

LESSON NAME: OUTBREAKS, EPIDEMICS, PANDEMICS, OH MY!

ONE HEALTH TOPIC

Global Health

GRADE LEVEL

High School

STATE STANDARDS

ELA: SL.9-10.4, SL.11-12-.4, SL.9-10-.8, SL.11-12.8

Health Education: Community Health 12.1, 12.4, 12.6 ; Pre vention and Control of Diseases 12.1, 12.2 ; Consumer Health 12.6

HGSS: Societies are shaped by identities, beliefs, and practices of individuals and groups. Choices have consequences

SUBJECT AREA



English Language Arts



Health Education



Social Studies

One Health delves into the wonderful web connecting humans, animals and the environment. This lesson provides an opportunity to consider how the well-being of one component impacts the well-being of all three components.

LEARNING GOALS/OBJECTIVES

Students will be able to:

- Define/describe the concepts of “Global Health,” “outbreak”, “epidemic”, and “pandemic.”
- Identify various Global Health organizations (WHO, UNICEF, Global Health Council, Partners in Health).
- Understand how community health is part of Global Health.

MATERIALS NEEDED

Small Group Presentations

- Access to the internet and a computer/computer lab
- *Pandemic Presentation Guide*
- *Global Health: Teacher Notes*

Classroom Debate

- Access to the internet and a computer/computer lab
- Flashcards (1 per student)
- Writing utensils (1 per student)

Global Health “Jeopardy!”

- Access to the internet and a computer/computer lab

Solve the Outbreak

- Access to the internet and a computer/computer lab

A note for Educators: We encourage you to personalize this lesson plan to better suit your students' diverse learning needs, allowing for a tailored exploration of One Health concepts in your classroom.

LESSON INTRODUCTION

This lesson identifies the concept of Global Health, which is the state of health worldwide, and efforts made to create unified global health policies, practices, organizations and resources. This lesson also highlights various organizations that focus on Global Health efforts, including the World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), Global Health Council and Partners in Health.

Begin by asking students to consider how health issues can affect not only individuals but also entire communities and even spread beyond borders. Pose the question: "What comes to mind when you hear the word 'community'" and allow a moment for students to either reflect silently or turn to a partner and discuss their answers for 2 minutes. Select a few students to share their thoughts on their definition of "community", encouraging them to consider aspects like place, norms, religion, values, customs or identity. Explain that for this lesson, we'll define "community" as a geographic area, such as a country, that shares common characteristics.

Briefly mention that health issues within a specific community can have broader impacts beyond that community's boundaries. For example, explain that health problems that spread are called "outbreaks," "epidemics" and sometimes even "pandemics." Briefly define these terms:

- Outbreak: A sudden increase in cases of a particular disease in a specific area.
- Epidemic: A larger outbreak that affects more people within a community.
- Pandemic: An epidemic that crosses borders and affects multiple countries

Wrap up the introduction to this lesson by reinforcing the idea that community health is an essential building block of global health, as health issues can cross community borders and have far-reaching effects. Encourage students to keep this interconnectedness in mind as they learn about global health efforts and organizations during this lesson.

LEARNING ACTIVITIES

Activity Option #1: Small Group Presentations (*Meets standards Societies are shaped by identities, beliefs, and practices of individuals and groups; SL.9-10.4, SL.11-12-.4; Community Health 12.1, 12.4, 12.6; Consumer Health 12.6; Prevention and Control of Diseases 12.1, 12.2*)

Divide students into three even groups, assigning each group to represent three different communities where each of the following pandemics began:

- Mexico Tenochtitlán - Smallpox Pandemic of 1520
- Yunnan China - Bubonic Plague Pandemic of 1855
- Camp Funston - Influenza Pandemic of 1918 (also known as "Spanish Flu")

Ask each group to work together and develop a presentation summarizing their community and its response to the pandemic it faced. You may choose which presentation type works best for the class (i.e., PowerPoint, art project, poster, trifold, etc.). Regardless of the presentation type you choose, provide students with the supplemental document entitled *Pandemic Presentation Guide*, which contains a list of questions that should be addressed in student presentations. Following each presentation, reiterate and discuss key concepts with the class. Use the *Global Health: Teacher Notes* resource for guidance on discussion points.

