

Ganado Unified School District

(PLTW HUMAN BODY SYSTEMS/10-12)

ALL INFORMATION TAKEN DIRECTLY FROM PLTW COURSE MATERIAL AS POSTED ON THE HBS ONLINE CURRICULUM

PACING Guide SY 2017-2018

Timeline & Resources	AZ Science Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<p>Q1 <u>Lesson 1.1</u> <u>Identity: Human</u> <u>- Overview</u> Activity 1.1.1 Amazing Facts Activity 1.1.2 Orientation to the Maniken</p>	<p>Strand 4: Life Science Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems) Understand the organization of living systems, and the role of energy within those systems. PO 5. Describe the levels of organization of living things from cells, through tissues, organs, organ systems, organisms, populations, and communities to ecosystems.</p> <p>(THIS STANDARD IS ONGOING THROUGHOUT THE ENTIRE CLASS)</p>	<ol style="list-style-type: none"> 1. In what ways do the parts of a human body system work together to carry out a specific function? 2. In what ways do different human body systems work together to complete specific functions? 3. How can directional terms and regional terms help describe location in the body? 4. What features of structure and function are common to all humans? 	<p>It is expected that students will:</p> <ul style="list-style-type: none"> • Identify the systems and structures involved in basic body processes. • Explain the functions of different human body systems, and list the major organs within each system. • Describe how multiple body systems are interconnected and how those interconnections and interactions are necessary for life. • Explain how directional terms and regional terms can be used to pinpoint location on the body. • Show the relationship between multiple human body systems. • Demonstrate the correct use of directional and regional terms. • Illustrate key directional term pairs on a model of the human body. 	<p>Anterior Deep Directional Terms Distal Dorsal Identity Inferior Lateral Medial Posterior Proximal Regional Terms Superficial Superior System Ventral</p>

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<p><u>Lesson 1.2</u> <u>Identity: Tissues</u> 1.2.1 Identity of your Maniken 1.2.2 Skeletal Scavenger Hunt 1.2.3 Bone Detectives 1.2.4 Height Estimation from Bones</p>		<ol style="list-style-type: none"> 1. What are the main types of tissue in the human body? 2. How does the structure of a type of human tissue relate to its function in the body? 3. How does the distribution and structure of different types of tissue in the body contribute to personal identity? 4. What are the functions of the human skeletal system? 5. What are the main bones of the human skeletal system? 6. What is forensic anthropology and how does this field relate 	<p>It is expected that students will:</p> <ul style="list-style-type: none"> • Identify characteristics of the four categories of human tissue. • Describe the functions of the human skeletal system. • Recognize that differences in bone structure contribute to a person's unique identity. • Recognize that there is a relationship between the length of long bones and the overall height of an individual. • Analyze the structure of various human tissue types to infer function. • Identify and locate bones of the human skeletal system. • Interpret bone markings, bone landmarks, and bone measurements to determine a person's gender, age, stature, and ethnicity. 	<p>Adipose tissue Appendicular Skeleton Axial Skeleton Connective Tissue Epithelial Tissue Femur Forensic Anthropology Humerus Pelvis Skull Tibia Tissue</p>

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		<p>to human body systems?</p> <p>7. How can features of bone be used to determine information about a person's gender, ethnicity, age or stature?</p>		
<p><u>Lesson 1.3</u> <u>Identity:</u> <u>Molecules and Cells</u></p> <p>1.3.1 DNA Detectives 1.3.2 Careers in Identity 1.3.3 Biometrics: Who are You?</p>		<ol style="list-style-type: none"> 1. What is the structure and function of DNA? 2. How does DNA differ from person to person? 3. What role does DNA play in our identity? 4. How can tools of molecular biology be used to compare the DNA of two individuals? 5. What are restriction enzymes? 	<ul style="list-style-type: none"> • It is expected that students will: • Explain how restriction enzymes cut DNA. • Describe how gel electrophoresis separates DNA fragments. • Recognize that gel electrophoresis can be used to examine DNA differences between individuals. • Outline current biometrics technology. • Digest DNA samples using restriction enzymes. • Demonstrate the steps of gel electrophoresis and analyze the resulting restriction fragment length polymorphisms (RFLPs). 	<p>Agarose Biometrics Deoxyribonucleic acid (DNA) Gel electrophoresis Restriction enzyme Restriction fragment length polymorphisms (RFLPs)</p>

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		<p>6. What are restriction fragment length polymorphisms ?</p> <p>7. What is gel electrophoresis and how can the results of this technique be interpreted?</p> <p>8. How can the field of biometrics be used to verify and protect identity?</p>		
<p>Q2 <u>Lesson 2.1 The Brain</u></p> <p>2.1.1 The Power of Communication 2.1.2 Build a Brain 2.1.3 Map a Brain</p>		<p>1. What is communication?</p> <p>2. What are ways communication occurs in machines and in the human body?</p> <p>3. What are consequences of miscommunication in the body?</p> <p>4. How do the central nervous</p>	<p>It is expected that students will:</p> <ul style="list-style-type: none"> Describe the structure and function of the central nervous system and the peripheral nervous system. Identify major regions of the human brain. Match regions of the brain with their primary function in the human body. Apply knowledge of brain structure and function to 	<p>Brain Stem Central nervous system Cerebellum Cerebrum Gyrus Limbic System Lobe Peripheral nervous system Phrenology Sulcus</p>

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		<p>system and the peripheral nervous system work together to control the body?</p> <p>5. What are the functions of the main regions of the brain?</p> <p>6. How do scientists determine which areas of the brain are associated with specific actions, emotions or functions?</p>	<p>determine the parts of the brain related to specific human actions, emotions, and/or dysfunctions.</p> <ul style="list-style-type: none"> • Interpret how a breakdown in communication in the central nervous system would impact the function of the human body. 	

