Help shape future versions of this course by sharing your feedback via the elective feedback form.
For immediate assistance email: ubeats@unmc.edu

Week 4: Health, Protection, and Early Detection

Module 3: Your Body's Defense: The Immune System

Lesson: How Vaccines Prepare the Immune System

Lesson Overview

In this lesson, students build on their understanding that illness can occur when pathogens are not recognized quickly. Students investigate how vaccines help the immune system recognize pathogens earlier and use evidence from the module to explain how vaccination can reduce illness and disease spread.

Learning Targets

Explain why delayed pathogen recognition leads to more severe illness.

Describe how vaccines help the immune system recognize pathogens faster.

Use evidence to explain how vaccination prevents immune system failure.

Explain how vaccination reduces disease spread in a population.

Vocabulary

Pathogen
something that causes disease

Immune response
how the body reacts to infection

Vaccine
something that trains the immune system

Immunity
protection against disease

Materials

Module
Student response sheets
Whiteboard or chart paper

Instructional Notes

This lesson builds directly on the previous lesson, where students learned that illness can occur when pathogens are not recognized quickly enough. In this lesson, students investigate how vaccines address that problem by preparing immune cells before infection occurs. Students move from explaining why immune defenses sometimes fail to explaining how those failures can be prevented. Many students enter with the idea that people avoid severe illness because they have a "stronger" immune system. The module challenges this assumption by emphasizing recognition and preparation. Students should discover that pathogens sometimes avoid detection because they are disguised and that vaccines help immune cells recognize those pathogens sooner. This lesson also

	extends students' thinking beyond the individual. Students consider how vaccination affects communities and explore how reducing opportunities for disease spread can help protect larger populations.

Learning Experience		
8 min	Opening	Ask: “How would your body stop a completely new germ it has never seen before?” Give students time to think independently and discuss their ideas. Present the scenario: • Person A is exposed to a pathogen and gets very sick. • Person B is exposed to the same pathogen and has mild symptoms. • Both people have healthy immune systems. Ask students to choose: A. Person B has a stronger immune system. B. Person B recognized the pathogen faster. C. Person B was just lucky. Ask students to explain their reasoning. Remind students that both people have healthy immune systems and invite them to revise their thinking if needed. Students respond to the opening question, analyze the scenario, select an explanation, and explain and revise their thinking. Sentence Frame: I think _____ because _____. My original idea was _____. Now I think _____ because _____.
15 min	Module	**Focus**: Gather evidence about why pathogens sometimes cause illness and how vaccines help the immune system respond. **Guiding Questions**: • Why do pathogens sometimes cause illness? • What causes delays in pathogen recognition? • How do vaccines help the immune system recognize pathogens? **Quick Checks**: • What allows some pathogens to cause illness before the immune system responds? • How do vaccines change the way immune cells respond to pathogens? Sentence Frame: One piece of evidence from the module is _____. This suggests _____.

15 min	Application	Tell students they are serving on a Community Health Response Team. Present the scenario: A new pathogen has been identified in your community. The pathogen can disguise itself and avoid detection when it first enters the body. Community leaders have enough funding for only one immediate response. Plan A: Provide additional medical support after people become sick. Plan B: Increase vaccination before the pathogen begins spreading. Students must determine which plan is more likely to reduce illness and explain their reasoning using evidence from the module. Facilitate discussion and encourage students to support claims with evidence from the module. Students: **Step 1: Evaluate the Problem** Read the community scenario. Identify what makes the pathogen difficult to stop. Discuss how pathogens can avoid detection. **Step 2: Recommend a Prevention Plan** Determine whether Plan A or Plan B is the stronger response. Create a claim supported by evidence from the module. **Step 3: Defend the Recommendation** Explain how pathogen recognition affects disease outcomes. Use evidence from the module to support the recommendation. Explain how the chosen plan addresses the problem. **Step 4: Consider Community Impact** Predict how the chosen plan could affect disease spread. Explain how the plan might help protect more people in the community. Sentence Frames: Our team recommends Plan _____ because _____. Evidence from the module shows _____. This matters because _____. The community would benefit because _____. Answer Key: Recommended Plan: Plan B Acceptable Evidence and Reasoning: • The module explains that pathogens can sometimes disguise themselves, causing delays in recognition and allowing illness to develop. Vaccines help immune cells recognize those disguises faster. Therefore, vaccination addresses the problem before significant damage occurs. • The module states that people often get sick because pathogens are not recognized quickly enough, not because the body cannot fight them. Vaccines prepare immune cells with information about what pathogens look like, helping them respond sooner. • The module demonstrates that vaccinated immune systems respond with less damage because immune cells have already been trained to recognize the pathogen. • The module explains that when more people are vaccinated, pathogens have a harder time spreading through a population, helping protect communities. Acceptable Student Conclusion: Plan B is more likely to reduce illness because it prepares the immune system before infection occurs, helps immune cells recognize pathogens faster, reduces damage caused by infection, and can limit disease spread within the community.

2 min	Reflection	How has your thinking changed about why some people get less sick from the same pathogen?
2 min	Career Connections	Public health professionals, doctors, epidemiologists, and vaccine researchers regularly make decisions similar to the one students explored in this lesson. These professionals use evidence about disease spread, immune responses, and prevention strategies to protect individuals and communities. Understanding how vaccines prepare the immune system helps health experts reduce illness, respond to outbreaks, and improve community health outcomes.