Activity Option #2a: Classroom Debate (*Meets standards Choices have consequences, SL.9-10-.8, SL.11-12.8; Community Health 12.6*)

After the class has had the opportunity to learn about Camp Funston and the Influenza pandemic that began in early 1918, explain that World War I did not end until November 1918. With that in mind, ask students to consider the following question: “*Should a health crisis impact whether a war continues or closes, or does the cause for war overrule the right to health?*”

After posing this question, choose one of the following options for students to consider various viewpoints to the question:

1. Facilitate an open discussion with the class.
2. Invite students to consider the following viewpoints:
 - a. The continuation of war during a global health crisis
 - b. The development of a global health policy to temporarily suspend or conclude war activities during a global health crisis

Give students 5-10 minutes to **anonymously** write their viewpoints on a flashcard. When the given time ends, ask students to summarize their thoughts by either writing “*Continue*” or “*Conclude*” on the top line of the flashcard.

- Collect flashcards from the class, making note of who is arguing for each side.
- Once flashcards have been collected, distribute them to the class so that students are reading viewpoints from the opposing side. Assign them to write 2-3 sentences about the opposing viewpoint that they are reading.
- Finish the activity with a class discussion about the importance of this activity and what they have learned.

Activity Option #2b: Global Health “Jeopardy!” (*Meets standards SL.9-10.8, SL.11-12.8; Prevention and Control of Disease 12.1*)

Divide students into two separate teams to compete in an online “Jeopardy!” game against each other. The game includes “answers” about terms discussed in the lesson introduction, details from historic pandemic presentations, and more. Follow this link to access the game: jeopardylabs.com/play/outbreaks-epidemics-pandemics-oh-my-8.

Activity Option #3: Solve the Outbreak (*Meets standards Community Health 12.4, 12.6; Prevention and Control of Disease 12.1*)

Invite students to become disease detectives and solve the simulated outbreak, “*Breathless in the Midwest*”. This is a scenario in which a drum is imported from Africa, but the outbreak begins in the Midwestern United States. This simulation game is produced by the CDC and can be played for free on a PC or Mac.

If each student has access to a computer (i.e., computer lab), students may complete this simulation individually. If the computer is limited, this activity can also be completed together as a class.

- Click on the simulation link: cdc.gov/mobile/applications/sto/web-app.html.

- Select “Level 1” and choose “*Breathless in the Midwest*”.
- Individually, or as a class, review each clue in the investigation and answer the questions correctly to solve the outbreak. There will be 5 clues and answers given throughout the simulated outbreak.

ASSESSMENT

Create an age-appropriate rubric for student participation, presentations, and gained knowledge.

RESOURCES

- Black Death: britannica.com/event/Black-Death
- CDC Epidemic Disease Occurrence page: archive.cdc.gov/#/details?q=https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html&start=0&rows=10&url=https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html
- CDC Global Health website: cdc.gov/globalhealth/index.html
- CDC History of 1918 Flu Pandemic: archive.cdc.gov/www_cdc_gov/flu/pandemic-resources/1918-pandemic-h1n1.html
- Influenza Pandemic of 1918-19: britannica.com/event/influenza-pandemic-of-1918-1919
- PBS article – Influenza 1918 The First Wave: pbs.org/wgbh/americanexperience/features/influenza-first-wave
- Smallpox: britannica.com/science/smallpox
- Solve the Outbreak, Level One: *Breathless in the Midwest*: cdc.gov/mobile/applications/sto/web-app.html

