of the brain</li> <li>● Describe the location of the diencephalon, and name its subdivisions and functions</li> <li>● Identify the 3 major regions of the brainstem and the functions of each</li> <li>● describe the structure and function of the cerebellum</li> <li>● Describe how meninges, cerebrospinal fluid, and the blood brain barrier protect the CNS</li> <li>● Name the 12 pairs of cranial nerves</li> <li>● Describe the gross and microscopic structure of the spinal cord</li> <li>● Name the components of a reflex arc</li> </ul>					
Special Senses	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Classify general sensory receptors by structure, stimulus detected, and body location</li> <li>● Describe the structure and function of accessory eye structures, eye layers, the lens, and humors of the eye</li> <li>● Trace the pathway of light through the eye, and explain how</li> </ul>	5-6 Blocks	<p>Socratic Quiz</p> <p>Senses Quiz</p> <p>Eye Dissection</p> <p>Various Labs</p>	Special Senses Exam	Final exam	

	<p>light is focused for distant and close vision</p> <ul style="list-style-type: none"> <li>● Outline the causes and consequences of astigmatism, myopia, hyperopia, glaucoma, and cataracts</li> <li>● Compare and contrast the roles of rods and cones in vision</li> <li>● Describe the location, structure, and afferent pathways of smell and taste receptors</li> <li>● Describe the structure and general function of the outer, middle and inner ear</li> <li>● Describe the sound conduction pathway to the temporal cortex</li> <li>● Explain how the balance organs of the semicircular canals and the vestibule help maintain equilibrium</li> </ul>		<p>Eye &amp; Ear Models</p> <p>Clinicals</p>			
Endocrine System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Compare hormonal and neural controls of body functioning</li> <li>● List major endocrine organs and their body locations</li> <li>● Describe the effects of the major hormones released by each endocrine organ</li> <li>● Identify antagonistic and synergistic hormones</li> </ul>	5-6 Blocks	<p>Socratic Quiz</p> <p>Clinicals</p> <p>Various labs</p>	Endocrine System Exam	Final exam	

<p>Blood &amp; Lymphatic System</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Describe the composition and functions of blood</li> <li>● Describe structure, function and production of erythrocytes</li> <li>● List the class, structural characteristics, and functions of leukocytes</li> <li>● Describe the structure and function of platelets</li> <li>● Describe ABO and Rh blood groups and transfusion compatibility</li> <li>● Describe the structure and distribution of lymph vessels</li> <li>● Describe the source of lymph and mechanisms of its transport</li> <li>● Describe the general location and function of lymph nodes and other lymph organs</li> <li>● Compare innate and adaptive immunity</li> <li>● Define antigen and explain its complementary relationship to antibodies</li> <li>● Compare and contrast the origin, maturation, and function of B and T lymphocytes</li> <li>● Describe humoral immunity and compare to cellular immunity</li> <li>● Describe the structure and function of an antibody monomer and name the 5 classes of antibodies</li> </ul>	<p>8-9 Blocks</p>	<p>Socratic Quiz</p> <p>Clinicals</p> <p>Various Labs</p> <p>Blood Typing</p> <p>Vaccine Webquest</p>	<p>Blood &amp; Lymphatic System Exam</p>	<p>Final exam</p>	<p>Health Careers Project</p>
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Cardiovascular System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Describe the structure and function of each of the heart chambers, and heart valves</li> <li>● Describe the structure and function of each of the three layers of the heart wall</li> <li>● Describe the events of cardiac muscle contraction</li> <li>● Compare a normal and abnormal ECG, name each wave and what it represents</li> <li>● Compare vasoconstriction to vasodilation</li> <li>● Compare and contrast the structure and function of the 3 types of arteries, capillaries, and veins</li> <li>● Define and explain the relationship between blood pressure and resistance</li> <li>● Name and give the specific location of the major arteries and veins in systemic circulation</li> </ul>	5-6 Blocks	<p>Socratic Quiz</p> <p>Clinicals</p> <p>Various Labs</p> <p>Heart Dissection</p> <p>Heart Model</p>	Cardiovascular System Exam	Final exam	
Respiratory System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Identify the organs of the respiratory passageway</li> <li>● Describe the gross structure of lungs and pleurae</li> <li>● Relate Boyles Law, respiratory muscles, and lung elasticity to inspiration and expiration</li> <li>● List physical factors that influence pulmonary ventilation</li> <li>● List and explain various lung volumes and capacities</li> <li>● Describe how oxygen is transported</li> </ul>	3-4 Blocks	<p>Socratic Quiz</p> <p>Pluck Examination &amp; tracheotomy</p> <p>Clinicals</p> <p>Various Labs</p>	Respiratory System Exam	Final exam	

	<p>in blood and factors that can affect it</p> <ul style="list-style-type: none"> <li>● Describe the effects of acclimatization to high altitudes</li> </ul>					
Digestive System & Nutrition	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Differentiate and describe organs of the alimentary canal and accessory digestive organs</li> <li>● List and describe major processes occurring during digestive system activity</li> <li>● Describe the composition and function of saliva</li> <li>● Differentiate between deciduous and permanent teeth</li> <li>● Identify and describe the structural modifications of the small intestine to enhance the digestive process</li> <li>● List the enzymes involved in digestion and macromolecules on which they act</li> <li>● List and define the 6 categories of nutrients, their sources, and cellular uses.</li> <li>● Describe several metabolic functions of the liver</li> <li>● Define and calculate basal metabolic rate and total metabolic rate. Describe factors that influence them</li> </ul>	3-4 Blocks	<p>Socratic Quiz</p> <p>Alimentary Canal model</p> <p>Clinicals</p> <p>Fetal Pig Dissection</p>	Digestive System Exam	Final exam	What is Healthy? Webquest & Project

Urinary System	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Trace the blood supply through the kidney</li> <li>● Describe the anatomy of a nephron</li> <li>● Describe mechanisms and regulation of water and solute filtration and reabsorption</li> <li>● Explain formation of dilute versus concentrated urine</li> <li>● Compare normal versus abnormal physical and chemical properties of urine</li> <li>● Describe general location, structure and function of the ureters urinary bladder, and urethra</li> <li>● Compare the length and function of the male and female urethra</li> <li>● List factors that determine body water content and the effect of each</li> <li>● List and describe the 3 major chemical buffer systems of the body</li> </ul>	3-4 Blocks	<p>Socratic Quiz</p> <p>Clinicals</p> <p>Various Labs</p>	Urinary System Exam	Final exam	
Reproductive System & Embryonic Development	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Describe the structure and function of the testes, and explain the importance of their location in the scrotum</li> <li>● Describe the sources and functions of semen</li> <li>● Outline the events of spermatogenesis and compare to events of oogenesis</li> <li>● Describe the structure, function and location of the ovaries and other organs of the female reproductive system</li> <li>● Describe the anatomy of the</li> </ul>	3-4 Blocks	<p>Socratic Quiz</p> <p>Reproductive Models</p> <p>Various Labs</p> <p>Clinicals</p>	Reproductive System & Embryonic Development Exam	Final exam	

external female genitalia and mammary glands

- Describe phases of ovarian and uterine cycle and hormonal regulation
- Indicate the infectious agents and modes of transmission of several common sexually transmitted infections
- Describe significant events of puberty and menstruation
- Describe the events of fertilization
- Describe the product, process, and stages of cleavage
- Outline steps of implantation
- Describe placenta formation and functions
- Name and describe the formation, location, and function of the extra embryonic membranes
- Describe gastrulation and its consequences
- Define organogenesis and indicate the significance of the 3 primary germ layers
- Describe unique features of fetal circulation
- Indicate the duration of the fetal period, and note the major events of fetal development

