

LESSON PLAN

PATIENT ZERO

Solving the Mysteries of Deadly Epidemics

by Marilee Peters

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Genre: middle grade non-fiction

Themes: public health, history of science, diseases and illnesses, biology, epidemiology, problem solving, the scientific method

Suitable for: Grades 5–9, Ages 10–14

Guided Reading Level: Fountas and Pinnell W

Lexile: 1080L

Common Core standards: W.6.1,1a,1b,1c,1d,1e,2,2a,2b,2c,2d,2e,2f,4,5,6,7,8,9b,10
RI.6.1,2,3,4,5,6,7,8,9
L.6.1,1a,2,2a,2b,3,3a,3b,4,4a,4b,4c,4d,5,5b,5c,6
SL.6.1,1a,1b,1c,1d,1e, 2,3,4,5,6

Summary:

Engrossing true stories of the pioneers of epidemiology who risked their lives to find the source of deadly diseases—now revised to include updated information and a new chapter on Covid-19.

More people have died in disease epidemics than in wars or other disasters, but the process of identifying these diseases and determining how they spread is often a terrifying gamble. Epidemiologists have been ignored, mocked, or silenced all while trying to protect the population and identify “patient zero”—the first person to have contracted the disease, and a key piece in solving the epidemic puzzle.

Patient Zero tracks the gripping tales of eight epidemics and pandemics—how they started, how they spread, and the fight to stop them. This revised edition combines a brand-new design with updated information and features diseases such as Spanish influenza, Ebola, and AIDS, as well as a new chapter on Covid-19.

Using a guided inquiry approach, educators can use a variety of approaches and techniques that most appropriately fit with their students and their own teaching style.

BEFORE READING THE BOOK

These activities build the context, introduce the topic of the book, and establish prior knowledge and interest.

PART A: ENGAGE

VIDEOS

“How to Stop the Next Pandemic,” *The New York Times* (13:55) [linked here](#)

This video discusses how the human footprint, which increases in size through habitat destruction, loss of biodiversity, and wildlife trade, causes spillover events between humans and wildlife and increases the chance of pandemics occurring. The video also offers solutions of how to stop future pandemics from happening.

“The Coronavirus Explained & What You Should Do,” *Kurzgesagt in a Nutshell* (8:34) [linked here](#)

This video discusses how COVID-19 is transmitted and the importance of public health measures to slow down the rates of infection during a pandemic.

“The Side Effects of Vaccines—How High is the Risk?,” *Kurzgesagt in a Nutshell* (10:55) [linked here](#)

This video discusses how vaccines work and why vaccination programs are important.

“For the survivors of Ebola, the crisis isn’t over,” TedTalk by Soka Moses (13:55) [linked here](#)

Soka Moses discusses the stigmatization of a disease like Ebola and how it impacts patient care during and after infection. He also gives a personal account of the experiences of front-line health workers during the 2014 Ebola outbreak in Liberia.

NON-FICTION ARTICLE

Chandrashekhar, Vaishnavi. “From leprosy to COVID-19, how stigma makes it harder to fight epidemics.” *Science*, September 29, 2020. [linked here](#)

FICTIONAL SHORT STORY

Lord, Karen. “The Plague Doctors.” *Take Us to a Better Place*: January 21, 2020. Robert Wood Johnson Foundation, USA.

This fictional short story is written about a doctor’s account of trying to find a cure for her niece who is dying from a contagious disease during a pandemic. The story can be downloaded for free: [linked here](#)

DEBATE OR SUPPORTED OPINION PIECE

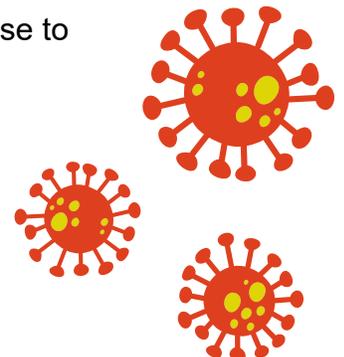
To engage students' understanding of outbreaks, epidemics, or pandemics, students can debate, write personal opinion pieces, or film themselves explaining their opinions using one of the following prompts:

