Unit 6 - The Cardiovascular System

Content Area: **Science**
Course(s): **CP Physics, Accelerated Physics, CP Anatomy & Physiology I, CP Anatomy & Physiology II**
Time Period: **Marking Period 3**
Length: **6 weeks**
Status: **Published**

Course Pacing Guide

Unit	Marking Period	Weeks
Unit 5: The Respiratory System	3	4
Unit 6: The Cardiovascular System	3	6
Unit 7: The Circulatory & Lymphatic System	4	5
Unit 8: The Muscular System	4	3

Unit Overview

The living body is in constant chemical communication with its external environment. Nutrients are absorbed through the lining of the digestive tract, gases move across the thin epithelium of the lungs, and wastes are excreted from the body. Even though these chemical changes occur at specialized sites, they affect every cell, tissue, and organ in a matter of moments because all parts of the body are linked together by blood, the heart, and the entire cardiovascular system. The purpose of this Unit is to examine the structure and function of the cardiovascular system in regards to its essential role in the human body.

Enduring Understandings

Describe the important components and major functions of blood.

Discuss the composition and function of plasma.

Describe the origins and production of the formed elements in blood.

Discuss the characteristics and functions of RBCs, WBCs, and platelets.

Explain the factors that determine a person's blood type, and why blood types are important.

Categorize the various white blood cells on the basis of their structure and function.

Describe the mechanisms that reduce blood loss after an injury.

Describe the location and structural features of the heart.

Identify the layers of the heart wall and how they function.

Trace the flow of blood through the heart, identifying major blood vessels, chambers, and heart valves.

Describe the components and functions of the conducting system of the heart.

Explain the events of the cardiac cycle and relate the heart sounds to specific events in the cycle.

Describe the major diseases, illnesses, and disorders that impact the cardiovascular system.

Summarize the effects of aging on the cardiovascular system.

Discuss the interrelationships between the cardiovascular system and other organ systems.

Essential Questions

What role does blood have in the functioning of our body?

What is the composition of blood?

What is the importance of a person's blood type?

How does your body respond to an injury that results in blood loss? What is blood clotting and how is it regulated?

How is the heart organized and how does blood flow in the heart and throughout the entire body?

What is the pacemaker and how does our heart beat in a rhythm?

What causes a heart attack and how does this impact the functioning of our body?

What effect does aging have on homeostasis and the work of the cardiovascular system?

How does the cardiovascular system work with other systems to allow the human body to successfully

function?

New Jersey Student Learning Standards (No CCS)

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-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
SCI.HS-LS1-7	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
SCI.HS-LS4-1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
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-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Amistad Integration

N/A

Holocaust/Genocide Education

N/A

Interdisciplinary Connections

HPE.2.1.12.A.1	Analyze the role of personal responsibility in maintaining and enhancing personal, family, community, and global wellness.
HPE.2.1.12.A.2	Debate the social and ethical implications of the availability and use of technology and medical advances to support wellness.
HPE.2.1.12.B.1	Determine the relationship of nutrition and physical activity to weight loss, weight gain, and weight maintenance.

HPE.2.1.12.B.2	Compare and contrast the dietary trends and eating habits of adolescents and young adults in the United States and other countries.
HPE.2.1.12.B.3	Analyze the unique contributions of each nutrient class (fats, carbohydrates, protein, water, vitamins, and minerals) to one's health.
HPE.2.1.12.C.1	Determine diseases and health conditions that may occur during one's lifespan and identify prevention and treatment strategies.
HPE.2.1.12.C.3	Determine the emotional, social, and financial impact of mental illness on the family, community, and state.
HPE.2.1.12.C.4	Relate advances in medicine and technology to the diagnosis and treatment of mental illness.
HPE.2.1.12.D.3	Analyze the relationship between alcohol and drug use and the incidence of motor vehicle crashes.
HPE.2.1.12.D.6	Demonstrate first-aid procedures, including Basic Life Support and automatic external defibrillation, caring for head trauma, bone and joint emergencies, caring for cold and heat injuries, and responding to medical emergencies.
HPE.2.1.12.E.4	Develop a personal stress management plan to improve/maintain wellness.
HPE.2.3.12.A.1	Determine the potential risks and benefits of the use of new or experimental medicines and herbal and medicinal supplements.
HPE.2.3.12.A.2	Summarize the criteria for evaluating the effectiveness of a medicine.
HPE.2.3.12.A.3	Relate personal abuse of prescription and over-the-counter medicines to wellness.
HPE.2.3.12.B.1	Compare and contrast the incidence and impact of commonly abused substances (such as tobacco, alcohol, marijuana, inhalants, anabolic steroids, and other drugs) on individuals and communities in the United States and other countries.
HPE.2.3.12.B.3	Correlate increased alcohol use with challenges that may occur at various life stages.
HPE.2.3.12.C.1	Correlate duration of drug abuse to the incidence of drug-related injury, illness, and death.
HPE.2.3.12.C.2	Analyze the effectiveness of various strategies that support an individual's ability to stop abusing drugs and remain drug-free.
HPE.2.3.12.C.3	Analyze the societal impact of substance abuse on the individual, family, and community.
HPE.2.4.12.C.2	Analyze the relationship of an individual's lifestyle choices during pregnancy and the incidence of fetal alcohol syndrome, sudden infant death syndrome, low birth weight, premature birth, and other disabilities.
HPE.2.6.12.A.1	Compare the short- and long-term impact on wellness associated with physical inactivity.
HPE.2.6.12.A.3	Determine the role of genetics, gender, age, nutrition, activity level, and exercise type on body composition.
HPE.2.6.12.A.5	Debate the use of performance-enhancing substances (i.e., anabolic steroids and other legal and illegal substances) to improve performance.

