

Subject: Science

Grade: 11 Anatomy and Physiology

# Hallsville R-IV High School

## Anatomy and Physiology

[Rationale](#) | [Course Description](#)

### Curriculum Strands

- **Matter and Energy**
- **Force and Motion**
- [Living Organisms](#)
- **Ecology/Environments**
- **Earth Systems**
- **Universe**
- **Scientific Inquiry**
- **Impact of Science, Technology and Human Activity**

### Rationale:

The primary task of science education is to foster student's curiosity to investigate the natural phenomena of their world. Students will develop confidence in the ability to use scientific concepts and principles to understand and control real-world situations. In preparation for careers and life choices, students must comprehend the impact of science and technology on their world.

### Course Description:

This course is designed to meet the needs of those students interested in learning more about the structure and function of the human body. In addition to studying the basic anatomy of each organ system, students will spend considerable time in activities oriented toward a better understanding of the physiology or functioning of each system. The focus of study will be on the skeletal, muscular, nervous, cardiovascular, digestive, respiratory, and urinary systems, with the emphasis on the principles of nutrition, fitness, and disease prevention. This is a laboratory intensive course that will develop a thorough knowledge and understanding of the anatomy and physiology of human body systems, and the study skills necessary to learn complex terminology and concepts. An in-depth dissection of a preserved cat is required. Students will also be introduced to biochemistry and molecular biology concepts in this course.

Concept: Nature of Anatomy and Physiology

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**Topic Objective:**  
**1. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the nature of anatomy and physiology and the Integumentary system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
1A. Recognize and practice respect and proper care of laboratory equipment and materials including specimens.  1B. Practice safety precautions to avoid laboratory hazards.  1C. Demonstrate proper dissection techniques and procedures as instructed.  1D. Compare/contrast anatomy and physiology.  1E. Use proper anatomical terminology to describe body direction, surfaces and planes.  1F. Locate the major body cavities and list the organs in each cavity.  1G. Identifies the relationships among cells, tissues, organs, systems, and organisms.		SC 3			1A Is It Really Clean?:  1B Horseplay:  1C Make It Work:  1D Structure/Function Relationships:  1E Jeopardy:  1F Wheel of Fortune:  1G Family Feud:  1H Balance:  1I Slides'n Scopes:  1J Tissues Not Kleenex:  1K Dissection:  1L Dissection/Video:  1M Dust To Dust:	1A - H, K - Q Discussion: (Scoring Guide)  1A - C, G, H, K, L, P Written Quiz: (Scoring Guide)  1I Lab Practical: (Scoring Guide)  1J Socratic Seminar: (Scoring Guide)  1K, L Lab Observation: (Scoring Guide)

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1H. Describe the nature of homeostasis and identify the factors contributing to its imbalance.</p> <p>1I. Identify the major characteristics of the four tissue types.</p> <p>1J. Identify the embryological origin of the four tissue types and the systems into which each develops.</p> <p>1K. Identify the layers of the skin.</p> <p>1L. Identify the accessory structures in the skin.</p> <p>1M. Describe growth, development, and aging of the skin.</p> <p>1N. Understand the importance of thermoregulation.</p> <p>1O. Understand the importance of keratin on hair and nails.</p> <p>1P. Understand the role of the skin in the immune response.</p> <p>1Q. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, burns, patient treatment, and medical careers associated with the integumentary system.</p>					<p>1N Thermostat:</p> <p>1N Feedback (+/-):</p> <p>1O Tougher Than Tough:</p> <p>1P First Line of Defense:</p> <p>1Q Medical Careers Related to the Integumentary System:</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools

Resources:

Instructional Methods:

Enrichment/ Special Needs:

+Key to Integrated Skills

DS = Disability Equity  
C = Character Education  
E = Gender Equity  
D = Cultural Diversity

R = Research Skills  
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Concept: Skeletal/Muscular Systems

