

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Identity – Human Tissues, Molecules and Cells

Instructional Unit: A. Identify how the systems of the human body work together

Standard Alignments (Section 2)

SCCLE: SC3.2.Ea; SC3.3.Ba-c; SC7.1.B
Knowledge: (CA) 1,3,6 (H/PE) 1 (MA) 1,3 (SC) 7
CCSS: 9-10.RI.1; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6; 9-10.WHST.1; 9-10.WHST.8;
N-Q.1; F-IF.4; A-CED.2; S-ID.6c
NETS: 1a, 3b, 5a
Performance: 1.2, 1.4, 1.6, 2.1

Unit (Section 3)

Learning Targets:

- Knowledge:
 - 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**
 - 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
 - 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
- Skills:
 - 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
 - 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
 - Derive and analyze a linear equation
 - Digest DNA samples using restriction enzymes

- Demonstrate the steps of gel electrophoresis and analyze the resulting restriction fragment length polymorphisms (RFLPs)

Instructional Strategies:

- The teacher will provide Project Based Learning to be implemented in the following ways:
 - Assess student's previous knowledge of the topics
 - Introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - Direct the discussion and record student responses
 - Teacher-guided PowerPoint to illustrate the Basics of Histology
 - Present microscopic slides of tissues
 - Lead students through building structures on their Manikens with clay
 - Review the essential questions and key terms of the unit
- Students will participate in the following activities:
 - Investigating the anatomy and physiology of the body's organ systems – students will:
 - research their assigned body system to identify its organs and function
 - list ten unknown, cool, or unusual facts about their body systems
 - create a body system graphic organizer
 - Learning medical terminology – students will:
 - identify and label the location of the organs using a Clay Maniken
 - play a game to learn about medical terminology
 - create sentences, using medical terminology, to compare organs
 - define regional anatomical terms (cervical, buccal, etc.)
 - Learn about the Four Types of Tissues activity (epithelial, muscle, connective, and nervous) – students will:
 - review the structure and function of the different types of connective tissues
 - create a concept map with the different types of tissues
 - use a microscope to view bone, adipose, and skeletal muscle tissue prepared slides
 - identify the bones and muscles of the skull and neck
 - use clay to sculpt the facial features of their Maniken
 - Identify the Bones in the Bbody activity – students will:
 - identify and label bones using the Maniken as a guide
 - participate in a skeletal scavenger hunt
 - Use the Principles of Forensic Anthropology to Identify the Characteristics of Bones project – students will:
 - examine bones to determine the gender, race, and age of the person
 - label the location of the bones on the Maniken
 - Calculating and Estimating a Person's Height Using Bones activity – students will:
 - use the Trotter System to calculate the height of a person using bones
 - compare and contrast the stature of people of different ethnicities, gender, and age
 - derive and test an equation to predict their height using their femur
 - Use DNA analysis as a method of identifying individuals – students will:
 - perform a gel electrophoresis experiment on DNA samples
 - analyze data from the experiment to determine the person's identity

- investigate the action of restriction enzymes
- Researching careers in forensic science – students will:
 - research the duties of a forensic anthropologist and DNA analyst
 - write a script for a mock interview for the two professionals
- Use biometrics to determine how someone’s identity is confirmed – students will:
 - research the uses of biometrics
 - create and present a biometric security plan for an assigned scenario

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - review:
 - the body system facts and graphic organizers and give feedback
 - review their Maniken flag placement, sentences, and graphic organizers for accuracy and give feedback
 - review (to give feedback) the:
 - concept map
 - Maniken’s facial features
 - graphic organizers
 - labeled Manikens for accuracy
 - Learning Bones activity results
 - Student data sheet
 - case report
 - students’ calculations and their height estimation formula
 - assess students’ prior knowledge of gel electrophoresis
 - monitor the students’ lab techniques and review their experimental results
 - review the career journals and mock interviews and give feedback
 - review the summary and give feedback
 - The scavenger hunt questions will be reviewed and feedback will be given
 - Student:
 - response sheets will be reviewed and feedback will be given
 - will be questioned about their security plans and will receive feedback
 - All conclusion questions will be discussed
- Summative – assessed using a scoring guide:
 - Students will:
 - label the graphic organizer
 - identify how their organ system interacts with another
 - discuss anatomical terms and create flags with the terms to label their Maniken
 - write sentences using the anatomical terms
 - label their graphic organizer with anatomical terminology
 - exchange their labeled Manikens with another group and label the bones on a sheet of paper
 - complete the scavenger hunt questions
 - record their results from the Learning Bones activity
 - complete the Student Data Sheet during the bone exercise
 - prepare a case report
 - develop and test an equation to estimate their height

- complete all the calculations for the activity
- analyze and record their experimental results in their lab notebook
- complete the Student Response Sheet
- record their research in their career journals
- create a mock interview for the two professionals
- write a summary of the scientific article
- devise and present their biometric security plans to the class
- A written exam assessing all essential learning targets will be administered

Sample Assessment Questions:

- How do different body systems work together to complete specific functions, such as movement and communication?
- What is the advantage of using regional and directional terms when discussing location in the body?
- How does the structure of specific human tissue provide clues as to its function in the human body?
- Why is it useful to analyze tissue when determining information about a person's gender, ethnicity, age, or stature?
- How do all tissues in the body contribute to the identity of a person?
- What are the limitations in using bone measurements to determine aspects of human identity?
- What role does DNA play in human identity?
- Do identical twins, who have the same DNA, share the same identity?
- What are the limitations of using molecular biology techniques to compare the DNA of two individuals?
- How can the field of biometrics be used to verify and protect identity?

Instructional Resources/Tools:

- PLTW Human Body Systems Curriculum with the following activities:
 - A.1.1.1: Amazing Facts
 - A.1.1.2: Orientation to the Maniken
 - A.1.2.1: Identity of your Maniken
 - A 1.2.2: Skeletal Scavenger Hunt
 - P 1.2.3: Bone Detectives
 - A 1.2.4: Height Estimation From Bones
 - A.1.3.1: DNA Detectives
 - A 1.3.2: Careers and Identity
 - P 1.3.3: Biometrics: Who Are You?

