Unit 1 :Human Body Orientation & Basic Chemistry

Content Area: **Science**
Course(s): **Anatomy and Physiology**
Time Period: **First Marking Period**
Length: **3 weeks**
Status: **Published**

Unit Overview

This introductory chapter to Human Anatomy and Physiology is about the relationship between structure and function. It goes onto explain the complexity of the human body from atoms to organ systems. Anatomical terminology is further introduced to reference positions of body organs and cavities. Basic Chemistry as related to the structure and function of the human body is described in detail along with the process of Homeostasis and its importance in body functioning.

STAGE 1- DESIRED RESULTS

Standards- 2020 New Jersey Student Learning Standards- Science

SCI.9-12.HS-LS1	From Molecules to Organisms: Structures and Processes
SCI.9-12.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.9-12.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
SCI.9-12.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.9-12.HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
SCI.9-12.HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
SCI.9-12.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.9-12.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.

Science and Engineering Practices

- Analyzing and Interpreting Data
- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information
- Planning and Carrying Out Information

DCI

Cross Cutting Concepts

- Cause and Effect
- Interdependence of Science, Engineering, and Technology
- Structure and Functions

Essential Questions

- How does the study of Anatomy and Physiology help one to understand body structures and functions ?
- How is Homeostasis maintained through negative and positive feedback mechanisms ?
- How does the body maintain various pH levels within the body ?
- What are the different chemicals that the human body is made up of and relate its connections to the bodily functions ?

Enduring Understanding

- The understanding that structure and function in the human body is closely related.
- The human body is arranged in an increasingly complex series of levels from atoms to organ systems.
- The body is composed of chemicals that underlie and provide for all bodily functions.

Students will know...

Vocabulary Definitions:

Students understand the definitions of anatomy, physiology, atoms, tissues, organ, organ system, organism, 11 organ systems, homeostasis, control center, homeostatic imbalance, human body landmarks, body planes and sections.

Predictable misconceptions:

Students may think that human body is made up of many different compounds and elements. Students will understand that human body is made up of only four basic macromolecules.

Student may think that function and structure are two different concepts.

Students may know that to maintain general health all organs have to work well, but may not realize that maintenance of homeostasis is the key to maintenance of health.

Students will be able to...

- Analyze how anatomy and physiology are related.
- Categorize and classify by organ system all organs discussed.
- Define homeostasis and explain its importance.
- Synthezise their knowledge of proper anatomical terminology to describe body directions, surfaces, and body planes.
- Evaluate the importance of the four essential elements in the human body.
- Compare and contrast the structure and functions of DNA and RNA.
- Explain the importance of ATP in the body.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment

- 3- Minute Pause
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check

- Observation
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments

1. Anatomy of a Dill Pickle - Students understand the anatomical terms in the human body and experience anatomical dissection by dissecting a Dill Pickle.

2. How much are you worth - Students analyze the different elements that the human body is made up of. Then the students calculate their body weight in terms of the elements they are made up of. Finally, students estimate their value in terms of dollars.

3. Students play an interactive game. Each student is given an index card with either the name of an organ or an organ system or the function of the organ system stated in it. With music in the background, students find their pairs within a short period of time. Students repeat the game till they have memorized each organ, connected organ system and their functions.

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Benchmark Assessments

Chapter test on 1. Human Body Orientation

Chapter test on 2. Basic Chemistry

STAGE 3- LEARNING PLAN

Instructional Map

- Use of Anatomy and Physiology e-text to do readings on the topic.
- Study guides, Chapter notes.
- Online assessments/tools.
- Have students stand and assume the anatomical position. Ask the students to comment on how that position differs from the "usual" standing position and to explain why knowing this position is important to precisely identify anatomical terms and physiological processes.
- Call out anatomical terms (buccal, femoral, etc.) and have the students (as a group) point out the named regions on their own bodies. Alternatively, organize students into small groups/teams for a quiz with a game show format with cards that have body landmarks they must demonstrate on their bodies or draw out.
- Have students find a series of landmarks on their own bodies, providing a list of landmarks for the students to locate. Use real-life examples to help the students better understand the terminology. For example, the list could include items such as "the location where a necktie is worn," "the location of a belly button piercing," and so on. Have the students do this in small groups so they can discuss the terms with each other and begin to develop camaraderie among the group.
- Have students extract DNA from fruit, such as bananas or strawberries, so they can visualize the genetic material.
- Have students investigate why fat-soluble vitamins should be taken after a meal, while water-soluble vitamins do not need to be, but should be taken with plenty of water.

Modification/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

<u>Differentiation Strategies for Gifted and Talented Students</u>

- 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

- Cooperative Grouping
- Extended Time

- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-direct
- Repeated Drill and Practice
- Teacher Notes
- Tutorials
- Use of Additional Reference Materials
- Use of Audio Resources

Differentiation Strategies

High Preparation

- Alternative Assessments
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Literature Circles
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation

- Choice of Book / Activity

- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Open-ended Activities
- Think-Pair-Share by Readiness, Interest, or Learning Style
- Use of Collaboration
- Use of Reading Buddies
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

See Appendix

Vertical Integration- Discipline Mapping

In grade 6, students complete a unit on "Diversity of Life". This leads into "Populations and Ecosystems" in grade 7. In grade 8 students study "Human Systems Interactions" and "Heredity and Adaptations". In freshman year, students study Biology, a full year required course, and in sophomore year take Chemistry. After that, students have taken Anatomy and Physiology. This course will continue to focus on having students gain a deeper understanding of the Performance Expectations outlined in the NGSS, particulary in Life Sciences and Engineering Design. After this, students will be able to chose from Physics, Human Impact on the Environment, Forensics and Zoology.

Additional Materials

Textbook : etext of masteringaandp.com

Internet Resources –

Teacher Resources – e-Textbook – Essentials of Human Anatomy and physiology by Marieb,

http://www.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