PANDEMIC PRESENTATION GUIDE

- 1.** Provide general information about your group's community, including basic details about the history, economy, and overall health of the community prior to the pandemic.
- 2.** What pandemic/epidemic started in your group's community?
- 3.** How did the disease spread (i.e., mode of transmission)?
- 4.** What efforts did the community make to prevent the spread of the disease, and what impact did that have on global health?
- 5.** What impact did those efforts have on the community's economy and culture?
- 6.** Did other nations/communities/global health organizations provide aid? If so, how far into the pandemic did they provide support?
- 7.** How quickly was the pandemic or epidemic resolved?
- 8.** What was the death toll of this pandemic/epidemic?
- 9.** What global actions do you believe should have been taken?
- 10.** Why is health unity across nations important during outbreaks or pandemics?

Group #1: Mexico-Tenochtitlán (1520, Smallpox Pandemic)

Summary of Details

Provide general information about your group's community, including basic details about the history, economy, and overall health of the community prior to the pandemic.

- Mexico-Tenochtitlán was the capital of the Aztec Empire, a powerful Mesoamerican civilization.
- The community had a rich history and culture, with a complex political and social structure.
- The economy was based on agriculture, trade, and the utilization of natural resources.
- The community had no previous exposure to the disease, and overall health conditions were relatively stable.

What pandemic/epidemic started in your group's community? How was it introduced?

- Smallpox found its way to Mexico-Tenochtitlan through the arrival of Spanish conquistadors led by Hernán Cortés. In 1519, Cortés and his forces landed on the coast of Mexico, initiating contact between the indigenous populations and the Europeans. The Spanish brought with them not only weapons and technology but also unintentionally introduced new diseases to which the indigenous populations had no immunity. Among these diseases was smallpox.
- It's important to note that the introduction of smallpox to Mexico-Tenochtitlan was unintentional. The Spanish conquistadors did not have prior knowledge of the devastating impact their diseases would have on the indigenous populations. The spread of diseases like smallpox is an unfortunate consequence of historical contact and colonization, underscoring the importance of understanding the historical context when studying such events.

How did the disease spread (i.e., mode of transmission)?

- Smallpox is a highly contagious viral infection that spreads through respiratory droplets. As the Spanish interacted with the indigenous people, the disease likely spread through direct contact and respiratory transmission. The indigenous population had no previous exposure to smallpox, which made them highly susceptible to the virus.

What efforts did the community make to prevent the spread of the disease, and what impact did that have on global health?

- The community likely implemented quarantine measures and isolated infected individuals.
- However, due to the lack of prior exposure to the disease, their preventive efforts were limited and largely ineffective in containing the spread.
- The impact on global health was significant, as the introduction of smallpox to the New World had devastating consequences for indigenous populations across the Americas.

Summary of Details, Continued (Smallpox: Mexico-Tenochtitlán)

What impact did those efforts have on the community's economy and culture?

- The outbreak of the pandemic severely disrupted the community's economy and trade networks.
- The loss of a large portion of the population resulted in a decline in agricultural production and disrupted labor systems.
- The cultural fabric of the community was also deeply impacted, as the loss of many individuals led to social and religious upheaval.

Did other nations/communities/global health organizations provide aid? If so, how far into the pandemic did they provide support?

- During this time, there were no global health organizations as we know them today.
- Other nations and communities, such as the Spanish conquistadors, inadvertently brought the disease to the community without providing aid or support.

How quickly was the pandemic or epidemic resolved?

- The smallpox pandemic of 1520 was not resolved quickly, as the lack of immunity and effective treatments led to high mortality rates and ongoing outbreaks for several years.

What was the death toll of this pandemic/epidemic?

- Smallpox had devastating consequences for the people of Mexico-Tenochtitlan and other indigenous communities across the Americas. The disease spread rapidly, causing widespread illness and death. The lack of immunity and effective treatments led to high mortality rates, contributing to the collapse of the Aztec Empire.
- The exact death toll of the smallpox pandemic in Mexico-Tenochtitlán is difficult to determine, but it is estimated to have been devastating, resulting in the loss of a significant portion of the population.