1. Ultimately who is responsible for the spread of an outbreak, an epidemic, or a pandemic?
2. How does public behavior influence the spread of disease during an outbreak, an epidemic, or a pandemic?
3. Would you want to live in a world that limits your access to consumer goods in order to reduce the emergence of new infectious diseases? Why or why not?
4. Are you in favor of vaccination? Why or why not?
5. Would you let public health, family members, and/or friends know if you contracted a communicable disease? Why or why not?
6. Are simple practices like wearing masks, washing your hands, and sneezing into your arm to prevent the spread of bodily fluids effective public health measures in preventing the spread of disease?
7. Do you believe that your country's government should allocate more money towards public health?
8. Should the government require everyone in the country to be vaccinated?
9. How does unsupported information from various sources of media influence how the public behaves during a pandemic? Provide an example.
10. What preventative strategy shared via the media did you follow as part of your own response to the COVID-19 pandemic? What was your source for this strategy?

PART B: EXPLORE

Students can use a gallery walk or shared document to discuss some of important ideas covered in this book. To aid student discussion, educators can provide the prompts, images, questions, and videos discussed in Part A of this lesson plan. During the gallery walk or when referring to the shared document, students should be guided by these central focus questions:

1. How are bacterial or viral diseases transmitted?
2. How do public health measures reduce the spread of disease during a pandemic?
3. How does stigmatization influence public health measures and public response to diseases?



WHILE READING THE BOOK

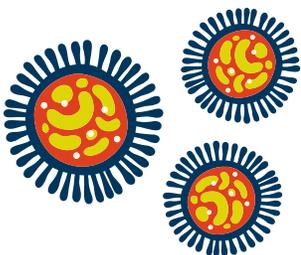
The questions below are based on information presented in each chapter. Educators are encouraged to select and assign questions during chapter readings that best support information that they want to emphasize in their classes. Students can then share their information with their classmates in a variety of formats (i.e., think pair share, jigsaw, four corners, etc.)

INTRODUCTION

1. During a pandemic, what do epidemiologists call the first patient to contract the disease?
How is this person referred to in pop culture? p. 2
2. What is a microbe and are all microbes “bad guys”? p. 3
3. How do viruses survive and make us sick? p. 3
4. What is a pandemic? p. 4

CHAPTER 1: A DEADLY YEAR | The Great Plague of London, 1655

1. What were the four humors and why did people prior to the 19th century believe that it was necessary to balance your humors? p. 12
Do some research: Is there any scientific justification for balancing the humors or was the practice just rooted in popular beliefs?
2. How was John Graunt’s detective work like the role of an epidemiologist? p. 14–16
3. What plague epidemics has the world also suffered from? p. 17
4. What is the sickly year theory and how was it used to predict a new outbreak? p. 18–20
5. King Charles II implemented social distancing to prevent the spread of plague. What social distancing measures did he implement? Compare these social distancing methods with those implemented by different countries to slow the spread of COVID-19. p. 21
6. Despite John Graunt’s ability to predict an upcoming plague, what were some questions that still needed answering? Why are his observations still important today? p. 22–23
7. What were some of the treatments used in 1665 to treat bubonic plague? p. 24–25
8. Where is the London plague believed to have originated? p. 26
9. How was the bubonic plague transmitted? What is the name of the scientist who is credited with the discovery of the bacteria that causes plague? p. 27–28
10. What other types of plague does *Yersinia pestis* cause? Which one is the deadliest and why?
How quickly do people have to be treated after they are infected? p. 30
11. Is the plague still feared today? Provide evidence of a modern outbreak of bubonic plague. p. 31
12. Do some research and write a fictitious diary account or news paper article about Londoners living during the 1665 plague.

