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Week 2: Microbiology Foundations

Module 1: Microbiology Introduction

Lesson: Invisible But Impactful: How the Right Choice Affects what Happens in Your Body

Lesson Overview	
Students investigate how invisible microorganisms affect the human body by analyzing real-life scenarios, independently working through the module, and building explanations of what is happening inside the body. Students apply this understanding to explain why some health treatments work while others fail, helping them make sense of real health decisions.	
Learning Targets	Vocabulary
Distinguish between bacteria and viruses using evidence Explain what microorganisms are doing inside the body Explain why a treatment works or does not work	Microorganism living things too small to be seen without a microscope Bacteria living cells that can survive and reproduce on their own Virus particles that must enter a host cell to reproduce Pathogen a microorganism that can cause disease
Materials	Instructional Notes
Module Chart paper Markers Student notebooks	Students often believe all microbes are harmful or that medicine always works the same way. This lesson builds understanding through visible reasoning and real scenarios. Bacteria are living cells that can reproduce independently, while viruses must take over host cells to reproduce. Antibiotics only work on bacteria, not viruses. Many microorganisms are beneficial to the body, especially in digestion. Focus on helping students visualize what is happening inside the body and guiding them to revise misconceptions through evidence and explanation.



Learning Experience

8 min	Opening	Explain that students will examine several real-world scenarios involving microorganisms. Read each example aloud and have students identify whether the microorganism is helpful, harmful, or whether the situation depends on the cause of the illness. Guide students to recognize that flu viruses spread illness, yogurt and gut bacteria support digestion, and antibiotics are ineffective against the common cold because colds are caused by viruses, not bacteria. Emphasize that symptoms alone do not determine treatment; understanding the underlying cause of an illness is essential for deciding how it can be prevented or treated.
15 min	Module	Focus: What is actually happening inside your body when microorganisms are present? Guiding Questions: Why do we need microscopes to study microorganisms? What makes bacteria and viruses different? How can microorganisms be helpful or harmful? Quick Checks: Conduct a show of hands: Can viruses reproduce on their own? Then have students turn and talk about which type of microorganism can live independently. Answer Key: Microorganisms are too small to see without microscopes. Bacteria are living cells and reproduce independently. Viruses must enter and hijack cells to reproduce. Microorganisms can help or harm the body.
15 min	Application	Step 1: Build a System (Diagram) Draw a diagram showing how a microorganism enters the body, what it does next, and what happens to cells. Answer Key (expected diagram features): Include an entry point (air, touch, ingestion). Show that bacteria grow independently or that a virus takes over a cell. The result should show symptoms or a body response. Create two columns: Bacteria and Virus. Sort the following statements: Needs a host cell, Can live independently, Can be killed by antibiotics, Not affected by antibiotics, Made of cells, Hijacks a cell. Answer Key: Bacteria: Can live independently. Made of cells. Can be killed by antibiotics. Virus: Needs a host. Not affected by antibiotics. Hijacks a cell. Common Error: "Antibiotics work on viruses" Correction: Antibiotics only work on bacteria.

2 min	Reflection	What idea changed your thinking today, and why does it matter for real health decisions? Expected Responses: • Not all microbes are harmful • Antibiotics do not work for viruses • Understanding what causes illness matters
2 min	Career Connections	Doctors and healthcare professionals must decide what type of microorganism is causing an illness before choosing treatment. If they make the wrong decision, the treatment may fail, and the illness can continue or spread. The same thinking students used today—analyzing evidence, understanding systems, and explaining cause and effect—is used to make real decisions that affect patient health every day.