What global actions do you believe should have been taken?

- In hindsight, implementing strict quarantine measures and restricting contact with infected individuals could have potentially slowed the spread of the disease.
- Educating communities about disease prevention and the importance of hygiene could have had a positive impact.

Has the disease that caused this pandemic been eradicated yet?

- Smallpox was eventually eradicated in 1980, making it the first disease to ever be eradicated. The elimination of smallpox is largely due to a massive global vaccination campaign that began in 1959.

Why is health unity across nations important during outbreaks or pandemics?

- Health unity across nations is crucial during outbreaks or pandemics as diseases do not respect borders.
- Cooperation and collaboration among nations can help in sharing knowledge, resources, and expertise to mitigate the spread of diseases and minimize their impact on global health.

Follow-up: Class Discussion Questions

- Reflecting on the smallpox pandemic in Mexico-Tenochtitlán, what lessons can we draw regarding the devastating impact of diseases introduced to populations with no prior exposure or immunity? How can we apply these lessons to current global health challenges?
- Considering the efforts made by the community to prevent the spread of the disease, what factors contributed to their limited effectiveness? How does this highlight the importance of early detection, preparedness, and access to healthcare resources in combating pandemics?
- Consider the cultural and economic ramifications of the smallpox pandemic on Mexico-Tenochtitlán. How did the loss of a significant portion of the population impact social structures, religious practices, and economic systems? In what ways can a pandemic shape the trajectory of a civilization or community?

Group #2: Yunnan, China (1855, Bubonic Plague)

Summary of Details

Provide general information about your group's community, including basic details about the history, economy, and overall health of the community prior to the pandemic.

- Yunnan, China, is a region with a rich history and diverse ethnic groups.
- The community has a long-standing agricultural tradition, known for its tea production, mining, and trade routes.
- Overall health conditions varied within the community, with access to healthcare and sanitation facilities differing across regions and social classes.

What pandemic/epidemic started in your group's community? How was it introduced?

- The bubonic plague, also known as the Black Death, is believed to have made its way to Yunnan, China in 1855 through international trade routes and movement of people. Yunnan, being a region with a rich history and diverse ethnic groups, was a hub for trade and commerce.

How did the disease spread (i.e., mode of transmission)?

- During the 19th century, trade routes connected Yunnan with other parts of China and neighboring countries. These routes facilitated the movement of goods, including rats that carried infected fleas, which were the primary vectors of the disease. It is believed that infected rats carrying the bacterium *Yersinia pestis*, the causative agent of the bubonic plague, traveled along these trade routes.
- Additionally, the movement of people, such as traders, travelers, and laborers, played a role in the spread of the disease. Infected individuals, either showing symptoms or acting as carriers, could have introduced the disease to Yunnan through their travels.
- Once the bubonic plague reached Yunnan, it spread within the local population through flea bites and human-to-human transmission, particularly in crowded and unsanitary conditions. The lack of understanding about the disease and limited medical knowledge at the time further exacerbated its spread.

Summary of Details, Continued (Bubonic Plague: Yunnan, China)

What efforts did the community make to prevent the spread of the disease, and what impact did that have on global health?

- The community implemented quarantine measures and isolated infected individuals.
- Strict regulations were enforced to control the movement of people and goods.
- These efforts helped contain the spread within the community, but the impact on global health was limited due to the lack of interconnectedness at the time.

What impact did those efforts have on the community's economy and culture?

- The outbreak severely impacted the community's economy, as trade routes were disrupted and fear of contagion led to reduced economic activity.
- Social and cultural practices also changed, with increased focus on hygiene and disease prevention.

Did other nations/communities/global health organizations provide aid? If so, how far into the pandemic did they provide support?