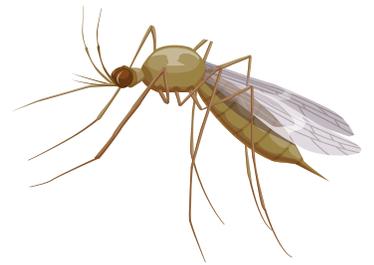


CHAPTER 2: PLOTTING A MYSTERY | The Soho Cholera Outbreak, 1854

1. What are some of the symptoms of cholera? p. 32–35
2. What were some methods that people in the 19th century used to treat cholera? How do we treat cholera today? p. 37
3. Based on the story, what were some of the problems with sewage treatment in Soho in 1854? p. 38
4. How does John Snow act as an epidemiologist? p. 39
5. Why are there some connections to public health measures and miasma? Why is miasma not the cause of cholera? p. 41
6. What simple fix put an end to the Broad Street outbreak? p. 44
7. What is “shoe-leather” epidemiology? p. 48
8. While cholera is often thought of as a disease of the past, it still re-emerges. What conditions have caused this disease to reappear and when has this occurred in recent history? p. 50–51

CHAPTER 3: DID THE MOSQUITO DO IT? | Yellow Fever in Cuba, 1900

1. What role did James Carroll and Jesse Lazear play in the investigation of yellow fever? What roles did Major Walter Reed and Aristides Agramonte play? p. 56
2. In 1900 there were three theories on the cause of yellow fever. What were these theories and which one(s) proved to be the cause? p. 57
3. What previous evidence led the scientists to test these causes? p. 66–67
4. Often called the “world’s deadliest animal,” mosquitos are known to transmit diseases. Which diseases are transmitted by mosquitoes and how many people become ill and die from mosquito borne infections each year? p. 63
5. What is the importance of medial ethics and patient consent? p. 65



Do some research and report about:

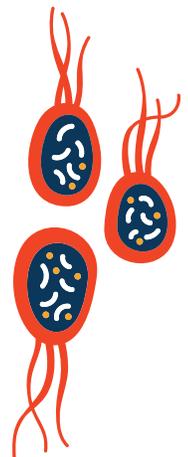
- Nazi experimentation during World War II
 - Syphilis Tuskegee experiments
 - Chancroid and Gonorrhea experiments in Guatemala
 - Hansen’s disease treatment on Indigenous populations in Australia and New Zealand
 - Other human experimental cases
6. The Clara Maass case on p. 68 is evidence of the risks of human experimentation. What are some things that are needed to ensure that patients are properly informed of the risks?
 7. Is yellow fever a disease of the past? p. 69
 8. What is one way that scientists are trying to eliminate yellow fever and other mosquito borne diseases? p. 69
 9. Do some research to learn more about vaccines and why are they so important in eliminating some of these deadly infections. During this current pandemic, development of COVID-19 vaccines and vaccination programs are important to halting the spread of illness. Make a case as if you were speaking to a person who is resistant to receiving vaccines. Use cases of historical vaccination programs to help make a public service announcement (PSA) or supported opinion paragraph.

CHAPTER 4: COOKING UP TROUBLE | Typhoid in New York, 1906

1. Why are some people afraid to disclose that they suspect or know that they have a disease? Why is it important for public health officials, doctors, and epidemiologist to ensure the public does not develop stigma against disease? p. 75, p. 86
2. What is an asymptomatic carrier? p. 76
3. Why is hand washing and sterilizing instruments important to preventing the spread of illness? p. 78
4. Why is critical to improve public health measures and prevent outbreaks? p. 81
5. How is typhoid transmitted? p. 82
6. Read p. 83–87 of this book and argue the point “What are the rights of the patient?”
7. What is a “superbug” and why might this pose a risk for the re-emergence of diseases? Provide evidence of cases where superbugs have caused outbreaks. p. 88

CHAPTER 5: WORLD VS. VIRUS | Spanish Influenza Pandemic, 1918–19

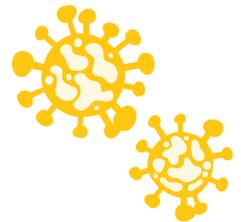
1. Why is it called the Spanish flu if its origins did not occur in Spain? What is the problem naming a disease in this way? p. 89–95, p. 164
2. How are viruses like the flu transmitted? p. 94, p. 101
3. Why was the Spanish flu so contagious and deadly? p. 103–104
4. What is antigenic shift or antigenic drift? p. 103–104
5. When were social distancing measures first realized to prevent illness even if no known treatment was available? What are some of the benefits and drawbacks of social distancing? p. 107–108
6. Do some research regarding viruses which are asymptomatic in animals but can sometimes jump to people. Rarer still is the jump of these zoonotic viruses from human to human which can lead to an epidemic or pandemic. Based on cases in history, how and why were these viruses able to transmit from animal hosts to humans and then make a further jump to be transmissible in human populations? Why are these zoonotic diseases so deadly?



