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Week 3: Cells & Genetics

Module 1: Cells and Nucleus Introduction

Lesson: Building Living Things: From Cells to Organisms

Lesson Overview

Students explore cells as the basic units of life and investigate how specialized cell structures support the functions of living organisms. They examine how living things are organized from cells to organ systems and use evidence to explain how organization and structure help organisms survive and function.

Learning Targets

Explain that the body is made of cells organized into systems.

Distinguish between structure (what something is) and function (what something does).

Use evidence to identify where a problem in the body begins.

Explain how problems at the cellular level can affect the whole body.

Vocabulary

Cell
the smallest living part of the body

Tissue
a group of similar cells working together

Organ
a body part that performs a specific job

System
organs working together to perform a function

Nucleus
the part of the cell that controls its activities

Materials

Module
Sticky notes, index cards, paper squares, connecting cubes, or similar modeling materials
Chart paper or whiteboard

Instructional Notes

This lesson connects microbiology and human biology by introducing cells as the basic unit of life. Students move from studying microorganisms to understanding that all living things are made of cells that perform specific functions and work together in larger systems.
Throughout the lesson, students gather evidence about cells, nuclei, unicellular organisms, multicellular organisms, and levels of organization. They use this evidence to challenge common misconceptions and create models showing how living organisms are built. This learning provides a foundation for future study of specialized cells, receptors, DNA, proteins, and genetics.

Learning Experience		
8 min	Opening	Display the question: "What would every living thing need in order to survive and function?" Tell students that scientists have discovered organisms that contain only one cell and organisms that contain trillions of cells. Ask: "What do you think all living things have in common?" Give students time to record an initial claim before discussing their thinking with a partner and sharing with the class. Students: Record an initial claim. Discuss their thinking with a partner. Share ideas with the class. Listen to different explanations without trying to determine a final answer yet. Sentence Frame: "I think all living things _____ because _____."
15 min	Module	**Focus**: How do cells help living things survive and function? **Guiding Questions**: • What is the basic unit of life? • What is the difference between unicellular and multicellular organisms? • What functions do important cell structures perform? • What role does the nucleus play? • How are cells organized into larger structures?
15 min	Application	Tell students: "Scientists often use models to understand things that are too small to see directly. Cells are microscopic, so today you will create a model that shows how living things are organized." Display the challenge: "How can you build a model that shows how a single cell becomes part of a larger living organism?" Provide each group with simple modeling materials such as sticky notes, index cards, paper squares, connecting cubes, or notebook paper. Explain that there is no single correct design. The goal is to create a model that accurately represents the relationships described in the module. Remind students that their model should show a cell, a nucleus within the cell, cells forming tissues, tissues forming organs, and organs forming systems. Ask students to explain how their models represent evidence from the module. Encourage students to revise their models if they discover a more accurate way to represent the relationships. Students: **Step 1: Build a Cell** Create a model of a single cell. Include a nucleus within the cell model and label both parts. **Step 2: Show Organization** Use multiple cell models to represent a tissue. Combine tissues to represent an organ. Combine organs to represent a system. Label each level of organization.

		Step 3: Explain the Model Discuss how each level is connected to the next. Prepare a brief explanation using evidence from the module. **Step 4: Share and Compare** Present the model to another group or the class. Explain how the model represents the organization of living things. Compare similarities and differences between models.
2 min	Reflection	Return to the question from the beginning of the lesson. “What do all living things have in common, and why is that important?”
2 min	Career Connections	Scientists, physicians, laboratory researchers, veterinarians, and biomedical engineers use models to understand structures that cannot be easily observed. They study cells and levels of organization to investigate health problems, develop treatments, and explain how living organisms function. Understanding how cells form larger body structures provides the foundation for future learning in medicine, genetics, biotechnology, and many health science careers.