

Sept. 1B.Gr. 8: Structure of life

Content Area: **Art**
Course(s):
Time Period: **September**
Length: **6-8 Weeks**
Status: **Published**

Unit Overview

Cells are the building blocks of life. In this concept, you will learn about the different types of cells and how they are structured.

Enduring Understandings

Lesson Objectives

By the end of the lesson, students should be able to:

- Explain what cells are and why cells are important.
- Compare and contrast the organelles and other structures that most cells have in common.
- Distinguish between the cells in unicellular and multicellular organisms.
- Explain how the structure and function of multicellular organism depends on the interaction of tissues, organs, and organ systems.

Essential Questions

- **Overarching Question**
 - How do organisms live, grow, respond to their environment, and reproduce?
- **Focus Question**
 - Which structures distinguish cells in multicellular plants and animals from those of unicellular organisms, and why are cells important for identifying organs and their functions?
- **Lesson Questions**
 - What are cells and why are they important?
 - What structures do most cells have in common?
 - How do animal cells and plant cells differ?
 - How do cells in unicellular and multicellular organisms differ?

- **Can You Explain**

- Which structures distinguish cells in multicellular plants and animals from those of unicellular organisms, and why are cells important for identifying organs and their functions?

Instructional Strategies & Learning Activities

- [The Five E Instructional Model](#)

Science Techbook follows the 5E instructional model. As you plan your lesson, the provided Model Lesson includes strategies for each of the 5Es.

- [Engage \(45–90 minutes\)](#)

Students are asked to consider how cells in their body function. Students begin to formulate ideas around the Can You Explain? (CYE) question.

- [Explore \(180 minutes\)](#)

Students investigate questions about what cells are and how they function by using evidence from text and media assets. Students complete a Hands-On Activity to observe plant and animal cells under the microscope.

- [Explain \(45–90 minutes\)](#)

Students construct scientific explanations to the CYE question by including evidence of how different types of cells are structured and how they function.

- [Elaborate with STEM \(45–135 minutes\)](#)

Students apply their understanding of the structure of life as they learn about cancer research conducted by cell biologists, investigate cell size, and explore cancer detection technology.

- [Evaluate \(45–90 minutes\)](#)

Students are evaluated on the state science standards, as well as Standards in ELA/Literacy and Standards in Math standards, using Board Builder and the provided concept summative assessments.

Integration of Career Readiness, Life Literacies and Key Skills

Students explore careers in cell biology and cancer detection technology.

heightened the need to check sources for possible distortion, exaggeration, or misrepresentation.

TECH.9.4.8.IML.13	Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).
WRK.9.2.5.CAP.1	Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
TECH.9.4.8.IML.1	Critically curate multiple resources to assess the credibility of sources when searching for information. Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
WRK.9.2.5.CAP.2	Identify how you might like to earn an income. An individual's passions, aptitude and skills can affect his/her employment and earning potential.
TECH.9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
TECH.9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
WRK.9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
WRK.9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.

Technology and Design Integration

Students will interact with the lesson using the Smartboard, Chromebooks, Microscopes, Lab technology, and Discovery Techbook.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

CS.6-8.8.1.8.CS.4	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
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Interdisciplinary Connections

LA.SL.8.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
LA.RI.8.1	Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
LA.W.8.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.RI.8.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
LA.W.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.

LA.RI.8.7	Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
LA.W.8.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
LA.RI.8.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
LA.RI.8.10	By the end of the year read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.
LA.SL.8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Differentiation

Struggling Students

1. Using a two-column chart, ask students to compare and contrast plant and animal cells.
2. Have students bring in their own water samples from sources such as ponds, lakes, streams, or stagnant water and create their own slides to examine. Have them to discuss the different types of organisms and cells they see with a partner.

ELL

1. Assist students in identifying familiar prefixes and/or words within words for each glossary term (e.g. *chlorophyll* is from the Greek word *khloros*, which means “pale green or greenish yellow”.)
2. Encourage students to demonstrate their understanding by drawing concepts. For example, they can create a diagram of a cell with all of the organelles clearly labeled.

Accelerated Students

1. Have students find different examples of prokaryotic and eukaryotic cells and compare them to each other. Have them use internet sources to conduct further research if desired.
2. Tell students to research different types of cells, tissues, organs, and organ systems in different organisms.
3. Have students differentiate between the structure and function of organelles other than the cell membrane, cell wall, nucleus, cytoplasm, mitochondria, chloroplasts, and vacuoles, such as the Golgi Apparatus, smooth endoplasmic reticulum, rough endoplasmic reticulum, and ribosomes.

Differentiation in science can be accomplished in several ways. Once you have given a pre-test to students, you know what information has already been mastered and what they still need to work on. Next, you design activities, discussions, lectures, and so on to teach information to students. The best way is to have two or three groups of students divided by ability level.

While you are instructing one group, the other groups are working on activities to further their knowledge of the concepts. For example, while you are helping one group learn the planet names in order, another group is

researching climate, size, and distance from the moon of each planet. Then the groups switch, and you instruct the second group on another objective from the space unit. The first group practices writing the order of the planets and drawing a diagram of them.

Here are some ideas for the classroom when you are using differentiation in science:

- Create a tic-tac-toe board that lists different activities at different ability levels. When students aren't involved in direct instruction with you, they can work on activities from their tic-tac-toe board. These boards have nine squares, like a tic-tac-toe board; and each square lists an activity that corresponds with the science unit. For example, one solar system activity for advanced science students might be to create a power point presentation about eclipses. For beginning students, an activity might be to make a poster for one of the planets and include important data such as size, order from the sun, whether it has moons, and so on.
- Find websites on the current science unit that students can explore on their own.
- Allow students to work in small groups to create a project throughout the entire unit. For example, one group might create a solar system model to scale. Another group might write a play about the solar system. This is an activity these groups can work on while they are not working directly with you.

Differentiation in science gets students excited to learn because it challenges them to expand their knowledge and skills, instead of teaching the whole group concepts they have already mastered

Modifications & Accommodations

Refer to QSAC EXCEL SMALL SPED ACCOMMODATIONS spreadsheet in this discipline.

Modifications and Accommodations used in this unit:

In addition to differentiated instruction, IEP's and 504 accommodations will be utilized.

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Benchmark Assessments

Benchmark Assessments are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a standard or set of academic standards and goals.

Schoolwide Benchmark assessments:

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

Additional Benchmarks used in this unit:

Pre and post assessments to measure growth.

Formative Assessments

Assessment allows both instructor and student to monitor progress towards achieving learning objectives, and can be approached in a variety of ways. **Formative assessment** refers to tools that identify misconceptions, struggles, and learning gaps along the way and assess how to close those gaps. It includes effective tools for helping to shape learning, and can even bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply final marks (Trumbull and Lash, 2013). It can include students assessing themselves, peers, or even the instructor, through writing, quizzes, conversation, and more. In short, formative assessment occurs throughout a class or course, and seeks to improve student achievement of learning objectives through approaches that can support specific student needs (Theal and Franklin, 2010, p. 151).

Formative Assessments used in this unit:

See assessments located in links above.

Summative Assessments

Summative assessments evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

Summative assessments for this unit:

See assessments located in links above.

Instructional Materials

See materials located in links above.

Discovery Techbook

Teacher made materials

Additional labs are available through NJCTL on-line curriculum

Standards

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-LS3-1	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
SCI.MS-LS1	From Molecules to Organisms: Structures and Processes
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; 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. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
SCI.MS.LS1.A	Structure and Function Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.
SCI.MS.LS3.A	Inheritance of Traits Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes(mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.