Unit #1: Human Body Orientation & Basic Chemistry

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

Unit Overview

This introductory unit is designed to access previous knowledge about homeostasis and learn to apply it to an individual organism: the human body. Studying the body from the chemical level through the organism as a whole, one relationship is recurring: structure affects function. Students will be introduced to medical terminology as it is used to navigate around the body, different positions, body regions and cavities. We will review Chemistry in terms of how it relates to maintaining homeostasis in the body's functions and dysfunctions.

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-LS1-6	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-LS1-2	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.

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

- 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

Essential Questions

- How does the study of Anatomy & Physiology help one to understand the body's structures & functions?
- How is homeostasis maintained through negative and positive feedback loops?

- How do the chemical properties of elements relate to their structure and function in the body?
- How can this information be applied?

Enduring Understanding

- The essential connection between structure and function.
- The increasingly complex levels of organization in the body.
- Essentially all functions and dysfunctions of the body come down to chemical interactions.
- Study of Anatomy & Physiology is a foundation of a number of career opportunities.

Students will know...

Vocabulary Definitions:

anatomy, physiology, atoms, tissue, organ, organ system, organism, homeostasis, control center, homeostatic imbalance, receptor, effector, names of body cavities, directional terms

Predictable misconceptions:

- Students may believe that the human body is made up of many different elements. However, students will understand that the human body is made up of only four basic macromolecules.
- Students may believe that function and structure are unrelated.
- Students may believe that all organs must be functioning well in order to maintain health, but may not realize the how the body maintains health through homeostatic balance affecting a large number of chemical processes.

Students will be able to...

- explain how anatomy & physiology are related.
- locate and categorize organs by organ system and function.
- explain homeostasis as a dynamic state of balance and emphasize its importance.

- use directional terms and body regions to navigate around the human body.
- summarize why particular fields of study and career paths require the study of Anatomy & Physiology

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

- Greek & Latin roots – sort through and combine prefixes, root words and suffixes to build

medical terminology.

- vocabulary quiz
- How much are you worth? – analyze the different elements that make up the human body; calculate their percentages based on body weight and estimate a dollar value of their total composition of elements
- anatomical position - stand in anatomical position and compare/contrast it to a “natural stance
- directional terms Simon Says – point to the directional term when it is called out by the leader
- label body regions – use post-it notes to label body regions
- anatomical orientation quiz
- “organize” – work in teams and use cards to organize the organs of the body by their “anatomy” (body cavity) and by their “physiology” (body system)
- body system quiz
- cell reproduction & cancer (cell reproduction virtual lab) - compare different rates of growth in healthy cells and a variety of cancers

Benchmark Assessments

- chapter 1 test: human body orientation
- chapter 2 test: basic chemistry

STAGE 3- LEARNING PLAN

Instructional Map

- an overview of anatomy & physiology
- levels of structural organization
- maintaining life / homeostasis

- language of anatomy
- matter & energy
- biochemistry

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

- Teacher Resources – e-Textbook – Essentials of Human Anatomy and physiology by Marieb,
- http://nj.pbslearningmedia.org/resource/lsps07.sci.life.stru.bodysystems/all-systems-are-go/
- Internet Resources – Body systems mapping - http://www.anatomycorner.com/intro/organ_systems_blanks.jpg
- Jeopardy review game - https://www.superteachertools.us/jeopardyx/jeopardy-review-game.php?gamefile=349866#.VcQlHjorfdk
- Interactive games - https://www.wisc-online.com/learn/natural-science/life-science/ap15405/anatomical-terminology-body-regions
- http://sciencenetlinks.com/interactives/systems.html
- http://www.anatomyarcade.com/games/matchingGames/MatchABodySystem/matchABodySystem.html
- Understanding matter and energy: http://interactivesites.weebly.com/matter-chemical--physical.html
- http://www.glencoe.com/sites/common_assets/science/virtual_labs/E04/E04.html
- http://www.sciencemuseum.org.uk/onlinestuff/games/energy_flows.aspx
- To learn about lipids: http://www.wisc-online.com/objects/index_tj.asp?objID=AP13204
- To learn about proteins: http://www.wisc-online.com/objects/index_tj.asp?objID=AP13304
- To learn about carbohydrates: http://www.wisc-online.com/objects/index_tj.asp?objID=AP13104

- http://www.wiley.com/college/test/0471787159/biology_basics/home.html
- http://apchute.com/
- Cancer cell reproduction
  http://glencoe.mheducation.com/sites/dl/free/0078802849/383933/BL_23.html
- Introduction to Anatomy & Physiology: Crash Course #1
  https://www.youtube.com/watch?v=uBGl2BujkPQ&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8