- During this time, international aid and global health organizations as we know them today did not exist.
- However, neighboring regions and communities might have provided some support, but the extent and timing of aid are unclear.

How quickly was the pandemic or epidemic resolved?

- The bubonic plague outbreak in Yunnan was eventually contained, but the exact timeline of its resolution is not specified.

What was the death toll of this pandemic/epidemic?

- During this time, international aid and global health organizations as we know them today did not exist. However, neighboring regions and communities might have provided some support, but the extent and timing of aid are unclear.

What global actions do you believe should have been taken?

- International cooperation in sharing information, resources, and expertise could have facilitated a more coordinated response to the outbreak.
- Improved surveillance and early detection systems could have helped identify and contain the disease more effectively.

Has the disease that caused this pandemic been eradicated yet?

- Bubonic plague has still not been eradicated, and continues to exist in certain regions of the world particularly in parts of Africa, Asia, and the Americas. While modern medical advancements and public health measures have significantly reduced the impact and spread of bubonic plague, occasional outbreaks still occur. Prompt diagnosis, appropriate treatment with antibiotics, and effective control measures, such as rodent control and insecticide use, have helped manage the disease. Surveillance systems are in place to detect and respond to cases promptly to prevent large-scale outbreaks.

Summary of Details, Continued (Bubonic Plague: Yunnan, China)

Why is health unity across nations important during outbreaks or pandemics?

- Health unity across nations is crucial during outbreaks or pandemics because diseases can easily spread across borders
- Collaborative efforts enable countries to share knowledge, resources, and support to prevent and control the spread of diseases, ultimately protecting global health and well-being.

Follow-up: Class Discussion Questions

- Reflecting on the bubonic plague outbreak in Yunnan, China, what factors contributed to the spread of the disease and the difficulties in containing it? How can we apply these lessons to current efforts in preventing and controlling infectious diseases?
- Discuss the economic and social impact of the bubonic plague outbreak on the community of Yunnan. How did the disruption of trade routes and fear of contagion affect the local economy and cultural practices? In what ways can a pandemic reshape the dynamics of a region or community?
- Discuss the economic and social impact of the bubonic plague outbreak on the community of Yunnan. How did the disruption of trade routes and fear of contagion affect the local economy and cultural practices? In what ways can a pandemic reshape the dynamics of a region or community?

Group #3: Camp Funston, Kansas (1918, Influenza/“Spanish Flu”)

Summary of Details

Provide general information about your group’s community, including basic details about the history, economy, and overall health of the community prior to the pandemic.

- During World War I, Camp Funston was a training facility in Kansas for soldiers, and it housed a large number of troops.
- The community had a significant impact on the local economy, with increased employment opportunities and economic growth due to the presence of the camp.
- Overall health conditions varied, with a focus on military health and fitness standards.

What pandemic/epidemic started in your group’s community? How was it introduced?

- The 1918 Influenza pandemic is believed to have originated from a natural reservoir, potentially in birds or other animals. However, it is challenging to trace the specific source of introduction to Camp Funston or any specific location.
- During World War I, Camp Funston was a training facility for soldiers, and it housed a large number of troops. Given the movement of soldiers from various parts of the country and even internationally, it is believed that the strain of influenza was likely introduced to Camp Funston through infected individuals who arrived at the camp.

Summary of Details, Continued (Influenza: Camp Funston, Kansas)

- The 1918 influenza pandemic is often referred to as the "Spanish flu" because Spain was one of the first countries to openly report on the severity of the outbreak. During World War I, many countries involved in the conflict had strict censorship measures in place to control the spread of information that could affect morale. However, Spain, a neutral country during the war, did not have such restrictions and freely reported on the illness, including its impact on the population. As a result, news of the flu outbreak became widely known as the "Spanish flu," despite the fact that the virus did not originate in Spain. The misnomer highlights the role of reporting and media influence in shaping public perception and the naming of historical events.