Medical Ethics	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Describe how medical ethics and law have changed over time</li> <li>● Describe current laws that protect patient rights</li> <li>● Support and defend ethical decisions based on consideration of all stakeholders involved</li> </ul>	Integrated throughout course	<p>Class Discussions</p> <p>Integrated into labs and projects</p>		Final exam	Henrietta Lacks Research Paper
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**Robbinsville Public Schools**  
Unit #1: Introduction to Anatomy & Physiology

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> <li>● Function is dependent upon structure</li> <li>● Positive &amp; negative feedback mechanisms regulate homeostatic processes in the body</li> <li>● The 11 organ systems are highly organized and interdependent</li> <li>● Anatomical terminology is essential for universal understanding of anatomy and physiology</li> <li>● Biochemical reactions facilitate cell functions</li> <li>● The cell is the basic unit of structure and function for all organisms</li> <li>● Water is an essential component of life</li> </ul>	<p>Essential Questions:</p> <ul style="list-style-type: none"> <li>● What is complementarity; how does anatomy relate to physiology?</li> <li>● How does the body maintain constant conditions?</li> <li>● What are the major organs and functions of each organ system?</li> <li>● What is the necessity of learning anatomical terminology and sectional planes?</li> <li>● How do chemical reactions relate to cellular function?</li> <li>● What properties of water make it necessary for life to exist?</li> </ul>
<p><b>Interdisciplinary Connection</b></p> <p>HPE 2.1.12.B.3 Analyze the unique contributions of each nutrient class (fats, carbohydrates, protein, water, vitamins, and minerals) to one’s health.</p> <ul style="list-style-type: none"> <li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the connection between nutrition and overall health and wellness.</li> </ul>	

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
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<p>HS-LS1-3</p> <p>HS-LS1-2</p>	<p>Provide evidence that feedback mechanisms maintain homeostasis; Illustrate the hierarchical organization of interacting systems</p>	<ul style="list-style-type: none"> <li>● Anatomy vs. physiology</li> <li>● Functions of organ systems</li> <li>● Anatomical terminology, sectional planes, and body cavities</li> <li>● Homeostasis ( positive vs negative feedback)</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture</li> <li>● Textbook reading of Ch 1</li> <li>● Modeling</li> <li>● Pair Sharing</li> <li>● On-line Review</li> <li>● Study Guides</li> </ul>	<ul style="list-style-type: none"> <li>● Ch 1 Text</li> <li>● Illustrated Coloring Study Guide</li> <li>● On-line Classroom Resources</li> </ul>	<ul style="list-style-type: none"> <li>● Model Labeling</li> <li>● Lab Reports</li> <li>● Introductory Anatomy/Physiology Exam</li> </ul>
<p>HS-LS1-6</p>	<p>Explain how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids, or other large carbon based molecules.</p>	<ul style="list-style-type: none"> <li>● Characteristics of the macromolecules of life: carbohydrates, lipids, proteins, nucleic acids</li> <li>● Properties and necessity of water</li> <li>● Chemical bonds: polar and non-polar covalent, ionic, and hydrogen</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture</li> <li>● Textbook reading of Ch 1</li> <li>● Modeling</li> <li>● Pair Sharing</li> <li>● On-line Review</li> <li>● Study Guides</li> </ul>	<ul style="list-style-type: none"> <li>● Ch 2 Text</li> <li>● Illustrated Coloring Study Guide</li> <li>● On-line Classroom Resources</li> </ul>	
<p>HS-LS1-1</p>	<p>Explain how the structure of DNA determines the structure of proteins</p>	<ul style="list-style-type: none"> <li>● Functionality of cellular organelles</li> <li>● Protein Synthesis</li> <li>● Cell communication and transport</li> <li>● Cell growth, division, and repair</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture</li> <li>● Textbook reading of Ch 1</li> <li>● Modeling</li> <li>● Pair Sharing</li> <li>● On-line Review</li> <li>● Study Guides</li> </ul>	<ul style="list-style-type: none"> <li>● Ch 3 Text Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● On-line Classroom Resources</li> </ul>	

**Robbinsville Public Schools**  
**Unit #2: Histology**

<p>Enduring Understandings:</p> <ul style="list-style-type: none"><li>● Histology is the classification of tissues based on their structure and function.</li></ul>	<p>Essential Questions</p> <ul style="list-style-type: none"><li>● What are the characteristics of the 4 classes of tissues?</li><li>● How does tissue structure relate to its function?</li><li>● Where is each tissue located in the body?</li><li>● What are membranes and where are they found?</li></ul>
<p style="text-align: center;"><b>Interdisciplinary Connection</b></p> <p><b>HPE 2.1.12.B.3</b> Analyze the unique contributions of each nutrient class (fats, carbohydrates, protein, water, vitamins, and minerals) to one's health.</p> <ul style="list-style-type: none"><li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the connection between nutrition and overall health and wellness.</li></ul> <p><b>NJSLA Math HSF-IF.C.7</b> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</p> <ul style="list-style-type: none"><li>● Students will analyze data and create a graphic interpretation of the data and interpret it during laboratory exploration.</li></ul>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HS-LS1-2	Illustrate the hierarchical organization of interacting systems	Epithelial Tissues <ul style="list-style-type: none"> <li>● Structure</li> <li>● Location in body</li> <li>● Cell type and layers</li> <li>● Function</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● ID tissues and their locations with online Apps</li> <li>● Microscopy lab, labeling tissues, cells and proteins</li> <li>● Construct a tissue comparison Chart</li> <li>● Reading Histology chapter in textbook</li> <li>● Case Study/Clinical Application</li> <li>● Extension: Research tissue donation, and/or artificial tissue grafts</li> <li>● Tissue Project</li> </ul>	<ul style="list-style-type: none"> <li>● Text book</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Compound microscope</li> <li>● Slides of each tissue type</li> <li>● Histology Atlas</li> <li>● Histology Posters</li> </ul>	<ul style="list-style-type: none"> <li>● Labeled microscope Drawings/pictures</li> <li>● Quiz: Identification of tissue types</li> <li>● Lab Reports</li> <li>● Histology Exam</li> <li>● Tissue Box Project</li> </ul>
		<ul style="list-style-type: none"> <li>● Connective Tissues</li> <li>● Structure</li> <li>● Function</li> <li>● Location in body</li> <li>● Cell types and their functions</li> <li>● Notable structural proteins</li> </ul>			
		Muscle Tissue <ul style="list-style-type: none"> <li>● Cell Structure</li> <li>● Function</li> <li>● Voluntary or involuntary</li> <li>● Location in body</li> </ul>			

	<p>Nervous Tissues</p> <ul style="list-style-type: none"> <li>● General neuron structure</li> <li>● Function</li> </ul>			
	<p>Membranes</p> <ul style="list-style-type: none"> <li>● Structure: composed of epithelial and connective Tissues</li> <li>● Types</li> <li>● Location in body</li> </ul>			

**Robbinsville Public Schools**  
**Unit #3: Integumentary System**

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> <li>● Various tissues make up the layers of epidermis and dermis</li> <li>● Thermoregulation and protection are important functions of skin</li> <li>● Skin color is dependent upon genetic and environmental factors</li> <li>● Skin burns are classified by depth of damage.</li> </ul>	<p>Essential Questions</p> <ul style="list-style-type: none"> <li>● What are the layers of the skin?</li> <li>● How does the skin regulate body temperature?</li> <li>● How does skin act as the body's first line of defense?</li> <li>● What determines skin color?</li> <li>● What determines the degree of a burn and how it is treated?</li> <li>● How does aging affect skin?</li> </ul>
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### Interdisciplinary Connection

**NJSLA Math HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

- Students will analyze data and create a graphic interpretation of the data and interpret it during laboratory exploration.

