

Pre-Lab, Skills, and Standards Alignments

VIRAL INFECTION

Bacteriophages are viruses that use bacteria as a host to reproduce. In this lab, students will infect a harmless strain of *E. coli* with the T4 bacteriophage. After a day of growth in a Petri dish, small plaques indicate where infected bacterial cells have died.

Lab Length: 1 hour

Suggested Pre-Lab Teaching

- Characteristics of Life
- DNA structure and function
- Asexual reproduction
- Central Dogma (gene to protein)
- Introduction to infectious disease, and pathogens

Lab Skills

- Measure small volumes of liquid with micropipettes.
- Culture bacteria in petri dishes.
- Follow a multi-step procedure for a controlled experiment.

Conceptual Knowledge/Skills

- Explain the difference between genetic and infectious disease.
- Describe how viruses reproduce.
- Analyze and interpret results to assess spread of virus and formation of plaques among cultured cells.
- Construct an argument supporting an alternative to antibiotic treatment for bacterial infection.

New York State Science Learning Standards/NGSS

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
<p><u>Planning and Carrying Out Investigations</u> Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.</p> <p><u>Analyzing and Interpreting Data</u> Analyze and interpret data to provide evidence for phenomena.</p>	<p><u>LS1.A: Structure and Function</u> All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)</p> <p>Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2)</p> <p>Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)</p> <p><u>LS3.A: Inheritance of Traits</u> Genes are located in the</p>	<p><u>Structure and Function</u> Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.</p> <p><u>Cause and Effect</u> Cause and effect relationships may be used to predict phenomena in natural or designed systems.</p> <p><u>Patterns</u> Macroscopic patterns are related to the nature of microscopic and</p>



	<p>chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1)</p>	<p>atomic-level structure. Patterns can be used to identify cause and effect relationships.</p>
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