

EVIDENCE!

HOW DR. JOHN SNOW SOLVED THE MYSTERY OF CHOLERA

EDUCATORS' GUIDE

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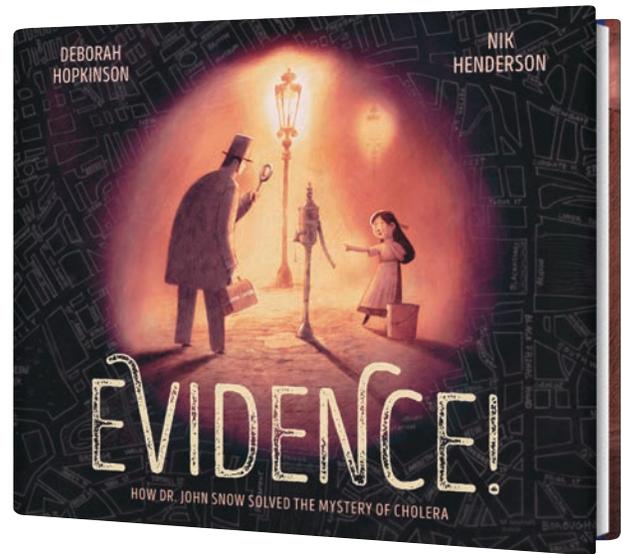
ABOUT THE BOOK

Dr. John Snow, a once humble community doctor, emerged as one of the most influential figures in Western medicine. His rise to fame was not the result of chance but a testament to his determination to solve a mystery that had plagued his community.

In nineteenth-century London, the spread of cholera was as unstoppable as it was deadly. Dr. Snow was determined to impede it, but he had a problem: His best theory of how cholera spread flew in the face of popular opinion. He needed evidence and fast before more lives were lost.

As detective and doctor, Dr. Snow knocked on doors, asked questions, and mapped out the data he'd collected. What he discovered would come to define how we think about public health today.

This compelling nonfiction picture book is a timely reminder of the power of science to save lives.



Themes: Biography, Science & Nature, Nonfiction

ABOUT THE AUTHOR AND ILLUSTRATOR

Author photo © Deborah Willes



Deborah Hopkinson is the author of many highly acclaimed picture books, including *A Letter to My Teacher*, which received two starred reviews, and the modern classic *Sweet Clara and the Freedom Quilt*,

which the *New York Times* called “inspiring.” Her other books include *Sky Boys: How They Built the Empire State Building*, a *Boston Globe-Horn Book* Honor Book; and *Abe Lincoln Crosses a Creek: A Tall, Thin Tale*, an ALA-ALSC Notable Children’s Book. Visit her online at deborahhopkinson.com.



Nik Henderson was raised in Strafford, Missouri, where he still lives. He studied illustration at the Savannah College of Art and Design in Savannah, Georgia. He is the illustrator of *Trucks on Trucks*

by Sorche Fairbank, which *Booklist* praised for its “eye-catching” art. *Evidence!* is his second picture book. Find him on Instagram at [@henderson_nik](https://www.instagram.com/henderson_nik).