**HPE 2.1.12.C.1** Determine diseases and health conditions that may occur during one’s lifespan and identify prevention and treatment strategies.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the connection between disease and health conditions.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
<b>MP4</b>  <b>HSF-IF.C.7</b>  <b>HS-LS1-3</b>  <b>HS-LS1-2</b>	Model with mathematics  Graph functions expressed symbolically and show key features of the graph  Provide evidence that feedback mechanisms maintain homeostasis  Illustrate the hierarchical	Epidermis <ul style="list-style-type: none"> <li>• Layers and cell types</li> <li>• Keratin production and function</li> <li>• Melanin, hemoglobin, carotene production, distribution and functions</li> <li>• Skin cancer, ABCD rule</li> </ul>	Lecture/discussion Reading Integumentary chapter in textbook Fingerprint analysis Skin Cancer Research Project	Skin model Compound Microscopes Skin cancer model Textbook Integumentary System Anatomy/Physiology Coloring Atlas and Study Guide	Labeled diagrams On line Quiz Apps Lab Reports Quizzes Integumentary Test Skin Cancer Project

organization of interacting systems

Dermis

- Layers and cell types
- Types and distribution of nerve receptors

- Two point threshold test and sensory Homunculi diagrams to scale
- Skin Model
- Frog Dissection

- Calipers
- Microscopes
- Dissecting trays and tools
- Gloves

Accessory Structures

- Hair – structure and types
- Nail structure
- Sebaceous glands
- Sweat glands-structure and types

- Hair and Nails Lab

- Microscopes
- Hair samples
- stereoscopes

Skin Pathologies

- Acne
- Psoriasis
- impetigo

- Clinicals: Burns and Skin Disease/Disorders

- Computer w/internet access

**Robbinsville Public Schools**  
**Unit #4: Skeletal System**

**Enduring Understandings:**

- Bones are classified into 4 types based on their structure.
- Compact and spongy bones are dynamic and multifunctional though structurally discernible
- Axial and appendicular skeletons are composed of various bones and bone markings
- Bones can undergo various types of fractures and regenerate.
- Newborn skulls have fontanelles to allow for birth and brain growth
- Male and female skeletons have observable differences
- Articulations can be classified by structure and function
- Tendons connect bone to muscle and ligaments connect bone to bone.

**Essential Questions:**

- How are bones classified?
- How do compact and spongy bones compare?
- What are the names of human bones and bone markings?
- How are fractures classified and how do they heal?
- How do newborn and adult skulls compare?
- How can gender be identified from bones?
- How are articulations classified?
- How do tendons and ligaments compare?

**Interdisciplinary Connection**

**HPE 2.3.12.A.1** Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

**NJSLA Math HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

- Students will analyze data and create a graphic interpretation of the data and interpret it during laboratory exploration.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HS-LS1-3	Provide evidence that feedback mechanisms maintain homeostasis	General: <ul style="list-style-type: none"> <li>• Classification of bones</li> <li>• Functions of bones</li> <li>• Compact vs. spongy Bone</li> <li>• Red marrow vs. yellow marrow</li> <li>• Bone formation</li> </ul> Bone fractures, remodeling, and repair	<ul style="list-style-type: none"> <li>• Lecture/discussion</li> <li>• Reading Skeletal chapter in textbook</li> <li>• Video clips (bone remodeling and repair)</li> <li>• Classify bone models</li> <li>• Fresh dissected cow long bone demo</li> <li>• Bone Repair Wheel</li> <li>• Textbook readings and questions</li> <li>• Chicken bone dissection</li> </ul>	Textbook Skeletal System Anatomy/Physiology Coloring Atlas and Study Guide Microscopes Compact and spongy bone slides X Rays Disarticulated Skeleton Articulated Skeletons Fresh Bones - Chicken	<ul style="list-style-type: none"> <li>• Bone Quizzes</li> <li>• Lab Practicum</li> <li>• Class Discussion</li> <li>• On line Quiz Apps</li> <li>• Skeletal System Exam</li> <li>• Lab Reports</li> </ul>
HS-LS1-2	Illustrate the hierarchical organization of interacting systems				
WHST.9-12.7	Conduct short research projects to solve a problem and synthesize multiple sources to demonstrate an understanding of the subject under investigation				

	<ul style="list-style-type: none"> <li>● Axial Skeleton</li> <li>● Skull bones and markings</li> <li>● Compare adult to fetal skull</li> <li>● Vertebral column</li> <li>● Thoracic cage</li> </ul>	<ul style="list-style-type: none"> <li>● Color code and label bones and markings in workbook</li> <li>● Sketch and label microscopic bone samples</li> </ul>	<ul style="list-style-type: none"> <li>● Newborn and adult skulls</li> <li>● Vertebra models</li> <li>● Inner ear bone model</li> </ul>	
	<ul style="list-style-type: none"> <li>● Appendicular skeleton</li> <li>● Pectoral girdle and upper limb</li> <li>● Pelvic girdle and lower limb</li> <li>● Compare male and female pelvis</li> </ul>	<ul style="list-style-type: none"> <li>● Color code and label bones and markings in workbook</li> <li>● Sketch and label</li> <li>● System Interdependence web</li> </ul>	<ul style="list-style-type: none"> <li>● Male and Female Pelvis models</li> <li>● Skeleton models</li> </ul>	
	<ul style="list-style-type: none"> <li>● Articulations</li> <li>● Fibrous</li> <li>● Cartilaginous</li> <li>● Synovial and movements</li> </ul>	<ul style="list-style-type: none"> <li>● Classify joint models based on structure and function</li> <li>● Demonstrate movements</li> <li>● Case Study</li> <li>● Virtual surgery: hip replacement; knee replacement</li> </ul>	<ul style="list-style-type: none"> <li>● Joint models</li> </ul>	

**Robbinsville Public Schools**  
**Unit #5: Muscular System**

**Enduring Understandings:**

- Actin and myosin cross-bridge formation is vital for muscle contraction
- ATP generated from aerobic and anaerobic processes fuel muscle contraction
- Muscles are named by structure, function or location

**Essential Questions:**

- How do muscles contract on a molecular level?
- How is energy regenerated for muscle contraction?
- How are muscles named?
- What are actions, points of origin and insertion of muscles?

