Unit #6: Blood, Cardiovascular System

Content Area: **Science**
Course(s): **Anatomy and Physiology**
Time Period: **Third Marking Period**
Length: **5 Week**
Status: **Published**

Unit Overview

This chapter begins with an investigation in the structure and function of the various components of the blood. Students will also investigate what determines one's blood type, how they differ structurally and how this information can be applied. Once students have a good understanding of this, they will explore the structures and functions of the cardiovascular system. The will draw conclusions about the relationship between the blood and the cardiovascular system.

STAGE 1- DESIRED RESULTS

Educational Standards

2020 New Jersey Student Learning Standards- Science

Performance Expectations

Life Sciences

SCI.HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
SCI.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

Science and Engineering Practices

- Practice 1: Asking Questions and Defining Problems
- Practice 2: Developing and Using Models
- Practice 3: Planning and Carrying Out Information
- Practice 4: Analyzing and Interpreting Data
- Practice 5: Using Mathematics and Computational Thinking
- Practice 6: Constructing Explanations and Designing Solutions
- Practice 7: Engaging in Argument from Evidence
- Practice 8: Obtaining, Evaluating, and Communicating Information

Cross Cutting Concepts

- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Functions
- Stability and Change

Disciplinary Core Ideas

Life Sciences

- LS1.A: Structure and function
- LS1.B: Growth and development of organisms
- LS1.C: Growth and development of organisms
- LS3.B: Variation of traits

Essential Questions

- What are the components of blood and how do they affect the function of the blood?
- What functions of the cardiovascular system help the blood to complete its function?
- What are the components of the heart and how do they function?

- How do arteries and veins help to maintain homeostasis in the body?
- How does the cardiovascular system respond to various changes in blood components, viscosity, pressure, blockages and injury?

Enduring Understanding

- The blood and cardiovascular system provide heat and essential molecules and remove deleterious waste from all tissues of the body.
- The heart is a pump that creates enough force to circulate the blood through the entire body.
- The significance of a four-chambered heart.
- The pathway of oxygen and carbon dioxide.

Students will know...

Vocabulary Definitions:

pulmonary circulation, systemic circulation, coronary circulation, hepatic circulation, coronary diseases, antigen, antibody, plasma, erythrocytes, leukocytes, platelets, viscosity, arteries, veins, atrium, ventricle, capillaries, pericardium, epicardium, myocardium, endocardium, tunica externa, tunica media, tunica intima, valve, diameter

Predictable misconceptions:

- Students may believe that blood is produced by the heart.
- Students may believe that if blood from two different individuals mixes, the blood types will mix.
- Students may believe that arteries carry red blood and veins carry blue blood.
- Students may believe that the heart is the processing center for feelings and emotions.

Students will be able to...

- indicate the composition, volume and proportions of whole blood.
- evaluate the role of ABO and Rh blood groups in the health of an individual.
- analyze the blood clotting process.
- design a model of the heart to understand the process of blood circulation.

- trace the pathway of blood through the heart, into the body and back.
- compare and contrast the structure and function of the arteries, veins and capillaries.
- explain the consequences of blood clots, atherosclerosis and other potential cardiovascular diseases.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment Suggestions

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments Suggestions

1. blood type mystery - uses knowledge of blood types and transfusions to solve mysteries
2. evaluate components in hematocrit
3. blood quiz
4. follow a drop of blood - label & identify structures & functions of heart
5. research sickle cell anemia to illustrate the relationship between structure & function
6. card sort - pulmonary & systemic circulation
7. explain importance of coronary circulation by studying what happens during a heart attack
8. circulation quiz
9. sheep heart dissection lab
10. heart anatomy quiz
11. factors that affect heart rate investigation lab
12. research variables that affect blood pressure to support cause & effect relationship in homeostasis
13. blood pressure & heart rate quiz
14. blood smear slide comparison

Benchmark Assessments

chapter 10 test: blood

chapter 11 test: cardiovascular system

STAGE 3- LEARNING PLAN

Instructional Map

- composition & function of blood
- hemostasis

- blood groups & transfusion
- developmental aspects of blood
- malaria and sickle cell anemia
- anatomy & physiology of the heart
- anatomy & physiology of the blood vessels
- circulation
- heart rate, pulse & blood pressure

Modifications/Differentiation of Instruction

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just single-subject areas

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means

- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

504 Plans

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

Modification Strategies

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials
- Use of Additional Reference Material
- Use of Audio Resources

High Preparation Differentiation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations

- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation Differentiation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

See Appendix

Vertical Integration- Discipline Mapping

Prerequisites: Students who wish to take Honors Anatomy & Physiology should have earned and A or B in both Biology and Chemistry courses.

Students who have successfully completed Honors Anatomy & Physiology are encouraged to enroll in: Physics, Zoology, Forensics or Human Impact on the Environment

Additional Materials

Textbook : Essentials of Human Anatomy & Physiology 11e, Elaine N. Marieb masteringaandp.com

Internet Resources

Parts of Blood https://www.youtube.com/watch?v=nLWemF0VnI0

Why Do Blood Types Matter? https://www.youtube.com/watch?v=xfZhb6lmxjk&t=2s

Malaria and Sickle Cell Anemia https://www.youtube.com/watch?v=Zsbhvl2nVNE

Healthline Body Maps http://www.healthline.com/human-body-maps/heart

Crash Course, Anatomy & Physiology: Blood, Part 1 https://www.youtube.com/watch?v=HQWlcSp9Sls

Crash Course, Anatomy & Physiology: Blood, Part 2 https://www.youtube.com/watch?v=9-XoM2144tk

Crash Course, Anatomy & Physiology: The Heart, Part 1 https://www.youtube.com/watch?v=X9ZZ6tcxArI&t=542s

Crash Course, Anatomy & Physiology: The Heart, Part 2 https://www.youtube.com/watch?v=FLBMwcvOaEo&t=6s

Crash Course, Anatomy & Physiology: Blood Vessels, Part 1 https://www.youtube.com/watch?v=v43ej5lCeBo

Crash Course, Anatomy & Physiology: Blood Vessels, Part 2 https://www.youtube.com/watch?v=ZVklPwGALpI

What Happens During a Heart Attack? https://www.youtube.com/watch?v=3_PYnWVoUzM&t=59s