Unit 1: Microbiome

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

Unit Overview

In this unit, students take on the role of student researchers as they work out and explain the anchor phenomenon for the unit—a fecal transplant cured a patient suffering from a potentially deadly C. difficile infection. They make arguments that justify continued research of this new treatment. By engaging in sense-making about the same types of data that professional scientists use, they work to understand how having 100 trillion microorganisms on and in the human body can keep a person healthy. In the process, they learn to examine living things at multiple scales, from molecules to single-celled organisms to the overall human body.

Enduring Understandings

Many organisms are microscopic—so small that they cannot be seen with the naked eye.
All living things are made of cells.
Even though they are both too small to see, cells are much bigger than molecules.
The human body provides an environment (food and space) for bacteria to survive.
A healthy microbiome has various helpful types of bacteria.

Essential Questions

How can having 100 trillion microorganisms on and in the human body keep us healthy?
How small are the microorganisms that live on and in the human body?
How do microscopic things vary in size?

Learning Objectives

Many organisms are microscopic—so small that they cannot be seen with the naked eye.
All living things are made of cells.
Almost all cells are microscopic.
Even though they are both too small to see, cells are much bigger than molecules.
view images of microscopic organisms. Use a digital Scale Tool, and work to create scale models of cells and molecules, glimpsing the very small world of microorganisms and laying a lifelong foundation for understanding issues of scale in life science
read an article titled The Human Microbiome and are introduced to the practice of Active Reading—annotating text with their own questions and connections.
analyze data about a patient's microbiome at different stages of an infection and treatment—with antibiotics and later a fecal transplant.

evaluate the relevance of different pieces of evidence about antibiotics and analyze data from experiments with mice.
Create evidence-based arguments to explain how fecal transplants work to cure infections. These arguments are used to address a fictional senator's attempts to eliminate funding for fecal transplant research.
Career Exploration – Students will explore careers in biology.

Standards: Content

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.

Standards: Interdisciplinary

RI.CR.7.1	Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.
RL.CI.7.2	Determine a theme in a literary text (e.g., stories, plays or poetry) and explain how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
RI.AA.7.7	Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
RL.CT.7.8	Compare and contrast a fictional portrayal of an event, time, place, or character and a historical or scientific account of the same period or event as a means of understanding how authors of fiction use or alter history and/or events.
W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.
W.WR.7.5	Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
W.SE.7.6	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
SL.PE.7.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.II.7.2	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
SL.ES.7.3	Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.
SL.PI.7.4	Present claims and findings, emphasizing salient points in a focused, coherent manner

	with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
SL.UM.7.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Warm Ups, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research
Summative	In correlation with the NJSLS, students must demonstrate the following as summative assessments: 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 the parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. Other summative assessments will include but are not limited to: lesson activities, summative tests, lab skills, demonstrations, and vocabulary quizzes.
Alternative & Benchmark	Alternative - Alternative assessments as required by student IEP/504/I&RS - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Amplify Digital Curriculum, Generation Genius, BrainPop, Mystery Science, Microsoft 365, Primary and Secondary Source Documents, Lab Materials as needed, Amplify Readings, Labs, Simulations

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness		Relationship Skills
X	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

X	Global and Cultural Awareness	X	Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		