**Topic Objective:**  
**2. Strand 3 Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Skeletal system and the Muscular system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
2A. Identify microscopic bone histology. 2B. Identify structures of the axial skeleton. 2C. Identify structures of the appendicular skeleton. 2D. Identify general surface features of bone. 2E. Describe growth, development, and effect of aging of osseous tissue. 2F. Identify functional classifications of articulations as no, little, or free movement. 2G. Identify bone marrow as the site of blood cell production. 2H. Use anatomically specific terms to identify body movement. 2I. Understand the effects of exercise and hormones as it pertains to the skeletal system.		SC3			2A Cork and Tree Rings: 2B Structures of the Axial Skeleton: 2C Structures of the Appendicular Skeleton: 2D Details Are In The Drawing: 2E Osteoclast vs. Osteoblast: 2F Joints: 2G Bones - Inside Out: 2H Which Way Did It Go?: 2I Two Week Walk: 2J Medical Careers Related to the Skeletal System: 2K, L Slides'n Scopes: 2M Jeopardy: 2N Lab Dissection:	2A, G Socratic Seminar: 2B, C, N, O Smart Board Review: 2D Worksheet From Drawing: 2D - F, H - M, P - S Discussion: 2D, F, O Written Quiz: 2I Report:

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2J. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment and medical careers associated with the skeletal system.</p> <p>2K. Identify the three types of muscle tissue.</p> <p>2L. Identify the microscopic and macroscopic organization of skeletal muscle tissues.</p> <p>2M. Identify the protocol for naming muscle.</p> <p>2N. Identify the major axial and appendicular muscles of the body, together with their origins, insertions, and actions.</p> <p>2O. Differentiate between a tendon and a ligament.</p> <p>2P. Differentiate between voluntary and involuntary muscle action and synergist and antagonistic pairs.</p> <p>2Q. Explain the sliding filament theory.</p> <p>2R. Explain a neuromuscular junction including the concept of action potential.</p>					<p>2O Skeletal Connections:</p> <p>2P Are You With Us or Against Us?</p> <p>2Q Sliding Filament Theory:</p> <p>2R Neuromuscular Junction:</p> <p>2S Medical Careers Related to the Muscular System:</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
2S. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment and medical careers associated with the muscular system.						
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Enrichment/ Special Needs:						

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Concept: Digestive System

**Topic Objective:**

**3. Strand 3: Characteristics and interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Digestive system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
3A. Locate and identify the sequence of major organs and accessory structures of the alimentary canal.  3B. Identify the basic functions of the digestive system.  3C. Identify the organs where digestion and absorption of carbohydrates, lipids, and proteins occur.  3D. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment, and medical careers associated with the digestive system.		SC 3			3A Lab Dissection:  3B Gullet to Gut and Beyond:  3C Family Feud:  3D Medical Careers Related to the Digestive system:	3A - D discussion: (Scoring Guide)  3A Lab Practical: (Scoring Guide)  3B Written Test: (Scoring Guide)
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Concept: Urinary System

**Topic Objective:**

**4. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Urinary system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
4A. Identify the gross anatomy of the organs involved in the formation and transportation of urine.  4B. Describe the use of urine as a diagnostic tool.  4C. Discuss two medical applications of current technologies as related to disorders, diseases, patient treatment and medical careers associated with the urinary system.		SC 3			4A Kidney Beans:  4B Urine Test:  4C Medical Careers Related with the Urinary System:	4A - C Discussion: (Scoring Guide)  4A Worksheet: (Scoring Guide)  4B Socratic Seminar of Urine Test Results: (Scoring Guide)

Resources:

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Concept: Cardiovascular System

**Topic Objective:**

**5. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Cardiovascular system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>5A. Compare and contrast structure and function of arteries, veins, and capillaries.</p> <p>5B. Identify the formed elements of blood including red blood cells, white blood cells, and platelets and the role platelets plays in blood clotting.</p> <p>5C. Identify chambers, valves, and blood vessels of the heart.</p> <p>5D. Describe the sequence of events involved in blood clot formation.</p> <p>5E. Trace impulse conduction through the heart.</p> <p>5F. Trace the pathway of blood in coronary, systemic and pulmonary circulations.</p> <p>5G. Identify the processes involved in specific and non-specific immune responses.</p>		SC 3			<p>5A Is Blood Blue or Red?:</p> <p>5B Blood Particles:</p> <p>5C Chambers, Valves, and Blood Vessels of the Heart:</p> <p>5D Platelets vs. Band-aids:</p> <p>5E Follow the Current:</p> <p>5F Blood Traces:</p> <p>5G Immunity:</p> <p>5H Signs of Life:</p> <p>5I Cardiovascular System Medical Careers:</p>	<p>5A - E, G - I Discussion: (Scoring Guide)</p> <p>5A, D Worksheet: (Scoring Guide)</p> <p>5C Lab Observation: (Scoring Guide)</p> <p>5C, H Written Quiz: (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
5H. Construct and recognize the events represented on a normal EKG.  5I. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment, and medical careers associated with the cardiovascular system.						