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting

- Math:
 - Number Sense
 - Creating and interpreting equations
 - Analyzing data
- Science:
 - DNA structure and sequences
 - Qualitative and quantitative observations
- Health: Relationships among human body systems

Depth of Knowledge (Section 5)

DOK: 3

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Communication – The Brain, Electrical Communication, Chemical Communication, Communication with the Outside World

Instructional Unit: B. Model and describe how the nervous system and endocrine system work together to maintain homeostasis in the body

Standard Alignments (Section 2)

SCCLE: SC3.1.Ba; SC3.2.F; SC7.1.Ab

Knowledge: (CA) 1,3,6 (H/PE) 1,3,5 (MA) 1,3 (SC) 7

CCSS: 9-10.RI.1; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6; 9-10.WHST.1; 9-10.WHST.8; N-Q.1; F-IF.4; S-ID.6c

NETS: 1a; 2d; 4c

Performance: 1.2, 1.4, 2.1, 4.6, 4.7

Unit (Section 3)

Learning Targets:

- Knowledge:
 - Describe the structure and function of the central and peripheral nervous system
 - Identify major regions of the human brain
 - **Match regions of the brain with their primary function in the human body**
 - 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
 - Describe how brain processing differs in reflex and voluntary responses
 - Describe the way in which hormones interact with target cells
 - **Recognize that the human body uses feedback mechanisms to maintain proper hormone levels**
 - 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
- Skills:
 - Apply knowledge of brain structure and function to determine the parts of the brain related to specific human actions, emotions, and/or dysfunctions
 - Interpret how a breakdown in communication in the central nervous system would impact the function of the human body
 - 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
 - Analyze case studies to determine the effects of a communication breakdown in the nervous system on the human body
 - 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
- 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
- Experiment with lenses to refocus light and correct problems with vision

Instructional Strategies:

- Project Based Learning will be implemented in the following ways – The teacher will:
 - assess student previous knowledge of the topics
 - introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - direct discussion
 - do a presentation on vision
 - lead students through:
 - dissections
 - building structures on their Manikens with clay
 - review the essential questions and key terms of the unit
- Investigating the various forms of human body communication – students will examine the different types of human communication
- Building a model of the central nervous system (CNS) – students will:
 - research the function and anatomy of the nervous system (central and peripheral)
 - build a model of the CNS in the Maniken
- Investigate the structure and function of the brain – students will:
 - create a structure/function map for the different parts of the brain
 - dissect a sheep brain to visualize the anatomy (optional)
 - investigate the story of Phineas Gage and the impact a brain injury has on a person's life
 - research how scientists determine the function of the different parts of the brain (optional)
- Investigating the structure and function of neurons – students will:
 - build a model of sensory, motor, and association neurons and label the parts
 - create a flow chart that details the nervous system's response to stimuli
- Determining how neurons communicate with each other – students will:
 - complete a virtual action potential exercise
 - summarize the action of communication between neurons
 - create trivia questions to share with the class
- Differentiate between reflexes (involuntary) and voluntary reactions – students will conduct an experiment to investigate reflexes and voluntary responses and their respective neurological pathway
- Measuring the reaction time to stimuli – students will:
 - complete a virtual fastball reaction time activity
 - conduct an experiment to measure the reaction time to stimuli
 - use the experimental data to analyze trends of the reaction time for the class
- Examining the impact of neurological disorders on a patient's health – students will analyze case studies of patients with various neurological conditions to determine a diagnosis and recommend treatments

- Exploring the anatomy of the eye – students will:
 - learn about the structure and function of the eye
 - dissect a cow’s eye and label the different components
 - test the eye’s response to light
- Investigating the physiology of vision – students will:
 - visit eleven stations to explore different aspects (astigmatism, depth perception, etc.) of human vision
 - examine how corrective lens are used to improve vision
- Examine the impact of eye disorders on vision – students will:
 - use a camera and software to generate images that models the sight of patients with vision disorders (myopia, glaucoma, etc.)
 - develop an interactive computer presentation for the class to learn about the disorders
- Researching careers in eye health – students will:
 - create a “What You Need to Know about an Eye Exam” handout
 - research the careers of there healthcare professional in eye health
 - identify the:
 - areas of the brain that are impacted by the disorders
 - healthcare professionals who treat neurological patients
- Investigating the action and targets of hormones – students will:
 - research the organs and function of the endocrine system
 - construct a concept map detailing the action of hormones for regulated blood glucose levels
- Examining the impact of hormone imbalances on a patient’s health – students will:
 - investigate a case study to diagnose a patient and recommend treatment
 - build a model of the pituitary gland and review its function
 - determine the relationship between the nervous and endocrine system

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - review the:
 - graphic organizer and Manikens for accuracy and give feedback
 - brain map and motor functions and give feedback
 - review the students’ activity questions for accuracy and feedback will be given
 - give feedback after reviewing the(ir):
 - models and concept maps for accuracy
 - Student Response sheets and paragraphs
 - students’ experimental results and drawings
 - students’ results
 - presentation and career journals
 - review the student:
 - concept maps, feedback loops, and graphic organizers and give feedback
 - diagnosis and models and concept maps and give feedback
 - lab results and eye labels and give feedback
 - response sheets and feedback will be given
 - the handout and scenario and give feedback

- rotate to each station to monitor student engagement and understanding
- check the students' pictures and presentations and give feedback
- All conclusion questions will be reviewed
- Summative – assessed using a scoring guide:
 - Students will:
 - label the nervous system on their graphic organizer
 - draw a picture of their model and share their Maniken with the class create a brain map that has the parts of the brain labeled with their function
 - map the 17 motor regions (optional)
 - build and discuss their neuron models and the flow chart detailing their interactions with other neurons
 - complete the Student Response Sheet
 - write two paragraphs using neurological terms
 - share and explain their results
 - draw a cross section of spinal cord and its role in the reflex action
 - analyze and explain their data with the class
 - discuss the importance and use of reaction time
 - present their patient's diagnosis (symptoms and the affected brain areas) and treatment recommendations to the class
 - research neuroscience professionals that can treat their patient and record the information in their career journals
 - answer all conclusion and assessment questions
 - explain their concept maps and answer any questions from the class
 - create an insulin/glucagon feedback loop in response to glucose
 - label the endocrine system (organs and hormones) on the graphic organizer
 - explain their diagnosis and recommend treatment
 - present their pituitary gland model to the class
 - examine and record the structure and function of the eye
 - answer the corresponding lab questions
 - complete the Student Response Sheet
 - share their vision disorder presentations with the class
 - explain the impact of vision disorders on a person's health
 - complete the handout
 - write a scenario that would require the use of the healthcare professionals
 - A written exam assessing all essential learning targets will be administered