PRE-READING ACTIVITIES



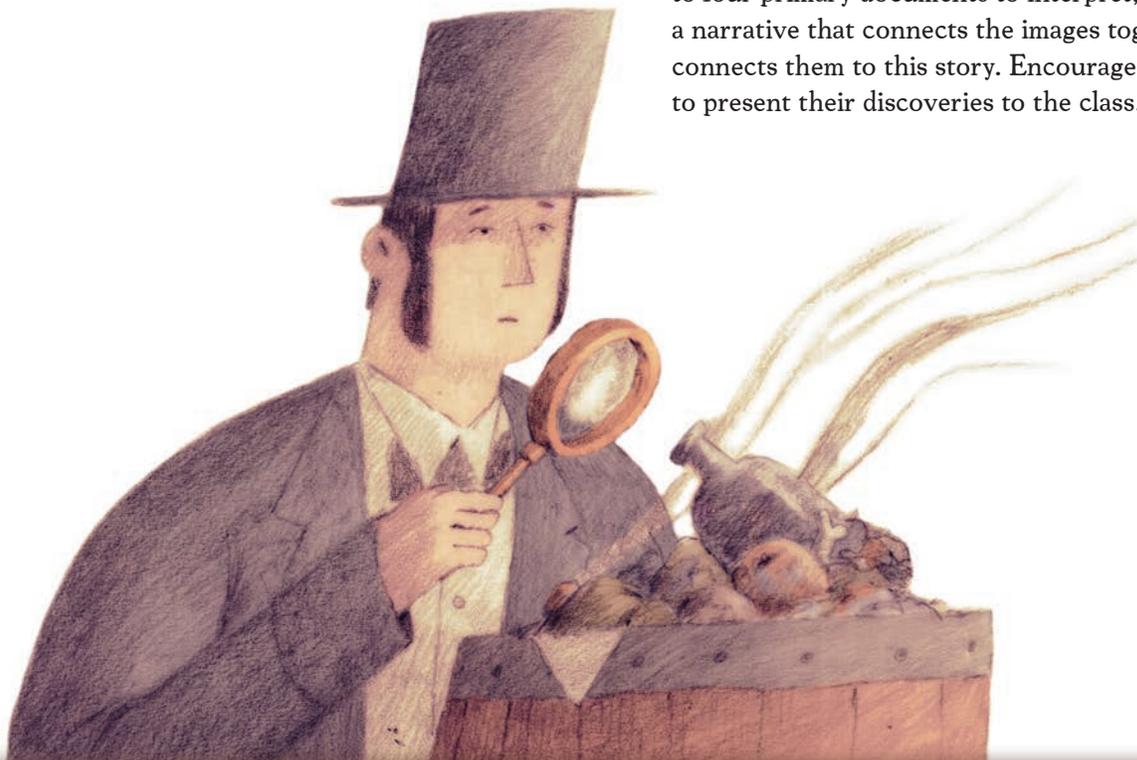
1. *Evidence! How Dr. John Snow Solved the Mystery of Cholera* is a nonfiction picture book, meaning it's a true story about real people and actual events. Are you familiar with the words *evidence* and *cholera*? Take a moment to look up their meaning if those words are unfamiliar. Based on the title and the subtitle of the story, does this book remind you of any other books you may have read? What connections can you make to other stories, real or imagined?
2. Read the description of the book inside the front cover; it offers a summary of the book. Now that you've read this description, what questions do you have about the story before you begin reading? What questions do you predict the book will answer?

READING ACTIVITIES & DISCUSSION QUESTIONS

1. This book is a bit of a chameleon in that it is an informational text with elements that appeal to fans of various subjects, including picture book biographies, science, history, and more. What themes can you identify in *Evidence!* as you read, and what literary genres do you see represented in the subject matter?
2. Examine the cover of *Evidence!* If your copy allows you to do so, remove the dust jacket so that you can examine the book's case cover hidden beneath. (A case cover is also known sometimes as a hard case or case wrap.) What can we learn from the case cover of this book? Where else do you see similar imagery in *Evidence!*, and how does this particular image of "hot, stinky old London" set the stage for your reading?
3. Author Deborah Hopkinson's writing style in *Evidence!* is matter-of-fact, succinct, and methodically paced.
 - a. Notice the difference in Hopkinson's phrasing when she states a research-proven fact (evidence!) as opposed to when she makes a conjecture or theory in the text. Why is this distinction important?
 - b. Also notice the use of italicized, bolded phrases in the text; what is the author signaling to the reader with this change in the font?
 - c. Hopkinson uses some evocative language to set the scene. "Factories spew yellow smoke" and the cholera outbreak is "bubbling up like blisters." Flag your favorite descriptive phrases and picture these vivid moments in your mind's eye as you read.
4. In picture books, the interaction between the art and the text helps to tell the story. Let's look more closely at Nik Henderson's artwork.
 - a. What words would you use to describe Henderson's illustrative style?
 - b. What materials did he use to create the artwork? (Hint: Check the copyright page!)
 - c. As you look at the artwork in the book, how does it make you *feel*?
 - d. How would you describe the way the palette, or the colors that Henderson chose to use in his illustrations, conveys a range of emotions including worry, confusion, and hope?
 - e. Take turns focusing on different elements—the portraiture (people's faces), the cityscapes, the light, and the way Henderson shows sickness and smog. Consider the different perspectives, or angles, from which Henderson presents his subjects. Why might an illustrator change colors or shift focus as the story progresses?

