Unit 02: From Molecules to Organisms - Structure & Process (Week 7 - Week 10)

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

- **MS-LS1-1**
  Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different types of cells.
  Clarification: Focus on cell structure and function for unicellular vs. multicellular organisms.

- **MS-LS1-2**
  Develop and use a model to describe the function of a cell as a whole and ways that parts of cells contribute to the function.
  Clarification: Emphasis on organelles and their specialized roles (nucleus, mitochondria, chloroplasts, etc.).

- **MS-LS1-3**
  Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
  Clarification: Focus on systems like the circulatory, respiratory, and digestive systems and how they work together.

- **MS-LS1-4**
  Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction.
  Clarification: Examples include animal mating behaviors and plant structures like flowers and seed dispersal mechanisms.

- **MS-LS1-5**
  Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
  Clarification: Focus on environmental factors (e.g., light, water, nutrients) and genetic predispositions.

- **MS-LS1-6**
  Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
  Clarification: Emphasis on how carbon dioxide, water, and light create glucose and oxygen.

- **MS-LS1-7**
  Develop a model to describe how food is rearranged through chemical reactions to form new molecules that support growth or release energy as this matter moves through an organism.
  Clarification: Focus on digestion and energy transfer processes in organisms.

- **MS-LS1-8**
  Gather and synthesize information that sensory receptors respond to stimuli by sending messages to

the brain for immediate behavior or storage as memories.
Clarification: Focus on the nervous system, sensory inputs, and response mechanisms.

New Jersey Student Learning Standards

LA.K-12.NJSLSA.R9	Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
LA.RST.6-8	Reading Science and Technical Subjects
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
SCI.MS-LS1	From Molecules to Organisms: Structures and Processes
SCI.MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
SCI.MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
SCI.MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
SCI.MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
SCI.MS-LS1-8	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Integration of Career Readiness, Life Literacies and Key Skills

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.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.
TECH.8.1.8.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.8.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
TECH.8.2.8	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.8.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.8.A.1	Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e., telephone for communication - smart phone for mobility needs).
TECH.8.2.8.A.2	Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

LA.RL.7	Reading Literature
	Key Ideas and Details
LA.RL.7.1	Cite several pieces of textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.RL.7.2	Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.
LA.K-12.NJSLSA.R2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
	Integration of Knowledge and Ideas
LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
LA.RL.7.7	Compare and contrast a written story, drama, or poem to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, or camera focus and angles in a film).
LA.K-12.NJSLSA.W	Writing
	Text Types and Purposes
LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid

	reasoning and relevant and sufficient evidence.
LA.K-12.NJSLSA.W9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
LA.W.7.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.7.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit…

Organisms are composed of cellular units that carry out the functions required for life. Cells, tissues, and organs are structured as specialized systems to serve the needs of the organism. Every cell is a highly organized structure that is responsible for the form and function of an organism. Some organisms consist of only one cell; others consist of trillions of cells organized into interconnected organ systems. By understanding the nature and complexity of life at the cellular level, we can begin to understand and appreciate the marvels of living things.

Meaning

Essential Questions

Essential Questions

How does a cell's components, shape, size and structure relate to the function of a living organism?

What enables eukaryotes to perform more specialized functions than prokaryotes do?

How are the structures of cells, tissues, organs, and systems related to their functions in supporting life?

How do all body systems work together to achieve homeostasis?

How do organisms live and grow?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

The cell is the most basic unit of organisms and carries out specific functions to support life.

Most cells contain a set of observable structures called organelles which allow them to carry out life processes.

Cells differentiate and multiply to form many cells, tissues, and organs that compose the final organism.

Systems of the body are interrelated and regulates a body's internal environment.

Microscopes are tools that allow the observation and study of very small objects such as cells.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and energy. Living organisms use matter and energy to build their structures and conduct their life processes, have mechanisms and behaviors to regulate their internal environments and to respond to changes in their surroundings. Knowledge about life processes can be applied to improving human health and well-being.

The Structure and Function in Living Systems: Living systems, at all levels of organization, demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, whole organisms, and ecosystems.

Cells Are The Basis Of Life: All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms, including humans, are multicellular.

Cells Have Specific Responsibilities: Cells carry on the many functions needed to sustain life. They grow and divide, thereby producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.

From Molecules to Organisms: Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form a tissue. Different tissues are in turn grouped together to form larger functional units, called organs. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.

A Structure and Function Relationship: The human body has systems that perform functions necessary for life. Major systems of the human body include the digestive, respiratory, reproductive, and circulatory systems.

Skills

Skills

Student will be skilled at …

Students will develop a definition of life by discussing the characteristics of living and nonliving things. Students will determine what is required for living things to survive.

Students will identify names and functions of each part of the cell. Students will explain how important the nucleus is to the function of the cell.

Students will differentiate between plant and animal cells and the specific organelles required to complete the appropriate functions.

Students will describe the function of a selectively permeable membrane. Students will explain how the processes of diffusion and osmosis move molecules in living cells.

Students will use appropriate instruments to observe, describe, and compare various types of cells.

Students will describe how the needs of organisms at the cellular level are met by tissues and organ systems.

Students will relate the structures of cells, tissues and systems to their function of supporting the human body.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

Internet/Videos

Interactive Notebooks/Materials

Google Presentations

Interactive Websites

Document Camera

Lab Materials

Copies of Student Activity Materials

Formative Assessment Strategies

Formative Assessment Strategies

Observation/Discussion/Informal Questioning

Interactive Notebook Activities/Graphic Organizers

Quizzes/Checkpoints/Wrap-Ups

Peer/Self Assessments (Reflection)

Notebook Checks

Virtual labs

Learning Activities/Unit of Study

Learning Activities/Unit of Study

Characteristics of Living Things: Are Cars Living? Debate

Cell Organelles: Cell Explorer Game; Cells in Real Life

Cells to Systems: Human Body Stations; Human Body System Game

Are Cars Living? Debate
Cell Explorer Game
Cells in Real Life
Human Body System Game

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many

teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.