How did the disease spread (i.e., mode of transmission)?

- The 1918 influenza was primarily spread through respiratory droplets when an infected person coughed, sneezed, or talked.
- Rapid spread of the virus was facilitated by the global movement of military personnel and subsequent transmission around the world

What impact did those efforts have on the community's economy and culture?

- The implementation of preventive measures, such as isolation and quarantine, disrupted the normal functioning of the community and had a negative impact on the local economy.
- Cultural practices, such as public gatherings and social events, were curtailed to minimize the risk of transmission.

What efforts did the community make to prevent the spread of the disease, and what impact did that have on global health?

- The community implemented measures such as isolation, quarantine, and social distancing to prevent the spread of the disease.

Did other nations/communities/global health organizations provide aid? If so, how far into the pandemic did they provide support?

- During the 1918 influenza pandemic, global health organizations, as we know them today, did not exist.
- Aid and support from other nations and communities were limited, as the pandemic affected multiple regions simultaneously, leaving little capacity for assistance.

How quickly was the pandemic or epidemic resolved?

- The 1918 influenza pandemic resolved over time as the virus circulated and infected a significant portion of the population, eventually leading to the development of herd immunity.

Summary of Details, Continued (Influenza: Camp Funston, Kansas)

What was the death toll of this pandemic/epidemic?

- It is estimated that the influenza pandemic infected approximately one-third of the global population and caused the deaths of tens of millions of people. The exact number of deaths attributed to the 1918 Influenza pandemic is difficult to determine due to limited data and varying reporting practices at the time. However, estimates range from 20 million to 50 million deaths, with some estimates going as high as 100 million.
- This far surpassed the death toll of World War I, which resulted in an estimated 17 million to 20 million military and civilian deaths.
- It is important to note that the 1918 Influenza pandemic affected people of all ages, whereas World War I primarily impacted the military-aged population. The high mortality rate of the influenza pandemic, particularly among young adults, made it one of the deadliest pandemics in human history.

What global actions do you believe should have been taken?

- Improved global coordination and sharing of information about the virus, its transmission, and effective containment strategies could have helped minimize the impact of the pandemic.
- Stronger international collaboration in research and vaccine development could have accelerated the availability of effective vaccines.

Has the disease that caused this pandemic been eradicated yet?

- The H1N1 influenza virus has continued to circulate and evolve since the 1918 pandemic. It is still one of the seasonal influenza strains that cause seasonal flu outbreaks around the world. However, the H1N1 strain has undergone significant genetic changes over the years, resulting in different subtypes and variations.
- Efforts to control the spread of influenza primarily involve annual influenza vaccinations, which are formulated based on predictions of the most prevalent strains for each flu season. The vaccines provide protection against specific strains of the influenza virus, including various H1N1 subtypes that have emerged since the 1918 pandemic.

Why is health unity across nations important during outbreaks or pandemics?

- Health unity across nations is crucial during outbreaks or pandemics because diseases can easily cross borders and impact global populations.
- Cooperation and collaboration among nations are vital for sharing resources, expertise, and best practices to control the spread of diseases, minimize mortality, and protect global health security.

Follow-up: Class Discussion Questions

- Reflecting on the Influenza pandemic that started at Camp Funston, Kansas, what factors contributed to the rapid spread of the virus within the military camp? How might crowded living conditions, close contact, and troop movements have facilitated the transmission of the disease?
- Discuss the impact of preventive measures, such as isolation, quarantine, and social distancing, on the local community and the effectiveness of these measures in containing the spread of the influenza virus. How might the balance between public health measures and economic and social disruptions be achieved during a pandemic?
- Consider the global response to the 1918 Influenza pandemic. How did the lack of global health organizations and limited international aid impact the ability to control and mitigate the spread of the disease? What lessons can we learn from this historical context in terms of the importance of global cooperation and preparedness in responding to future pandemics?