READING ACTIVITIES & DISCUSSION QUESTIONS CONTINUED

5. Dr. John Snow collected evidence and used the scientific method to prove his hypothesis that cholera is spread by something other than “bad, smelly air.” Are you familiar with the scientific method? What steps does it entail? What steps of the scientific method do we see Dr. Snow use in *Evidence!*?
 - a. Hopkinson refers to Dr. Snow as “a medical detective.” How would you compare or contrast the work of a medical detective with that of a research scientist? Create a Venn diagram to chart characteristics of the two investigative approaches.
 - b. The community’s decision-making “committee isn’t sure John’s right. But his idea is their only hope.” What do you see as the relationship between hope and reason? Do you think that relationship might change during high-stress moments, such as during an outbreak?
 - c. Much of Snow’s work depended on accurate record-keeping, such as his ability to find a death record for Hampstead resident Susannah Eley at the London records office. What resources might a modern-day forensics investigation have at its disposal, and how might that change the medical response to an outbreak?
6. Snow was trying to prove the existence of something no one in his community could see. What a challenge that must’ve been! Would you have believed him? What sort of evidence do you think it would’ve taken for Snow to convince you to remove the handle from the Broad Street pump? Think of Snow’s work as a lesson in open-mindedness. Journal privately about this mentality, and ways in which you think it’s a personality trait that does or doesn’t manifest in your academic or personal life.
7. The Broad Street pump saw some things. Rewrite a critical scene or create a one-page graphic story detailing this cholera outbreak from the pump’s perspective.
8. Thorough research is a critical part of writing a reliable informational text. Encourage readers to examine the author’s backmatter while they evaluate this text. What source notes does Hopkinson offer readers in *Evidence!*? Invite students to explore those resources, then spend some time researching primary sources, perhaps at the British Library or the Library of Congress (you can use their websites), for evidence of cholera through the years or images from London, England, in the 1850s. In small groups, select two to four primary documents to interpret, and offer a narrative that connects the images together or connects them to this story. Encourage students to present their discoveries to the class.



VOCABULARY BUILDER

As you read *Evidence!*, create a list of unfamiliar words you encounter. Can you infer the meaning of those words from their context? Use a dictionary to look up their definitions. This word list might include:

Cholera _____

Spew _____

Cesspool _____

Outbreak _____

EXTENSION ACTIVITIES

1. Dr. John Snow's microscope was not strong enough for him to see cholera in the water sample he took from the Broad Street pump, but microscopes have come a long way since 1854!

Those curious about the developmental history of microscopes might research Dutch microbiologist Antonie van Leeuwenhoek, the first scientist to observe bacteria.

What do you predict the bacterium will look like when you examine it up close? Find a microscopic image of *Vibrio cholerae* and sketch what you see. How does the actual image compare to the one in your imagination?

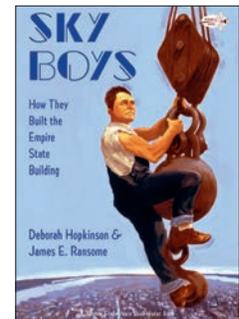
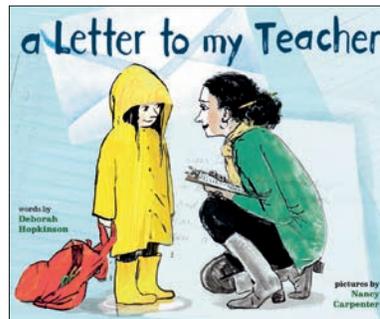
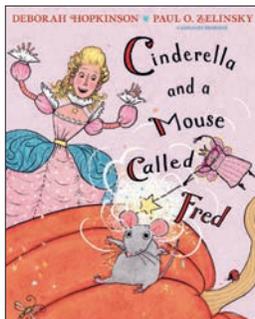
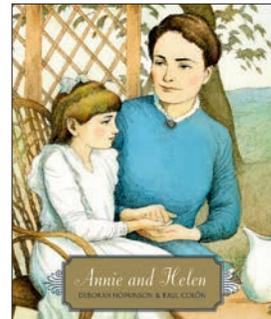
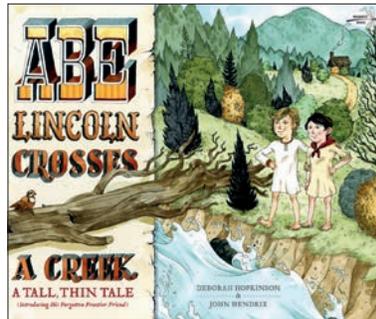
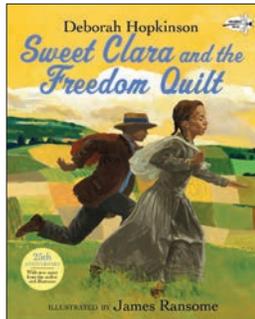
2. This mystery takes place in London in 1854, but cholera outbreaks still occur around the world today. Consult the [World Health Organization \(WHO\)](#) for data about more recent cholera cases. What can you learn about recent developments in cholera treatment? What lingering questions do you have about cholera?
3. Take a virtual trip to visit the Broad Street pump online! The pump still stands and, believe it or not, it is quite a tourist attraction. Use Google Earth to find its location, or visit, for example, the pump's [Trip Advisor](#) page.
4. This book is written in a style known as narrative nonfiction. Narrative nonfiction typically reads like a fictional story; it is a type of nonfiction writing that's particularly effective at helping readers understand a past time and place. Research other types of nonfiction, focusing on the five types of nonfiction identified by science writer [Melissa Stewart](#).
5. Let's get gross: Poop plays a big part in John Snow's discovery! Annie Lewis lives in a home with twenty people and no indoor toilets, and her baby sister's dirty diapers were to blame for the Broad Street cholera outbreak. What do you know about the history of toilets, sewage,