Sample Assessment Questions:

- What are the consequences of miscommunication in the human body?
- What are the limitations and challenges in diagnosing problems with the human brain?
- How might a patient's change in personality be used to diagnosis whether a specific area of the brain is malfunctioning
- How would the transmission of a neurological stimulus be altered if the action of neurotransmitters were impaired?
- Why does reaction time typically differ in reflex and voluntary actions?
- How could the technology used to collect and analyze response time be improved?
- How can technology be used to alter human response time?

- How do hormones and feedback mechanisms maintain homeostasis in the human body?
- How can improper levels of a hormone lead to disease or dysfunction in the human body?
- How will varying the amounts of specific hormones affect overall homeostasis in the body?
- Why is it necessary in some cases to utilize synthetic hormones?
- How would modern medicine be impacted if synthetic hormones were not available?
- How do the eye and the brain work together to process what we see?
- How does an error in the structure or function of the eye relate to disease or dysfunction?
- How does information received through sight initiate a response in other body systems?
- How can new technology, such as laser eye surgery, improve human vision?

Instructional Resources/Tools:

- A.2.1.1: The power of communication
- A 2.1.2: Build a brain
- P 2.1.3: Map-a-brain
- A.2.2.1: The neuron
- A 2.2.2: The secret to signals
- P 2.2.3: It's all in the reflexes
- P 2.2.4: Reaction time
- P 2.2.5: Communication breakdown
- A.2.3.1: The hormone connection
- A 2.3.2: Hormones gone wild
- A.2.4.1: Exploring the anatomy of the eye
- A 2.4.2: Visual perceptions
- P 2.4.3: Optional: put yourself in someone else's eyes
- A 2.4.4: Eye care professionals

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting
- Math:
 - Number Sense
 - Interpreting functions
 - Analyzing data
- Science:
 - Recognize that cells can be specialized
 - Explain the transport of molecules across membranes
 - Analyzing an experiment (scientific inquiry)

- Health:
 - Relationships among human body systems
 - Diseases and methods for prevention
 - Methods used to assess health

Depth of Knowledge (Section 5)

DOK: 3

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Power – Introduction to Power, Food, Oxygen, Water

Instructional Unit: C. Describe how the Digestive System, Respiratory System and Urinary System work to maintain homeostasis in the body

Standard Alignments (Section 2)

SCCLE: SC3.1.Cb; SC3.2.Ac; SC3.2.Da; SC7.1.Aa-c,g; SC7.1.Da

PEGLE: PALW.3.B

Knowledge: (CA) 1,3,6 (H/PE) 1,3,5,7 (MA) 1,3 (SC) 7

CCSS: 9-10.RI.1; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6; 9-10.WHST.1; 9-10.WHST.8;
N-Q.1; A-CED.2; F-IF.4; S-ID.6c

NETS: 1a; 2d; 4c

Performance: 1.2, 1.4, 1.6, 2.1, 4.6, 4.7

Unit (Section 3)

Learning Targets:

- Knowledge:
 - List and describe the human body systems that create, process, and distribute food, water, and oxygen
 - **Recognize that factors unique to the person, such as age, weight, and overall health affect the body's ability to utilize biological resources and maintain homeostasis**
 - Recognize that factors in the environment, such as climate or temperature, affect the body's ability to utilize biological resources and maintain homeostasis
 - Recognize that enzymes are designed to be highly specific, and the structure of the enzyme's active site determines the substrate it acts upon
 - Recognize that factors such as temperature, pH, and enzyme and substrate concentration affect the rate of an enzyme-catalyzed reaction
 - List specific enzymes that digest carbohydrates, fats, and proteins at sites along the digestive tract
 - **Describe the structure and function of the organs in the digestive system**
 - Explain how energy is stored in ATP
 - **Describe the structure of the respiratory system, especially the lungs, and the basic mechanics of breathing**
 - Explain how the structure of the lungs facilitates the exchange of oxygen and carbon dioxide between air and the body
 - Describe the structure and function of the human urinary system
 - Describe how the structure of the kidney relates to its function in the body
 - Recognize that the nephron is the structural and functional unit of the kidney
 - Describe the connections between urine and blood and the exchange of ions and fluids that occurs across the nephron
 - Explain how the body uses hormones and feedback to maintain a water balance

- Skills:
 - Estimate how long the human body can last without food, without water, and without oxygen
 - Model the interaction between enzymes and their corresponding substrates
 - Outline what happens to a bite of food as it travels down the digestive tract
 - Design a laboratory experiment investigating the impact that environmental changes can have on enzyme function and analyze the results
 - Analyze energy inputs and outputs in the body to assess overall health
 - Use sensors to measure lung capacity
 - Analyze data collected using a spirometer to determine tidal volume, vital capacity, and minute volume
 - Describe the action of specific medication on the body and investigate how this action helps treat and control disease
 - Analyze medical data to diagnose lung disorders and design a corresponding treatment plan
 - Illustrate the path of urine formation through the kidney
 - Estimate the filtration rate of the glomerulus and relate mathematical estimates to the function of the human kidney
 - Analyze urinalysis results to diagnose disease and dysfunction in human body systems

Instructional Strategies:

