Unit Planner: Traveling Cells: An Online Learning Module for 4-8
Science 4

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Stage 1: Desired Results

Standards

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5

CCSS: Grade 4

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.4.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Speaking and Listening

5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

SL.4.5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

CCSS: Grade 5

Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

W.5.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W.5.1a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose.

W.5.1b. Provide logically ordered reasons that are supported by facts and details.

W.5.1c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically).

W.5.1d. Provide a concluding statement or section related to the opinion presented.

2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.5.2a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.

W.5.2b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.

W.5.2c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).

W.5.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

W.5.2e. Provide a concluding statement or section related to the information or explanation presented.

Speaking and Listening

5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

SL.5.5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

CCSS: English Language Arts 6-12

CCSS: Grade 8

Speaking & Listening

5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

SL.8.5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

CCSS: Literacy in History/Social Studies, Science, & Technical Subjects 6-12

CCSS: Grades 6-8

Reading: Science & Technical Subjects

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts.

2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

RST.6-8.2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

Writing

2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

WHST.6-8.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

WHST.6-8.7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

WHST.6-8.9. Draw evidence from informational texts to support analysis reflection, and research.

NJSLS-S: Science and Engineering Practices

NJSLS-S: 3-5

Practice 2. Developing and using models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

Construct and/or support an argument with evidence, data, and/or a model.

NJSLS-S: 6-8

Practice 1. Asking questions (for science) and defining problems (for engineering)

Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

Ask questions to identify and/or clarify evidence and/or the premise(s) of an argument.

Practice 2. Developing and using models

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed.

Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena.

Practice 3. Planning and carrying out investigations

Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.

Conduct an investigation and/or evaluate and/or revise the experimental design to produce data to serve as the basis for evidence that meet the goals of the investigation.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

Construct, use, and/or present an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

Make an oral or written argument that supports or refutes the advertised performance of a device, process, or system based on empirical evidence concerning whether or not the technology meets relevant criteria and constraints.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

NJSLS-S: Crosscutting Concepts

NJSLS-S: 3-5

Crosscutting Statements

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

A system can be described in terms of its components and their interactions.

NJSLS-S: 6-8

Crosscutting Statements

2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.

Phenomena that can be observed at one scale may not be observable at another scale.

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions.

Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

Connections to Engineering, Technology and Applications of Science

Interdependence of Science, Engineering, and Technology

Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems.

Connections to the Nature of Science: Most Closely Associated with Crosscutting Concepts

Science is a Human Endeavor

Scientists and engineers rely on human qualities such as persistence, precision, reasoning, logic, imagination and creativity.

NJSLS-S: Disciplinary Core Ideas

NJSLS-S: Grade 4

LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function

Plants and animals have both internal and external structures that serve various functions in growth, survival,behavior, and reproduction. (4-LS1-1)

NJSLS-S: 6-8

LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function

All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)

Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)

In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

LS1.B: Growth and Development of Organisms

Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)

Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)

Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)

NJ: 2016 SLS: Science

NJ: Grade 5

5-LS1 From Molecules to Organisms: Structures and Processes

Performance Expectations

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

NJ: MS Life Science

MS-LS1 From Molecules to Organisms: Structures and Processes

Performance Expectations

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.

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.

MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

NJ: 2014 SLS: Technology

NJ: Grades 3-5

8.1 Educational Technology

8.1 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.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

8.1.5.A.3 Use a graphic organizer to organize information about problem or issue.

8.1.5.A.5 Create and use a database to answer basic questions.

C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

8.1.5.C.1 Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.

D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

8.1.5.D.2 Analyze the resource citations in online materials for proper use.

8.1.5.D.3 Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.

8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.

E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

8.1.5.E.1 Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.

8.2 Technology Education, Engineering, Design, and Computational Thinking

C. Design: The design process is a systematic approach to solving problems.

8.2.5.C.1 Collaborate with peers to illustrate components of a designed system.

NJ: Grades 6-8

8.1 Educational Technology

8.1 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.
A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

ISTE: Educational Technology (2016)

ISTE: All Grades

1. Empowered Learner

Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. Students:

a. articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.

c. use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

2. Digital Citizen

Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical. Students:

b. engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.

3. Knowledge Constructor

Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others. Students:

a. plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

b. evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.

c. curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

6. Creative Communicator

Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. Students:

c. communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.

7. Global Collaborator

Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students:

b. use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

c. contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

Enduring Understandings

Why is each part of the cell essential to survival?
How do plant and animal cells differ?
How do bacterium and Protista cells differ?
How do Prokaryotic and Eukaryotic cells differ?
How do the functions of cell organelles help the overall cells?
What structures (organelles) are in eukaryotic cells and prokaryotic cells?
Are these organelles the same in each cells? How do they differ?
Why is each part of the cell essential to survival?

Essential Questions

What defines a living thing?

Content

Skills

Stage 2: Assessment Evidence

Assessment

Types of Cells Test
Summative: Test: Common
Students assess their knowledge of different types of Cells.
Cell Organelle Test
Summative: Test: Common

Students assess their knowledge of Cell Organelles.
3-D Cell Model
Formative: Project: Visual Arts
Students will design a 3-D cell model to represent their learning from this unit.
Cells and Organelles Summary Report
Summative: Written: Report
Students will be asked to write a research paper giving specific information about cells and their organelles.

Stage 3: Learning Plan

Gospel Values

Learning Activities	Resources
Notes 3-D models research paper gallery walk	