**Interdisciplinary Connection**

**HPE 2.3.12.A.1 Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.**

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HS-LS1-7	<p>Illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.</p>	<p>General:</p> <ul style="list-style-type: none"> <li>● Organization of skeletal muscle</li> <li>● Muscle contraction (sliding filament)</li> <li>● Muscle Energetics</li> <li>● Lever Systems</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Reading Muscular chapter in textbook</li> <li>● Video clips (contraction)</li> <li>● Muscle models</li> <li>● Muscle Contraction Lab</li> <li>● Article on enhancing muscle performance and class discussion</li> </ul>	<ul style="list-style-type: none"> <li>● Textbook Muscular System</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Lever arm</li> <li>● Slides of skeletal muscle</li> <li>● Muscle fiber model</li> </ul>	<ul style="list-style-type: none"> <li>● Quizzes</li> <li>● Lab Reports</li> <li>● On-line Quiz Apps</li> </ul>
HS-LS1-2	<p>Illustrate the hierarchical organization of interacting systems</p>				
SL.11-12.5	<p>Make strategic use of digital media in presentations to enhance understanding of findings</p>	<ul style="list-style-type: none"> <li>● Naming muscle and their actions</li> </ul>	<ul style="list-style-type: none"> <li>● Identify muscles on Rat and Fetal Pig</li> <li>● Color code and label bones and markings in workbook</li> </ul>	<ul style="list-style-type: none"> <li>● Dissection specimens and tools</li> </ul>	

**Robbinsville Public Schools**  
**Unit #6: Nervous System**

**Enduring Understandings:**

- Specialized cells called neurons and neuroglia control communication of the human nervous system
- Changes in membrane potential generate and conduct nerve impulses
- The brain is subdivided into functional regions
- Drugs can interfere with neural communication at the synapse in various ways

**Essential Questions:**

- How is the nervous system organized?
- What types of cells are the functional units of the nervous system?
- How do neurons sense change and respond to it?
- How is the brain organized and how does it function?
- How do drugs interfere with neurotransmission?

**Interdisciplinary Connection**

**HPE 2.3.12.A.1 Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.**

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
<p>HS-LS1-2</p> <p>SL.11-12.5</p> <p>WHST.9-12.9</p> <p>WHST.11-12.8</p>	<p>Illustrate the hierarchical organization of interacting systems</p> <p>Make strategic use of digital media in presentations to enhance understanding of findings</p> <p>Draw evidence from informational texts to support analysis, reflection, and research</p> <p>Gather relevant information from multiple authoritative print and digital sources,</p>	<p>General:</p> <ul style="list-style-type: none"> <li>● Neurons vs. Neuroglia</li> <li>● Structure of neuron</li> <li>● Generation of action potential</li> <li>● Sympathetic vs. parasympathetic pathways</li> <li>● Drug interference</li> </ul>	<p>Lecture/discussion</p> <p>Reading Nervous chapter in textbook</p> <p>Microscopy Lab Effect of Drugs on Daphnia</p> <p>PSA or pamphlet on the effect of a drug on the nervous system</p>	<p>Textbook Muscular System</p> <p>Anatomy/Physiology</p> <p>Coloring Atlas and Study Guide</p> <p>Slides of Nervous Tissue</p> <p>Microscopes</p> <p>Effect of drugs kit</p> <p>Live daphnia</p> <p>Neuron model</p>	<p>Labeled diagrams</p> <p>Class Discussion</p> <p>Lab write-ups</p> <p>On-line Quiz Apps</p> <p>Quizzes</p> <p>Nervous System Exam</p>

<p>using advanced searches effectively; assess the strengths and limitations of each source in terms of specific task; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>	<p>CNS</p> <ul style="list-style-type: none"> <li>● Brain Anatomy</li> <li>● Cranial Nerves</li> </ul>	<p>Brain Dissection Neurological Disorders Project Virtual surgery: deep brain stimulation</p>	<p>Brain model Computer</p>
	<p>PNS</p> <ul style="list-style-type: none"> <li>● Spinal nerves</li> <li>● Reflex arc</li> </ul>	<p>Clinical Case Study</p>	

**Robbinsville Public Schools**  
**Unit #7: Special Senses**

**Enduring Understandings:**

- Light can be focused and transmitted to the visual cortex by eye structures.
- Sound waves can be transmitted to the auditory cortex by ear structures.
- Spatial orientation can be detected and transmitted to the cerebellum by ear structures.
- Smells can be detected and transmitted to the olfactory cortex by nasal structures
- Taste can be detected and transmitted to the gustatory cortex by oral and nasal structures

**Essential Questions:**

- How does the structure and location of eye structures and photoreceptors allow them to focus and transmit light?
- How does the structure and location of ear structures facilitate their functioning in hearing and balance?
- How does the structure and location of the olfactory & gustatory receptors facilitate their function?

**Interdisciplinary Connection**

- **HPE 2.3.12.A.1** Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.
  - Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HS-LS1-2  MP4	<p>Illustrate the hierarchical organization of interacting systems</p> <p>Model with mathematics</p>	<p>Sight</p> <ul style="list-style-type: none"> <li>● Structure of the eyeball and accessory structures</li> <li>● Optics, photoreceptors, and visual pathways</li> <li>● Visual pathologies</li> </ul>	<ul style="list-style-type: none"> <li>● Lectures/discussion</li> <li>● Read textbook Special Senses</li> <li>● Eye Dissection</li> <li>● Vision tests</li> <li>● Clinical Case study</li> </ul>	<ul style="list-style-type: none"> <li>● Textbook Special Senses</li> <li>● Eye Model</li> <li>● Ear Model</li> <li>● Color blindness test</li> <li>● Depth perception tester</li> <li>● Snellins eye chart</li> <li>● Straight pins</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> </ul>	<ul style="list-style-type: none"> <li>● On-line Quiz Apps</li> <li>● Quizes</li> <li>● Lab Reports</li> <li>● Special Senses Exam</li> </ul>

	Hearing/Balance <ul style="list-style-type: none"> <li>● Ear structures</li> <li>● Physiology of hearing</li> <li>● physiology of equilibrium and orientation</li> <li>● Conduction versus sensorineural deafness</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Clinical Case Study</li> <li>● Hearing and balance lab</li> </ul>	<ul style="list-style-type: none"> <li>● Ear Model</li> <li>● Tuning forks</li> </ul>	
	Smell/Taste <ul style="list-style-type: none"> <li>● Structure of nasal epithelium</li> <li>● Structure and types of taste receptors</li> <li>● Olfactory &amp; gustatory pathways</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Smell and taste lab</li> <li>● Clinical Case Study</li> </ul>	Dissectible Torso Textbook Ch 15 and workbook	

**Robbinsville Public Schools  
Unit #8: Endocrine System**

<p><b>Enduring Understandings:</b></p> <ul style="list-style-type: none"> <li>● The Endocrine system influences metabolic activity by hormones.</li> <li>● Hormones are ligands that can be classified chemically as steroids or amino acids</li> <li>● Hormones alter cell activity by stimulating or inhibiting cellular processes of their target cells</li> <li>● The homeostatic imbalance of hormone secretion can lead to various pathologies.</li> <li>● All organ systems are highly dependent upon the endocrine system for long term regulation.</li> </ul>	<p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● How does the endocrine system complement the nervous system?</li> <li>● What are hormones?</li> <li>● How do hormones function?</li> <li>● What is the result of overproduction or underproduction of a hormone?</li> </ul>
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### Interdisciplinary Connections

**HPE 2.3.12.A.1** Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HS-LS1-3	Provide evidence that feedback mechanisms maintain homeostasis	Chemistry of Hormones <ul style="list-style-type: none"> <li>• Structures: amino acid vs. steroid</li> <li>• Mechanisms of hormone action</li> <li>• Regulation of Hormones</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture/discussion</li> <li>• Read textbook Special Senses</li> </ul>	<ul style="list-style-type: none"> <li>• Textbook Endocrine System</li> <li>• Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>• Dissectible Torso</li> </ul>	On-line Quiz Apps Endocrine System Exam
HS-LS1-2	Illustrate the hierarchical organization of interacting systems				
		Endocrine Glands <ul style="list-style-type: none"> <li>• Functions of hormones released</li> <li>• Target Organ and effector action</li> <li>• Effects of hypersecretion and hyposecretion</li> </ul>	Flow chart of endocrine organs, their hormones and effectors Case studies	<ul style="list-style-type: none"> <li>• Computer</li> <li>• Poster/Markers</li> </ul>	

