

Unit 2 : Cells Tissues/Integumentary System

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

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-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
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.

Science and Engineering Practices

- Analyzing and Interpreting Data
- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Developing and Using Models
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information

Cross Cutting Concepts

- Cause and Effect
- Interdependence of Science, Engineering, and Technology
- Stability and Change
- Structure and Functions
- Systems and System Models

Disciplinary Core Ideas

Physical Sciences

Life Sciences

- LS1A: Structure and Functions
- LS1B: Growth and Development of Organisms
- LS1D: Information Processing
- LS3A: Inheritance of Traits
- LS3B: Variation of traits

Earth and Space Sciences

Engineering. Technology. and Applications of Science

- ETS1B: Developing Possible Solutions

Essential Questions

What is the role of cell organelles in the general functioning of the human body ?

What are the different cell types and how does their shape and structure relate to their special 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 are the important functions of the integumentary system and their derivatives ?

How does the pigment melanin determine the human skin color ?

What are the characteristics of basal cell carcinoma, squamous cell carcinoma, and malignant melanoma ?

Enduring Understanding

- Cell is the basic structural and functional unit of all living things.
- Living things can be described, organized and classified for understanding.
- Skin is an example of an organ comprised of various tissues working together to perform various functions.

Students will know...

Definitions:

cell theory, fluid mosaic model, nucleus, plasma membrane, membrane junctions, cytoplasmic organelles, cell extensions, cell diversity, cell physiology, protein synthesis, and body tissues.

Misconceptions:

Students will be made aware that all living cells are all basically made up of four main macromolecules.

Students may not know that the skin is made up of many layers.

Students are also made aware of the fact that skin color cannot be changed through any means and it is a

genetic trait.

Students may not be aware that there is a relationship between cell cycle, cell aging and how it relates to cancer.

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 types occurs within the human body and describe the structure and function of the four major tissue types.
- Illustrate and label the major tissue types using the microscope/online tools.
- Analyze the structure and function of each layer of skin and its derivatives.
- Evaluate the factors that determine skin color.
- Justify the role of accessory organs associated with the skin.
- Compare and contrast the different types of skin cancer and the stages of, causes, preventions and treatments.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment

- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- 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

- Group activity - to campaign for the best cellular organelle.
- Compare the histological slides of tissues with the diagrams on the microscope/on the computer.
- Identify various parts of the skin and its derivatives on a poster/model of the skin.
- Touch/Pain/Thermo/receptor lab activity.
- Create 3-D models of the skin.
- Case studies.
- Lab reports.

Benchmark Assessments

- Chapter test on Cells.
- Chapter test on Tissues and its functions.
- Chapter test on Skin and its Body membranes.

STAGE 3- LEARNING PLAN

Instructional Map

- Have students label a picture of the generalized cell with the organelles and structures.
- Have students create or fill out a chart of organelle functions.
- Have students create a fluid-mosaic model of the cell membrane out of various lollipops or use paper to make a 3 D model of the same.
- Have students go to the board to draw out how a substance can be brought into the cell: endocytosis, pinocytosis etc.
- Have students look at several cell types and draw what they see. Point out similarities and differences,

and ask them to guess the various functions based on structure.

- Have students identify tissue types from verbal descriptions or pictures, such as simple squamous, stratified squamous and so on. Have students explain the first part of the nomenclature (simple or stratified) means, that is, number of layers of cells, and what the second part of the nomenclature (cuboidal, columnar) means, that is, shape of the cells at the apical surface. This can be worked into the format of a game show, such as Jeopardy.
- Demonstrate the structure of the skin using a 3-D model.
- Discuss tattooing and use it as a model to emphasize learning the layers of the epidermis and dermis. Use a cross-sectional picture or model of skin structure and show where the ink initially is deposited, where it is distributed, and why tattoos can fade over time.
- Discuss the various mechanisms of blistering, sunburn blisters versus pressure/friction blisters versus fracture blisters, for example.
- Expand their knowledge of skin cancer by introducing them to various kinds of skin cancers.

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

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

- Cooperative Grouping
- Extended Time
- 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
- Literature Circles
- Multiple Texts
- 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
- Mini Workshops to Re-teach or Extend Skills
- 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 Intergration- 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, particularly 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

Online materials:

www.cellsalive.com

Video on "War on Cancer"

www.smm.org/tissues

www.bioanim.com

www.iknowthat.com/ScienceIllustrations/humanbody/science-desk.swf

<http://www.montville.net/Page/4532>