Ganado Unified School District (Insert Subject/Grade Level)

PACING Guide SY 2014-2015

Timeline & Resources	AZ College and Career Readiness Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<p>Q3 <u>Lesson 2.2</u> <u>Electrical Communication</u></p> <p>2.2.1 The Neuron 2.2.2 The Secret to Signals 2.2.3 It's All in the Reflexes 2.2.4 Reaction Time 2.2.5 Communication Breakdown</p>		<ol style="list-style-type: none"> 1. How does communication happen within the body? 2. What is the basic structure and function of a neuron? 3. How do the different types of neurons work together to send and receive signals? 4. How are electrical impulses created in the human body? 	<p>It is expected that students will:</p> <ul style="list-style-type: none"> • Recognize that the nervous system relies on specialized cells called neurons to pass signals to and from the brain and spinal cord. • Describe how the movement of ions across the cell membrane of a neuron generates an action potential and propagates electrical signals. • Explain how neurons communicate at the synapse. 	<p>Action Potential Axon Dendrite Ion Myelin sheath Neurologist Neuron Neurotransmitter Reaction Time Reflex Synapse</p>

		<p>5. How do neurons convey information using both electrical and chemical signals?</p> <p>6. What factors impact our ability to react to a stimulus?</p> <p>7. How and why does reaction time differ in reflex and voluntary actions?</p> <p>8. How do errors in communication impact homeostasis in the human body?</p> <p>9. How can biomedical professionals help treat, cure and improve the quality of life of those suffering from nervous system disorders?</p>	<ul style="list-style-type: none"> • Describe how brain processing differs in reflex and voluntary responses. • Outline what goes on in the human body from an initial stimulus to a response. • Analyze experimental data to explore reaction time and reflexes in the human body. • Design an experiment to test factors that impact reaction time. • Analyze case studies to determine the effects of a communication breakdown in the nervous system on the human body. 	
Q4		1. What is a hormone?	It is expected that students will:	Endocrine Gland Endocrine System

<p><u>Lesson 2.3</u> <u>Chemical</u> <u>Communication</u></p> <p>2.3.1 Hormone Connection 2.3.2 Hormones Gone Wild</p>		<p>2. How do hormones interact with target cells? 3. What are examples of endocrine glands and exocrine glands in the human body? 4. How do feedback loops help regulate the action of hormones? 5. How can too little or too much of a hormone lead to disease?</p>	<ul style="list-style-type: none"> Describe the way in which hormones interact with target cells. Recognize that the human body uses feedback mechanisms to maintain proper hormone levels. Model a feedback loop that shows how the body maintains homeostasis. Analyze physical symptoms of a patient and relate these symptoms to errors in chemical communication. 	<p>Exocrine Gland Gland Glucagon Hormone Hypothalamus Insulin Pituitary Gland</p>
<p><u>Lesson 2.4</u> <u>Communication</u> <u>with the Outside</u> <u>World</u></p> <p>2.4.1 Exploring the Anatomy of the eye 2.4.2 Visual Perception 2.4.3 Put Yourself in Someone Else's Eyes 2.4.4 Eye Care Professionals</p>		<ol style="list-style-type: none"> How do humans communicate with the world around them? How does the power of sight allow humans to communicate with the outside world? How is light focused by the eye? How do the eye and the brain work together to process what we see? How does what we see impact 	<p>It is expected that students will:</p> <ul style="list-style-type: none"> Identify the key structures of the eye. Demonstrate how light is processed in the eye in a person with normal vision, as well as a person with myopia or hyperopia. Explain the tests and procedures in a typical eye exam. Diagram the path of light as it enters the eyes and travels to the brain for processing. Evaluate visual perception by testing depth perception, peripheral vision, color vision, and visual acuity. 	<p>Accommodation Astigmatism Blind spot Cone Cornea Depth Perception Hyperopia Iris Lens Myopia Optic nerve Pupil Refraction Retina Rod</p>

		<p>other human body systems?</p> <ol style="list-style-type: none"> 6. What is visual perception? 7. What does it mean to have 20/20 vision? 8. How can corrective lenses be used to refocus light and resolve myopia and hyperopia? 9. How does the eye perceive depth, color and optical illusions? 10. How does an error in the structure or function of the eye relate to disease or dysfunction? 11. How is life impacted by a vision disorder? 12. What are the tests and procedures in a routine eye exam? 	<ul style="list-style-type: none"> • Experiment with lenses to refocus light and correct problems with vision. 	
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