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Concept: Respiratory System

**Topic Objective:**

**6. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Respiratory system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
6A. Identify the gross anatomy of organs involved in respiration.  6B. Identify the structures that enhance the function of the respiratory system (e.g., mucosa, cilia, alveoli)  6C. Discuss two medical applications of current technologies as related to disorders, diseases, patient treatment and medical careers associated with the respiratory system.  6D. Identify the role of the diaphragm and intercostals in air exchange.  6E. Trace the gaseous exchange between capillaries and alveoli.		SC 3			6A Sponges:  6B Lung Features:  6C Medical Careers with the Respiratory System:  6D How do Lungs Fill and Empty with Air?:  6E Gas Exchange:	6A - E Discussion: (Scoring Guide)  6B, E Worksheet: (Scoring Guide)

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Concept: Nervous System

**Topic Objective:**

**7. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Nervous system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7A. Describe the parts of a neuron.</p> <p>7B. Identify and describe the function of the gross regions of the brain including the cerebrum, the cerebral cortex, the cerebellum, and the brainstem.</p> <p>7C. Describe the location and function of the four lobes (i.e., frontal, parietal, temporal, and occipital) of the cerebrum.</p> <p>7D. Identify the gross anatomy of the spinal cord, including regions, meninges, cerebrospinal fluid, and location of white and gray matter.</p> <p>7E. Identify synaptic transmissions.</p> <p>7F. Identify the importance of a myelinated sheath and a neurolemma.</p> <p>7G. Trace the pathway of a reflex arc.</p>		SC 3			<p>7A Reflexes:</p> <p>7B, C Brain Teasers:</p> <p>7D Spinal Tap:</p> <p>7E Synaptic Transmission:</p> <p>7F Protective Sheath:</p> <p>7G Reflex Arc:</p> <p>7H Brain Delegation - Neurotransmitters:</p> <p>7I Balance and Equilibrium:</p> <p>7J Medical Careers Related to the Nervous System:</p>	<p>7A, B, E, F, I, J Discussion: (Scoring Guide)</p> <p>7B, C Worksheet: (Scoring Guide)</p> <p>7D, H Socratic Seminar: (Scoring Guide)</p> <p>7E, F Smart Board Review: (Scoring Guide)</p> <p>7G Drawing: (Scoring Guide)</p> <p>7I Written Quiz: (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7H. List the functions of the cerebrum, cerebellum, and medulla oblongata.</p> <p>7I describe structures responsible for balance and equilibrium.</p> <p>7J. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment and medical careers associated with the nervous system.</p>						

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Concept: Endocrine System

**Topic Objective:**

**8. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Endocrine system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
8A. Locate and identify the endocrine glands.  8B. Identify the function(s) of each endocrine gland.  8C. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment, and medical careers associated with the endocrine system.		SC 3			8A Hormones:  8B Hormone Communication:  8C Medical Careers Related to the Endocrine System:	

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Concept: Reproductive System

**Topic Objective:**

**9. Strand 3: Characteristics and Interactions of Living Organisms - All students will demonstrate proficiency in their understanding of the structure and function of the Reproductive system.**

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
9A. Identify the gross anatomy of the reproductive organs in the male and female.  9B. Differentiate between the embryo and the fetus.  9C. Recognize labor, birth, and after birth as the three major stages of the birth process.  9D. Relate male and female hormones to their role in sexual development and reproduction.  9E. Discuss at least two medical applications of current technologies as they relate to disorders, diseases, patient treatment, and medical careers associated with the reproductive system.		SC 3			9A What is the difference between a Boy and a Girl?:  9B Is an Embryo a Baby?:  9C Video - "Birth Process":  9D Male and Female Hormones - Compare and Contrast:  9E Medical Careers Related to the Reproductive System:	9A, C - E Discussion: (Scoring Guide)  9A, C Written Quiz: (Scoring Guide)  9B Socratic Seminar: (Scoring Guide)  9D Worksheet: (Scoring Guide)

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