- Project Based Learning will be implemented in the following ways – The teacher will:
 - assess the student’s previous knowledge of the topics
 - introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - direct the discussion and record student responses
 - show the Discovery Channel’s *Human Body: Pushing the Limits* video clip
 - lead students through:
 - building structures on their Manikens with clay
 - dissections
 - present a PowerPoint on prescription drugs
 - answer clarification questions
 - review the essential questions and key terms of the unit
- Investigating the resources that the human body needs to survive – students will:
 - determine the critical resources the body needs to function
 - explore the body systems that process the resources for the body
- Explore the Rules of Threes for human survival – students will:
 - study factors that allow the body to survive when vital resources are not available
 - complete the chart
- Modeling the action of enzymes and co-enzymes – students will:
 - research enzymes and co-enzymes and their role in chemical reactions
 - build a model to demonstrate the action of enzyme and co-enzyme binding

- Investigating the anatomy and physiology of the digestive system – students will:
 - research the anatomy and physiology of the digestive system
 - build a model of the digestive system and place it in the Maniken
 - develop a flow chart that details the absorption of food within the digestive system
- Using the principles of materials engineering to build a model of the digestive system (optional) – students will:
 - design and build an accurately scaled model of the digestive system
 - create a flow chart detailing the digestion of food
- Investigating the action of catalase – students will:
 - conduct an experiment to examine the action of catalase
 - design an experiment investigating the action of catalase under different conditions (e.g., pH, temperature, etc.)
- Learning about the impact of metabolism on a person's health – students will:
 - analyze case studies of patients with different metabolic conditions
 - calculate the patient's body mass index (BMI) and basal metabolic rate (BMR)
 - research the careers of a registered dietician and a nutrition counselor
- Examining how cells utilize energy – students will:
 - research the structure and function of ATP
 - model the process of cellular respiration
- Investigating the structure and function of the respiratory system – students will:
 - research the structure and function of the respiratory system
 - review a case study of Melissa Martin, a patient with respiratory issues, and present a diagnosis and recommend a treatment
- Measuring to determine lung capacity – students will:
 - become familiar with terms (tidal volume, etc.) related to respiration
 - conduct an experiment to measure the lung capacity of several individuals
 - use lung capacity data to diagnose the Melissa Martin activity
- Learning about asthma pharmaceuticals – students will:
 - review common pharmaceutical terms
 - analyze the prescriptions that were prescribed to Melissa Martin and their impact on her body
- Examining the role of a respiratory therapist – students will:
 - research the role and responsibilities of a respiratory therapist
 - create a resume that details the career of a respiratory therapist
 - develop an asthma action plan for Melissa Martin
- Investigating the structure and function of the urinary system – students will:
 - build a model of the urinary system within the Maniken
 - create a diagram of the urinary system and label the function of each organ
 - record changes in the bladder's structure when it is empty and full
- Studying the anatomy of the kidney – students will:
 - research the anatomy of the kidney
 - dissect a pig's kidney and label the different parts
 - draw a map of the kidney and label the parts and their functions
- Examining how the kidneys regulate the blood chemistry – students will:
 - research the composition of normal urine and blood
 - build a model of the nephron and explain how it filters the blood
 - calculate the glomerular filtration rate for a day

- Investigating how the body systems regulates the body's water balance – students will:
 - research the hormones that maintain the body's water balance and create a feedback-loop diagram
 - create a model of the adrenal gland and place it in the Maniken
 - use a Venn diagram to compare and contrast ADH and aldosterone
 - update their endocrine system graphic organizer to reflect the water balance process
- Conducting a urinalysis – students will:
 - examine the urine of different patients
 - research the diseases that may be afflicting the patients
 - research the career of a medical technologist

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - review the students':
 - charts and give feedback
 - completed charts and summaries and give feedback
 - enzyme models and provide feedback
 - digestive system models, flow charts, and graphic organizers and give feedback
 - research plans, results, and reports and give feedback
 - Client Report handouts and give feedback
 - activity questions and give feedback
 - examine the models and digestive flow charts and provide feedback
 - All the conclusion questions will be discussed
 - Student progress and understanding will be monitored throughout the experiment
 - Medical History handouts and body system organizer – the teacher will:
 - review the:
 - results and Medical History handout
 - research findings
 - resumes, Medical History handouts, and action plans
 - students' models, graphic organizers, and diagrams
 - Student Data Sheet, disease diagnosis, and career journals and be given feedback
 - check the students' urinary system models and graphic organizers
 - monitor the students' progress and their labels will be reviewed for accuracy
 - The models, Student Resource Sheet, and calculations will be reviewed and feedback will be given
- Summative: *(all summative assessments are evaluated using a scoring guide)*
 - Students will:
 - complete the Powering the Human Body chart
 - update the Powering the Human Body chart
 - write a summary on the Rule of Threes for travelers in the lab notebook
 - present and explain their enzyme and co-enzyme bonding model
 - use the Student Resource Sheet to build their model
 - complete the digestive system flow charts with the class

- label the digestive system on the graphic organizer
- build their models and flow charts
- record and discuss their results
- design and conduct their experiment
- submit a laboratory report
- complete the Client Report handouts and explain their results to the class
- answer the activity questions and discuss their results
- use puzzles to model ATP/ADP recycling
- discuss the case study and their diagnosis and treatment recommendation by completing the Medical History handouts
- sketch the respiratory system on the body system organizer
- record their experiment results and explain their findings with the class
- update the Medical History handout
- discuss their research on Melissa's medications
- share their resumes and asthma action plans
- complete the Medical History handout
- present and explain their model (anatomy and physiology)
- label the urinary system on the graphic organizer
- examine and label the parts of the pig kidney and explain their diagrams to the class
- share the results of their kidney models (anatomy and physiology) and calculations
- complete the Student Resource Sheet
- share their endocrine system feedback diagrams and models (anatomy and physiology)
- label the endocrine system on the graphic organizer
- compare and contrast the two hormones
- complete the:
 - Student Data Sheet and record their disease diagnosis
 - career journal assignment
- A written exam assessing all essential learning targets will be administered

Sample Assessment Questions:

- How does the body obtain and use energy from food?
- Why does an enzyme only catalyze a specific chemical reaction under specific conditions?
- How can a scientist determine the ideal conditions for a specific enzyme-catalyzed reaction?
- How is the air you breathe and the food you eat used in the production of ATP?
- What are the consequences of a lack of a specific macromolecule or nutrient in the diet?
- How do the systems of the human body work together to facilitate gas exchange?
- How can analysis of lung capacity be used to diagnose or treat a patient?
- What factors impact normal lung function?
- How can an individual improve or damage their lung function?
- How does living in an area with high levels of air pollution impact overall lung function?