**Robbinsville Public Schools**  
**Unit #9: Blood & Lymphatic System**

<p><b>Enduring Understandings:</b></p> <ul style="list-style-type: none"> <li>● Blood is responsible for transporting materials, regulating body temperature, pH, and fluid volume.</li> <li>● The structure of hemoglobin allows erythrocytes to effectively transport oxygen; each type of WBC has a specific structure related to its function.</li> <li>● Hemostasis involves vascular spasm, platelet plug formation, coagulation, and clot retraction</li> <li>● Lymph is derived from blood plasma and is circulated by lymph vessels.</li> <li>● Innate barriers are the 1<sup>st</sup> line of defense, innate cellular and chemical defenses provide the body's 2<sup>nd</sup> line of defense..</li> <li>● Adaptive immune response is antigen specific, systemic and has memory as a result of humoral and cell mediated responses.</li> </ul>	<p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● What is the function of blood?</li> <li>● How do the structures of blood cells relate to their functions?</li> <li>● What are the phases of hemostasis?</li> <li>● How is lymph formed and transported?</li> <li>● What are innate defenses and how do they compare to adaptive defense?</li> <li>● How are humoral and cellular mediated responses complimentary?</li> </ul>			
<p><b>Interdisciplinary Connection</b></p> <p><b>HPE 2.3.12.A.1</b> Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.</p> <ul style="list-style-type: none"> <li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.</li> </ul>				
<p><b>Guiding / Topical Questions with Specific Standards</b></p>	<p><b>Content, Themes, Concepts, and Skills</b></p>	<p><b>Teaching Strategies</b></p>	<p><b>Instructional Resources and Materials</b></p>	<p><b>Assessment Strategies</b></p>

HS-LS1-3	Provide evidence that feedback mechanisms maintain homeostasis	Components of Blood	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Read textbook Blood</li> </ul>	<ul style="list-style-type: none"> <li>● Microscopes</li> <li>● Whole blood model</li> </ul>	On-line Quiz Apps
HS-LS1-2	Illustrate the hierarchical organization of interacting systems	<ul style="list-style-type: none"> <li>● Plasma &amp; functions</li> <li>● Erythrocytes (RBC)</li> <li>● Erythropoiesis</li> <li>● Death and recycling</li> </ul>	<ul style="list-style-type: none"> <li>● Whole blood Microscopy lab</li> <li>● Clinical Case Study: sickle cell anemia, leukemia, mononucleosis</li> </ul>	<ul style="list-style-type: none"> <li>● Textbook Blood</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> </ul>	Lab report
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research	<ul style="list-style-type: none"> <li>● Leukocytes (WBC)</li> <li>● Leukopoiesis</li> <li>● Platelets</li> <li>● Hemostasis</li> </ul>		<ul style="list-style-type: none"> <li>● Anatomy Atlas</li> <li>● Blood Smear Slides</li> <li>● Sickle Cell Slides</li> </ul>	Quiz
		Blood Typing and Compatibility	Blood Typing Lab	Artificial blood and antibodies	Lab report
		Lymph Organs and tissues	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Read textbook Lymphatic System</li> </ul>	<ul style="list-style-type: none"> <li>● Textbook Lymphatic System</li> <li>● Anatomy/ Physiology Coloring Atlas and Study Guide</li> <li>● Dissectible torso</li> </ul>	Labeled Diagram

Innate and Adaptive Defenses

- Surface barriers
- Cells & Chemicals
- Humoral Immune Response
- Cellular Immune Response

●Antibody structure & function activity

●Clinical Case Study: SCIT, IV, MS, Allergies

Blood & Lymphatic System Exam

**Robbinsville Public Schools**  
**Unit #10: Cardiovascular System**

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> <li>● Cardiovascular system includes the heart and blood vessels</li> <li>● The human four-chamber heart and its associated valves pump blood through the pulmonary and systemic blood vessels.</li> <li>● An electrocardiogram measures electrical activity of the heart and can be used to detect pathologies.</li> <li>● Arteries, veins, and capillaries differ in layers of tissue, direction of blood flow, and oxygenation of erythrocytes.</li> </ul>	<p>Essential Questions:</p> <ul style="list-style-type: none"> <li>● How is the cardiovascular system organized?</li> <li>● How do the structures of the heart relate to its function?</li> <li>● How are ECG's and heart sounds used to analyze the cardiac cycle?</li> <li>● How does the structure of arteries, veins, and capillaries relate to their functions?</li> </ul>
<p><b>Interdisciplinary Connection</b></p> <p><b>HPE 2.3.12.A.1</b> Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.</p> <ul style="list-style-type: none"> <li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.</li> </ul>	

<b>Guiding / Topical Questions with Specific Standards</b>	<b>Content, Themes, Concepts, and Skills</b>	<b>Teaching Strategies</b>	<b>Instructional Resources and Materials</b>	<b>Assessment Strategies</b>
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<p>HS-LS1-3</p> <p>HS-LS1-2</p> <p>WHST.9-12.9</p>	<p>Provide evidence that feedback mechanisms maintain homeostasis</p> <p>Illustrate the hierarchical organization of interacting systems</p> <p>Draw evidence from informational texts to support analysis, reflection, and research</p>	<p>Heart</p> <ul style="list-style-type: none"> <li>● Structures &amp; Functions</li> <li>● Direction of Blood Flow</li> <li>● Cardiac Cycle</li> <li>● Pathologies</li> </ul>	<ul style="list-style-type: none"> <li>● Heart Model</li> <li>● Build a Heart</li> <li>● Lecture/Discussion</li> <li>● ECG analysis lab</li> </ul>	<ul style="list-style-type: none"> <li>● Heart Models</li> <li>● Textbook Cardiovascular System</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> </ul>	<ul style="list-style-type: none"> <li>● Labeled Diagrams Quiz</li> <li>● On-line Quiz Apps</li> <li>● Lab reports</li> <li>● Cardiovascular System Exam</li> </ul>
<p>MP2</p> <p>MP4</p>	<p>Reason abstractly and quantitatively</p> <p>Model with mathematics</p>	<p>Blood vessels</p> <ul style="list-style-type: none"> <li>● Arteries</li> <li>● Veins</li> <li>● Capillaries</li> </ul>	<ul style="list-style-type: none"> <li>● Rat and Fetal Pig Heart and blood vessel Dissection</li> <li>● HR/Blood Pressure lab</li> </ul>	<ul style="list-style-type: none"> <li>● Textbook</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Cardiovascular System</li> <li>● Stethoscopes</li> <li>● Sphygmomanometers</li> <li>● Model: Artherosclerosis</li> <li>● Model: Major blood vessels</li> </ul>	

**Robbinsville Public Schools**  
**Unit #11: Respiratory System**

**Enduring Understandings:**

- The structure and location of each respiratory organ is directly related to its function
- Inspiration and expiration are due to changes in thoracic volume, are measurable and regulated by the nervous system
- Gas exchange between the air and blood occurs in the alveoli as a result of diffusion.
- Gas exchange between the lungs and body cells is facilitated by hemoglobin and bicarbonate ions

**Essential Questions:**

- What is the role of each of the respiratory organs in the respiratory tract?
- How is inspiration and expiration accomplished?
- How is gas exchanged in the pulmonary and systemic circuits?