CHAPTER 6: MYSTERY IN THE JUNGLE | Ebola in Zaire, 1976

1. How does a virus differ from bacteria? How does treatment of viral infection differ from treatment of bacterial infection? p. 117
2. How does public behavior aid or hinder the spread of epidemics? Examine the case in Zaire (now the Democratic Republic of Congo) and make a case for other human epidemics, including COVID-19. p. 119
3. Why is qualitative observation just as important as quantitative research when it comes to understanding the spread of disease? p. 120
4. What are Koch’s Postulates and how are they important in identifying diseases? p. 122

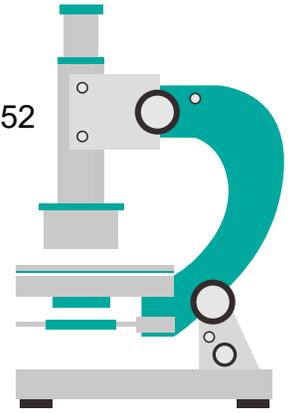
5. What is a disease reservoir? Why do some emergent diseases like Ebola still cause epidemics? p. 124
6. Do some research to find out the mortality rate is for Ebola Why are public health officials concerned about the mortality rates of infections when implementing measures to stop an outbreak? p. 125
7. Are all strains of Ebola dangerous to humans? Do some research to determine what makes one strain of Ebola lethal and another strain benign. p. 125
8. What are biosafety levels? Who can work with strains of diseases with different biosafety levels? p. 126
9. Research to find out why are some animals able to become viral reservoirs without getting sick. p. 128
 - bats
 - rats
 - birds
 - pigs
10. Why is an ecosystem approach important in understanding the spread of new emergent diseases? p. 128
11. How are front-line healthcare workers put at risk during a disease outbreak or pandemic? p. 129
12. What are some of the weather conditions that were believed to be responsible for the spread of Ebola? p. 130



CHAPTER 7: THE NEW PLAGUE | AIDS Pandemic, 1980

1. How did Dr. Gottlieb and Dr. Shandera act as epidemiologists? p. 132–140
2. Why were hemophiliacs also being diagnosed with or at risk of getting HIV/AIDS? What did that indicate about how this pathogen was transmitted? p. 142
3. What were some of the stigmas surrounding HIV/AIDS and why was the cause or awareness of this disease kept silent? How did this group of people ensure that there was funding to help victims of this disease? p. 143–151
4. Why was the term “patient zero” adopted? Why was this patient made the villain of the disease? p. 145
5. Why did stigmatization and prejudice slow progress to getting infections under control? How many people had died before the US government decided to acknowledge the disease? p. 146
6. Do some research: When were the first cases of HIV/AIDS reported North America before it became widespread in the late 1970s and 1980s?
7. Read the case “Discovering the Virus.” How is this relevant to current vaccine development for COVID-19? p. 147
8. What are some support systems needed to help people with HIV/AIDS here and abroad? p. 148

9. How will the COVID-19 pandemic impact HIV patients? p. 150
10. How is it currently believed that HIV made the jump from apes to humans? p. 152
11. Research to find out if chimpanzees get the same illness from simian immunodeficiency virus (SIV). Is this the reservoir of HIV? If not, where is HIV believed to have originated? p. 152
12. Do some research: Do all people who get infected with HIV go on to develop AIDS? Cite specific case studies.
13. Through research, explain the lifecycle of HIV infection.



