Unit #2: Cells, Tissues & Integumentary System

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

Unit Overview

Cell as the fundamental building block of life which is emphasized by the Cell Theory is introduced in this chapter. The anatomy of a generalized cell and the physiology of all the cell structures is discussed next. Different types of cells and the cell transport processes are presented then. Protein synthesis and the process of cell replication is discussed next. Students will explore the phenomenon of cancerous cell growth. Body tissues and membranes are then presented. Students will then learn about the skin, the largest organ of the body along with all its accessory structures.

STAGE 1- DESIRED RESULTS

Educational Standards

2020 New Jersey Student Learning Standards- Science

Performance Expectations

Life Sciences

SCI.HS-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
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.A: Inheritance of traits
- LS3.B: Variation of traits

Essential Questions

- What is the role of cell organelles in the general functioning of the human body?
- What are the different types & how does their shape and structure relate to their specific functions?
- What is the role of different body tissues and the body membranes in the human body?
- How does the process of DNA replication, protein synthesis help you understand the importance of cell division?
- What happens to a cell that divides too rapidly?
- Are all cancers the same?
- What are the important functions of the integumentary system and their derivatives?
- How does the pigment melanin determine the human skin/hair/eye color?
- How do skin conditions affect the ability of the skin to perform its functions?
- What are the characteristics of basal cell carcinoma, squamous cell carcinoma and malignant melanoma?
- How does a burn affect the various layers of skin?

Enduring Understanding

- The cell is the basic structural and functional unit of all living things.
- Living things can be described, organized and classified by different criteria for deeper understanding.
- Skin is an example of an organ comprised of various tissues working together to perform common functions.
- When the structures of a tissue/organ are affected by a disease or condition, the ability of that tissue/organ to function will be affected.

Students will know…

Vocabulary Definitions:

cell, cell theory, mosaic model, nucleus, plasma membrane, membrane junctions, cytoplasmic organelles, cell extensions, cell diversity, cell physiology, protein synthesis, mitotic index and body

tissues

Predictable misconceptions:

- Students may not understand that all body functions (digestion, respiration, aging, etc) are essentially cellular functions.
- Students may believe that all cancers are the same, grow at the same rate and can be treated in the same way.
- Students may not understand that skin is made up of different layers with unique functions.
- Students may believe your skin does not change in response to internal stimuli such as metabolism and external stimuli like UV exposure and friction.
- Students may believe that the cause of a burn determines the severity.

Students will be able to...

- Compile a list of the functions of major cell organelles in the functioning of the human body.
- Demonstrate where each major tissue type occurs within the human body and describe the structure and function of the four major tissue types.
- Illustrate and label major tissues types using the microscope slides and online tools as reference.
- Analyze the structure and function of each layer of skin, the accessories and the interdependence among all structures.
- Evaluate the factors that determine skin color.
- Compare and contrast the different types of skin conditions and cancers and the stages of, causes of preventions and treatments.
- Compare and contrast the degrees of burns, identify first aid for each and identify the affected structures for each.

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. label a picture of the generalized cell with the organelles and structures
2. create a graphic organizer of the organelles & their functions
3. small group activity - campaign for the best cellular organelle
4. diffusion lab - compare cellular transport methods
5. cancer growth investigation/simulation
6. compare the histological slides of tissues with the diagrams on the microscope (online histology library) and create graphic organizer comparing structure and functions of 4 tissue types
7. identify tissue types from verbal descriptions or pictures (simple squamous, stratified squamous, etc) and suggest locations in the body different tissue arrangements can be found, based on their structure and function

8. identify various parts of the skin and its derivatives on a virtual or drawing model of the skin
9. discuss tattooing and use it as a model to emphasize learning the layers of the epidermis and dermis. Use cross-sectional picture of skin structure to show where ink is initially deposited, where it is distributed and why tattoos can fade over time
10. receptors in the skin lab: touch, pain, thermo Lab activity
11. case studies
12. discuss the various mechanisms of blistering, causes (thermal/UV/friction)
13. use the Rule of 9s and degree levels of burns to evaluate the severity of burns in order to formulate what structures are affected and what health risks associated
14. individual research - skin conditions, pathologies and cancers in the format of an informational brochure one would find in a health care office

Benchmark Assessments

- chapter 3 test: cells & tissues
- chapter 4 project: skin pathology pamphlet

STAGE 3- LEARNING PLAN

Instructional Map

- cell theory
- structure & function of a cell
- cancer growth
- epithelial tissue
- connective tissue
- muscle tissue

- nervous tissue
- development of tissue
- structure & function of skin
- skin color
- burns
- pathologies & conditions

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
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- **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
- The immortal cells of Henrietta Lacks - Robin Bulleri- https://www.youtube.com/watch?v=22lGbAVWhro&t=1s
- Cancer cell reproduction http://glencoe.mheducation.com/sites/dl/free/0078802849/383933/BL_23.html
- How does cancer spread through the body? - Ivan Seah Yu Jun- https://www.youtube.com/watch?v=OcigJn8UJNQ
- Why We Haven't Cured Cancer (Sci Show)- https://www.youtube.com/watch?v=7tzaWOdvGMw
- Virtual Lab - Cell Reproduction-

http://glencoe.mheducation.com/sites/dl/free/0078802849/383933/BL_23.html

- Tissues, Part 1: Crash Course Anatomy & Physiology #2 https://www.youtube.com/watch?v=i5tR3csCWYo&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=2
- Tissues, Part 2-Epithelial Tissue: Crash Course Anatomy & Physiology #3- https://www.youtube.com/watch?v=lUe_RI_m-Vg&index=3&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8
- Tissues, Part 3-Connective Tissue: Crash Course Anatomy & Physiology #4 - https://www.youtube.com/watch?v=D-SzmURNBH0&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=4
- Tissues, Part 4-Types of Connective Tissue: Crash Course Anatomy & Physiology #5- https://www.youtube.com/watch?v=Jvtb0a2RXaY&index=5&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8
- The Integumentary System, Part 1 - Skin Deep: Crash Course Anatomy & Physiology #6- https://www.youtube.com/watch?v=Orumw-PyNjw&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=6
- The Integumentary System, Part 2 - Skin Deeper: Crash Course Anatomy & Physiology #7- https://www.youtube.com/watch?v=EN-x-zXXVwQ&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=7
- The Science of Skin Color - Angela Koine Flynn - https://www.youtube.com/watch?v=_r4c2NT4naQ&t=9s
- What makes Tattoos Permanent?- https://www.youtube.com/watch?v=DMuBif1mJz0
- How do Scars Form? -Sarthak Sinha- https://www.youtube.com/watch?v=ucRMDdw82yw
- Burns: Classification & Treatment- https://www.youtube.com/watch?v=Dsvtzwp4nG8
- The Rule of Nines- https://www.youtube.com/watch?v=7fK6tQ01Ap0
- Mitosis - The Cell Cycle & Cancer - https://www.youtube.com/watch?v=w2ZfH3Jp5p8