**Interdisciplinary Connection**

**NJSLA Math HSF-IF.C.7** Write a function that describes a relationship between two quantities

**Example:** Students create mathematical expressions to determine relationships between two respiratory organs.

**HPE 2.3.12.B.1** Compare and contrast the incidence and impact of commonly abused substances (such as tobacco, alcohol, marijuana, inhalants, anabolic steroids, and other drugs) on individuals and communities in the United States and other countries.

**HPE 2.3.12.A.1** Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of commonly abused substances.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
HSF-IF.C.7	Graph functions expressed symbolically and show key features of the graph	Respiratory Organs <ul style="list-style-type: none"> <li>● Nasal cavity &amp; sinuses</li> <li>● Pharynx &amp; larynx</li> <li>● Trachea &amp; Bronchi</li> <li>● Lungs</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Pluck Examination</li> <li>● Clinical Case Study: COPD, Asthma, TB, CF</li> </ul>	<ul style="list-style-type: none"> <li>● Model Lung</li> <li>● Dissectible Torso</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Respiratory Systems Textbook</li> </ul>	<ul style="list-style-type: none"> <li>● Labeled Diagram</li> <li>● Lab Reports</li> <li>● On-line Quiz Apps</li> <li>● Respiratory System Exam</li> </ul>
HS-LS1-7	Illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules				

<p>HS-LS1-3</p> <p>HS-LS1-2</p>	<p>are broken and the bonds in new compounds are formed resulting in a net transfer of energy.</p> <p>Provide evidence that feedback mechanisms maintain homeostasis</p> <p>Illustrate the hierarchical organization of interacting systems</p>	<p>Mechanics of Breathing</p> <ul style="list-style-type: none"> <li>● Inspiration &amp; Expiration</li> </ul> <p>Respiratory Volumes &amp; Capacities</p>	<ul style="list-style-type: none"> <li>● Respiratory volume lab</li> </ul>	<ul style="list-style-type: none"> <li>● Spirometer</li> </ul>	
		<p>Gas Exchange &amp; Transport</p> <ul style="list-style-type: none"> <li>● Alveoli</li> <li>● Oxyhemoglobin</li> <li>● Deoxyhemoglobin</li> <li>● Myoglobin</li> </ul>	<ul style="list-style-type: none"> <li>● Flow Chart</li> <li>● Hemoglobin/myoglobin activity</li> </ul>	<ul style="list-style-type: none"> <li>● Computer animation</li> </ul>	

**Robbinsville Public Schools**  
**Unit #12: Digestive System & Nutrition**

**Enduring Understandings:**

- The structure and location of each digestive organ is directly related to its function
- Digestive processes include ingestion, propulsion, mechanical breakdown, digestion, absorption, and defecation.
- Enzymes play a critical role in chemical digestion of specific foods.
- Carbohydrates, Lipids, Proteins, Vitamins, Minerals, and Water must be ingested for proper cell functioning
- The nutrients are broken down through catabolic processes and utilized through anabolic processes.

**Essential Questions:**

- What is the role of each of the digestive organs in the gastrointestinal tract?
- What are the six stages of digestion?
- What enzymes are involved in digestion of various foodstuffs?
- What are the sources of each of the six nutrient categories?
- How do catabolism and anabolism differ in their metabolic roles?

**Interdisciplinary Connection**

**HPE 2.3.12.A.1 Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.**

**HPE 2.3.12.A.1** Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.

<b>Guiding / Topical Questions with Specific Standards</b>	<b>Content, Themes, Concepts, and Skills</b>	<b>Teaching Strategies</b>	<b>Instructional Resources and Materials</b>	<b>Assessment Strategies</b>
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HS-LS1-3	Provide evidence that feedback mechanisms maintain homeostasis	Digestive Organs <ul style="list-style-type: none"> <li>● Mouth</li> <li>● Pharynx &amp; esophagus</li> <li>● Stomach</li> <li>● Small &amp; Large Intestines</li> <li>● Liver, pancreas, gallbladder</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> <li>● Sketch and label diagram</li> <li>● Project: design a representative obstacle course of GI tract</li> </ul>	<ul style="list-style-type: none"> <li>● Model stomach</li> <li>● Model colon</li> <li>● Dissectible torso</li> <li>● Digestive System Textbook</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> </ul>	<ul style="list-style-type: none"> <li>● Project</li> <li>● On-line Quiz Apps</li> <li>● Webquest</li> <li>● Labeled diagram Quiz</li> <li>● Dissection</li> <li>● Digestion Lab Reports</li> <li>● Digestive System Exam</li> </ul>
HS-LS1-2	Illustrate the hierarchical organization of interacting systems				
HS-LS1-6	Explain how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids, or other large carbon based molecules.				
HS-LS1-7	Illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	Digestive Process <ul style="list-style-type: none"> <li>● Ingestion</li> <li>● Propulsion</li> <li>● Mechanical breakdown</li> <li>● Digestion</li> <li>● Enzymes</li> <li>● Absorption</li> <li>● Defecation</li> </ul>	<ul style="list-style-type: none"> <li>● Demo peristalsis</li> <li>● Flow chart</li> <li>● Enzymes chart</li> </ul>	<ul style="list-style-type: none"> <li>● Teeth model</li> <li>● Rat and Fetal Pig Dissections</li> </ul>	

Nutrition

- Carbohydrates, Lipids, Proteins, Vitamins, Minerals, and Water

Metabolism

- Anabolic vs. Catabolic reactions

Body Temperature Regulation

- BMR

- Webquest: What is healthy?
- Vitamins and Minerals Chart
- Clinical Case Study

- Digestive System Textbook

**Robbinsville Public Schools  
Unit #13: Urinary System**

<p><b>Enduring Understandings:</b></p> <ul style="list-style-type: none"> <li>● The structure and location of each urinary organ is directly related to its function</li> <li>● Nephrons are involved in glomerular filtration, tubular reabsorption, and secretion.</li> <li>● Components, volume, pH and concentration are all used to monitor proper urinary system functioning.</li> </ul>	<p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● What is the role of each of the urinary organs in the urinary tract?</li> <li>● What are the functional components of urine formation?</li> <li>● How can urine be used for clinical evaluations?</li> </ul>
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<p align="center"><b>Interdisciplinary Connection</b></p> <p><b>HPE 2.3.12.A.1</b> Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.</p> <ul style="list-style-type: none"> <li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements.</li> </ul>
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Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
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HS-LS1-3	Provide evidence that feedback mechanisms maintain homeostasis	Urinary organs <ul style="list-style-type: none"> <li>● Kidney</li> <li>● Ureter</li> <li>● Bladder</li> <li>● Urethra</li> </ul>	<ul style="list-style-type: none"> <li>● Rat &amp; Fetal Pig Dissection</li> <li>● Label Diagram</li> </ul>	<ul style="list-style-type: none"> <li>● Urinary System Textbook</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Model Kidney</li> <li>● Dissectible Torso</li> <li>● Kidney demo kit</li> </ul>	<ul style="list-style-type: none"> <li>● Labeled diagram</li> <li>● Quiz</li> <li>● Lab Reports</li> <li>● Urinary System Exam</li> </ul>
HS-LS1-2	Illustrate the hierarchical organization of interacting systems	Urine <ul style="list-style-type: none"> <li>● Formation in Nephron</li> <li>● Concentration &amp; Color</li> <li>● Micturition</li> </ul>	<ul style="list-style-type: none"> <li>● Kidney filtration demonstration</li> <li>● Urine analysis</li> </ul>	<ul style="list-style-type: none"> <li>● Urine analysis kit</li> </ul>	
		Fluid, Electrolyte and Acid-Base Balance <ul style="list-style-type: none"> <li>● Body Fluids and water balance</li> <li>● Electrolyte Balance</li> <li>● Buffer Systems</li> </ul>	<ul style="list-style-type: none"> <li>● Lecture/discussion</li> </ul>	<ul style="list-style-type: none"> <li>● Urinary System Textbook</li> </ul>	