CHAPTER 8: A WAKEUP CALL TO THE WORLD | COVID-19 Pandemic, 2020–21

1. What was sudden acute respiratory syndrome (SARS) and how were its symptoms similar to COVID-19? p. 155
2. Who was Dr. Li Wenliang and how did he act like an epidemiologist? p. 155
3. What was the believed cause of COVID-19 and why was it linked to a Wuhan seafood market? p. 156
4. Why was SARS easier to stop than COVID-19? p. 162
5. What mechanisms were already in place in 2020 that made identification of this virus and viral response more rapid than other past pandemics? p. 162
6. Read “Tools of the Trade: Staying Ahead of the Curve.” What type of outbreak is COVID-19? p. 163
7. Read “A Science Fair Project to Close Schools.” How have governments around the world decided whether or not to close schools? What has influenced their decisions? p. 167
8. What is turbo-charging? Was turbo charged monitoring adopted in your area during the COVID-19 pandemic? p. 170
9. How is COVID-19 transmitted? p. 171
10. What is a super spreader? p. 172
11. Do some research: Have Indigenous methods to protect people during the COVID-19 pandemic been successful? p. 175



AFTER READING THE BOOK

These activities inspire continued reflection and response to the text, bring conclusion to the experience of reading this text, and stimulate further extensions.

PART C: EXPLAIN

1. Watch the video [Zombie Preparedness for Educators](#). As educator, choose one of the activities outlined in Disease Detectives and Emergency Response on this website. Ask students how the zombie apocalypse activities like tracking disease transmission and emergency preparedness compare to public health response during an actual pandemic.
2. Ask students: Given the state of the world right now, what do you think is the single most important priority or method for flattening the COVID-19 pandemic curve?
3. Ask students to make a case for public health measures like hand washing, sterilizing, mask wearing, or using mosquito nets and bug repellent to prevent the spread of contagious diseases.

PART D: ELABORATE PANDEMICS AND FICTION

Pandemics are frequently featured in media and popular culture. A list of young adult books on this topic is available for download [here](#). Get your students to point out discrepancies between fiction and science in these novels.

WOMEN IN SCIENCE

Chapter 4 covers the story of Dr. Josephine Baker and her contributions to public health policy in response to typhoid. Who are some other notable women who also made contributions to public health? In a poster, video, infographic, or podcast, ask students to outline their contributions.

STIGMATIZATION

How has stigmatization hindered public measures for various pandemics? Research how political, social, and economic stigmatization during various pandemics shaped their public health response measures. Present your information in a poster, video, infographic, or podcast.

SURVIVORS OF EPIDEMICS

Who survives Ebola? Read over survivor stories and discuss some of the testimonials found [here](#). Important discussion topics include stigmatization, healthcare, disability, mental health, and the economic impact of Ebola on survivors.

Media and Myth Busting

A term coined prior to this pandemic was “fake news.” What “fake news” have you heard about this virus and why it is difficult to convince someone if they believe news that has no evidential support? Find a news article or a video report and debunk its message by showing where its claims contradict scientific evidence.

IMPORTANCE OF CELEBRITY AND DISEASE AWARENESS

For good or ill, discuss how celebrities have influenced the public awareness and public acceptance of various diseases. Share your work with the class in gallery walk using a format of your choice.

PUBLIC HEALTH POLICY

Based on your country’s current response to COVID-19, how should current public health measures be changed to lessen the social, political, and economic impacts of these diseases? Are there other countries that were more successful at slowing this pandemic and what were their public health measures? How do they compare to your country’s choices?

PART E: EVALUATE

It is critical for students to reflect on the economic, social, and political implications of pandemics. As an educator, you can use the following prompts to guide student reflection:

- Name one of the major themes of *Patient Zero*. What evidence from the book supports this theme?
- What was one major economic, social, or political implication of diseases and pandemics that you learned while reading this book? Does this have relevance to your own life? How or how not?
- After reading this book, reflect on your initial supported opinion piece that you wrote or your initial debates before beginning the book. Has your opinion stayed the same or has it changed after reading *Patient Zero*? Explain your answer with evidence from the book.