- How does the nephron function to maintain fluid and electrolyte balance in the human body?
- How can the composition of urine provide clues about problems in human body systems?
- What information can a blood test provide that urinalysis cannot?
- How do hormones help maintain water balance in the human body?

Instructional Resources/Tools:

- A.3.1.1: Resources for life
- A 3.1.2: The rules of 3
- A.3.2.1: Action molecules
- P 3.2.2: Digestive system design
- P 3.2.3 (optional): Living in a material world
- P 3.2.4: Investigating enzyme action
- A 3.2.5: Metabolism – a balancing act
- A 3.2.6: In search of energy
- A 3.3.1: Gasping for air
- A 3.3.2: Measuring lung capacity
- A 3.3.3: Rx understanding prescriptions
- A 3.3.4: Respiratory therapy
- A 3.4.1: Hook up the plumbing
- A 3.4.2: Spotlight on the kidney
- P 3.4.3: The blood/urine connection
- P 3.4.4: Water balance
- A 3.4.5: Urinalysis

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting
- Math:
 - Number Sense
 - Creating and interpreting equations
 - Analyzing data
- Science:
 - Describe the structure of cell parts
 - Explain interactions between organelles
 - Summarize how energy transfer occurs
 - Analyzing an experiment (scientific inquiry)
- Health:
 - Relationships among human body systems
 - Diseases and methods for prevention
 - Methods used to assess health
 - Responses to emergency situations

Depth of Knowledge (Section 5)

DOK: 3

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Movement: Joints and Motion, Muscles, Blood Flow, Energy and Motion (Exercise Physiology)

Instructional Unit: D. Outline the function of a muscle and describe how the muscular system works to maintain homeostasis in the body

Standard Alignments (Section 2)

SCCLE: SC3.2.Da; SC7.1.Ab; SC7.1.B; SC7.1.Da
Knowledge: (CA) 1,3,6 (H/PE) 1,3,5 (MA) 1,2,3 (SC) 7
CCSS: 9-10.RI.1; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6; 9-10.WHST.1; 9-10.WHST.8;
N-Q.1; G-MD.1; S-ID.6c
NETS: 1a; 2d; 4c
Performance: 1.2, 1.4, 2.1, 4.6, 4.7

Unit (Section 3)

Learning Targets:

- Knowledge:
 - **Recognize that a joint is the location at which two or more bones connect, allowing movement and providing support to the human skeleton**
 - Describe the motion at joints, such as flexion and extension
 - Describe how the three types of muscle tissue differ in structure and function
 - Explain the sliding filament mechanism of muscle contraction
 - **Recognize the connection between nerves and muscle**
 - Explain the relationship between the heart and the lungs
 - Identify the body's major arteries and veins and name the body region supplied by each
 - Recognize that unlike arteries, veins contain valves that prevent the backflow of blood
 - Describe pulse and blood pressure as they relate to cardiovascular health
 - Recognize that lifestyle choices, such as poor diet and smoking, can lead to the development of blood flow disorders
 - **Recognize that the body uses high energy molecules such as creatine phosphate, glycogen, and glucose to supply ATP to working muscle**
 - Recognize that muscle fatigue occurs with prolonged or repetitive use of a muscle group
 - Describe ways in which an athlete can prepare his or her body for the stress of an athletic event
- Skills:
 - Demonstrate the types of movement possible at a joint and match range of motion photographs to specific actions
 - Measure range of motion of human joints using a goniometer
 - Analyze muscle tissue structure using a microscope
 - Interpret muscle function by examining its structure and its attachment to bones
 - Test the effect of varying solutions of ATP on the contraction of muscle tissue

DRAFT

- Demonstrate the process of muscle contraction as well as the phenomenon of rigor mortis
- Trace blood flow in pulmonary and systemic circulation
- Calculate and interpret cardiac output values and relate the amount of blood pumped by the heart to the health of other body systems and organs
- Measure peripheral pulses using Doppler ultrasound and calculate an ankle brachial index (ABI)
- Interpret the ankle brachial index (ABI) to determine possible blockages in blood vessels
- Illustrate the body's response to the stages of exercise
- Design an experiment to test the effect of feedback, coaching, or competition on muscle fatigue
- Interpret EMG and grip strength data to assess muscle fatigue
- Apply knowledge of power and movement in the body to design a comprehensive training plan for an athlete

Instructional Strategies:

- Project Based Learning will be implemented in the following ways – The teacher will:
 - assess the students' previous knowledge of the topics
 - introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - direct the discussion and record student responses
 - lead students through:
 - building structures on their Manikens with clay
 - dissections
 - emphasizes structure of the muscle
 - answer clarification questions
 - review the essential questions and key terms of the unit
- Investigating the function of different types of joints – students will:
 - research the anatomy and physiology of the different types of joints
 - sketch and label the joints and their connective tissue in the skeletal graphic organizer
 - dissect a cow elbow joint and identify all the parts
- Measuring the range of motion of joints – students will:
 - research range of motion terms
 - use a goniometer to measure and record the range of motion of their joints
- Investigating three types of muscle tissue (skeletal, smooth, and cardiac) – students will:
 - research the different types of muscle tissue and create a comparison table
 - use a microscope to view prepared muscle tissue slides
 - build a model of skeletal muscle on the Maniken
 - create rules that describe muscle functions
- Learning about the anatomy of chest muscles – students will:
 - build a model of the chest muscles on the Maniken
 - sketch a picture of the muscles in their graphic organizer and describe their function
 - research exercises that will strengthen and tone chest muscles

