

# 20.1 Viruses

## Lesson Objectives

-  Explain how viruses reproduce.
-  Explain how viruses cause infection.

## Lesson Summary

**The Discovery of Viruses** In 1935, the American biochemist Wendell Stanley isolated a virus for the first time.

- ▶ A **virus** is a particle made of nucleic acid, protein, and, in some cases, lipids.
- ▶ A typical virus is composed of a core of DNA or RNA surrounded by a protein coat called a **capsid**.
- ▶ Viruses that infect bacteria are called **bacteriophages**. They enter living cells and, once inside, use the machinery of the infected cell to produce more viruses.

**Viral Infections** Viruses have two methods of infection once inside a host cell.

- ▶ In a **lytic infection**, a virus enters a cell, makes copies of itself, and causes the cell to burst, releasing new virus particles that can attack other cells. In the case of bacteriophage *T4*, viral DNA directs the synthesis of new viruses using materials in the cell.
- ▶ In a **lysogenic infection**, a virus integrates part of its DNA called a **prophage** into the DNA of the host cell. The viral genetic information replicates along with the host cell's DNA. Eventually, the prophage will remove itself from the host cell DNA and make new virus particles.

In a **retrovirus**, the genetic information is copied backward—from RNA to DNA instead of from DNA to RNA. The virus that causes the disease AIDS is a retrovirus.

Viruses must infect a living cell in order to reproduce. Although viruses are parasites, they are not made of cells and are not considered living things.

## The Discovery of Viruses

1. What is a bacteriophage?

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2. What are viruses?

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3. What is a capsid?

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4. How does a typical virus get inside a cell?

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5. What occurs when viruses get inside cells?

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## Viral Infections

6. **VISUAL ANALOGY** In the visual analogy, why is the outlaw locking up the sheriff, instead of the other way around?

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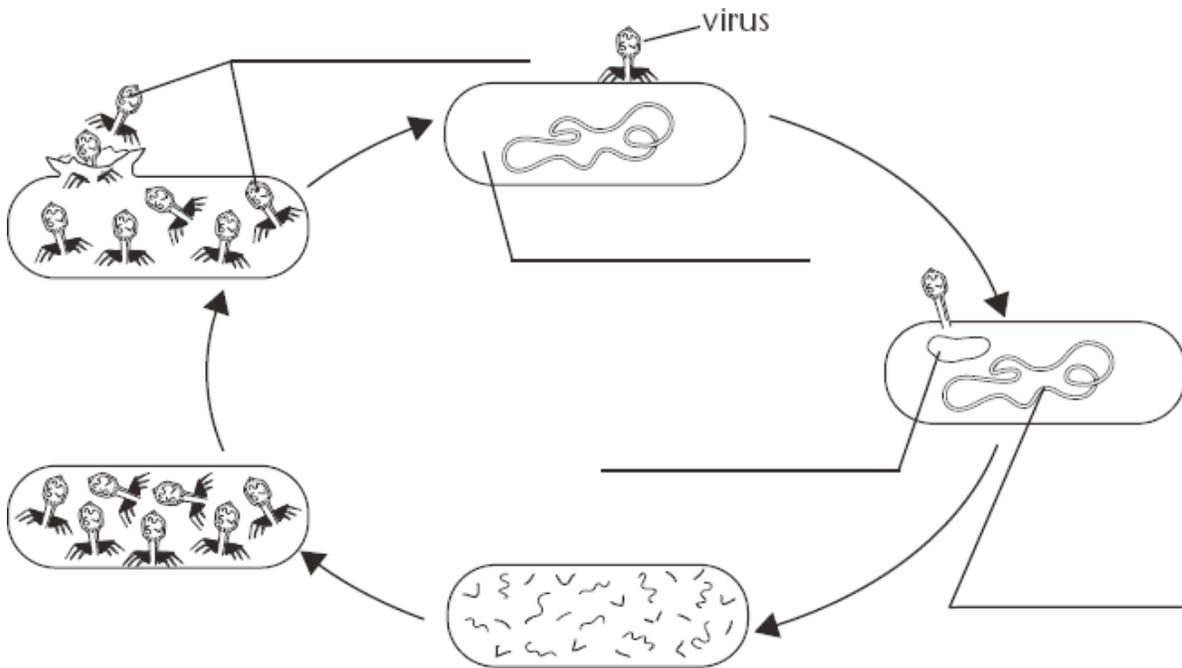
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7. **THINK VISUALLY** The diagram below shows the lytic cycle of a viral infection. Label the bacterial DNA, host bacterium, viral DNA, and virus. Then, circle the step that shows lysis of the host cell.



8. In a lysogenic infection, how can one virus infect many cells?

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9. How is the common cold like the HIV virus?

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### Apply the Big idea

10. What would happen to a virus that never came in contact with a living cell? Explain your answer.

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