**Robbinsville Public Schools**  
**Unit #14: Reproductive System & Embryonic Development**

**Enduring Understandings:**

- The structure and location of each urinary organ is directly related to its function
- Nephrons are involved in glomerular filtration, tubular reabsorption, and secretion.
- Components, volume, pH and concentration are all used to monitor proper urinary system functioning.

**Essential Questions:**

- What is the role of each of the urinary organs in the urinary tract?
- What are the functional components of urine formation?
- How can urine be used for clinical evaluations?

**Interdisciplinary Connection**

**HPE 2.4.12.B.5** Relate preventative healthcare strategies of male/female reproductive systems to the prevention and treatment of disease (e.g., breast/testicular exams, Pap smear, regular STI testing, and HPV vaccine).

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the prevention of STI's and available treatments.

**HPE 2.4.12.C.2** Analyze the relationship of an individual's lifestyle choices during pregnancy and the incidence of fetal alcohol syndrome, sudden infant death syndrome, low birth weight, premature birth, and other disabilities.

- Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the lifestyle choices during pregnancy and the consequences of these choices on infants.

<b>Guiding / Topical Questions with Specific Standards</b>	<b>Content, Themes, Concepts, and Skills</b>	<b>Teaching Strategies</b>	<b>Instructional Resources and Materials</b>	<b>Assessment Strategies</b>
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HS-LS4-1	Common ancestry and biological evolution are supported by multiple lines of empirical evidence	Male Reproductive System	<ul style="list-style-type: none"> <li>● Scrotum, Testes, Perineum, Penis, Duct System and accessory glands</li> <li>● Hormones and sexual response</li> <li>● Spermatogenesis</li> </ul>	<ul style="list-style-type: none"> <li>● Diagram and label anatomy</li> <li>● Lecture/Discussion</li> <li>● Sexually Transmitted infections Flow Chart</li> </ul>	<ul style="list-style-type: none"> <li>● Reproductive System Textbook</li> <li>● Anatomy/Physiology Coloring Atlas and Study Guide</li> <li>● Dissectible Torso</li> </ul>	Labeled Diagrams
WHST.9-12.2	Write informative/explanatory text	STI	<ul style="list-style-type: none"> <li>● Gonorrhea, Syphilis, Chlamydia, Trichomoniasis, Genital Warts, Herpes</li> </ul>			Quizzes
WHST.9-12.4	produce clear and coherent writing					Test
HS-LS1-4	Use a model to illustrate the role of mitosis and differentiation					Research Paper
SL.11-12.5	Make strategic use of					

<p>WHST.9-12.9</p>	<p>digital media in presentations to enhance understanding of findings</p> <p>Draw evidence from informational texts to support analysis, reflection, and research</p>	<p>Female Reproductive System</p> <ul style="list-style-type: none"> <li>● Ovaries, duct system, perineum, external genitalia, and mammary glands</li> <li>● Ovarian and Menstrual Cycle</li> <li>● Hormones and sexual response</li> </ul> <p>Contraceptives</p> <ul style="list-style-type: none"> <li>● Hormonal, barrier, chemical, abstinence or temporal</li> </ul>	<ul style="list-style-type: none"> <li>● Rat &amp; Fetal Pig Dissection</li> <li>● Diagram and label anatomy</li> <li>● Lecture</li> <li>● Comparison Chart: oogenesis and spermatogenesis</li> </ul>	<ul style="list-style-type: none"> <li>● Contraceptive Case Study</li> <li>● Dissectible Torso</li> <li>● Uterine Model w/pathologies</li> </ul>	
<p>WHST.11-12.8</p>	<p>Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of specific task; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>	<p>Pregnancy &amp; Human Development</p> <ul style="list-style-type: none"> <li>● Fertilization</li> <li>● Blastocyst formation</li> <li>● Gastrulation</li> <li>● Organogenesis</li> <li>● Effects of pregnancy on the mother</li> </ul>	<ul style="list-style-type: none"> <li>● Embryonic development research paper</li> </ul>	<ul style="list-style-type: none"> <li>● National Geographic DVD “Life Before Birth: In the womb”</li> <li>● Embryonic Development Textbook</li> <li>● Breast model w/pathologies</li> </ul>	

**Robbinsville Public Schools**  
**Unit #15: Medical Ethics**

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> <li>● HeLa cells were derived unknowingly from a woman w/cancer</li> <li>● HeLa cells have been used for research in the development of polio vaccine, karyotyping, cloning, space exploration and much more.</li> <li>● Common Rule was established in 1981 to protect people, and HIPAA was established in 1996 to protect privacy</li> <li>● The laws leave much room for interpretation.</li> </ul>	<p>Essential Questions:</p> <ul style="list-style-type: none"> <li>● How were HeLa cell lines derived?</li> <li>● What is the significance of HeLa cells?</li> <li>● Are there any laws that govern human tissue research?</li> <li>● What is the ethical responsibility of doctors and researchers to their patients?</li> </ul>
<p><b>HPE 2.3.12.A.1</b> Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.</p> <ul style="list-style-type: none"> <li>● Students will review clinical case studies, conduct small group discussions, and write an informative paper or create an informative presentation on the potential risks and benefits of the usage of new or experimental medicines, herbals, and medicinal supplements and the medical ethics of the FDA in ensuring that these are safe for public use.</li> </ul>	

<b>Guiding / Topical Questions with Specific Standards</b>	<b>Content, Themes, Concepts, and Skills</b>	<b>Teaching Strategies</b>	<b>Instructional Resources and Materials</b>	<b>Assessment Strategies</b>
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SL.11-12.5	Make strategic use of digital media in presentations to enhance	<ul style="list-style-type: none"> <li>● Biography of Henrietta Lacks</li> <li>● Cell biology of cancer</li> <li>● Cell culture, cloning, somatic cell nuclear transfer, inbreeding</li> <li>● Bio-med ethical issues</li> <li>● Timeline of HeLa cell line contributions</li> </ul>	<ul style="list-style-type: none"> <li>● Reading Guide</li> <li>● Student facilitated group discussion</li> <li>● Research Paper on a related topic of interest</li> </ul>	<ul style="list-style-type: none"> <li>● The Immortal Life of Henrietta Lacks by Rebecca Skloot</li> </ul>	<ul style="list-style-type: none"> <li>● Monitor student discussion</li> <li>● Timeline</li> <li>● Research Paper on a related topic of interest</li> </ul>
HS-LS1-2	Illustrate the hierarchical organization of interacting systems				