- Building and studying the different muscle groups – students will:
 - build a muscle group on the Maniken for the arm, leg, shoulder, back, or hip
 - take a “tour” of all the muscle groups to learn about their structure and function
 - record the characteristic of the muscle groups (name, location, joint, and use) in their lab journals
- Determining the optimal amount of energy needed for a muscle contraction – students will:
 - conduct an experiment to determine the reaction of skeletal muscle fibers to various concentrations of ATP
 - record the change in fiber length throughout the experiment
 - use a microscope to view the structure of muscle fibers
- Designing a three-dimensional contracting muscle model – students will:
 - research the mechanics of muscle contractions
 - describe the steps of the sliding filament theory
 - create a model of a contracting muscle
 - demonstrate the action of muscle fibers in living and dead muscle tissue
- Determining the role of the nervous system in muscle contractions and repetitive motion injury – students will:
 - build the brachial plexus on the Maniken and attach nerves to the arm muscle fibers that were built from previous activities
 - research carpal tunnel syndrome and identify the nerves that are associated with the disease
- Investigating the muscles of the cardiovascular system – students will:
 - review the anatomy and physiology of the cardiovascular system
 - build a model heart in the Maniken
- Investigating the structure and function of arteries and veins – students will:
 - use microscopy to study the structure of arteries, veins, and capillaries
 - measure the width of blood vessels
 - determine the cause of varicose veins
 - build a model of arteries and veins
 - create a brochure or write a letter explaining varicose veins to their grandmother
- Creating a model of the arteries and veins pathways in the body – students will:
 - research the pathway of arteries and veins in the body
 - add model blood vessels to the Maniken’s arms
- Measuring their pulse rate and calculating their cardiac output – students will:
 - feel their pulse at different locations throughout the body
 - record and measure their pulse rate and compare them to normal values
 - calculate their cardiac output
- Determining the impact of smoking on the limbs – students will:
 - examine case studies of smokers and the diseases (peripheral vascular disease, etc.) that can impact the limbs
 - conduct an ankle brachial index (ABI)
 - model PAD on the Maniken
- Investigating the body’s response to exercise – students will:
 - research the impact of exercise on body systems
 - write about the role that the body systems (nervous, cardiovascular) while running
 - create a timeline about the body’s response during exercise

- Studying muscle fatigue – students will:
 - use a dynamometer to measure the muscle’s electrical activity
 - develop an experiment to overcome muscle fatigue
- Researching the use and impact of performance enhancing drugs – students will:
 - research one well-known performance enhancer and discuss its advantages and disadvantages
 - conduct a mock World Anti-Doping Agency meeting to discuss which enhancing substances should be banned
- Developing a training plan for an athlete – students will:
 - choose an athletic event and a client profile and devise a training plan (diet, medication, injury prevention, etc.)
 - research the careers of the healthcare professionals needed for supporting the training plan

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - monitor student engagement and understanding (labeling, connective tissue identification, etc.) throughout the experiment
 - review the:
 - range of motion measurements, ROM Matching sheet, and give feedback
 - student heart diagrams and Maniken models and give feedback
 - journals, brochure or letters, and models and then give feedback
 - models for accuracy and give feedback
 - ABI worksheet, questions regarding John’s health, and PAD model and give feedback
 - check the pulse measurements and heart rate calculations and give feedback
 - The graphic organizer will be reviewed by the teacher and feedback will be given
 - All the conclusion questions will be reviewed and/or discussed
 - The teacher will review and give feedback for the:
 - Student Resource Sheet and timelines
 - data from both experiments
 - Performance Enhancers handout and the proposed list of banned substances
 - training plan and career journal entries
- Summative: *(all summative assessments are evaluated using a scoring guide)*
 - Students will:
 - explain their results from their research and dissections to the class
 - label the graphic organizer with the skeletal system
 - compare the results of their range of motion experiment with each other
 - complete the Student Resource ROM Matching Sheet
 - share the results of their research and explain their muscle models (anatomy and physiology)
 - present and explain their models (anatomy and physiology)
 - label the muscles on the graphic organizers
 - present and explain their models (anatomy and physiology) to the class
 - write the muscle characteristic in their lab journals
 - explain their experimental results

- present their muscle contraction models (anatomy and physiology) using a presentation
- share their description of the steps of the sliding filament theory to the class
- present their models (anatomy and physiology) to the class and explain the interaction of muscles and the nervous system
- record their research on repetitive motion injury in their lab journals
- build their Maniken's heart
- discuss their heart diagrams to the class to explain the anatomy, blood flow, and electrical activity
- record their microscopy observations and width measurements in the journal
- share their vessel models and letters or brochures with the class
- share and explain their Maniken's vessel models
- record their pulse rate and heart rate calculations
- complete the ABI worksheet
- answer questions about John's health in their lab notebook
- model PAD on their Maniken
- complete Student Resource Sheets
- complete and share their timeline
- record their experimental data in their lab notebook
- design and conduct an experiment to overcome muscle fatigue
- complete the Performance Enhancers handout and create a list of recommended banned substances
- complete and present their training plans
- complete their career journals
- A written exam assessing all essential learning targets will be administered

Sample Assessment Questions:

- How does the structure of a joint provide information about its function?
- How do bones, muscles, and joints work together to enable movement and locomotion for the human body?
- Why would medical professionals measure range of motion at a joint?
- How could medical professionals measure range of motion without a goniometer?
- In what ways are joints similar to simple machines?
- How does the structure of Mammalian joints differ based on their method of locomotion?
- How do muscles assist with movement of the body and of substances around the body?
- What do skeletal muscle structure and attachment to bones indicate about function?
- How can the muscular and nervous systems be integrated in the design of prosthetic devices?
- How can neurological diseases affect overall muscle function?
- How do the cardiovascular and pulmonary systems work together to maintain homeostasis in the human body?
- How does the structure of arteries, veins and capillaries relate to their function in the body?
- What medical interventions are available to improve circulation in impaired blood vessels?
- How can smoking lead to Peripheral Artery Disease (PAD)?
- What body systems are involved with powering an athlete through a running race?

- How do body systems work together to overcome muscle fatigue?
- How does athletic training reduce the rate at which muscles fatigue?
- How would you determine whether a runner is more suited for endurance or sprint events?

