Honors Science 8 Unit 1: Cell Structure and Function 2019

Content Area: **Science**
Course(s): **Honors Life Science 8**
Time Period: **September**
Length: **Full Year**
Status: **Published**

Enduring Understandings:

- Cellular boundaries are imperative to maintaining cellular homeostasis o Compare and contrast the differences between cell walls, cell membranes and their functions
- Fundamental life processes depend on the physical structure of the cell, the basic unit of life.

Essential Questions:

- What are the cell organelles and how do their structures relate to their functions?
- What are the different types of cells and how are they different?

Lesson Titles:

- "Egg"excellent Osmosis
- 3-D Cell Lab
- Cell Story
- Cell Theory Lab
- Characteristics of life notes and video clips
- Characteristics of life project
- Escape the Room Review
- Intro To Cells Notes
- Introduction to Cell Transport
- Life is Cellular Notes
- Living Vs. non-living items lab
- Plant and Animal Cell Lab
- Unit Test

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate

	effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RST.6-8	Reading Science and Technical Subjects
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.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.
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.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.
LA.RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
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.
LA.RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
LA.WHST.6-8	Writing History, Science and Technical Subjects
LA.WHST.6-8.1	Write arguments focused on discipline-specific content.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- As a continuation of their study of the cell, students will study the structure of the cell. This study begins with thinking of the cell as a system that is made up of parts, each of which has a function that contributes to the overall function of the cell. Students will learn that within cells, special structures—such as the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall—are responsible for particular functions. It is important to remember that students are required only to study the functions of these organelles in terms of how they contribute to the overall function of the cell, not in terms of their biochemical functions.

- Students will also study nonliving things, some of which are made up of cells. Students will understand that life is a quality that distinguishes living things—composed of living cells—from once-living things that have died or things that never lived. Emphasis is on students beginning to understand the cell theory by developing evidence that living things are made of cells, distinguishing between living and nonliving things, and understanding that living things may be made of one cell or many and varied cells.

- Students will examine the structure and function relationship of the cell membrane and the cell wall. They will learn that the structure of the cell membrane makes it possible for it to form the boundary that controls what enters and leaves the cell. They will also learn that the structure of the cell wall makes it

possible for it to serve its function. This study of the relationship between structure and function will be limited to the cell wall and cell membrane. Students will use variables to represent two quantities that describe some attribute of at least one structure of the cell—for example, how the surface area of a cell changes in relation to a change in the volume cell's volume. Students will write an equation to express the dependent variable in terms of the independent variable, and they will analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation.

- Students will pose a question drawn from their investigations and draw on several sources to generate additional related, focused questions that allow for multiple avenues of exploration. They will conduct a short research project to collect evidence to develop and support their answers to the questions they generate. The report created from their research will integrate multimedia and visual displays of cells and specific cell parts into a presentation that will clarify the answers to their questions. Students will include in their reports variables representing two quantities, such as the number of cells that makes up an organism and units representing the size or type of the organism, and their conclusion about the relationship between these two variables. They will write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Students will analyze the relationship between the dependent and independent variables using graphs and tables and relate the graphs and tables to the equation.

- As part of their learning about the structure of the cell, students use models as a way of visualizing and representing structures that are microscopic. Students will develop and use a model to describe the function of the cell as a whole and the ways parts of the cell contribute to the cell's function. Models can be made of a variety of materials, including student-generated drawings, digital representations, or 3-D structures.

- This unit of study begins with students distinguishing between living and nonliving things. Students will conduct investigations examining both living and nonliving things and using the data they collect as evidence for making this distinction. During this investigation, students will study living things that are made of cells, either one cell or many different numbers and types of cells

- Throughout this unit, students will learn that some of the structures of the cell are visible when studied under certain magnification while others are and that engineering discoveries are making many new industries possible.

Modifications

Formative Assessment:

- Anticipatory Set
- Closure
- Daily check-ins with students
- Entry and Exit Tickets
- Jigsaw
- Kahoots
- Quizlet
- Review Ball
- Think-Pair-Share
- Thumbs up / Thumbs Down
- Warm-Up

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Alternative Assessments

Performance tasks

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Problem-based assignments

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Concept maps

Case-based scenarios

Summative Assessment:

- Cell and Cell Processes Test
- Cell Story Project
- Characteristics of Life Project
- Marking Period Assessment
- Microscope labs
- Observing Cells Lab
- Types of Cells Quiz

Alternative assessments:

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Benchmark Assessments

Skills-based assessment
Reading response
Writing prompt
Lab practical

Resources & Materials:

- Let's Talk Science: Seeding Argumentation About Cells and Growth: This is a sequence of lessons that have been developed to help middle school students learn and argue about the core concept of how a plant root grows at the cellular level. The first part of the sequence begins with a corn seed germination activity and the initial phase of teaching the students argumentation. The second part of the sequence consists of a microscope investigation to provide data upon which students will base their arguments explaining growth at the cellular level. In the third part of the sequence, students use their data to publicly make a claim, and provide evidence and reasoning to support their claims. This sequence unfolds over the course of three weeks. http://ngss.nsta.org/Resource.aspx?ResourceID=79

- Movement of Molecules Into or Out of Cells: Movement of Molecules Into and Out of Cells is one of a series of activities from "Scientific Argumentation in Biology: 30 Classroom Activities. Movement of Molecules engages students in planning and carrying out investigations, modeling, engaging in argument from evidence, and communication. After observing a figure of magnified red blood cells, and a figure of magnified red blood cells with sugar water added, students are presented with a question (Why do the red blood cells appear smaller) and three possible explanations. Based on their chosen explanation and a set of available materials, they design an experiment to test their claim. After engaging in an "Argumentation Session", they write an essay to support their explanation. Teachers are encouraged to refer to the preface, introduction, assessment samples, and appendix provided in the full book for important background on the practice of argumentation and resources for classroom implementation. The standards addressed in the lesson are also included in the teacher's notes. http://ngss.nsta.org/Resource.aspx?ResourceID=520