Unit 03: Cellular Structure and Function

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

Standards Alignment

New Jersey Student Learning Standards

LS1: From Molecules to Organisms: Structures and Processes
LS1.A: Structure and Function

Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1)

All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1)(secondary to HS-LS3-1)

LS1.B: Growth and Development ofOrganisms

In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complexorganism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)

LS1.C: Organization for Matter and Energy Flow in Organisms

The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (suchas proteins or DNA), used for example to form new cells. (HS-LS1-6)

	Key Ideas and Details
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.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
	Key Ideas and Details
LA.RST.9-10.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
LA.RST.9-10.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
SCI.1.LS1.A	Structure and Function
SCI.1.LS1.B	Growth and Development of Organisms
SCI.5.LS1.C	Organization for Matter and Energy Flow in Organisms

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

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

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…

Meaning

Essential Questions

Essential Questions

- What are the two major differences between prokaryotic and eukaryotic cells?
- How can the organelles of a cell be compared to the job of a factory?
- What are the major differences between plant and animal cells?
- What can move in and out of cells?
- How do things move in and out of cells?
- How do cells maintain homeostasis?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

Students will understand that:

- The difference between prokaryotic and eukaryotic cells
- The organelles inside the cells have different functions
- Cells have different roles, however they all work together to carry out functions
- The difference between plant and animal cells
- The parts of a microscope
- Cells maintain homeostasis by moving things in and out of the cell
- There are different ways cells move things in and out

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- Prokaryotes are single celled organisms that are generally smaller than eukaryotic cells and lack a nucleus
- Eukaryotes are single or multicellular organisms that are larger than prokaryotes and contain a nucleus
- Each organelle inside the cell contains a specific function and they all work together to perform tasks
- Plant cells contain the same organelles as animal cells, as well as a chloroplast, cell wall and large central vacuole
- How to use a microscope to view both plant and animal cells
- Cells can move things in and out either by passive transport or active transport
- Things moving in and out of cells will affect their homeostasis

Skills

Skills

Student will be skilled at …

- Identify a prokaryotic cell verse a eukaryotic cell
- Identify the organelles of a eukaryotic cell and describe their role in the cell
- Identify a plant verse an animal cell
- Identify the parts of a microscope and describe their functions
- Use a microscope to examine both plant and animal cells
- Explain how things move in and out of cells through both passive transport and active transport
- Explain how the movement of things in and out of the cell affects its homeostasis

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- Glencoe Biology Textbook
- Worksheets
- Powerpoints and Exit Slips
- Lab Equipment
- Textbooks

Formative Assessment Strategies

Formative Assessment Strategies

exit slips

tests/quizzes

lab assessments

lab write-ups

worksheets

quick thoughts

class discussion

writing assignments

Learning Activities/Unit of Study

Learning Activities/Unit of Study

cell form and function

1 - Introduction to the cellular level of life

2 - cellular structure and function lecture part 1 and exit slip

3 - cellular structure and function lecture part 2 and exit slip

4 - cellular structure and function lecture part 3 and exit slip

5 - cellular organelle chart

6 - cell organelle catalog project

7 - cell organelle catalog project

8 - cell organelle catalog project

9 - cell organelle catalog project

10 - cell organelle catalog presentations

11 - cell organelle quiz

microscopes and cells

12 - parts of the microscope

13 - microscope lab

14 - plant cells verse animal cells; function and identification lab

15 - the plasma membrane; drawing, function and vocabulary

cellular transport

16 - diffusion lecture and exit slip

17 - diffusion lab

18 - diffusion white board practice

19 - active transport lecture and exit slip

20 - diffusion verse active transport

21 - transport through the cell quiz

assessment

22 - cellular structure and function review part 1

23 - cellular structure and function review part 2

24 - practice test

25 - cellular structure and function benchmark

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.