Instructional Resources/Tools:

- A 4.1.1: Bones, joints, action!
- A 4.1.2: Range of motion
- A 4.2.1: Muscle rules
- A 4.2.2: Building a better body
- P 4.2.3: Maniken muscles
- A 4.2.4: Laws of contraction
- P 4.2.5: Rigor mortis modeling
- A 4.2.6: You've got nerve
- A 4.3.1: The heart of the matter
- P 4.3.2: Varicose veins
- A 4.3.3: Go with the flow
- A 4.3.4: Cardiac output
- A 4.3.5: Smoking can cost you an arm and a leg
- P 4.4.1: The body's response to exercise
- A 4.4.2: Mind over muscle
- A 4.4.3 (Optional): Performance enhancers
- B 4.4.4: Train a champion

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting
- Math:
 - Number Sense
 - Geometric shapes and properties
 - Analyzing data
- Science:
 - Describing the structure of cell parts
 - Summarizing how energy transfer occurs
 - Analyzing an experiment (scientific inquiry)
- Health/PE:
 - Relationships among human body systems
 - Diseases and methods for prevention
 - Methods used to assess health

Depth of Knowledge (Section 5)

DOK: 3

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Protection – The Skin, Bones, Lymph and Blood Cells

Instructional Unit: E. Explain how different tissues and the skeletal system work together to maintain homeostasis in the body

Standard Alignments (Section 2)

SCCLE: SC3.1.Ba; SC3.3.Ea-b; SC7.1.Ab; SC7.1.B; SC7.1.Da

Knowledge: (CA) 1,3,6 (H/PE) 1,3,5 (MA) 1,3 (SC) 7

CCSS: 9-10.RI.1; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6; 9-10.WHST.1; 9-10.WHST.8;
N-Q.1; F-IF.4; S-ID.6c

NETS: 1a; 2d; 4c

Performance: 1.2, 1.4, 2.1, 4.6, 4.7

Unit (Section 3)

Learning Targets:

- Knowledge:
 - **Describe the structure and function of the two main layers and the accessory organs of the skin**
 - Explain how different degrees of burns damage layers of the skin
 - Explain how the human body senses and processes signals of pain
 - Recall the four main types of bone
 - **Recognize that bone is a living connective tissue composed of cells and protein fibers wrapped in hard mineral salts that can adapt and change to fit the needs of the person**
 - Describe the structure and function of compact and spongy bone
 - Describe the types of bone fractures
 - Describe the structure and function of the lymphatic and immune system
 - Recognize that a type of white blood cell called B lymphocyte is responsible for the production of antibodies and has the ability to remember invaders once they have entered the body
 - Recognize that blood type is determined by the antigens present on red blood cells
 - **Describe the genetics of blood type**
 - Describe the interaction between antigens and antibodies
- Skills:
 - Interpret how burn damage to the skin will affect the function of the organ and overall homeostasis in the body
 - Outline what happens inside the body when a person feels pain
 - Analyze bone structure using a microscope
 - Interpret X-rays to determine specific types of bone fractures
 - Apply knowledge of hormones and of bone remodeling to explain calcium balance in the body
 - Diagram the stages of bone healing after injury
 - Analyze simulated blood samples to determine blood type

- Produce and analyze a family pedigree for blood type and determine potential donors for a transfusion
- Graph and interpret antibody data collected after an infection and relate this data to the response of body cells
- Diagram an immune response to a common cold
- Apply knowledge of specific immunity to deduce how vaccines function

Instructional Strategies:

- Project Based Learning will be implemented in the following ways – The teacher will:
 - assess the students' previous knowledge of the topics
 - introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - direct the discussion and record student responses
 - lead students through building structures on their Manikens with clay
 - instruct students to view the Discovery Channel *Human Body: Pushing the Limits* video clip
 - show various X-ray images as engagement
 - answer clarification questions
 - review the essential questions and key terms of the unit
- Building a skin model to examine the anatomy and physiology – students will:
 - research the structure and function of skin
 - create a 3D model of skin and label all the parts
 - use a microscope to view a section of human skin
 - study the impact of stress and aging on the skin
- Examining the impact of burns – students will:
 - research the burn classification system
 - label their skin model to indicate the layers impacted by burns (1st-4th degree)
 - research the careers of health professionals that treat burn victims
 - reflect on the life of a burn victim
- Investigating the role of pain on the human body – students will:
 - watch a video on pain
 - examine a case study of a patient who does not feel pain
- Examining the anatomy of bones – students will:
 - research the four types of bones and use their Manikens to find examples
 - use a microscope to view compact and spongy bone
 - dissect a cow's long bone and label the structures and record their functions
- Analyzing x-rays of damaged bones – students will:
 - research the different types of bone fractures
 - analyze the x-rays of fractured bones
 - create an ad for an x-ray technician
- Investigating the process of bone remodeling and repair – students will:
 - research the process of bone repair and remodeling and create a feedback loop on the process
 - investigate the factors that impact bone density
 - examine bone healing on an x-ray

- Investigating the role of the immune and lymphatic systems – students will:
 - complete their graphic organizer on the two systems
 - build the lymphatic system in the Maniken
- Learning about blood types and transfusions – students will:
 - test for the different blood types and determine the types of blood the recipient can receive
 - examine the genetic of blood types
- Demonstrating the action of antibodies in fighting infections – students will:
 - graph the antibody concentration over the course of the common cold
 - compare the antibody response to two antigens

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - review and give feedback on the:
 - the skin models for accuracy (correct anatomy) and lab journal responses
 - bone labels and journal entries
 - feedback loops and x-ray timelines
 - activity questions
 - examine the skin burn models, career journals, and patient reflections and give feedback
 - assist students in finding the bone fractures on the x-rays
 - review and give feedback on the:
 - Maniken models and graphic organizer
 - experimental results and pedigree analysis
 - graph and flow chart
 - assess the students' prior knowledge on blood typing
 - discuss all the conclusion questions
 - All conclusion questions will be reviewed at the end of the activity
- Summative:
 - Students will: (*all summative assessments are evaluated using a scoring guide*)
 - present and explain their labeled skin models
 - record the skin's response to healing, sunlight, and aging in their lab journals
 - list the skin's anatomy and function in their lab notebook
 - complete:
 - their skin burn models and explain the degree of damage
 - the career journals about burn unit professionals
 - their bone repair feedback loop diagrams and healing timelines
 - all the conclusion questions
 - their lymphatic system on the Maniken models
 - the Pedigree Resource Sheet
 - write a reflection as a patient in a burn unit
 - answer:
 - the activity questions
 - all the conclusion questions
 - analyze and label the cow bone
 - label the site of the fractured bone on the x-ray
 - share their x-ray technician job ads

