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Week 2: Microbiology Foundations

Module 3: Viruses – Are They Living?

Lesson: When Does a Virus Become Dangerous?

Lesson Overview

Students develop an evidence-based understanding of how viruses function by investigating what viruses can and cannot do on their own. They use this understanding to explain why viruses depend on living cells and determine when a virus becomes capable of causing harm.

Learning Targets

Describe how viruses are different from living cells

Explain when and why a virus becomes dangerous

Use evidence to show how viruses depend on host cells

Vocabulary

Virus
 a particle that needs a living cell to reproduce

Cell
 the smallest unit of life that carries out life processes

Genome
 genetic instructions carried as DNA or RNA

Host Cell
 a living cell used by a virus to reproduce

Materials

Module

Paper or notebooks

Pencils or markers

Optional projected image of a virus and cell

Instructional Notes

Students learned previously that bacteria can live and reproduce on their own, while viruses cannot. This lesson deepens that distinction by focusing on dependence. Students often believe viruses are always active or dangerous simply because they can make people sick. Emphasize that a virus outside a host cell cannot reproduce, grow, or carry out life functions independently. The key idea is cause and effect: once a virus enters a host cell, it gains access to the machinery needed to make more viruses.



Learning Experience

8 min	Opening	Display the scenario: <i>A virus lands on a classroom desk and remains there.</i> Ask students to consider what the virus can do right now, what the virus cannot do right now, whether it can reproduce, and whether it can make more viruses. Have students make individual predictions before discussing. Students: Write a response independently. Identify one thing the virus can do and one thing the virus cannot do. Turn and talk with a partner, then share evidence-based ideas with the class. Sentence frame: I think the virus cannot _____ because it does not have _____.
15 min	Module	Focus: What can viruses do, and what do they need from cells? Guiding Questions: • What structures do viruses have? • What can viruses not do on their own? • What happens when a virus enters a host cell? • Why do scientists debate whether viruses are living? Quick Checks: • Thumbs up/down: "Viruses can reproduce without a host cell." • Turn-and-talk: "What is the most important thing a virus is missing?"
15 min	Application	Present the challenge: <i>You are explaining to a younger student when a virus becomes dangerous.</i> Direct students to create a simple BEFORE and AFTER explanation. Students: Create a two-part model showing Before Entering a Cell: what the virus can do, what the virus cannot do, and why it is limited. Create After Entering a Cell showing what changes, how the virus uses the cell, and why more viruses can be produced. Include a labeled virus, a labeled host cell, an arrow showing entry into the cell, and a cause-and-effect explanation. Then share explanations with a partner, compare models, and identify the clearest explanation. Sentence frame: A virus becomes dangerous when _____ because it uses the host cell to _____.
2 min	Reflection	Why is a virus unable to reproduce on its own?
2 min	Career Connections	Doctors, scientists, and public health professionals study how viruses interact with human cells to develop treatments, vaccines, and prevention strategies. Understanding that viruses depend on host cells helps health science professionals predict how

		infections spread and identify ways to stop them. The same cause-and-effect reasoning students used today is applied when making decisions that protect individual and community health.
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