and plumbing? A few years after the handle was removed from the Broad Street pump, an engineer named Joseph Bazalgette helped the city of London take major steps forward in public health and hygiene. What can you learn about Bazalgette's work? Have students pair off and assume the identity of either Snow or Bazalgette to stage an imaginary conversation between the two men.

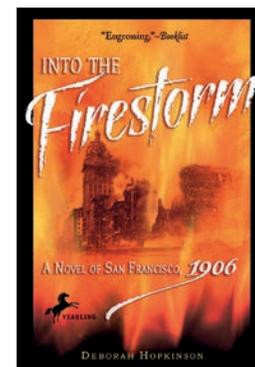
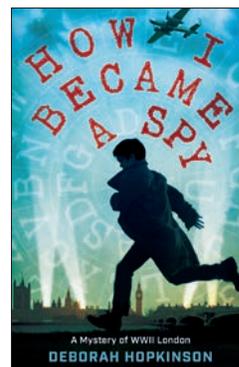
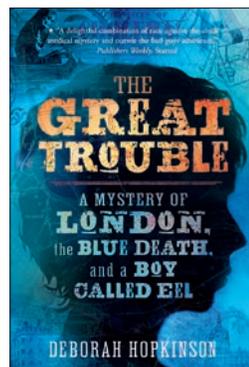
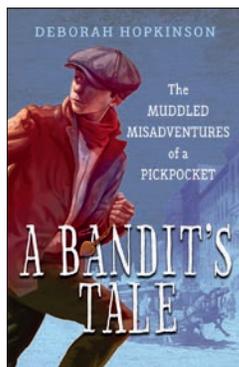
6. Spreading diseases can be categorized as *epidemics* or *pandemics* and can become endemic. These words sound a lot alike; what does each mean from a public health standpoint? Revisit *Evidence!* to find indications of how the Broad Street cholera outbreak might have been categorized. (Adults may find this [article from the Columbia University Mailman School of Public Health](#) helpful in guiding a conversation.)
7. The handle was removed from the Broad Street pump on Friday, September 8, 1854. What other notable events in history occurred on that day? Create a timeline of significant events that might include the unveiling of Michaelangelo's statue of *David*, the Galveston hurricane of 1900, or the release of the first iPhone on June 29, 2007. How do you think Snow's "milestone in science" compares in historical memory to these other events? Other events on that date may be more widely known, but how would you compare this milestone in terms of its historical significance? Visit [This Day in History](#) for suggestions.
8. Hopkinson's backmatter includes a list of "Major Infectious Diseases and their Causes." Poll students on their familiarity with these diseases. Work as a group to map the global prevalence of these diseases over time. Break this list of diseases down into categories based on their similarities and differences; look at, for example, vectors, survival rates, treatment methods, availability of vaccines, etc.

EXPLORE MORE BOOKS BY DEBORAH HOPKINSON

PICTURE BOOKS



MIDDLE GRADE



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