- label the immune and lymphatic system on their graphic organizer
- record the data from the blood typing experiment
- plot and analyze the antibody versus time graph in their lab journal
- create a flow chart on the body's response to a cold
- A written exam assessing all essential learning targets

Sample Assessment Questions:

- How do the skin and accessory organs of the skin help maintain homeostasis in the human body?
- How does burn damage to the skin affect different systems in the body?
- What should scientists and engineers consider in the development of artificial skin?
- Why would the inability to feel pain put the human body in danger?
- What is the best way to measure the level of pain a person is experiencing?
- How does the overall structure of bone provide strength and flexibility but keep bone from being too bulky and heavy?
- How do specific cells, such as osteoblasts and osteoclasts, and hormones assist with bone remodeling and blood calcium balance in the human body?
- Why is osteoporosis more common in women than in men?
- What has been the most significant advancement in the treatment of broken bones?
- How do the lymphatic and immune system work together to help maintain homeostasis in the human body?
- How does the body react when exposed to an antigen for the second time?
- Are blood transfusions safe?
- What should scientists and engineers consider in the development of artificial blood?
- Should parents be required to vaccinate their children?

Instructional Resources/Tools:

- A 5.1.1: Under my skin
- A 5.1.2: Burn unit
- A 5.1.3: Hurts so good
- A 5.2.1: Looking inside bone
- A 5.2.2: X-ray vision
- A 5.2.3: Bone remodeling and repair
- A 5.3.1: To drain and protect
- A 5.3.2: Transfusion confusion
- A 5.3.3: Fighting the common cold

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting

- Math:
 - Number Sense
 - Interpreting functions
 - Analyzing data
- Science:
 - Explaining genotypes and predicting probability of the occurrence of traits
 - Recognizing that cells differentiate and become specialized
 - Analyzing an experiment (scientific inquiry)
- Health:
 - Relationships among human body systems
 - Diseases and methods for prevention
 - Methods used to assess health

Depth of Knowledge (Section 5)

DOK: 3

Curriculum: Human Body Systems (PLTW)

Curricular Unit: Homeostasis – Health and Wellness

Instructional Unit: F. Interpret medical data about structure and function of the human body systems and describe how the systems of the body work together to maintain homeostasis and overall health

Standard Alignments (Section 2)

HECLE: HME.1.A
Knowledge: (CA) 1,3,6 (H/PE) 1,3,5
CCSS: 9-10.RI.1; 9-10.WHST.1; 9-10.WHST.8; 9-10.SL.4; 9-10.L.4; 9-10.L.5; 9-10.L.6
NETS: 1a; 2d; 4c
Performance: 1.2, 1.4, 2.1, 4.6

Unit (Section 3)

Learning Targets:

- Knowledge:
 - **Describe how the body systems respond to extreme external environments**
 - **Explain how the systems work together to maintain homeostasis in the body and to complete basic functions such as movement and communication**
 - **Illustrate disease in the human body, from its initial symptoms to eventual diagnosis and treatment**
- Skills:
 - Interpret knowledge of homeostasis in the body to design an innovative medical intervention or invention
 - Trace disease in human systems by generating a fictional case study and compiling a patient case file

Instructional Strategies:

- Project Based Learning will be implemented in the following ways – The teacher will:
 - assess the students' previous knowledge of the topics
 - introduce several activities within the unit (*see activity list in Instructional Resources/Tools section*)
 - direct the discussion and record student responses
 - ask the students to brainstorm environments or situations that push the human body to the limit
 - facilitate final reviews as students remove anatomy from the Maniken
 - answer clarification questions
 - review the essential questions and key terms of the unit

- Developing a product to increase survival in an extreme environment – students will:
 - develop a product for survival in a chosen extreme environment (desert, jungle, etc.)
 - research current products available for survival in their environment
 - bridge the connection between each body system – students will create 5 graphic organizers to link the body systems to each other
- Studying the impact of illness on the body systems – students will:
 - create a patient case study to determine how an illness impacts the body systems
 - identify biomedical personnel that will help with treating their disease
- Reflecting on the uniqueness of the human body – students will:
 - add finishing touches (hair, clothes, etc.) to their Maniken
 - reflect on their own unique identity and on the information they learned throughout the course
 - disassemble their Maniken

Assessments/Evaluations:

- Formative:
 - The teacher will:
 - use a scoring guide to evaluate the students' projects and give feedback
 - review and give feedback for the:
 - graphic organizers and summaries
 - course and career reflections
 - use a scoring guide to evaluate the case files and presentations and give feedback
 - All the conclusion questions will be reviewed at the end of the project
- Summative – students will: (*all summative assessments are evaluated using a scoring guide*)
 - present their product to the class and demonstrate its use
 - vote on the product with the greatest impact
 - complete their graphic organizers
 - write a brief summary of the role of the body systems for each function
 - complete and present their case study
 - write about the medical professionals involved with disease diagnosis and treatment
 - record their reflections on their identity and their course experience
 - discuss the career of interest that they learned throughout the course
 - answer all the conclusion questions

Sample Assessment Questions:

- How does the body's reaction to the external environment impact the internal environment?
- What medical innovation would have the greatest impact on human survival?
- What type of environmental conditions put the greatest stress on the human body?
- How do medical interventions help medical professionals and patients prevent, diagnose, and treat disease?

Instructional Resources/Tools:

- B 6.1.1: Surviving the extremes
- A 6.1.2: Putting it all together
- B 6.1.3: Building a case
- A 6.1.4: Finishing touches

Cross Curricular Connections:

- ELA:
 - Reading
 - Speaking
 - Listening
 - Writing
 - Researching
 - Presenting
- Health:
 - Relationships among human body systems
 - Diseases and methods for prevention
 - Methods used to assess health
 - Examine system function and disease formation

Depth of Knowledge (Section 5)

DOK: 3