Technology Standards

TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.E.1	Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.2.12.A.3	Research and present information on an existing technological product that has been repurposed for a different function.
TECH.8.2.12.B.4	Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.

21st Century Themes/Careers

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Financial Literacy Integration

12.9.3.HL.1	Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career.
12.9.3.HL.2	Explain the healthcare workers' role within their department, their organization and the overall healthcare system.
12.9.3.HL.4	Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care.
12.9.3.HL.5	Analyze the legal and ethical responsibilities, limitations and implications of actions within the healthcare workplace.
12.9.3.HL.6	Evaluate accepted ethical practices with respect to cultural, social and ethnic differences within the healthcare workplace.
12.9.3.ST.2	Use technology to acquire, manipulate, analyze and report data.
12.9.3.ST.5	Demonstrate an understanding of the breadth of career opportunities and means to those

	opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.
12.9.3.HU-PC.1	Analyze basic principles of biology, chemistry and human anatomy for safe and effective utilization and selection of personal care products and services.
PFL.9.1.12.A.3	Analyze the relationship between various careers and personal earning goals.
PFL.9.1.12.A.4	Identify a career goal and develop a plan and timetable for achieving it, including educational/training requirements, costs, and possible debt.
CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.

Instructional Strategies & Learning Activities

Resources

Anatomy & Physiology Lesson Plans

PowerPoint Presentation

Textbook Reading

Study Guide

Video Series - The New Living Body Series, The Human Body: How It Works, Standard Deviants of Anatomy

Homework

Current Event #3 Due

Current Event #4 Due

Video Questions Due

Coloring/Labeling Packet Due

Study Guide Due

Evaluation & Assessment

Test - Major Assessment

Final Exam Study Guide

Differentiated Instruction

- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Discussion Stems
- Tiered Learning Targets
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Goal-Setting & Learning Contracts
- Game-Based Learning
- Grouping
- Socratic Seminar
- Rubrics
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning
- Student Interest & Inventory Data

Formative Assessments

Homework - Daily Notes Review

Current Event Reports in Anatomy & Physiology

Creating, Labeling, Coloring Anatomy Diagrams

Notecard/Study Guide Generation

Daily Questioning

Review Games

Unannounced, non-graded quizzes

Short comparative assessment to see how students are performing compared to peers.

Summative Assessment

End of Unit Major Test

Unit-Based Project

Semester Final Exam

Benchmark Assessments

Pre-Test at Beginning of Semester

Final Exam serves as Post-Test at End of Semester

Alternate Assessments

Students with an applicable IEP are provided a Modified Format Test

All assessments include:

- Word Bank for Matching.
- Word Bank for Fill-In.
- Word Bank for Diagrams.
- Diagrams in Color to help distinguish anatomical structures.
- Student-generated study guide for use on test.

Resources & Technology

- Canvas Course Managment Program (Computer & Phone App)
- Genesis
- Email communication with Instructor

- Use of Personal Device - laptop, chromebook
- Videomicroscope
- Video Series - The New Living Body Series, The Human Body: How It Works, Standard Deviants of Anatomy
- Anatomical Models
- Lab Equipment - Reflex Hammer, Stethoscope, Blood Pressure Cuff, etc.

BOE Approved Texts

Essential of Anatomy & Physiology - 4th edition, 2007

ISBN: 0-8053-7303-9

Closure

- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Sequence It - create timelines of major events discussed.
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.

ELL

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions

- Frequent Breaks
- E-Dictionaires
- Google Translate

Special Education

- Shorten assignments to focus on mastery of key concepts.
- Evaluate the classroom structure against the student's needs.
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Use a study carrel.
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Permit as much time as needed to finish tests.
- Divide tests into small sections of similar questions or problems.
- Show a model of the end product of directions.
- Stand near the student when giving directions or presenting a lesson.

504

- Preferential seating.
- Extended time on tests and assignments.
- Verbal, visual, or technology aids.
- Behavior management support.
- Excused lateness, absence.
- Pre-approved nurse's office visits.

At Risk

- Have student restate information.
- Provision of notes or outlines.
- Concrete examples.
- Use of a study carrel.
- Assistance in maintaining uncluttered space.
- School to home communication via Genesis, Canvas, Email.
- No penalty for spelling errors or sloppy handwriting.
- Follow a routine/schedule.
- Teach time management skills.
- Verbal and visual cues regarding directions and staying on task.
- Adjusted assignment timelines.
- Immediate feedback.
- Work-in-progress check.
- Pace long-term projects.
- Preview test procedures.
- Cue/model expected behavior.
- Use de-escalating strategies.
- Use peer supports and mentoring.

Gifted and Talented

- Focus on effort and practice.
- Offer the Most Difficult First.
- Offer choice.
- Speak to Student Interests.
- Allow G/T students to work together.
- Encourage risk taking.