

# Infectious Disease - Unit 1 - Outbreak!

## Unit Focus

This introductory unit will expose students to the triad by which all infectious diseases operate. This will serve as a foundation for students to research one disease through the lens of the triad by which epidemiologists analyze diseases. Topics to be explored include: types of pathogens, factors that cause the spread of disease, mechanisms of infection, vaccines, treatments, evolution of pathogens and the development of resistance to treatment.

## Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p><b>Common Core</b> <i>Science &amp; Technical Subjects: 11-12</i></p> <ul style="list-style-type: none"> <li>• Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. <i>CCSS.ELA-LITERACY.RST.11-12.2</i></li> <li>• Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11– 12 texts and topics. <i>CCSS.ELA-LITERACY.RST.11-12.4</i></li> <li>• Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. <i>CCSS.ELA-LITERACY.RST.11-12.7</i></li> <li>• Draw evidence from informational texts to support analysis, reflection, and research. <i>CCSS.ELA-LITERACY.WHST.11-12.9</i></li> </ul> <p><b>Next Generation Science Standards (DCI)</b> <i>Science: 11</i></p> <ul style="list-style-type: none"> <li>• All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins. <i>LS1.9.A2</i></li> </ul>	<p><b>T1</b> Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.</p> <p><b>T2</b> Create models to explore complex systems, show mastery of key science concepts, and/or develop solutions through creation of a product open to testing and redesign.</p>	
	Meaning	
	Understanding(s)	Essential Question(s)
	<p><b>U1</b> There are certain characteristics of pathogens that make them highly transmissible.</p> <p><b>U2</b> There are specific differences between bacteria and viruses that affect their ability to be treated and prevented.</p> <p><b>U3</b> Different regions of the world, cultures, governments, and socioeconomic status impact the ability of diseases to spread.</p> <p><b>U4</b> Various groups of people work together to continuously monitor and prevent pandemics through a series of protocols and policies.</p> <p><b>U5</b> Understanding the Epidemiological Triad can help scientists, governments, researchers, doctors, and first responders predict, prevent, and treat outbreaks of infectious diseases.</p>	<p><b>Q1</b> How do diseases spread?</p> <p><b>Q2</b> What do stakeholders need to understand in the event of a disease outbreak?</p> <p><b>Q3</b> How does the epidemiological triangle help us understand infectious disease?</p>
	Acquisition of Knowledge and Skill	
Knowledge	Skill(s)	
<p><b>K1</b> Viruses cannot be treated by antibiotics.</p> <p><b>K2</b> Zoonotic viruses can spread between animals and humans.</p>	<p><b>S1</b> Use the epidemiological triangle to assess an infectious disease.</p>	

## Stage 1: Desired Results - Key Understandings

- Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. *LS4.9.C2*

**Student Growth and Development 21st Century Capacities Matrix**

*Critical Thinking*

- Analyzing: Students will be able to examine information/data/evidence to make inferences and identify possible underlying assumptions, patterns, and relationships. *MM.1.2*

*Collaboration/Communication*

- Product Creation: Students will be able to effectively use a medium to communicate important information (findings, ideas, feelings, issues, etc.) for a given purpose. *MM.3.2*

- K3** Vaccines can be used to prevent some bacterial and viral infections.
- K4** The Epidemiological Triad consists of: Agent, Host, and Environment.
- K5** Pathogen, transmission, causative agent, epidemiological triangle, zoonotic, communicable, virulence, host, Emerging Infectious Disease (EID), vector, outbreak, pandemic, epidemic, vaccine, antibiotic.

**S2** Explain the factors that influence the spread of infectious diseases.