## General Differentiated Instruction Strategies

<ul style="list-style-type: none"> <li>● Leveled texts</li> <li>● Chunking texts</li> <li>● Choice board</li> <li>● Socratic Seminar</li> <li>● Tiered Instruction</li> <li>● Small group instruction</li> <li>● Guided Reading</li> <li>● Sentence starters/frames</li> <li>● Writing scaffolds</li> <li>● Tangible items/pictures</li> <li>● Adjust length of assignment</li> </ul>	<ul style="list-style-type: none"> <li>● Repeat, reword directions</li> <li>● Brain breaks and movement breaks</li> <li>● Brief and concrete directions</li> <li>● Checklists for tasks</li> <li>● Graphic organizers</li> <li>● Assistive technology (spell check, voice to type)</li> <li>● Study guides</li> <li>● Tiered learning stations</li> <li>● Tiered questioning</li> <li>● Data-driven student partnerships</li> <li>● Extra time</li> </ul>
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### Possible Additional Strategies for Special Education Students, 504 Students, At-Risk Students, and English Language Learners (ELLs)

Time/General	Processing	Comprehension	Recall
<ul style="list-style-type: none"> <li>● Extra time for assigned tasks</li> <li>● Adjust length of assignment</li> <li>● Timeline with due dates for reports and projects</li> <li>● Communication system between home and school</li> <li>● Provide lecture notes/outline</li> </ul>	<ul style="list-style-type: none"> <li>● Extra Response time</li> <li>● Have students verbalize steps</li> <li>● Repeat, clarify or reword directions</li> <li>● Mini-breaks between tasks</li> <li>● Provide a warning for transitions</li> <li>● Reading partners</li> </ul>	<ul style="list-style-type: none"> <li>● Precise step-by-step directions</li> <li>● Short manageable tasks</li> <li>● Brief and concrete directions</li> <li>● Provide immediate feedback</li> <li>● Small group instruction</li> <li>● Emphasize multi-sensory learning</li> </ul>	<ul style="list-style-type: none"> <li>● Teacher-made checklist</li> <li>● Use visual graphic organizers</li> <li>● Reference resources to promote independence</li> <li>● Visual and verbal reminders</li> <li>● Graphic organizers</li> </ul>

Assistive Technology	Assessments and Grading	Behavior/Attention	Organization
<ul style="list-style-type: none"> <li>● Computer/whiteboard</li> <li>● Tape recorder</li> <li>● Spell-checker</li> <li>● Audio-taped books</li> </ul>	<ul style="list-style-type: none"> <li>● Extended time</li> <li>● Study guides</li> <li>● Shortened tests</li> <li>● Read directions aloud</li> </ul>	<ul style="list-style-type: none"> <li>● Consistent daily structured routine</li> <li>● Simple and clear classroom rules</li> <li>● Frequent feedback</li> </ul>	<ul style="list-style-type: none"> <li>● Individual daily planner</li> <li>● Display a written agenda</li> <li>● Note-taking assistance</li> <li>● Color code materials</li> </ul>

## Enrichment

The goal of Enrichment is to provide learners with the opportunity to participate in extension activities that are differentiated and enhance the curriculum. All enrichment decisions will be based upon individual student needs.

- Show a high degree of intellectual, creative and/or artistic ability and demonstrate this ability in multiple ways.
- Pose questions and exhibit sincere curiosity about principles and how things work.
- The ability to grasp concepts and make real world and cross-curricular connections.
- Generate theories and hypotheses and pursue methods of inquiry.
- Produce products that express insight, creativity, and excellence.
- Possess exceptional leadership skills.
- Evaluate vocabulary
- Elevate Text Complexity
- Inquiry based assignments and projects
- Independent student options
- Tiered/Multi-level activities
- Purposeful Learning Center
- Open-ended activities and projects
- Form and build on learning communities
- Providing pupils with experiences outside the 'regular' curriculum
- Altering the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- A higher quality of work than the norm for the given age group.
- The promotion of a higher level of thinking and making connections.
- The inclusion of additional subject areas and/or activities (cross-curricular).

- Using supplementary materials in addition to the normal range of resources.

### English Language Learner (ELL) Resources

- Learning style quiz for students- <http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml>
- “Word clouds” from text that you provide-<http://www.wordle.net/>
- Bilingual website for students, parents and educators: <http://www.colorincolorado.org/>
- Learn a language for FREE-[www.Duolingo.com](http://www.Duolingo.com)
- Time on task for students-<http://www.online-stopwatch.com/>
- Differentiation activities for students based on their Lexile-[www.Mobymax.com](http://www.Mobymax.com)
- WIDA-<http://www.wida.us/>
- Everything ESL - <http://www.everythingESL.net>
- ELL Tool Box Suggestion Site [Http://www.wallwisher.com/wall/ell toolbox](http://www.wallwisher.com/wall/ell_toolbox)
- Hope4Education - <http://www.hope4education.com>
- Learning the Language <http://blogs.edweek.org/edweek/learning-the-language/>
- FLENJ (Foreign Language Educators of NJ) 'E-Verse' wiki: <http://www.flenj.org/Publications/?page=135>
- OELA - <http://www.ed.gov/offices/OBEMLA>
- New Jersey Department of Education- Bilingual Education information <http://www.state.nj.us/education/bilingual/>

### Special Education Resources

- Animoto -Animoto provides tools for making videos by using animation to pull together a series of images and combining with audio. Animoto videos or presentations are easy to publish and share. <https://animoto.com>
- Bookbuilder -Use this site to create, share, publish, and read digital books that engage and support diverse learners according to their individual needs, interests, and skills. <http://bookbuilder.cast.org/>
- CAST -CAST is a non-profit research and development organization dedicated to Universal Design for Learning (UDL). UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. <http://www.cast.org>
- CoSketch -CoSketch is a multi-user online whiteboard designed to give you the ability to quickly visualize and share your ideas as images. <http://www.cosketch.com/>
- Crayon -The Crayon.net site offers an electronic template for students to create their own newspapers. The site allows you to bring multiple

sources together, thus creating an individualized and customized newspaper. <http://crayon.net/> Education Oasis -Education Oasis offers a collection of graphic organizers to help students organize and retain knowledge – cause and effect, character and story, compare and contrast, and more! <http://www.educationoasis.com/printables/graphic-organizers/>

- Edutopia -A comprehensive website and online community that increases knowledge, sharing, and adoption of what works in K-12 education. We emphasize core strategies: project-based learning, comprehensive assessment, integrated studies, social and emotional learning, educational leadership and teacher development, and technology integration. <http://www.edutopia.org/>
- Glogster -Glogster allows you to create "interactive posters" to communicate ideas. Students can embedded media links, sound, and video, and then share their posters with friends. <http://edu.glogster.com/?ref=personal>
- Interactives – Elements of a Story -This interactive breaks down the important elements of a story. Students go through the series of steps for constructing a story including: Setting, Characters, Sequence, Exposition, Conflict, Climax, and Resolution. <http://www.learner.org/interactives/story/index.html>
- National Writing Project (NWP) -Unique in breadth and scale, the NWP is a network of sites anchored at colleges and universities and serving teachers across disciplines and at all levels, early childhood through university. We provide professional development, develop resources, generate research, and act on knowledge to improve the teaching of writing and learning in schools and communities. <http://www.nwp.org>
- Paccar -Vocab Ahead offers videos that give an active demonstration of vocabulary with audio repeating the pronunciation, definition, various uses, and synonyms. Students can also go through flash cards which give a written definition and visual representation of the word. <http://pacecar.missingmethod.com/>